Komoditas : Kopi
Tahun 2004-2008 (355 judul)

Monika Mueller, Alois Jungbauer, Culinary plants, herbs and spices - A rich source of PPAR[gamma] ligands, Food Chemistry, Volume 117, Issue 4, 15 December 2009, Pages 660-667, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.04.063.
(http://www.sciencedirect.com/science/article/B6T6R-4W6XW2X-7/2/9ed5cb42710e57aa0c24c45b5f583cfe)
Abstract:
Obesity and the related disorders, diabetes, hypertension and hyperlipidemia have reached epidemic proportions world-wide. The influence of 70 plants, herbs and spices on peroxisome proliferators-activated receptor (PPAR)[gamma] activation or antagonism, a drug target for metabolic syndrome, was investigated. Approximately 50 different plant extracts bound PPAR[gamma] in competitive ligand binding assay, including pomegranate, apple, clove, cinnamon, thyme, green coffee, bilberry and bay leaves. Five plant extracts transactivated PPAR[gamma] in chimeric GAL4-PPAR[gamma]-LBD system: nutmeg, licorice, black pepper, holy basil and sage. Interestingly, nearly all plant extracts antagonized rosiglitazone-mediated coactivator recruitment in time resolved fluorescence resonance energy transfer coactivator assay. The five transactivating extracts may function as selective PPAR[gamma] modulators (SPPAR[gamma]Ms), and the other extracts seem to be moderate antagonists or undetectable/weak SPPAR[gamma]Ms. As SPPAR[gamma]Ms improve insulin resistance without weight gain and PPAR[gamma] antagonists exert antiobesity action, a combination of these plants in diet could reduce obesity and the incidence of metabolic syndrome.
Keywords: Obesity; PPAR[gamma]; Diabetes; Plants; SPPAR[gamma]Ms; PPAR[gamma]-antagonists

R. Dittrich, C. Dragonas, D. Kannenkeril, I. Hoffmann, A. Mueller, M.W. Beckmann, M. Pischetsrieder, A diet rich in Maillard reaction products protects LDL against copper induced oxidation ex vivo, a human intervention trial, Food Research International, Volume 42, Issue 9, November 2009, Pages 1315-1322, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.04.007.
(http://www.sciencedirect.com/science/article/B6T6V-4W2W5HH-4/2/50bf556e5104977ac0262f11e07ae0d4)
Abstract:
Maillard reaction products (MRPs) have antioxidative properties in vitro but the influence of a diet rich in MRPs on oxidative damage in vivo remains unknown.
In this study, the influence of thermally processed foods rich in MRPs on copper induced oxidation of human low-density lipoprotein (LDL) in vitro was examined. Moreover, oxidative resistance of LDL (OR) in blood plasma of eight healthy subjects was monitored, who consumed diets poor and rich in MRPs in weekly turn for 3 weeks.
Dark beer, bread crust, and roasted coffee led to a statistically significant increased OR in vitro compared to pale beer, bread crumb, and raw coffee. The consumption of a diet rich in MRPS significantly increased plasma OR compared to the diet poor in MRPs by 35.5%.
This study indicates that thermally processed foods rich in MRPs inhibit the LDL oxidation in vitro and have the ability to reduce oxidative modification of LDL in vivo.
Keywords: Beer; Coffee; Diet; LDL oxidation; Maillard reaction products

J. Refugio Lomeli-Flores, Juan F. Barrera, Julio S. Bernal, Impact of natural enemies on coffee leafminer Leucoptera coffeella (Lepidoptera: Lyonetiidae) population dynamics in Chiapas,

Mexico, Biological Control, Volume 51, Issue 1, October 2009, Pages 51-60, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.03.021.
(http://www.sciencedirect.com/science/article/B6WBP-4WHFD64-1/2/b26c3db5928fea1a7c93a6f733bde8b1)
Abstract:
Coffee leafminer, Leucoptera coffeella, is a pest in many New World coffee growing areas. Previous studies suggested that its population dynamics were strongly affected by natural enemies, particularly of larvae, and physical environmental conditions. Our study documented through field surveys and life table analyses (i) the natural enemy complex associated with coffee leafminer and (ii) the impacts of natural enemies on the population dynamics of coffee leafminer, on coffee (Coffea arabica) at two elevations and two rainfall levels in the Soconusco region of Chiapas, Mexico. Twenty-two larval parasitoid species (including 14 morphospecies) were collected. Egg and pupal parasitoids were not recovered. Life table analyses showed that parasitism contributed [less-than-or-equals, slant]10% of real mortality, and parasitism rates were 8-10-fold higher at the low (<550 m) versus high (>950 m) elevation; parasitism rates were similar under low (<100 mm) and high (>400 mm) rainfall. Seventeen predator species (including five morphospecies) were collected, of which most were ants (Formicidae, 14 species) that contributed >58% of real mortality. Life table analyses showed that predation rates were higher at high versus low elevation and under high versus low rainfall. Independently of elevation and rainfall, egg predation (likely by ants) was the most important source of indispensable mortality (range = 0.13-0.30), except at low elevation and high rainfall where pupal predation (=0.14) was similarly important. Also, predation was the main source of coffee leafminer larval and pupal mortality during a 13-month period in a low elevation coffee farm and was highest during the rainy season (>400 mm rainfall/month), when coffee leafminer prevalence was highest. Overall, predation of eggs and pupae (the latter particularly at low elevation), mostly by ants, were the most important sources of coffee leafminer mortality. Because ants were the main source of coffee leafminer egg and pupal mortality, their importance and potential role in coffee pest management strategies were discussed.
Keywords: Biological control; Life tables; Formicidae; Eulophidae; Braconidae; Predation; Parasitism; Coffea arabica

Sylwester Furmaniak, Artur P. Terzyk, Roman Golembiewski, Piotr A. Gauden, Leszek Czepirski, Searching the most optimal model of water sorption on foodstuffs in the whole range of relative humidity, Food Research International, Volume 42, Issue 8, October 2009, Pages 1203-1214, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.06.004.
(http://www.sciencedirect.com/science/article/B6T6V-4WH2KY3-1/2/c2ada3c24022f8821f52a24d75647f8d)
Abstract:
Water sorption on foodstuffs is very important in different areas of food science engineering. However, usually measured range of relative humidity covers only two of three stages of water sorption mechanism i.e. polymolecular sorption and capillary condensation. Since in this range different water sorption models can fit the experimental data well it is hard to decide which model is the most correct. In this study the results of water sorption isotherms measured from low humidity levels on marjoram, dill, granulated garlic, semolina, skim milk powder and ground coffee are reported. They are fitted by the most popular models applied in food science (i.e. proposed by: Halsey, Lewicki, Henderson, Chung and Pfost, Ferro Fontan et al. and Guggenheim, Anderson and de Boer (GAB)). We also extend the study to the newest models successfully applied in food engineering, i.e. the generalized D'Arcy and Watt model (GDW) and the approach of the cooperative multimolecular sorption (CMMS). Finally, we discuss the limits of the models at low humidity levels, the possibility of reduction to Henry's law and we show the advantages and

disadvantages of all approaches. It is concluded that among studied models the GDW equation seems to be the best for description of data in the whole range of relative humidity.
Keywords: Models testing; Water sorption isotherms; Food

Meike Brohan, Timon Huybrighs, Christine Wouters, Bart Van der Bruggen, Influence of storage conditions on aroma compounds in coffee pads using static headspace GC-MS, Food Chemistry, Volume 116, Issue 2, 15 September 2009, Pages 480-483, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.02.072.
(http://www.sciencedirect.com/science/article/B6T6R-4VR9FHR-3/2/29c68b748a3d352a1277db987255ca47)
Abstract:
Static headspace gas chromatography coupled to mass spectrometry (SHGC-MS) was used to identify aroma compounds in coffee pad powder. Based on the peak areas of these aroma compounds, the influence of the type of original package on the time of evolution was studied. Statistical ANOVA indicated that coffee pads which were individually packed and hermetically sealed lost less aroma compounds than did pads which were enclosed together in an open package. In addition, coffee pads from an open package were stored in closed plastic bottles at two different temperatures. Storing the pads at 4 [degree sign]C instead of keeping them at room temperature had a positive influence on the evolution of aroma compounds with time.
Keywords: Coffee pads; Coffee powder; Aroma compounds; Storage conditions; Static headspace; GC-MS

Luis Roberto Batista, Sara Maria Chalfoun, Cristina Ferreira Silva, Marcelo Cirillo, Eugenia Azevedo Varga, Rosane Freitas Schwan, Ochratoxin A in coffee beans (Coffea arabica L.) processed by dry and wet methods, Food Control, Volume 20, Issue 9, September 2009, Pages 784-790, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.10.003.
(http://www.sciencedirect.com/science/article/B6T6S-4TPF4CK-1/2/e07aa1b00ccd7ba49ccf9a95b2467a9f)
Abstract:
The incidence of ochratoxin A was studied in different coffee (Coffea arabica L.) samples. A higher incidence of filamentous fungi was observed in the coffee swept from ground and floating coffee samples. The species Aspergillus ochraceus, Aspergillus sulphureus and Aspergillus sclerotiorum were ochratoxin A producing. In 128 (44%) samples ochratoxin A was not detected; however, in 89 samples (31%), ochratoxin A was detected at 0.1-5.0 [mu]g/Kg levels. Other 25% samples presented contamination above 5.0 [mu]g/Kg. This study showed that the fractions coffee swept from ground and floating coffee represents a serious risk of ochratoxin A contamination.
Keywords: Ochratoxin A; Coffee; Aspergillus

Weihua Lai, Daniel Y.C. Fung, Xu Yang, Liu Renrong, Yonghua Xiong, Development of a colloidal gold strip for rapid detection of ochratoxin A with mimotope peptide, Food Control, Volume 20, Issue 9, September 2009, Pages 791-795, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2008.10.007.
(http://www.sciencedirect.com/science/article/B6T6S-4TTMJP1-1/2/91a74ea360e6a877928c281f7d198f6b)
Abstract:
Ochratoxin A (OTA), a mycotoxin mainly produced by some Aspergillus and Penicillium species, is found in cereals, coffee, wine, pork and grapes. The kidney and liver are the target organs of OTA, resulting in teratogenicity, carcinogenicity, and mutagenicity. To avoid the risk of OTA consumption, raw materials should be identified and removed from distribution. Current procedures for detection of OTA are time-consuming and involve sophisticated equipment. Furthermore, materials containing OTA is a biohazard for manufacturers and consumers. In this

study, a rapid, inexpensive, and user-friendly lateral flow strip assay ideally suited for on site testing of OTA was developed. Moreover, mimotope peptide capable of mimicking OTA by panning from a M13 phage-displayed random seven-peptide was used instead of OTA-protein conjugate. Ten ppb of OTA was detected in 10 min by this new strip. The results indicated that a rapid method without using the mycotoxin, but using mimotope peptides was developed to screen OTA; related methods also can be developed to screen other mycotoxins.
Keywords: Ochratoxin A; Strip; Mimotope peptide

Demirhan Citak, Mustafa Tuzen, Mustafa Soylak, Simultaneous coprecipitation of lead, cobalt, copper, cadmium, iron and nickel in food samples with zirconium(IV) hydroxide prior to their flame atomic absorption spectrometric determination, Food and Chemical Toxicology, Volume 47, Issue 9, September 2009, Pages 2302-2307, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.06.021.
(http://www.sciencedirect.com/science/article/B6T6P-4WJ3DXY-1/2/2e7c8968e9dc3cc6d807d6516cf45bee)
Abstract:
A simple and new coprecipitation procedure is developed for the determination of trace quantities of heavy metals (lead, cobalt, copper, cadmium, iron and nickel) in natural water and food samples. Analyte ions were coprecipitated by using zirconium(IV) hydroxide. The determination of metal levels was performed by flame atomic absorption spectrometry (FAAS). The influences of analytical parameters including pH, amount of zirconium(IV), sample volume, etc. were investigated on the recoveries of analyte ions. The effects of possible matrix ions were also examined. The recoveries of the analyte ions were in the range of 95-100%. Preconcentration factor was calculated as 25. The detection limits for the analyte ions based on 3 sigma (n = 21) were in the range of 0.27-2.50 [mu]g L-1. Relative standard deviation was found to be lower than 8%. The validation of the presented coprecipitation procedure was performed by the analysis certified reference materials (GBW 07605 Tea and LGC 6010 Hard drinking water). The procedure was successfully applied to natural waters and food samples like coffee, fish, tobacco, black and green tea.
Keywords: Heavy metals; Zirconium(IV) hydroxide; Preconcentration; Coprecipitation; Atomic absorption spectrometry

Esayas Mendesil, Abush Tesfaye, The influence of weather on the seasonal incidence of coffee berry moth, Prophantis smaragdina (Butler), Journal of Asia-Pacific Entomology, Volume 12, Issue 3, September 2009, Pages 203-205, ISSN 1226-8615, DOI: 10.1016/j.aspen.2009.02.005.
(http://www.sciencedirect.com/science/article/B8JJN-4VPD6WP-1/2/3590f330144fc837a571451900775360)
Abstract:
The seasonal incidence of the coffee berry moth, Prophantis smaragdina (Butler) (Lepidoptera: Pyralidae), was investigated on Coffea arabica L. in Jimma, Ethiopia. Our results showed that; the coffee berry moth was present throughout the study period except during November and December. The average incidence was 24.5% and the peak incidence (61%) was in September. Multiple correlation analysis was used to estimate the strength of association between weather variables and the incidence of the pest, and stepwise (both forward and backward) regression analysis was used to select the best explanatory variable. There were strong associations among the explanatory weather variables, indicating the potential problem of multicollinearity in the regression analysis. Relative humidity had a highly significant regression coefficient of 2.228 and was selected in the stepwise regression analysis as the best explanatory variable. The results of the study can be used in designing an integrated pest management strategy against the coffee berry moth.
Keywords: Coffee; Coffee pest; Coffee berry moth; Incidence; Prophantis smaragdina

Joana Simoes, Fernando M. Nunes, Maria do Rosario M. Domingues, Manuel A. Coimbra, Structural features of partially acetylated coffee galactomannans presenting immunostimulatory activity, Carbohydrate Polymers, In Press, Accepted Manuscript, Available online 20 August 2009, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2009.08.020.
(http://www.sciencedirect.com/science/article/B6TFD-4X1YCGG-1/2/921f4bc329898d402e5994b6a4820f70)
Abstract:
The galactomannans purified from coffee infusions have been shown to present in vitro immunostimulatory activity on murine B- and T-lymphocytes. These properties have also been shown characteristic of the galactomannans recovered from coffee residue by strong alkali solutions and rendered soluble in water by partial acetylation. In this study, purified fractions of galactomannans with immunostimulatory activity obtained from coffee infusion and from coffee residue were compared according to their average molecular weight determined by size-exclusion chromatography on Sephacryl S300, glycosidic-linkage composition by methylation analysis, selective hydrolysis by an endo-(1-->4)-[beta]-d-mannanase, analysis of the resultant oligosaccharide profile by Bio-Gel P2 separation, and determination of the pattern of acetylation by electrospray tandem mass spectrometry (ESI-MS/MS). It was found that the galactomannans have a comparable molecular weight (90-110 kDa), and similar glycosidic linkage composition. However, the galactomannans from coffee residue were preferentially acetylated in the side chain residues whereas the galactomannans recovered from coffee infusions only had acetyl groups directly linked to the backbone residues. These results show that these polysaccharides that present comparable immunostimulatory properties have different acetylation patterns.
Keywords: Coffee; Mannan; Acetylation of polysaccharides; Mass spectrometry; Electrospray; Oligosaccharides

Jose Soares dos Santos, Maria Lucia Pires dos Santos, Melina Moreira Conti, Sabrina Novaes dos Santos, Elisabeth de Oliveira, Evaluation of some metals in Brazilian coffees cultivated during the process of conversion from conventional to organic agriculture, Food Chemistry, Volume 115, Issue 4, 15 August 2009, Pages 1405-1410, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.01.069.
(http://www.sciencedirect.com/science/article/B6T6R-4VH8B3V-2/2/6eb4fb80f62d03f7d7962abd48e85671)
Abstract:
The aim of this study was to evaluate the presence of nutrients and toxic elements in coffees cultivated during the process of conversion, on organic agriculture, in southwest Bahia, Brazil. Levels of the nutrients and toxic elements were determined in samples of soils and coffee tissues from two transitional organic farms by atomic absorption spectrometry (FAAS). The metals in soil samples were extracted by Mehlich1 and USEPA-3050 procedures. Coffee samples from both farms presented relatively high levels of Cd, Zn and Cu (0.75, 45.4 and 14.9 [mu]g g-1, respectively), but were still below the limits specified by the Brazilian Food Legislation. The application of statistical methods showed that this finding can be attributed to the addition of high amounts of organic matter during the flowering tree period which can act on the bioavailability of metal ions in soils.
Keywords: Principal component analysis; Organic coffee; Cluster analysis; Available metals in soil; Nutrients and toxic elements

Rita C. Alves, Susana Casal, M. Beatriz P.P. Oliveira, Tocopherols in espresso coffee: Analytical method development and validation, Food Chemistry, Volume 115, Issue 4, 15 August 2009, Pages 1549-1555, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.01.068.
(http://www.sciencedirect.com/science/article/B6T6R-4VH8B3V-1/2/e01a48df4ece3b88cc63c76156080194)

Abstract:
The present paper reports the development and validation of an analytical micro-method for tocopherols quantification in espresso coffee by normal-phase HPLC with fluorescence detection. The proposed method consists in a liquid-liquid extraction with n-hexane:ethyl acetate, followed by a clean-up with dimethylformamide to eliminate co-eluting interferences. The method showed good intra- and inter-day precisions (coefficient of variation < 6.5%), good accuracies (98 +/- 6%), and high correlation coefficients (r > 0.999) for standards subjected to the entire procedure. Only [alpha]- and [beta]-tocopherols were identified in the brews. The detection and quantification limits were 0.5 and 1.4 ng/ml, for [alpha]-tocopherol, and 0.4 and 1.1 ng/ml, for [beta]-tocopherol, respectively. A mean total tocopherol content ([alpha] + [beta]) of 3.5 +/- 0.9 [mu]g in commercial espresso coffee blends (30 ml) was detected. The proposed method requires low solvent consumption and proved to be sensitive, precise and accurate.
Keywords: Espresso coffee; Coffee brew; Tocopherols; Vitamin E; HPLC

Joni Valkila, Fair Trade organic coffee production in Nicaragua -- Sustainable development or a poverty trap?, Ecological Economics, In Press, Corrected Proof, Available online 7 August 2009, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2009.07.002.
(http://www.sciencedirect.com/science/article/B6VDY-4WY7PHD-1/2/a0c85a6015106bc28b9b4ba33a1ddb12)
Abstract:
This article assesses the impact of Fair Trade organic coffee production on the well-being of small-scale farmers in Nicaragua. Studying the results of organic management is crucial for evaluating the advantages of Fair Trade because approximately half of all Fair Trade coffee is also organically certified. A wide range of farmers, representatives of cooperatives and export companies in Nicaragua were interviewed during seven months of field work between 2005 and 2008. Fair Trade organic production raises farmer income when low-intensity organic farming is an alternative to low-intensity conventional farming. However, low-intensity farming produces very little coffee in the case of the most marginalized farmers, keeping these farmers in poverty. With higher intensities of management, the economic advantages of Fair Trade organic production largely depend on prices in the mainstream market.
Keywords: Organic agriculture; Fair Trade; Certification; Coffee; Nicaragua

Handojo Djati Utomo, Keith A. Hunter, Particle concentration effect: Adsorption of divalent metal ions on coffee grounds, Bioresource Technology, In Press, Corrected Proof, Available online 5 August 2009, ISSN 0960-8524, DOI: 10.1016/j.biortech.2009.06.094.
(http://www.sciencedirect.com/science/article/B6V24-4WXRDJ3-4/2/5409489fe2f5436c85c4a566532fa062)
Abstract:
The adsorption of divalent metal ions Cu2+, Pb2+, Zn2+, and Cd2+ on coffee grounds as a function of coffee grounds concentration was studied in which adsorption density decreased as the concentration of coffee grounds (Cs) increased. Adsorption studies were conducted by equilibrating aqueous solutions of each metal ion at concentrations in the range 19-291 [mu]mol L-1 with coffee suspensions in the concentration range 0.971-8.738 g L-1, with the initial pH adjusted to 5.0 +/- 0.1 using NaOH or HNO3. Metastable Equilibrium Adsorption theory did not adequately explain the adsorption phenomenon, except at low concentrations of coffee grounds and trace metal ions. Instead the results indicated that flocculation might reduce the surface availability thus reducing the adsorption density. The flocculation theory was confirmed after a further experiment adding dispersant sodium hexa-meta-phosphate (NaHMP) to the suspension.
Keywords: Adsorption; Dispersant; Flocculation; Metastable Equilibrium Adsorption; Trace metal

Rita C. Alves, C. Soares, Susana Casal, J.O. Fernandes, M. Beatriz P.P. Oliveira, Acrylamide in espresso coffee: Influence of species, roast degree and brew lenght, Food Chemistry, In Press, Accepted Manuscript, Available online 3 August 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.07.051.
(http://www.sciencedirect.com/science/article/B6T6R-4WXC26Y-4/2/6580de9038f345fb2d2c39ca67a36acc)
Abstract:
Espresso coffees were analyzed for acrylamide contents by matrix solid-phase dispersion and GC-MS. The influence of coffee species, roast degree, and brew length were ascertained. Mean acrylamide contents of medium roasted espressos (30 mL) were 1.16 +/- 0.25 and 2.31 +/- 0.43 [mu]g for pure Arabica and Robusta samples, respectively. Espressos prepared from commercial blends contained an average acrylamide level of 1.26 +/- 0.28 [mu]g. A 25% decrease was observed when comparing espressos prepared with medium and dark roasted coffee. The extraction efficacy of acrylamide for standard espressos of 30 mL was near 80%, being only affected by brew volume, with long espressos (70 mL) containing practically all acrylamide of the coffee cake (99%), almost double that of short ones (20 mL). When compared with other common coffee beverages, espresso acrylamide concentration ([mu]g/L) was higher. However, due to the small volume per cup, it may contribute less to acrylamide ingestion.
Keywords: acrylamide, espresso coffee, coffee brews, coffee species, roast, brew length

Jacques Avelino, Marie-Elsie Bouvret, Luis Salazar, Christian Cilas, Relationships between agro-ecological factors and population densities of Meloidogyne exigua and Pratylenchus coffeae sensu lato in coffee roots, in Costa Rica, Applied Soil Ecology, In Press, Corrected Proof, Available online 29 July 2009, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2009.06.006.
(http://www.sciencedirect.com/science/article/B6T4B-4WW7NMX-1/2/6d05d5e97ef5c3a4a4e07d1665aa2b55)
Abstract:
Controlling coffee nematodes using fewer pesticides is a priority for most producing countries. The aim of this study was to identify ecological and agricultural factors associated with Meloidogyne exigua and Pratylenchus coffeae sensu lato population densities in coffee roots. The influence of these factors was studied in a two-year survey by characterizing 57 coffee plots in five major producing regions in Costa Rica, where coffee is generally cultivated in intensified systems. Correspondence analyses and Chi-squared automatic interaction detector (CHAID) classification trees were used to identify and classify the ecological and agricultural factors associated with nematode population densities. M. exigua and P. coffeae population densities were opposites with respect to soil characteristics. Low M. exigua population densities were especially found in soils with low sand and high Zn and K contents. The opposite was seen for P. coffeae. In addition, M. exigua and P. coffeae seemed to have different climatic requirements: M. exigua was mainly found at lower altitudes than P. coffeae. Consequently and through possible competition phenomena between P. coffeae and M. exigua, a negative correlation was found between the two nematode population densities on a plot scale. We found only one cropping practice that seemed to affect both nematodes similarly: a within-row distance between coffee trees of less than 0.9 m was associated with large M. exigua and P. coffeae population densities. The results of this study provide further evidence of the greater intensity of pest and disease attacks in intensified coffee systems.
Keywords: Coffea arabica; Root-knot nematode; Root-lesion nematode; Multivariate analysis

Carlos E. Hernandez, Ho-Hsien Chen, Chi-I. Chang, Tzou-Chi Huang, Direct lipase-catalyzed lipophilization of chlorogenic acid from coffee pulp in supercritical carbon dioxide, Industrial Crops and Products, In Press, Corrected Proof, Available online 26 July 2009, ISSN 0926-6690, DOI: 10.1016/j.indcrop.2009.07.004.

(http://www.sciencedirect.com/science/article/B6T77-4WVK2HJ-1/2/292a1026907494a9af089c0e6d184eac)
Abstract:
The direct esterification of chlorogenic acid (5-CGA) by immobilized Candida antarctica lipase B (Novozym 435) in supercritical CO2/t-butanol has been studied. The Taguchi approach was applied to evaluate the effects of temperature (35-55 [degree sign]C), pressure (150-250 bar), t-butanol (2-10%, v/v), and the enzyme amount (10-30 mg/ml), on the ester concentration and overall conversion. Optimum reaction conditions were established at: 150 bar, 55 [degree sign]C, 10% t-butanol (v/v), 20 mg/ml of lipase. Addition of 20 mg/ml of molecular sieves (3 A) was also necessary to minimize the inhibiting effect of the increasing water concentration. Maximum conversions reached 77, 82 and 85% in 25 h using geraniol, pentanol and heptanol as aliphatic chain donors, respectively. HPLC analysis demonstrated the selective esterification of 5-CGA from a coffee pulp aqueous-methanolic extract, which reached a conversion to heptyl ester of 65% at the optimal condition. The supercritical CO2 selectivity towards the esterified product was the working principle of this study, by which minimized interphase transport limitations and enhanced mass-transfer phenomena substantially improved the reaction kinetics.
Keywords: Candida antarctica lipase; Chlorogenic acid; Lipophilization; Supercritical CO2

Allen F. Sanborn, Two new species of cicadas from Vietnam (Hemiptera: Cicadoidea: Cicadidae), Journal of Asia-Pacific Entomology, In Press, Accepted Manuscript, Available online 23 July 2009, ISSN 1226-8615, DOI: 10.1016/j.aspen.2009.07.001.
(http://www.sciencedirect.com/science/article/B8JJN-4WV15YR-1/2/51fa7d13f0b65caafdc4ccf832a95e61)
Abstract:
Two species of Vietnamese cicadas are described as new. Pomponia daklakensis sp. nov. is described from Daklak Province and Haphsa bicolora sp. nov. is described from Gai Lai Province. Pomponia daklakensis has become a pest of coffee in Vietnam.
Keywords: New species; Cicada; Taxonomy; Pomponia daklakensis; Haphsa bicolora

Gerardo Hernandez-Martinez, Robert H. Manson, Armando Contreras Hernandez, Quantitative classification of coffee agroecosystems spanning a range of production intensities in central Veracruz, Mexico, Agriculture, Ecosystems & Environment, In Press, Corrected Proof, Available online 21 July 2009, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.05.020.
(http://www.sciencedirect.com/science/article/B6T3Y-4WTHB0Y-1/2/ee5cfba1a227b4d3640c026930bd514e)
Abstract:
Coffee production has attracted considerable attention globally, due to its economic, social, and ecological importance. The capacity of coffee farms to conserve the biodiversity and environmental benefits offered by adjacent forest ecosystems varies greatly in relation to varying cultivation strategies. However descriptions of these strategies are scarce and largely qualitative in nature, thus hindering comparisons between studies. A rigorous quantitative classification of this agroecosystem was undertaken, in order to address these concerns. For this purpose, a multivariate analysis was applied, in order to analyze the changes in the biophysical structure and management of 18 coffee plantations and three fragments of montane cloud forest, spanning a wide variety of cultivation intensities in central Veracruz, Mexico. This analysis identified five main classes of vegetation structure, ranging from sun exposed to rustic coffee plantations, with the mean height of shade trees, vertical vegetation diversity, tree richness and abundance and coffee plant density, representing the most important structural descriptors, referring to the farms studied. Analysis of the frequency and type of management practices employed (fertilization, weed and pest control) yielded three groups of farms ordered along a gradient, ranging from conventional to alternative practices. Together, these analyses yield a robust quantitative classification system for

coffee farms in central Veracruz, which differs in several important ways from accepted qualitative classification schemes. As vegetation structure and management practices did not co-vary in this analysis, future studies should include standardized measurements of both dimensions used to describe coffee farms, in order to improve understanding of how intensification affects conservation potential and help to identify more sustainable production strategies.
Keywords: Coffee agroecosystems; Vegetation structure; Farm management; Biodiversity conservation; Cloud forest

Kentaro Matsumiya, Wataru Takahashi, Takashi Inoue, Yasuki Matsumura, Effects of bacteriostatic emulsifiers on stability of milk-based emulsions, Journal of Food Engineering, In Press, Corrected Proof, Available online 21 July 2009, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2009.07.012.
(http://www.sciencedirect.com/science/article/B6T8J-4WTHS1R-2/2/7f55c89d1881bee271810e86e6e2b85e)
Abstract:
For milk-based emulsion products such as canned coffee or tea, the addition of bacteriostatic emulsifiers is necessary to inhibiting the growth of heat-resistant sporeformers. Since bacteriostatic emulsifiers often cause the destabilization of emulsions, other type of emulsifiers, such as stability-enhancing ones, are necessary for the long-term stability of emulsions. Four milk-based emulsions were prepared from powdered milk combined with several types of emulsifiers. The long-term stability of emulsions, which was detected by the occurrence of a creaming layer after 3 months of storage, differed according to the composition of emulsifiers. To understand the reason for the differences in the stability of emulsions, particle size, distribution, [zeta]-potential, and the amount of proteins and phospholipids present in the cream layer (separated oil droplets) in the emulsions were measured. Only the amount of proteins adsorbed onto oil droplets was found to be closely related to the difference in emulsion stability, that is, the more proteins adsorbed, the higher the emulsion stability. SDS-PAGE analyses revealed that [kappa]-casein and [beta]-lactoglobulin play an important role in emulsion stability by adsorbing onto the oil droplet surface.
Keywords: Bacteriostatic emulsifier; Emulsion stability; Milk protein; Protein displacement; Milk-based emulsion; Powdered milk

Javier Calzada, Miguel Delibes-Mateos, Miguel Clavero, Miguel Delibes, If drink coffee at the coffee-shop is the answer, what is the question? Some comments on the use of the sprainting index to monitor otters, Ecological Indicators, In Press, Corrected Proof, Available online 19 July 2009, ISSN 1470-160X, DOI: 10.1016/j.ecolind.2009.06.012.
(http://www.sciencedirect.com/science/article/B6W87-4WT39T6-3/2/cd26515177edc6da25e5092bc7d1a044)

Han-Seok Seo, Thomas Hummel, Effects of olfactory dysfunction on sensory evaluation and preparation of foods, Appetite, In Press, Corrected Proof, Available online 18 July 2009, ISSN 0195-6663, DOI: 10.1016/j.appet.2009.07.010.
(http://www.sciencedirect.com/science/article/B6WB2-4WSY472-5/2/6eee5757f93a6291493c7bb82f62da34)
Abstract:
Aim of this study was to investigate the impact of olfactory dysfunction on behavior during sensory evaluation and self-preparation, as well as on sensory perception and pleasantness of green tea and coffee. We compared the intensities of overall odor, flavor, and bitter taste, respectively, and the pleasantness ratings for three different concentrations of green teas and coffees between three groups: young (n = 30) and elderly (n = 30) with normal olfactory function and elderly (n = 30) with olfactory dysfunction. In addition, we compared the subject groups' behavior during sensory testing and preparation of green tea or coffee. As expected, elderly subjects with olfactory

dysfunction rated the overall odor intensity less intense than subjects with normal olfactory function. Also, elderly subjects with olfactory dysfunction rated the intensities of overall flavor and bitter taste significantly lower rather than subjects with normal olfactory function in green tea, whereas this result was not obtained in coffee. Compared to young subjects with normal olfactory function, elderly with olfactory dysfunction used more green tea powder to optimize their own green tea. Moreover, olfactory function scores assessed by the 'Sniffin' Sticks' test were positively related with sniffing frequency for green tea and with sniffing time for coffee during sensory evaluation. During preparation of the green tea, compared to elderly subjects, young healthy subjects tried to adjust the green tea more frequently by adding green tea powder or water. Such behavioral differences were not present during coffee preparation. In conclusion, our findings demonstrate that olfactory dysfunction affects odor perception and sniffing behavior. However, under the current conditions, it appeared to have no effect on hedonic ratings and self-preparation behaviors.
Keywords: Behavior; Food preparation; Olfactory dysfunction; Sensory evaluation; Sniffin' Sticks test; The elderly

Fabio S. Matos, Ricardo Wolfgramm, Fabio V. Goncalves, Paulo C. Cavatte, Marilia C. Ventrella, Fabio M. DaMatta, Phenotypic plasticity in response to light in the coffee tree, Environmental and Experimental Botany, In Press, Corrected Proof, Available online 7 July 2009, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2009.06.018.
(http://www.sciencedirect.com/science/article/B6T66-4WPJ62N-5/2/70af55e4a5c44dcc684b019dfd10c9b2)
Abstract:
Phenotypic plasticity to light availability was examined at the leaf level in field-grown coffee trees (Coffea arabica). This species has been traditionally considered as shade-demanding, although it performs well without shade and even out-yields shaded coffee. Specifically, we focused our attention on the morpho-anatomical plasticity, the balance between light capture and excess light energy dissipation, as well as on physiological traits associated with carbon gain. A wide natural light gradient, i.e., a diurnal intercepted photon irradiance differing by a factor of 25 between the deepest shade leaves and the more exposed leaves in the canopy, was explored. Responses of most traits to light were non-linear, revealing the classic leaf sun vs. leaf shade dichotomy (e.g., compared with sun leaves, shade leaves had a lower stomatal density, a thinner palisade mesophyll, a higher specific leaf area, an improved light capture, a lower respiration rate, a lower light compensating point and a limited capacity for photoprotection). The light-saturated rates of net photosynthesis were higher in sunlit than in shade leaves, although sun leaves were not efficient enough to use the extra light supply. However, sun leaves showed well-developed photoprotection mechanisms in comparison to shade leaves, which proved sufficient for avoiding photoinhibition. Specifically, a higher non-photochemical quenching coefficient was found in parallel to increases in: (i) zeaxanthin pools, (ii) de-epoxidation state of the xanthophyll cycle, and (iii) activities of some antioxidant enzymes. Intracanopy plasticity depended on the suite of traits considered, and was high for some physiological traits associated with photoprotection and maintenance of a positive carbon balance under low light, but low for most morpho-anatomical features. Our data largely explain the successful cultivation of the coffee tree in both exposed and shade environments, although with a poor resource-use efficiency in high light.
Keywords: Coffea; Photoinhibition; Photosynthesis; Shade leaves; Sun leaves; Xanthophylls

K. Ramalakshmi, L. Jagan Mohan Rao, Yuko Takano-Ishikawa, Masao Goto, Bioactivities of low-grade green coffee and spent coffee in different in vitro model systems, Food Chemistry, Volume 115, Issue 1, 1 July 2009, Pages 79-85, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.11.063.
(http://www.sciencedirect.com/science/article/B6T6R-4V17CWJ-M/2/794e914af4596cf99cb9a7f653004731)

Abstract:
Methanolic extracts of low-grade green coffee beans (LCB) and spent coffee were analysed for radical-scavenging activity ([alpha],[alpha]-diphenyl-[beta]-picrylhydrazyl radical) and oxygen radical absorbance capacity (ORAC). The extracts were also evaluated for anti-tumour (P388 cell assay), anti-inflammatory (J774A.1 cell assay) and anti-allergenic (RBL-2H3 cell line) activities in vitro. LCB extract was found to exhibit a radical-scavenging activity of 92.0% followed by spent Arabica (86.9%) and spent Robusta (82.0%) at a concentration of 50 ppm. The antioxidant activity of LCB extract, measured as Trolox equivalents (4416 [mu]M/g) was significantly ($p < 0.05$) higher than that of the spent coffee extracts. However, extracts of spent coffee exhibited significantly ($p < 0.05$) more anti-tumour activity than the LCB extract in terms of cell viability. This could be due to the possible role of brown pigments (melanoidins and phenolic polymers), formed during roasting, which may protect cells from oxidative damage in the biological system. However, both the extracts of LCB and spent coffee showed limited anti-inflammatory and anti-allergic activities. The presence of phenolics and chlorogenic acids in appreciable quantities along with brown pigments makes these coffee by-products a source for natural antioxidants.
Keywords: Low-grade coffee; Spent coffee; Radical-scavenging activity; ORAC; Anti-tumour; Anti-inflammatory; Anti-allergy

Oreste V. Brenna, Elena L.M. Ceppi, Gabriella Giovanelli, Antioxidant capacity of some caramel-containing soft drinks, Food Chemistry, Volume 115, Issue 1, 1 July 2009, Pages 119-123, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.11.059.
(http://www.sciencedirect.com/science/article/B6T6R-4V17CWJ-P/2/4a4322ad8dbe4b6cc66cf6264e228d03)
Abstract:
Antioxidant properties of foods and beverages have been widely studied; however, few data have been reported on the antioxidant capacity of soft drinks. Apart from fruit juice-based drinks, some of the most common soft drinks contain as a colouring agent one of the four caramel colours allowed in foods (E150 d). Caramels contain melanoidin compounds, which have been reported to contribute to the antioxidant powers of some foodstuff. This study aimed to ascertain the contribution to the antioxidant activity of some caramel-containing soft drinks, such as cola drinks, and chinotto, an original Italian soft drink. Some commercial caramel colours were analysed for main parameters, i.e. HMF (5-(hydroxymethyl)-2-furfural), residual glucose and fructose content, total reducing compounds by the Folin-Ciocalteau reagent, and the antioxidant activity by the FRAP and DPPH* methods. Similar analyses were performed on various soft drinks coloured with E150 d. The results showed that even if soft drinks have a lower antioxidant activity than other beverages such as tea, coffee or chocolate, they may contribute to the antioxidant pool assumed with the diet, since the antioxidant activity ranged from 0.2 for cola-like soft drinks to 1.0 mmoles Trolox equivalent/l for chinotto drinks.
Keywords: Antioxidant capacity; Soft drink; Caramel colours; Carbonated beverages; Chinotto

Silvio Alejandro Lopez-Pazos, Jorge Eduardo Cortazar Gomez, Jairo Alonso Ceron Salamanca, Cry1B and Cry3A are active against Hypothenemus hampei Ferrari (Coleoptera: Scolytidae), Journal of Invertebrate Pathology, Volume 101, Issue 3, Special Section: SIP 2009, SIP 2009, July 2009, Pages 242-245, ISSN 0022-2011, DOI: 10.1016/j.jip.2009.05.011.
(http://www.sciencedirect.com/science/article/B6WJV-4WBT4CH-3/2/abedbb84cb7f4364f7d968c244dda8a6)
Abstract:
Cry1B and Cry3 proteins from Bacillus thuringiensis are toxic to beetles such as the colorado potato beetle and the cottonwood leaf beetle. We report the development of a suitable rearing, bioassay method and the toxicity of these Cry proteins to coffee berry borer first instar larvae.
Keywords: Bacillus thuringiensis; Cry1B; Cry3A; Hypothenemus hampei; Artificial diet

Maik Kleinwachter, Dirk Selmar, Influence of drying on the content of sugars in wet processed green Arabica coffees, Food Chemistry, In Press, Corrected Proof, Available online 28 June 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.06.048.
(http://www.sciencedirect.com/science/article/B6T6R-4WMM7G6-2/2/04621ac0cc21b484d5ddb2bfc5d5a6fe)
Abstract:
When wet processed coffee beans are dried, the resulting decrease in the water potential induces various metabolic responses. This study was aimed at elucidating the impact of these reactions on the composition of sugars, representing potential aroma precursors. Wet processed green coffees were dried under defined conditions, and the relevant sugars were analysed. Special emphasis was put on the influence of the drying regime, i.e. continuous dryings and such interrupted by pauses in order to mimic sun dryings.
The contents of fructose and glucose decreased significantly within the first day of drying. This diminution for the first time proves that the lower contents of glucose and fructose generally present in wet processed coffee beans in comparison to dry processed ones are - at least in part - due to metabolic processes and are not related to the leaching of sugars into the process water in the course of wet processing.
Keywords: Coffea arabica; Glucose; Fructose; Sucrose; Galactose; Green coffee; Post-harvest treatment; Coffee processing; Drying

Marja H. Bakermans, Andrew C. Vitz, Amanda D. Rodewald, Carlos G. Rengifo, Migratory songbird use of shade coffee in the Venezuelan Andes with implications for conservation of cerulean warbler, Biological Conservation, In Press, Corrected Proof, Available online 17 June 2009, ISSN 0006-3207, DOI: 10.1016/j.biocon.2009.05.018.
(http://www.sciencedirect.com/science/article/B6V5X-4WJ91HF-5/2/d24bd4f5045542352e4a4012f2018a81)
Abstract:
Although previous studies have demonstrated high use of shade coffee plantations by Neotropical migratory birds, we still have a poor understanding of the suitability of shade coffee plantations as habitat on the wintering grounds. We studied density, body condition, and survivorship of Neotropical migrants, with emphasis on cerulean warbler (Dendroica cerulea), in primary forest and shade coffee plantations in Venezuela. We worked in three primary forest sites and three shade coffee plantations on the western slope of the Cordillera de Merida of the Andes Mountains. At each site, we surveyed migrants with distance-based line transects and mist-netted and banded migrants during November-February 2005/06 and 2006/07. In addition, we estimated apparent monthly survival for cerulean warbler based on 29 color-banded individuals. Densities of migrants were 3-14x higher in shade coffee plantations than primary forest sites, even after accounting for differences in detectability. Apparent monthly survival of cerulean warblers was estimated at 97% and overwinter persistence was similarly high. In addition, cerulean warblers demonstrated high between-season fidelity, with 65% of the birds banded the first year being resighted during the second year. Interestingly, immature birds returned at nearly half the rate as did adults. Banding data indicated that body condition increased significantly as the season progressed for cerulean warblers, Tennessee warblers (Vermivora peregrina), and American redstarts (Setophaga ruticilla). Collectively, these data provide evidence that shade coffee plantations offer high quality wintering habitat for Neotropical migrants, including cerulean warblers.
Keywords: Agroecosystems; Body condition; Migratory birds; Survival; Venezuela; Wintering grounds

Alexandra-Maria Klein, Nearby rainforest promotes coffee pollination by increasing spatio-temporal stability in bee species richness, Forest Ecology and Management, In Press, Corrected Proof, Available online 10 June 2009, ISSN 0378-1127, DOI: 10.1016/j.foreco.2009.05.005.
(http://www.sciencedirect.com/science/article/B6T6X-4WGT615-4/2/80c932c18b726fc09688fe6e34d271c1)
Abstract:
Natural tropical forests are highly diverse and are known to contribute to forest-based services such as pollination of nearby crops. Landscape changes cause spatial and temporal bee community changes, but consequences how the community changes affect pollination is not well analyzed. This paper addresses the effects of rainforest distance and on site flower resources in agro-forests on spatial and temporal variation in pollinator communities and the consequences for coffee pollination.
The study was conducted in 24 agro-forests dominated by coffee and cacao in Sulawesi, Indonesia differing in their distance to rainforest margin of the Lore-Lindu National Park and in flower density and its temporal variation. In all agro-forests, (1) transect surveys of the understory were obtained over a five-month period to assess bee community compositional similarity, bee diversity, and the temporal variation in bee diversity; and (2) coffee flower visitors were observed and open and bagged pollination treatments conducted over one week of coffee blooming to assess bee diversity and the spatial variation in bee diversity and coffee pollination.
Mean number of shared species of the understory ranged between 40 and 60% per agro-forest and was higher in agro-forests nearby the rainforest than in agro-forests with a minimal distance of 500 m isolated from the rainforest. Mean species richness in the understory and in coffee flowers decreased with rainforest isolation and increased with flower resource availability. Temporal variation in bee species richness of the understory and spatial variation of the coffee flower-visiting bee species richness per agro-forest increased with forest distance. The variation in bee species richness decreased the mean and increased the spatial variation in bee-pollinated coffee fruit set per agro-forest.
In conclusion, crops grown near intact rainforests and which profit from the pollination by many species may fluctuate less in bee-pollinated fruit set across crop plants than crop plants in isolated agriculture that receive low or even single species pollination services.
Keywords: Community stability; Forest-based regulating services; Pollination services; Resource heterogeneity

Urijatan Teixeira Carvalho Polari Souto, Marcio Jose Coelho Pontes, Edvan Cirino Silva, Roberto Kawakami Harrop Galvao, Mario Cesar Ugulino Araujo, Fatima Aparecida Castriani Sanches, Francisco Antonio Silva Cunha, Maria Socorro Ribeiro Oliveira, UV-Vis spectrometric classification of coffees by SPA-LDA, Food Chemistry, In Press, Corrected Proof, Available online 2 June 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.078.
(http://www.sciencedirect.com/science/article/B6T6R-4WF4J77-B/2/d14fcbb121a967384534a1015f8bab37)
Abstract:
UV-Vis spectrometry and chemometric techniques were used to classify aqueous extracts of Brazilian ground roast coffee with respect to type (caffeinated/decaffeinated) and conservation state (expired and non-expired shelf-life). Two classification methods were compared: soft independent modelling of class analogy (SIMCA) and linear discriminant analysis (LDA) with wavelength selection by the successive projections algorithm (SPA). The best results were obtained by SPA-LDA, which correctly classified all test samples. The classification accuracy of this model remained high (96%) even after the introduction of artificial spectral noise. These results suggest that UV-Vis spectrometry and SPA-LDA modelling provide a promising alternative for assessment of conservation state and decaffeination condition of coffee samples.

Keywords: Coffee classification; UV-Vis spectrometry; Linear discriminant analysis; Successive projections algorithm; Soft independent modelling of class analogy

Mauro Galetti, Henrique C. Giacomini, Rafael S. Bueno, Christine S.S. Bernardo, Renato M. Marques, Ricardo S. Bovendorp, Carla E. Steffler, Paulo Rubim, Sabrina K. Gobbo, Camila I. Donatti, Rodrigo A. Begotti, Fernanda Meirelles, Rodrigo de A. Nobre, Adriano G. Chiarello, Carlos A. Peres, Priority areas for the conservation of Atlantic forest large mammals, Biological Conservation, Volume 142, Issue 6, Conservation Issues in the Brazilian Atlantic Forest, June 2009, Pages 1229-1241, ISSN 0006-3207, DOI: 10.1016/j.biocon.2009.01.023.
(http://www.sciencedirect.com/science/article/B6V5X-4VRNNRG-8/2/9c84d96b2b74f98f41aa0bd12851c57a)
Abstract:
Large mammal faunas in tropical forest landscapes are widely affected by habitat fragmentation and hunting, yet the environmental determinants of their patterns of abundance remain poorly understood at large spatial scales. We analysed population abundance and biomass of 31 species of medium to large-bodied mammal species at 38 Atlantic forest sites (including three islands, 26 forest fragments and six continuous forest sites) as related to forest type, level of hunting pressure and forest fragment size using ANCOVAs. We also derived a novel measure of mammal conservation importance for each site based on a 'Mammalian Conservation Priority index' (MPi) which incorporates information on species richness, population abundance, body size distribution, conservation status, and forest patch area. Mammal abundance was affected by hunting pressure, whereas mammalian biomass of which was largely driven by ungulates, was significantly influenced by both forest type and hunting pressure. The MPi index, when separated into its two main components (i.e. site forest area and species-based conservation index Ci), ordered sites along a gradient of management priorities that balances species-focused and habitat-focused conservation actions. Areas with the highest conservation priority were located in semi-deciduous forest fragments, followed by lowland forests. Many of these fragments, which are often embedded within large private landholdings including biofuel and citrus or coffee crops, cattle ranches and pulpwood plantations, could be used not only to comply with environmental legislation, but also enhance the prospects for biodiversity conservation, and reduce edge effects and hunting.
Keywords: Defaunation; Hotspots; Subsistence hunting; Line-transect; Forest fragmentation

Julio C. Espinoza, Francisco Infante, Alfredo Castillo, Jeanneth Perez, Guadalupe Nieto, Erika P. Pinson, Fernando E. Vega, The biology of Phymastichus coffea LaSalle (Hymenoptera: Eulophidae) under field conditions, Biological Control, Volume 49, Issue 3, June 2009, Pages 227-233, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.01.021.
(http://www.sciencedirect.com/science/article/B6WBP-4VKP3Y4-1/2/7e84304dc4f97682ee354aca4b718f95)
Abstract:
The coffee berry borer (CBB) Hypothenemus hampei (Ferrari) (Coleoptera: Curculionidae: Scolytinae) was accidentally introduced into Mexico in 1978, and rapidly became the main pest of coffee. As an exotic pest, its management has been mainly based on biological control methods through the introduction of parasitoids from Africa. In this context, at the beginning of the present decade, the parasitoid Phymastichus coffea LaSalle (Hymenoptera: Eulophidae) was imported to Mexico. Since then, several studies have been carried out as part of the post introduction evaluation of this parasitoid. In this paper, information concerning the parasitism and life-cycle of P. coffea in coffee farms is presented with the objective of providing information that elucidates its role as a biological control agent. P. coffea showed highly significant preferences for allocation of two eggs per host, usually one female and one male. Both offspring are able to develop and reach the adult stage successfully. Lifespan of adults is 2-3 days only. The degree of parasitism by P. coffea was more than 95% at the three altitudes tested, when releases consisted of a ratio of 10

CBB:1 parasitoid. The median survivorship of CBB parasitized by this wasp was 13, 15 and 19 days at the low, medium and high altitude coffee zones, respectively. The parasitism by P. coffea was higher when parasitoid releases were carried out simultaneously with the CBB, and decreased with the time between host and parasitoid releases. We showed that using P. coffea at a density of 1 parasitoid per 10 hosts resulted in a 3- to 5.6-fold decrease in CBB damage to the coffee seeds when compared to the control. The importance and value of these results are discussed in terms of the use of P. coffea as a biological control agent of the CBB in Latin America.
Keywords: Hypothenemus; Coffee berry borer; Life-history; Biological control; Mexico; Phymastichus

Juliana Jaramillo, Adenirin Chabi-Olaye, Christian Borgemeister, Charles Kamonjo, Hans-Michael Poehling, Fernando E. Vega, Where to sample? Ecological implications of sampling strata in determining abundance and impact of natural enemies of the coffee berry borer, Hypothenemus hampei, Biological Control, Volume 49, Issue 3, June 2009, Pages 245-253, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.12.007.
(http://www.sciencedirect.com/science/article/B6WBP-4V7623V-1/2/42e73bc405e56d4fe40eadb402661e9b)
Abstract:
Several parasitoids of African origin have been introduced to coffee producing areas of the Americas and Asia as biological control agents of the coffee berry borer (CBB) Hypothenemus hampei (Coleoptera: Curculionidae). These parasitoids have become established in the field but their effect on the CBB has been limited. A two-year field study in Western Kenya has found Prorops nasuta (Hymenoptera: Bethylidae) to be the predominant parasitoid emerging from CBB-infested coffee berries collected on coffee trees or from the ground. P. nasuta comprises more than 75% of the total natural enemies collected. The density of P. nasuta was 90% higher in the berries collected from the ground than from the trees. Its hyperparasitoid, Aphanogmus sp. (Hymenoptera: Ceraphronidae), also emerged from both type of berries. Across the two seasons, the average P. nasuta density per berry was 18-35 times higher than that of Aphanogmus sp. Throughout the two years sampled, significantly higher numbers of P. nasuta and Aphanogmus sp. occurred between February and March, which coincides with the beginning of the rainy season. Higher numbers of live CBB females were recorded in berries collected from the trees. Nevertheless, mortality of adult CBB was considerably higher from January to March and started to decrease from April onwards. The possibly negative effects of cultural control practices in Latin America which include the removal of berries fallen to the ground on biological control of CBB are discussed, and the use of screened collection devices for these berries which would permit the release of parasitoids but prevent escape of the pest is proposed.
Keywords: Hyopthenemus hampei; Coffee berry borer; Coffee; Biological control; Parasitoid; Prorops nasuta; Aphanogmus; Hyperparasitoid; Cultural control; IPM

Vlasta Brezova, Anna Slebodova, Andrej Stasko, Coffee as a source of antioxidants: An EPR study, Food Chemistry, Volume 114, Issue 3, 1 June 2009, Pages 859-868, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.10.025.
(http://www.sciencedirect.com/science/article/B6T6R-4TTMJYP-4/2/f8ad89ec4462e26879539fff00cc6b1f)
Abstract:
Antioxidant properties of commercially-available ground and instant coffees were investigated by means of electron paramagnetic resonance (EPR) using as oxidants 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt (ABTS), 1,1-diphenyl-2-picrylhydrazyl (DPPH), 4-hydroxy-2,2,6,6-tetramethylpiperidine N-oxyl (TEMPOL) and thermally decomposed K2S2O8. Only moderate differences were found in the antioxidant capacities of individual samples

(expressed as trolox equivalent antioxidant capacity TEAC) with TEACABTS = 0.22 +/- 0.02 mmol g-1 for ground and TEACABTS = 0.71 +/- 0.07 mmol g-1 for instant coffees. Two coffee components (caffeic acid and caffeine) were investigated using moderate hydrogen/electron scavengers ABTS+ and DPPH, and a powerful oxidant OH radical (photochemically generated from H2O2). Caffeine is inert to ABTS+ and DPPH oxidants, but effective in the scavenging of OH radicals, with a bimolecular rate constant k = 2.6 x 109 M-1 s-1. Caffeic acid is a very effective antioxidant in all oxidant systems, with k = 9.4 x 109 M-1 s-1 in the bimolecular reaction with OH radicals. From the evaluated correlation matrix, a good linear relationship was found for the ground coffees between TEACABTS and TEACDPPH values () and also between the phenolics content expressed in gallic acid equivalents (GAE) and TEAC antioxidant capacities ().
Keywords: Ground coffee; Instant coffee; Antioxidants; EPR spectroscopy; Hydroxyl radicals; Caffeine; Caffeic acid

D. Albanese, M. Di Matteo, M. Poiana, S. Spagnamusso, Espresso coffee (EC) by POD: Study of thermal profile during extraction process and influence of water temperature on chemical-physical and sensorial properties, Food Research International, Volume 42, Issues 5-6, June-July 2009, Pages 727-732, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.02.027.
(http://www.sciencedirect.com/science/article/B6T6V-4VR9FFN-8/2/28eac016d8f8cc3dd06b6b5fe650ca18)
Abstract:
In this work the thermal profiles of five coffee pods (pure Arabica, pure Robusta, and Arabica Robusta blends: A20R80, A80R20, and A40R60) at 90, 100 and 110 [degree sign]C are reported. Moreover the chemical-physical and sensorial properties of espresso coffee (EC) obtained from five different coffee pods were investigated. The analysis of the thermal profiles highlighted that the extraction process can be considered as an isothermal process because, after a starting phase, the recorded temperatures stayed around a mean temperature (Tm). In addition the Tm recorded for each extraction temperature was significantly lower than those set up by the controller. The chemical-physical parameters of EC samples increased proportionally with extraction temperature highlighting that the effectiveness of extraction process scales up with percolation temperature. The solid and caffeine contents of the EC samples extracted at 110 [degree sign]C are related to an over extraction process. Principal Component Analysis (PCA) was applied to identify relationships and differences among EC samples. Pure Arabica and A80R20 EC samples at 100 and 110 [degree sign]C have shown sensorial attributes typical for a fine espresso coffee.
Keywords: Espresso coffee; Profile temperature; Extraction temperature

Juliana C.F. Mendonca, Adriana S. Franca, Leandro S. Oliveira, Physical characterization of non-defective and defective Arabica and Robusta coffees before and after roasting, Journal of Food Engineering, Volume 92, Issue 4, June 2009, Pages 474-479, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.12.023.
(http://www.sciencedirect.com/science/article/B6T8J-4V8G9XT-3/2/c77bb0c3b9b337427a0153dd38c49fcb)
Abstract:
The presence of defective coffee beans is known to depreciate the quality of coffee beverage consumed worldwide. These beans represent about 15-20% of the total coffee produced in Brazil and, although they are separated from the non-defective beans, they are still commercialized in the coffee trading market. Thus, it was the aim of this work to verify if physical characteristics provide an effective discrimination of defective and non-defective coffees of both Arabica and Robusta species, before and after roasting. The evaluated parameters were size (volume), density and color. The results obtained in the present study showed that, within a given coffee species, defective beans can be separated from non-defective ones by sieving, before roasting. In the case

of Arabica coffees, size separation between non-defective and defective can also be accomplished after roasting. Prior to roasting, color separation will be effective for Robusta coffees, but ineffective for separation of non-defective, immature and light sour Arabica beans.
Keywords: Coffee; Defective beans; Physical attributes

Adriana S. Franca, Leandro S. Oliveira, Rafael C.S. Oliveira, Pamela C. Mancha Agresti, Rodinei Augusti, A preliminary evaluation of the effect of processing temperature on coffee roasting degree assessment, Journal of Food Engineering, Volume 92, Issue 3, June 2009, Pages 345-352, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.12.012.
(http://www.sciencedirect.com/science/article/B6T8J-4V761WP-1/2/c35032b63defc6795433135afecead3c)
Abstract:
The objective of this study was to analyze the volatile profiles of both green and roasted coffee beans, for assessment of roasting degrees under two different processing temperatures. Volatiles extraction and concentration were performed by solid phase micro-extraction (SPME) of the ground coffee headspace and analysis of the volatiles profile was performed by GC-MS. Four SPME fibers were evaluated, with the one that extracted the highest amount of substances (DVB/CAR/PDMS) being selected. Statistical analysis of the data by principal components (PCA/clusters) showed that the volatile components profile provided separation of green and roasted coffees and also separation according to roasting degree and roasting temperature. Results also indicate that color and weight loss measurements alone are not reliable for roasting degree assessment.
Keywords: Coffee; Volatiles profile; Roasting degree assessment; SPME/GC-MS

G. Vuataz, V. Meunier, J.C. Andrieux, TG-DTA approach for designing reference methods for moisture content determination in food powders, Food Chemistry, In Press, Corrected Proof, Available online 31 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.066.
(http://www.sciencedirect.com/science/article/B6T6R-4WDNKVB-3/2/f07b6ac9930057f52903d044b6363b77)
Abstract:
There is no systematic procedure described in the literature to establish a robust and accurate reference method for determining the moisture content in any solid food product. In this paper, we are proposing a new approach based on simultaneous thermogravimetry and differential thermal analysis (TG-DTA), with data for several amorphous food powders that result from spray-drying, freeze-drying or extrusion. In the first step, by heating a representative sample of about 20 mg at 2 [degree sign]C/min we would detect the temperature and the mass loss at the inflection point that characterises, if there is an inflection, the end of the drying and the onset of chemical reactions. In cases of not too much sensitive products, the mass loss at the inflection may be considered as a good estimation of the moisture content. At 2 [degree sign]C/min heating rate, the inflection temperature Ti is an indicator that allows estimating the optimal isothermal drying temperature Td about 15-30 [degree sign]C below Ti, depending on the product sensitivity to heat treatments and the kinetics of water molecule diffusion through the amorphous matrix. Then, a series of three isothermal drying are performed at about Td-12 [degree sign]C, Td and Td+8 [degree sign]C, and a simple multilinear model allows calculating the best oven temperature to achieve the optimal moisture content determination in 2 h. This procedure is described and results are shown for several dehydrated food products: milk, coffee, cereal and pet food. This fast procedure may be applied either for establishing optimal oven conditions for most amorphous new products or for revising conditions that have been established in the past but are not robust enough for several ones.
Keywords: Water; Moisture; Content; Dehydration; Thermogravimetry; Oven; Methods; Milk powder; Coffee powder; Cereals; Pet food; Food powders

Jessica Gil-Serna, Amaia Gonzalez-Salgado, M Teresa Gonzalez-Jaen, Covadonga Vazquez, Belen Patino, ITS-based detection and quantification of Aspergillus ochraceus and Aspergillus westerdijkiae in grapes and green coffee beans by real-time quantitative PCR, International Journal of Food Microbiology, Volume 131, Issues 2-3, 31 May 2009, Pages 162-167, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.02.008.
(http://www.sciencedirect.com/science/article/B6T7K-4VM43VK-1/2/38f0c86a3c1e93bcf723f397b80fe9a8)
Abstract:
Aspergillus ochraceus and A. westerdijkiae are considered the most important Ochratoxin A (OTA) producing species included in Aspergillus section Circumdati which contaminate foodstuffs and beverages for human consumption. In this work a real-time quantitative PCR protocol was developed to detect both species using SYBR(R) Green and primers designed on the basis of the multicopy ITS1 region of the rDNA. The assay had high efficiency (94%) and showed no inhibition by host or fungal DNA other than the target species. The lower detection limit of the target DNA was 2.5 pg/reaction. Accuracy of detection and quantification by qPCR were tested with genomic DNA obtained from green coffee beans and grapes artificially contaminated with spore suspensions of known concentrations. Spore concentrations equal or higher than 106 spore/ml could be detected by the assay directly without prior incubation of the samples and a positive relationship was observed between incubation time and qPCR values. The assay developed would allow rapid, specific, accurate and sensitive detection and quantification of A. ochraceus and A. westerdijkiae to be directly used in a critical point of the food chain, before harvesting green coffee and grape berries, to predict and control fungal growth and OTA production.
Keywords: Aspergillus ochraceus; Aspergillus westerdijkiae; Real-time qPCR; OTA; Grapes; Green coffee beans; ITS

Jurandi Goncalves de Oliveira, Pedro Luis da Costa Aguiar Alves, Angela Pierre Vitoria, Alterations in chlorophyll a fluorescence, pigment concentrations and lipid peroxidation to chilling temperature in coffee seedlings, Environmental and Experimental Botany, In Press, Corrected Proof, Available online 27 May 2009, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2009.05.007.
(http://www.sciencedirect.com/science/article/B6T66-4WCTWS1-1/2/300e28c21ac0571b9af0339a3361e4cf)
Abstract:
Coffea arabica L. is considered to be sensitive to low temperatures throughout its life cycle. In some Brazilian regions, seedling production occurs under shade conditions and during the winter, with average temperatures of around 10 [degree sign]C. The formation and functioning of the photosynthetic apparatus are strongly controlled by temperature. This study aimed to assess the changes that occurred in pigment contents, lipid peroxidation and variables of chlorophyll a fluorescence during the greening process of coffee seedlings submitted to chilling. Results indicate that saturation of the photosynthetic activity of coffee seedlings occurred before saturation of the accumulation of chloroplastid pigments. Pigment accumulation during the greening process is far beyond the metabolic needs for the maintenance of photosynthetic activity, more specifically of photosystem II. Coffee seedlings attained a quantum yield equivalent to that of the control with approximately half the chlorophyll a and b contents and around 40% of the carotenoid. Low temperature decreases the metabolism of seedlings, consequently reducing free radical production and lipid peroxidation. The chilling temperature (10 [degree sign]C) used inhibited the accumulation of chloroplast pigments, in turn altering the capacity of the photosynthetic tissue of etiolated coffee seedlings to capture and transfer photon energy to the photosystem II reaction centre. These alterations were better demonstrated by O-J-I-P chlorophyll a fluorescence transients, rather than Fv/Fm and Fv/F0 ratios.

Keywords: Coffea arabica L.; Photosystem II quantum yield; Photosynthetic pigments; Chlorophyll a fluorescence transient O-J-I-P; Environmental stress

Andrea G. Antonio, Renata S. Moraes, Daniel Perrone, Lucianne C. Maia, Katia Regina N. Santos, Natalia L.P. Iorio, Adriana Farah, Species, roasting degree and decaffeination influence the antibacterial activity of coffee against Streptococcus mutans, Food Chemistry, In Press, Corrected Proof, Available online 27 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.063.
(http://www.sciencedirect.com/science/article/B6T6R-4WCTWXS-4/2/516ef4be74f633f257ba1673df1e69d1)
Abstract:
Coffee beverage has been associated with antibacterial activity against Streptococcus mutans, a cariogenic bacterium. This study aimed at identifying natural compounds in coffee that contribute to such activity and investigate the influence of species, roasting and decaffeination on it. Coffee chemical compounds and aqueous extracts of green and roasted regular and decaffeinated Coffea arabica and Coffea canephora beans were tested. MIC, biofilm inhibition and biofilm reduction results were correlated with the concentration of coffee compounds in the extracts. 5-Caffeoylquinic acid, trigonelline and caffeic acid solutions showed bacteriostatic activity (MIC = 0.8 mg/mL). Lighter and regular extracts showed higher inhibitory activity than darker and decaffeinated extracts, with an inverse correlation between bacterial colony-forming units and roasting degree. Only regular C. canephora extracts showed biofilm formation inhibition. The joint effect of chlorogenic acids, trigonelline and caffeine or other compounds removed by decaffeination seems to be one of the causes for coffee antibacterial activity against S. mutans.
Keywords: Coffee; Antibacterial activity; Biofilm; Anticariogenic activity; Streptococcus mutans; Chlorogenic acid; Trigonelline; Caffeine

M. Quintero, S. Wunder, R.D. Estrada, For services rendered? Modeling hydrology and livelihoods in Andean payments for environmental services schemes, Forest Ecology and Management, In Press, Corrected Proof, Available online 26 May 2009, ISSN 0378-1127, DOI: 10.1016/j.foreco.2009.04.032.
(http://www.sciencedirect.com/science/article/B6T6X-4WCK08D-3/2/61f8cd88ffc40a03f0f884c07c32fbab)
Abstract:
In the Andes, demand for water is growing and upland land-use changes are increasing. Water quality, quantity and seasonal flow have thus also become environmental services with potential monetary value. Yet, currently the region's pioneer PES schemes are not paying for measured environmental services, but for proxy land uses thought to provide the(se) service(s). Hydrological modeling makes explicit the tacit causal relationships and tests underlying assumptions. Ideally, when combined with an economic analysis of land-use alternatives, this could inform decision makers on how much to pay for different interventions in different spatial locations. This paper focuses on two Andean watersheds: Moyobamba (Peru) and Pimampiro (Ecuador). In the first case, a municipal water company is preparing a payment for environmental services (PES) scheme to reduce upstream sediment loads. In the second, a similar conservation-oriented municipal PES scheme has operated since 2000, but the hydrological linkages have never been tested. Applying the Soil & Water Assessment Tool (SWAT), we identify in both watersheds biophysically critical areas for service delivery, and compare services for current land uses with change scenarios: deforestation, reforestation, live barriers, and agroforestry. We then use the ECOSAUT optimization model to predict net economic benefits for service providers. In Moyobamba, switching to shade-grown coffee would halve sediment yields, and increase significantly farmers' economic benefits. This requires high up-front investment, but the willingness to pay of water users in Moyobamba town may suffice to cover the upfront costs. In Pimampiro, resumed deforestation would increase sediments by >50% and reduce dry-season flow by 0.5%,

thus reinforcing the rationale of the existing PES scheme, focused on conserving native forests and grasslands.
Keywords: Watershed protection; Natural resource management; Payments for environmental services; Andes

Thierry Joet, Andreina Laffargue, Frederic Descroix, Sylvie Doulbeau, Benoit Bertrand, Alexandre de kochko, Stephane Dussert, Influence of environmental factors, wet processing and their interactions on the biochemical composition of green Arabica coffee beans, Food Chemistry, In Press, Corrected Proof, Available online 21 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.048.
(http://www.sciencedirect.com/science/article/B6T6R-4WBK7HF-3/2/bb1ac105d3c1d2892916a4b33c42347d)
Abstract:
Although cultivation of Arabica coffee trees at high elevation is known to favourably affect the final quality of the beverage, quantitative data describing the influence of climatic conditions on the chemical composition of the seed are still lacking. Similarly, post-harvest treatments of the beans are known to affect the generation of flavour, but the chemical transformations that occur during wet processing are poorly understood. To better characterise the effects of the environment, wet processing and their possible interactions, we quantified the changes in the main chemical components of the coffee seed (lipids, chlorogenic acids, sugars and caffeine) caused by wet processing, and analysed how these changes were affected by the variations induced by the environment before harvest. Using 16 experimental plots in Reunion Island displaying broad climatic variations, we showed that chlorogenic acids and fatty acids in the seed were controlled by the mean air temperature during seed development. By contrast, total lipid, total soluble sugar, total polysaccharide and total chlorogenic acid contents were not influenced by climate. Glucose content was positively affected by altitude, while sorbitol content after wet processing depended directly on the glucose content in fresh seeds.
Keywords: Coffea; Environment; Chlorogenic acid; Caffeine; Fatty acid; Soluble sugars

Giselle S. Duarte, Antonio A. Pereira, Adriana Farah, Chlorogenic acids and other relevant compounds in Brazilian coffees processed by semi-dry and wet post-harvesting methods, Food Chemistry, In Press, Corrected Proof, Available online 20 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.042.
(http://www.sciencedirect.com/science/article/B6T6R-4WBC1X8-3/2/ae0754b3d7c3f7225a4c16449db03e91)
Abstract:
The levels of nine chlorogenic acids, caffeine, trigonelline and sucrose were determined by HPLC-UV and HPLC-RI systems in wet and semi-dry post-harvested coffee seeds from 17 Brazilian Arabica cultivars and progenies. Coffees processed by wet method showed higher contents of chlorogenic acids ($p = 0.02$) and trigonelline ($p < 0.01$), and lower content of sucrose ($p = 0.02$) compared to those produced by a semi-dry method. Regarding caffeine, no difference was observed between both methods. The implications of the differences observed in the chemical composition of coffee seeds treated by wet and semi-dry methods on cup quality deserve investigation.
Keywords: Coffee; Post-harvesting; Semi-dry post-harvesting method; Wet post-harvesting method; Chlorogenic acid; Trigonelline; Sucrose

Ana Carolina C.L. Martins, M. Beatriz A. Gloria, Changes on the levels of serotonin precursors - tryptophan and 5-hydroxytryptophan - during roasting of Arabica and Robusta coffee, Food Chemistry, In Press, Corrected Proof, Available online 15 May 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.05.016.

(http://www.sciencedirect.com/science/article/B6T6R-4W99W34-3/2/43162bdb191b04d8a1e551e6ad74eac0)
Abstract:
The levels of free and total tryptophan and of 5-hydroxytryptophan (5-HTP) were investigated in green and roasted grains and beverages of Coffea arabica L. (Arabica) and Coffea canephora Pierre var. robusta (Robusta). Grains were light, medium and dark roasted. Free and protein tryptophan were extracted before and after hydrolysis. The levels of tryptophan and 5-HTP were quantified simultaneously by ion-pair HPLC and fluorimetric detection after derivatisation with o-phthalaldehyde. Robusta green coffee had higher total and protein tryptophan, whereas Arabica had higher free tryptophan levels. 5-HTP was not detected in the samples before and after roasting. Free tryptophan was completely degraded during roasting. Roasting significantly affected protein tryptophan. The rate of loss was smaller in Arabica compared to Robusta at every roasting degree. A beverage prepared the Brazilian way with a medium-roasted coffee provided 1.4-2.5 mg tryptophan/50 ml cup.
Keywords: Coffee; Arabica; Robusta; Tryptophan; 5-Hydroxytryptophan; Roasting

Caleb E. Gordon, Brian McGill, Guillermo Ibarra-Nunez, Russell Greenberg, Ivette Perfecto, Simplification of a coffee foliage-dwelling beetle community under low-shade management, Basic and Applied Ecology, Volume 10, Issue 3, May 2009, Pages 246-254, ISSN 1439-1791, DOI: 10.1016/j.baae.2008.04.004.
(http://www.sciencedirect.com/science/article/B7GVS-4TG8P6W-1/2/05244f2d1466dcd297f0a435c0169426)
Abstract:
Coffee agroforests may be structurally and floristically complex and may contain a significant fraction of species from biodiverse and threatened tropical montane forest biotas; hence, understanding the dynamics of tropical forest biodiversity in coffee agroecosystems has emerged as a centrally important area of tropical conservation biology research. We conducted a morphospecies analysis on foliage-dwelling beetles collected from coffee plants on four coffee farms in southern Chiapas, Mexico, to characterize variation in the abundance, species richness, and species composition of this mega-diverse taxon in relation to coffee cultivation system, spatio-temporal variation, and predator removal. We constructed thirty-two cages to exclude birds and bats on four farms, each enclosing 7-10 coffee plants and paired with an adjacent uncaged control plot, and then collected beetles from coffee foliage with D-Vac aspirators in each plot once every 3 months for one year.
We classified the 2662 beetles collected into 293 morphospecies, representing 42 families of beetles. Extrapolation and interpolation analyses revealed a very high level of species richness, with no plateau and only a slight leveling trend observed in our species accumulation curves. We found that low-shade systems contain equal or higher beetle abundance, lower species richness, more highly homogenized species composition, and higher abundance of coffee berry borer pests on coffee foliage than do high-shade systems. We observed no effect of flying vertebrate exclusion on the coffee foliage beetle assemblage, but did find significant variation in abundance, species richness, and species composition of coffee foliage beetles across seasons and study sites.
The increased beetle biodiversity of high-shade coffee cultivation systems has important implications both for the preservation of native biodiversity in coffee growing regions and for the control of agricultural pests such as the coffee berry borer.
Keywords: Coleoptera; Biodiversity conservation; Diversity estimators; Morphospecies; Top-down effects; [beta] diversity; Predator exclusion; Conservation agroecology

Fernando Haddad, Luiz A. Maffia, Eduardo S.G. Mizubuti, Hudson Teixeira, Biological control of coffee rust by antagonistic bacteria under field conditions in Brazil, Biological Control, Volume 49, Issue 2, May 2009, Pages 114-119, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.02.004.

(http://www.sciencedirect.com/science/article/B6WBP-4VKXC35-1/2/b16a8576a0c01b0a4eb5b80f47bef4c6)
Abstract:
Rust (Hemileia vastatrix) is the most important coffee disease in Brazil. Organic coffee production has increased in the country and a research program aimed to develop alternatives to chemicals for disease control was required. Seven bacterial isolates, isolated from organic coffee plantings and selected in greenhouse tests, were evaluated under commercial organic crop conditions in 2005 (Experiment 1) and 2005/2006 (Experiment 2), in Machado, MG, Brazil. Ten treatments consisting of the seven bacterial isolates, copper hydroxide, calcium silicate and water were applied as three or four monthly sprays in Experiment 1 or 2, respectively. Rust severity and incidence were evaluated monthly. In Experiment 1, the sprays started in January when rust incidence was 23.8%, and none of the treatments reduced rust progress significantly. In Experiment 2, the sprays began in November 2005, when rust incidence was approximately 7.5%. There were significant differences ($P < 0.0001$) between treatments regarding maximum incidence and severity (as assessed in June, 2006), the rate of increase of the incidence between November 2005 and June 2006 and for the areas under disease progress curves for both rust incidence and severity. Lower values for these treatments were obtained in the plots treated with copper hydroxide or Bacillus sp. isolate B157, and intermediate values with the Pseudomonas sp. isolate P286. In a third experiment conducted in 2007 in Ervalia, MG, isolates B157 and P286 were also evaluated; isolate B157 reduced rust intensity as effectively as copper hydroxide. Isolate B157 is considered a potential biocontrol agent for coffee rust for organic crop systems in Brazil.
Keywords: Coffea arabica; Hemileia vastatrix; Pseudomonas; Bacillus; Biocontrol; Disease management

Pawel Gornas, Grazyna Neunert, Krzysztof Baczynski, Krzysztof Polewski, Beta-cyclodextrin complexes with chlorogenic and caffeic acids from coffee brew: Spectroscopic, thermodynamic and molecular modelling study, Food Chemistry, Volume 114, Issue 1, 1 May 2009, Pages 190-196, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.09.048.
(http://www.sciencedirect.com/science/article/B6T6R-4THSX87-1/2/bdbdea2845f5c3d4c93518902abaf5f4)
Abstract:
Coffee brew is rich in chlorogenic and cinnamic acids, potent antioxidants. Its interaction with beta-cyclodextrin leads to formation of inclusion complexes which affect the physicochemical properties of the guest molecule. We investigated spectral changes in coffee-originated phenols, chlorogenic (CHA) and caffeic (CA) acids, due to complexation with beta-cyclodextrin (betaCD) in aqueous solutions and studied thermodynamic properties of the complexes formed. The spectroscopic data (absorption and fluorescence) were used for deducing the position of both phenols inside the beta-cyclodextrin cavity, as well as to calculate the binding constants of the complexes. The obtained data indicate the formation of a 1:1 complex between betaCD and CHA or CA. The temperature-dependence of the latter allowed the calculation of thermodynamic parameters ([Delta]H, [Delta]S and [Delta]G) of the complexation. The negative values of all the thermodynamic parameters indicated that the formation of these inclusion complexes was an enthalpy-driven process in which a crucial role is played by weak van der Waals forces and hydrogen bonds. Molecular modelling confirmed experimental observations that, in aqueous phase, betaCD-CHA and -CA complexes are stable and energetically favourable, and additionally provided information regarding conformation and interaction between atoms forming the complexes. The experimental data were used to characterise the molecular mechanism of the complexation.
Keywords: Beta-cyclodextrin; Chlorogenic acid; Caffeic acid; Brewed coffee; Inclusion complex; Molecular modeling; Fluorescence; Thermodynamic parameters

R.C. Alves, S. Casal, M.R. Alves, M.B. Oliveira, Discrimination between arabica and robusta coffee species on the basis of their tocopherol profiles, Food Chemistry, Volume 114, Issue 1, 1 May 2009, Pages 295-299, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.08.093.
(http://www.sciencedirect.com/science/article/B6T6R-4TD4J0W-B/2/1efb29c0e56bb04053f5362c4f7d30fe)
Abstract:
The tocopherol profiles of arabica and robusta coffee beans, both green and roasted, were ascertained. A solid-liquid micro-extraction method was used, and the quantification performed by normal-phase HPLC/diode-array/fluorescence detection. Regarding green arabicas, the mean contents were 2.7 +/- 0.4 mg/100 g, for [alpha]-tocopherol, and 8.0 +/- 0.9 mg/100 g, for [beta]-tocopherol. For green robustas, mean values of 1.7 +/- 0.3 and 2.1 +/- 0.3 mg/100 g were found for [alpha]- and [beta]-tocopherol, respectively. Generally, more than 90% of tocopherols remained after the roasting procedure, except for [beta]-tocopherol in robustas, whose mean degradation was approximately 25% when expressed as dry weight. No [gamma]-tocopherol was detected in any sample. The results show that tocopherol profile could be useful in the discrimination of arabica and robusta coffees (either green or roasted).
Keywords: Tocopherols; Vitamin E; Arabica; Robusta; Coffee; Beans; Green; Roasted

Heike Scharnhop, Peter Winterhalter, Isolation of coffee diterpenes by means of high-speed countercurrent chromatography, Journal of Food Composition and Analysis, Volume 22, Issue 3, May 2009, Pages 233-237, ISSN 0889-1575, DOI: 10.1016/j.jfca.2008.10.018.
(http://www.sciencedirect.com/science/article/B6WJH-4VF56TB-1/2/24ea21534eb554373be4b028f870cf5e)
Abstract:
Many different physiological activities have been ascribed to coffee diterpenes, such as cholesterol increasing activity for the diterpenes kahweol and cafestol. Another member of this class, namely the diterpene 16-O-methylcafestol, is used as a marker substance for robusta coffee. Up to now, methodologies for the preparative isolation of these key coffee ingredients are still limited. In this study, high-speed countercurrent chromatography (HSCCC) was successfully employed for the isolation and purification of different diterpenes (i.e. kahweol, cafestol, 16-O-methylkahweol, 16-O-methylcafestol, dehydrokahweol, and dehydrocafestol) from Coffea arabica and Coffea canephora var. robusta. The solvent systems consisted of hexane-ethyl acetate-ethanol-water mixtures. Identity and purity of the isolated compounds were confirmed by high-performance liquid chromatography with photo diode array detection (HPLC-PDA) and HPLC-multiple mass spectrometry (HPLC-MSn) as well as NMR measurements.
Keywords: Coffee; 16-O-methylcafestol; Cafestol; Kahweol; Coffea canephora var. robusta; Diterpene; High-speed countercurrent chromatography; Bioactive non-nutrients; Food quality; Food analysis; Food composition

Rafael C.S. Oliveira, Leandro S. Oliveira, Adriana S. Franca, Rodinei Augusti, Evaluation of the potential of SPME-GC-MS and chemometrics to detect adulteration of ground roasted coffee with roasted barley, Journal of Food Composition and Analysis, Volume 22, Issue 3, May 2009, Pages 257-261, ISSN 0889-1575, DOI: 10.1016/j.jfca.2008.10.015.
(http://www.sciencedirect.com/science/article/B6WJH-4VCWG5R-3/2/01f291944c203e452cb10e0d47ed588a)
Abstract:
The objective of the present study was to verify the feasibility of detection of coffee adulteration with roasted barley by a comparative analysis of the volatile profiles of both coffee and barley, pure and mixed, at several roasting degrees. The methodology was based on a GC-MS analysis of the headspace volatiles of several samples of ground roasted coffee and barley. The collection and concentration of the headspaces was performed by solid phase micro-extraction (SPME). The

separation of the non-adulterated and adulterated samples was accomplished by application of principal component analysis (PCA) to the chromatographic data obtained. It was observed that, the highest the degree of roast, the more easily discriminated were the adulterated samples, allowing for detection of adulterations with as low as 1% (w/w) roasted barley in dark roasted coffee samples.
Keywords: Coffee adulteration; Fraud; Gas chromatography; GC; Mass spectrometry; MS; Solid-phase micro-extraction; SPME; Multivariate statistics; Detection and quantification method; Food analysis; Food quality; Food composition

L. Navarini, D. Rivetti, Water quality for Espresso coffee, Food Chemistry, In Press, Corrected Proof, Available online 14 April 2009, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2009.04.019.
(http://www.sciencedirect.com/science/article/B6T6R-4W2NDVW-5/2/51b0ca2ee4a2526a3f88f498900ebcd2)
Abstract:
Espresso coffee extraction is the most common brewing method in Italy and it is becoming very popular in many other countries around the world. Water (including its ionic content) is an essential ingredient and its role in Espresso brewing must be taken into due consideration. It is well known that water treatment is necessary to remove possible off-flavours deriving from the disinfection performed at municipal waterworks as well as to prevent expensive professional Espresso coffee machine from scaling problems. However, there is little awareness of the direct effect of water composition on the quality of coffee beverages, particularly for Espresso coffee.
In this paper, the state of the art is reviewed with emphasis of water/coffee components interaction during the brewing process. The role played by alkalinity and selected cations on sensory properties of Espresso coffee is discussed.
Keywords: Water; Roasted coffee; Espresso coffee; Foam

Santino Orecchio, Viviana Paradiso Ciotti, Loredana Culotta, Polycyclic aromatic hydrocarbons (PAHs) in coffee brew samples: Analytical method by GC-MS, profile, levels and sources, Food and Chemical Toxicology, Volume 47, Issue 4, April 2009, Pages 819-826, ISSN 0278-6915, DOI: 10.1016/j.fct.2009.01.011.
(http://www.sciencedirect.com/science/article/B6T6P-4VD5449-1/2/7b9c8edc91702269da8fcc6a384aa8ba)
Abstract:
Roasting is a crucial step for the production of coffee, as it enables the development of color, aroma, and flavor, which are essential for the characterization of the coffee quality. At the same time, roasting may lead to the formation of not desirable compounds, such as polycyclic aromatic hydrocarbons (PAHs). In this paper, we report a method for PAHs determination in coffee brew, based on saponification and liquid-liquid extraction with small volumes of hexane, with exclusion of further processes of purification since we analyze the extract by gas chromatography with mass spectrometric detectors in the single ion monitoring mode (SIM). The total concentration of the 28 compounds investigated, expressed as the sum of concentrations ([summation operator]PAH), in coffee brew varies from 0.52 to 1.8 [mu]g/l. Carcinogenic PAHs, expressed as B[a]Peq ranged from 0.008 to 0.060 [mu]g/l. The results indicate that coffee contributes with very insignificant quantities to the daily human intake of carcinogenic PAHs. The values of calculated isomeric ratios confirm that the PAHs identified in most of the coffee samples originate from high temperature processes.
Keywords: Coffee; PAHs; Brew; GC-MS; Sources; Food

Muriel Jaquet, Isabelle Rochat, Julie Moulin, Christophe Cavin, Rodrigo Bibiloni, Impact of coffee consumption on the gut microbiota: A human volunteer study, International Journal of Food

Microbiology, Volume 130, Issue 2, 31 March 2009, Pages 117-121, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2009.01.011.
(http://www.sciencedirect.com/science/article/B6T7K-4VFC7RJ-2/2/2f8482001ed22341779b47d82070c719)
Abstract:
The impact of a moderate consumption of an instant coffee on the general composition of the human intestinal bacterial population was assessed in this study. Sixteen (16) healthy adult volunteers consumed a daily dose of 3 cups of coffee during 3 weeks. Faecal samples were collected before and after the consumption of coffee, and the impact of the ingestion of the product on the intestinal bacteria as well as the quantification of specific bacterial groups was assessed using nucleic acid-based methods. Although faecal profiles of the dominant microbiota were not significantly affected after the consumption of the coffee (Dice's similarity index = 92%, n = 16), the population of Bifidobacterium spp. increased after the 3-week test period (P = 0.02). Moreover, in some subjects, there was a specific increase in the metabolic activity of Bifidobacterium spp. Our results show that the consumption of the coffee preparation resulting from water co-extraction of green and roasted coffee beans produce an increase in the metabolic activity and/or numbers of the Bifidobacterium spp. population, a bacterial group of reputed beneficial effects, without major impact on the dominant microbiota.
Keywords: Microbiota; Coffee; RT-PCR DGGE; FISH

M. Luisa Martinez, Octavio Perez-Maqueo, Gabriela Vazquez, Gonzalo Castillo-Campos, Jose Garcia-Franco, Klaus Mehltreter, Miguel Equihua, Rosario Landgrave, Effects of land use change on biodiversity and ecosystem services in tropical montane cloud forests of Mexico, Forest Ecology and Management, In Press, Corrected Proof, Available online 21 March 2009, ISSN 0378-1127, DOI: 10.1016/j.foreco.2009.02.023.
(http://www.sciencedirect.com/science/article/B6T6X-4VWJ1S6-2/2/58a073f69c6f9db8dbb2fd05e126f2ab)
Abstract:
Tropical montane cloud forests deliver important goods and services to society, such as timber, the supply and purification of fresh water, and carbon sequestration. In spite of their relevance, current deforestation rates are very high, at the expense of affecting the provision of ecosystem services. We explore the impact of land use change in terms of provision of ecosystem services by following two approaches, one very detailed (focused on hydrological services - water quality) and another one with a broader perspective (at a large scale and considering the ecosystem service value (ESV) of several ecosystems and their ecosystem services at the same time). In the highlands of the State of Veracruz, previously forested lands were converted into coffee plantations and cattle ranches. To evaluate the role of species composition and community structure on water quality, we studied nine small watersheds (<15 ha) covered by pristine cloud forest, coffee plantations and cultivated grassland (three each). Species richness of the three land use types was similar, although species composition was as different as 90%. Overall species diversity as well as that of woody species, and growth form diversities decreased in the transformed land uses. Water quality of streams flowing through these watersheds declined: nutrients (nitrate), conductivity, cations, chloride and suspended solids were lowest in the forest streams and highest in streams from coffee watersheds, whereas grasslands were intermediate. We also calculated ecosystem service values (using the transfer value method) and estimated economic market-non-market gains and losses owing to land transformation. Loss of natural ecosystems may imply a significant economic loss to society in terms of ecosystem services, although market gains may still lead land owners to land conversion because revenues are higher. Adequate Payment for Ecosystem Services may be a good option to prevent deforestation, but the compensation should be at least equal to the opportunity cost of the promoted land use. Our

estimates are indicative of the urgent need to go beyond water quantity as the most relevant ecosystem service considered in PES schemes.
Keywords: Tropical cloud forest; Coffee plantations; Grasslands; Land use change; Ecosystem services; Biodiversity; Mexico

David L.A. Gaveau, Matthew Linkie, Suyadi, Patrice Levang, Nigel Leader-Williams, Three decades of deforestation in southwest Sumatra: Effects of coffee prices, law enforcement and rural poverty, Biological Conservation, Volume 142, Issue 3, March 2009, Pages 597-605, ISSN 0006-3207, DOI: 10.1016/j.biocon.2008.11.024.
(http://www.sciencedirect.com/science/article/B6V5X-4VC743F-1/2/53fdf58da042fe88143537d61a9c46eb)
Abstract:
In situ conservation of tropical forests often requires restricting human use and occupancy within protected areas by enforcing regulations. However, law enforcement interventions that seek to prevent deforestation rarely have been evaluated. Conservationists increasingly recognize the need to measure the effectiveness of their interventions, using an indicator of biodiversity change, such as rate of deforestation, and a counterfactual approach that addresses a fundamental question: what would have happened had there been no intervention? This study examines how law enforcement can mitigate habitat loss from small-holder coffee growing by comparing 34 years of empirical data on deforestation rates and coffee prices across a zone of high law enforcement and a zone of low law enforcement using satellite imagery, ecological data, interviews, and GIS modeling.
In the early 1980s strong law enforcement efforts were found to reduce deforestation inside Bukit Barisan Selatan National Park (BBSNP), southwest Sumatra. However, law enforcement efforts were weak in remote areas of BBSNP, where high coffee prices spurred rapid deforestation. Furthermore, law enforcement efforts were reversed by the 1997-1998 Asian economic crisis, the fall of the national president, and by new regulations surrounding regional autonomy. These findings indicate that law enforcement is critical but insufficient alone. They also highlight that rising costs of agricultural commodities can be detrimental to tropical forests and their associated biodiversity. In the long run one must act to decrease the incentives for coffee cultivation. A multi-faceted strategy that includes law enforcement and incentives to reduce poverty around PAs is proposed.
Keywords: Protected areas; Sumatra; Law enforcement; Deforestation; Coffee prices

Anne A. Nunes, Adriana S. Franca, Leandro S. Oliveira, Activated carbons from waste biomass: An alternative use for biodiesel production solid residues, Bioresource Technology, Volume 100, Issue 5, March 2009, Pages 1786-1792, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.09.032.
(http://www.sciencedirect.com/science/article/B6V24-4TVY5C4-1/2/de605c87101d028d3fcd33d8f410cd41)
Abstract:
Defective coffee press cake, a residue from coffee oil biodiesel production, was evaluated as raw material for production of an adsorbent for removal of methylene blue (MB) from aqueous solution. Batch adsorption tests were performed at 25 [degree sign]C and the effects of particle size, contact time, adsorbent dosage and pH were investigated. Preliminary adsorption tests indicated that thermal treatment is necessary in order to improve adsorption capacity. Adsorption kinetics was determined by fitting first and second-order kinetic models to the experimental data, with the second-order model providing the best description of MB adsorption onto the prepared adsorbent. The experimental adsorption equilibrium data were fitted to Langmuir, Freundlich and Temkin adsorption models, with the last two providing the best fits. The experimental data obtained in the present study indicated that this type of waste material is a suitable candidate for use in the

production of adsorbents for removal of cationic dyes, thus contributing for the implementation of sustainable development in both the coffee and biodiesel production chains.
Keywords: Adsorption; Biodiesel solid waste; Toxic pollutants

C. Marin, M. Dollet, M. Pages, P. Bastien, Large differences in the genome organization of different plant Trypanosomatid parasites (Phytomonas spp.) reveal wide evolutionary divergences between taxa, Infection, Genetics and Evolution, Volume 9, Issue 2, March 2009, Pages 235-240, ISSN 1567-1348, DOI: 10.1016/j.meegid.2008.11.009.
(http://www.sciencedirect.com/science/article/B6W8B-4V3HFC7-1/2/a9c1ab7461cd78bb6ae25ec3288ecb9d)
Abstract:
All currently known plant trypanosomes have been grouped in the genus Phytomonas spp., although they can differ greatly in terms of both their biological properties and effects upon the host. Those parasitizing the phloem sap are specifically associated with lethal syndromes in Latin America, such as, phloem necrosis of coffee, `Hartrot' of coconut and `Marchitez sorpresiva' of oil palm, that inflict considerable economic losses in endemic countries. The genomic organization of one group of Phytomonas (D) considered as representative of the genus has been published previously. The present work presents the genomic structure of two representative isolates from the pathogenic phloem-restricted group (H) of Phytomonas, analyzed by pulsed field gel electrophoresis followed by hybridization with chromosome-specific DNA markers. It came as a surprise to observe an extremely different genomic organization in this group as compared with that of group D. Most notably, the chromosome number is 7 in this group (with a genome size of 10 Mb) versus 21 in the group D (totalling 25 Mb). These data unravel an unsuspected genomic diversity within plant trypanosomatids, that may justify a further debate about their division into different genera.
Keywords: Phytomonas; Plant pathogen; Hartrot; Trypanosomatids; Genome; Molecular karyotype; Taxonomy

Giampiero Sacchetti, Carla Di Mattia, Paola Pittia, Dino Mastrocola, Erratum to 'Effect of roasting degree, equivalent thermal effect and coffee type on the radical scavenging activity of coffee brews and their phenolic fraction' [J. Food Eng. 90 (2009) 74-80], Journal of Food Engineering, Volume 91, Issue 2, March 2009, Page 372, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.09.001.
(http://www.sciencedirect.com/science/article/B6T8J-4TFW94W-2/2/71d0eb088df326e2c351d2e9e334020b)

Liangzhi You, Stanley Wood, Ulrike Wood-Sichra, Generating plausible crop distribution maps for Sub-Saharan Africa using a spatially disaggregated data fusion and optimization approach, Agricultural Systems, Volume 99, Issues 2-3, February 2009, Pages 126-140, ISSN 0308-521X, DOI: 10.1016/j.agsy.2008.11.003.
(http://www.sciencedirect.com/science/article/B6T3W-4VC7452-1/2/6c285626ef38df9bd9978aeb3048f592)
Abstract:
Large gaps exist in our knowledge of the current geographic distribution and spatial patterns of performance of crops, and these gaps are unlikely to be filled. In addition, even the spatial scale of many sub-national statistical reporting units remains too coarse to capture patterns of spatial heterogeneity in crop production and performance that are likely important from a policy and investment planning perspective. To fill these spatial data gaps we have developed and applied a meso-scale model for the spatial disaggregation of crop production. Using a cross-entropy approach, our model makes plausible pixel-scale assessments of the spatial distribution of crop production within geopolitical units (e.g. countries or sub-national provinces and districts). The

pixel-scale allocations are performed through the compilation and judicious fusion of relevant spatially-explicit data, including: production statistics, land use data, satellite imagery, biophysical crop 'suitability' assessments, population density, and distance to urban centers, as wells as any prior knowledge about the spatial distribution of individual crops. The development, application and validation of a prior version of the model in Brazil strongly suggested that our spatial allocation approach shows considerable promise. This paper describes efforts to generate crop distribution maps for Sub-Saharan Africa for the year 2000 using this approach. Apart from the empirical challenge of applying the approach across many countries, the application includes three significant model improvements: (1) the ability to cope with production data sources that provided different degrees of spatial disaggregation for different crops within a single country; (2) the inclusion of a digital map of irrigation intensity as a new input layer; and (3) increased disaggregation of rainfed production systems. Applying the modified spatial allocation model we generated 5 min (approximately 10 km) resolution grid maps for the following 20 major crops across Sub-Saharan Africa: barley, dry beans, cassava, cocoa, coffee, cotton, cow peas, groundnuts, maize, millet, oil palm, plantain, potato, rice, sorghum, soybeans, sugar cane, sweet potato, wheat, and yam. The approach provides plausible results but also highlights the need for much more reliable input data for the region, especially with regard to sub-national production statistics and satellite-based estimates of cropland extent and intensity.
Keywords: Sub-Sahara Africa; Cross entropy; Satellite image; Spatial allocation; Agricultural production; Crop suitability

Melissa C. Nelson, Dianne Neumark-Sztainer, Peter J. Hannan, Mary Story, Five-Year Longitudinal and Secular Shifts in Adolescent Beverage Intake: Findings from Project EAT (Eating Among Teens)-II, Journal of the American Dietetic Association, Volume 109, Issue 2, February 2009, Pages 308-312, ISSN 0002-8223, DOI: 10.1016/j.jada.2008.10.043.
(http://www.sciencedirect.com/science/article/B758G-4VFF6Y8-P/2/277a45b178d8fe60291fc26918e1dbcf)
Abstract:
Detailed research examining concurrent longitudinal and secular changes in adolescent beverage intake is not currently available, particularly since the year 2000. This study's objective was to evaluate these trends in beverage intake in a large, diverse adolescent cohort. Project EAT (Eating Among Teens)-II is a 5-year longitudinal study (n=2,516) including two cohorts, which allows for the observation of longitudinal changes from early to mid-adolescence (junior high to high school) and from mid- to late adolescence (high school to post high school). Project EAT-II also examined secular trends in adolescent health behavior from 1999-2004 in mid-adolescence. Daily beverage servings were assessed using the Youth and Adolescent Food Frequency Questionnaire. Longitudinal findings indicate that intake of soda and sugar-sweetened beverages (including soda, sweetened iced teas, and fruit drinks) increased significantly among younger males, and alcohol increased across all groups ($P<0.01$). Consumption of certain beverages decreased with age: fruit juice (among all males and older females, $P<=0.02$), milk (older adolescents, $P<0.01$), other milk beverages (all females and older males, $P<0.01$), diet soda (younger adolescents, $P<0.01$), and coffee/tea (all males and younger females, $P<0.01$). Significant secular decreases were observed in fruit juice and coffee/tea for males and females ($P<=0.05$). Overall, these findings reflect recent secular and longitudinal shifts in adolescent beverage consumption during the critical transition period from early to mid-adolescence and mid- to late adolescence. Although additional research is needed to better understand nuances in adolescent consumption patterns, registered dietitians and other health care practitioners working with adolescents should address the importance of limiting sugar-sweetened beverages with low nutrient density.

Carlos H. Vergara, Ernesto I. Badano, Pollinator diversity increases fruit production in Mexican coffee plantations: The importance of rustic management systems, Agriculture, Ecosystems & Environment, Volume 129, Issues 1-3, January 2009, Pages 117-123, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.08.001.
(http://www.sciencedirect.com/science/article/B6T3Y-4TGGCHG-1/2/53152de9d09f982b32d23c9a0503ebe0)
Abstract:
Pollination is an ecological process that provides important services to humans. Pollination service in agroecosystems depends on several factors, including the land management systems used by farmers. Here we focused on the effects of insect pollinator diversity on coffee fruit production along a gradient of management systems in central Veracruz, Mexico. The gradient ranged from low environmental impact management systems (the native forest is not completely removed) to high environmental impact management systems (the native forest is completely removed). We hypothesized that pollinator diversity should be higher in low-impact systems. Then, if fruit production is positively related to pollinator diversity, plantations with low-impact management systems should display higher fruit production than plantations with high-impact management systems. We used observational and experimental data to test this hypothesis. Our results indicated that low-impact management systems have higher species richness and relative diversity (measured with the Shannon-Wiener diversity index) of pollinators than high-impact management systems. In all cases, fruit production was positively related with species richness and diversity of pollinators. Moreover, fruit production was higher in low-impact than in high-impact management systems. These results suggest that the diversity of insect pollinators can be influenced by the management system applied by farmers, and that such effects may have strong consequences on coffee fruit production.
Keywords: Coffee; Mexico; Pollination service; Pollinator diversity; Fruit production

Aske Skovmand Bosselmann, Klaus Dons, Thomas Oberthur, Carsten Smith Olsen, Anders Raebild, Herman Usma, The influence of shade trees on coffee quality in small holder coffee agroforestry systems in Southern Colombia, Agriculture, Ecosystems & Environment, Volume 129, Issues 1-3, January 2009, Pages 253-260, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.09.004.
(http://www.sciencedirect.com/science/article/B6T3Y-4TRHC0K-1/2/b43e92cfd9d545207eaaa6c9d46c5485)
Abstract:
Production of coffee, especially by small holders, is often associated with various forms of shade management. To analyse the effects of shade on physical coffee quality and on sensorial cup quality of Coffea arabica L. cv. Caturra KMC, a study was carried out with 94 plots on 16 farms in two municipalities, Timana and Oporapa, located at elevations from 1272 to 1730 masl. in Huila, Colombia. The study was designed with emphasis on shade cover variation within each of the two study areas, while minimizing the variability of environment, agronomic management other than shade, and post-harvest processing. 46 samples of shade coffee and 46 samples of sun coffee were evaluated for physical and sensorial attributes using three professional coffee cuppers (assessors). A principal component analysis including all quality and environmental variables showed that sensory attributes were influenced negatively by shade, and that physical attributes were influenced positively by altitude. A mixed linear model, with coffee cupper and farm as random variables, revealed different shade effects on coffee quality in the two areas. In Oporapa, situated at high altitudes, shade had a negative effect on fragrance, acidity, body, sweetness and preference of the beverage, while no effect was found on the physical quality. In Timana, situated at lower altitudes, shade did not have a significant effect on sensorial attributes, but significantly reduced the number of small beans. At high altitudes with low temperatures and no nutrient or water deficits, shade trees may thus have a partly adverse effect on C. arabica cv. Caturra resulting in reduced sensory quality. The occurrence of berry borer (Hypothenemus hampei) was

lower at high altitudes and higher under shade. Future studies on shade and coffee quality should focus on the interaction between physical and chemical characteristics of beans.
Keywords: Coffea arabica; Shade; Sensory quality; Physical quality; Mixed linear model; Colombia

Jean-Paul Lachaud, Gabriela Perez-Lachaud, Impact of natural parasitism by two eucharitid wasps on a potential biocontrol agent ant in southeastern Mexico, Biological Control, Volume 48, Issue 1, January 2009, Pages 92-99, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.09.006.
(http://www.sciencedirect.com/science/article/B6WBP-4TJTX78-3/2/35df5ef76f39a7f10892b8d847d3a9bd)
Abstract:
Eucharitids are specialized parasitoids of ants. The biology, life cycle and chemical ecology are known for a number of species, but the study of the impact of eucharitid wasps upon their ant hosts has been seldom addressed. Here, we determine the prevalence of the parasitism of two sympatric Kapala species upon a population of the neotropical ant Ectatomma ruidum, along a 12-month sampling period. Adult and immature parasitoids were present in the nests all year round, and several cases of superparasitism were observed. Parasitism varied strongly among the nests for any collecting date and among collecting dates, but the prevalence of Kapala parasitoids increased significantly during the rainy season, and the probability for a nest of being parasitized was positively correlated with colony size, particularly with cocoon number. At the population scale, more than 28% of all E. ruidum pupae produced during the ant reproductive and dispersal period (June) were infested. Our results are discussed from the point of view of the impact of these parasitoids on the colonies of E. ruidum, a potential biocontrol agent in coffee and cocoa plantations in southeastern Mexico.
Keywords: Prevalence of parasitism; Host-parasitoid interaction; Negative impact; Kapala izapa; Kapala iridicolor; Ectatomma ruidum

A.J. Adi, Z.M. Noor, Waste recycling: Utilization of coffee grounds and kitchen waste in vermicomposting, Bioresource Technology, Volume 100, Issue 2, January 2009, Pages 1027-1030, ISSN 0960-8524, DOI: 10.1016/j.biortech.2008.07.024.
(http://www.sciencedirect.com/science/article/B6V24-4T9BXGD-5/2/f1a75977d18bec1546a8b9fbf0fe03a1)
Abstract:
Vermicomposting using Lumbricus rubellus for 49 days was conducted after 21 days of pre-composting. Three different combination of treatments were prepared with eight replicates for each treatment namely cow dung: kitchen waste in 30:70 ratio (T1), cow dung: coffee grounds in 30:70 ratio (T2), and cow dung: kitchen waste: coffee grounds in 30:35:35 ratio (T3). The multiplication of earthworms in terms of numbers and weight were measured at the end of vermicomposting. Consequently, only T2 showed significant increase (from it initial stage) compared to other treatments. The presence of coffee grounds in T2 and T3 showed higher percentage of nutrient elements in vermicompost produced. The data reveal that coffee grounds can be decomposed through vermicomposting and help to enhance the quality of vermicompost produced rather than sole use of kitchen waste in vermicomposting.
Keywords: Coffee grounds; Kitchen waste; Nutrient element; Lumbricus rubellus; Vermicomposting

Lara Manzocco, Corrado Lagazio, Coffee brew shelf life modelling by integration of acceptability and quality data, Food Quality and Preference, Volume 20, Issue 1, January 2009, Pages 24-29, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2008.06.005.
(http://www.sciencedirect.com/science/article/B6T6T-4SWFNPT-1/2/8d06da45cc97303d8965d15ed522e883)
Abstract:

A methodology for the development of shelf life models predicting consumer acceptability of coffee brew on the basis of simple and easily detectable quality indices was proposed. Coffee brew was assessed during storage for consumer acceptability using both acceptability scoring methodology and evaluation of consumer rejection by survival analysis. Samples were also analysed for hydrogen ion concentration and intensity of sensory attributes (acid, off-flavour and bitter) by a trained sensory panel. Hydrogen ion concentration and sourness resulted to be the indices best correlating with the percentage of consumer rejecting the product during storage. Mathematical functions predicting hydrogen ion concentration and sourness as a function of the risk of consumer rejection were defined. These equations provided information to assist companies in choosing acceptance limits and were integrated with classic shelf life kinetic approach to produce shelf life models accounting for consumer response. Due to lower uncertainty of hydrogen ion concentration data as compared to sourness sensory data, only the former resulted to be a useful indicator of coffee brew shelf life.
Keywords: Shelf life modelling; Acceptance limit; Survival analysis; Consumer response; Coffee

Susana Andueza, Lara Manzocco, M. Paz de Pena, Concepcion Cid, Cristina Nicoli, Caffeic acid decomposition products: Antioxidants or pro-oxidants?, Food Research International, Volume 42, Issue 1, January 2009, Pages 51-55, ISSN 0963-9969, DOI: 10.1016/j.foodres.2008.08.006.
(http://www.sciencedirect.com/science/article/B6T6V-4T8SKY9-1/2/7a33248b4ec89fc2318fae702233dcc0)
Abstract:
The potential of phenol antioxidants to suffer decomposition reactions leading to the formation of products exerting pro-oxidant activity was studied. A hydroalcoholic solution containing caffeic acid was assessed for antioxidant and pro-oxidant activity during heating at 90 [degree sign]C to simulate the heat maintenance of the coffee brews in thermos. Decomposition products were also evaluated by HPLC analysis. In the early steps of caffeic acid decomposition, a decrease in antioxidant capacity was detected, associated to a significant increase in pro-oxidant activity because the development of pro-oxidant compounds. On further heating, an increase in antioxidant activity associated to a decrease in pro-oxidant molecules previously formed and the formation of polymers with higher antioxidant activity was observed. A mechanistic route of caffeic acid decomposition under thermal conditions according to the HPLC analysis was proposed. This study clearly showed that caffeic acid, a well known antioxidant, may also act as pro-oxidant due to thermal decomposition.
Keywords: Pro-oxidant; Antioxidant; Caffeic acid; Heat treatment

Giampiero Sacchetti, Carla Di Mattia, Paola Pittia, Dino Mastrocola, Effect of roasting degree, equivalent thermal effect and coffee type on the radical scavenging activity of coffee brews and their phenolic fraction, Journal of Food Engineering, Volume 90, Issue 1, January 2009, Pages 74-80, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.06.005.
(http://www.sciencedirect.com/science/article/B6T8J-4SRCJGX-3/2/795153a1c938624d1355ee5599c2220f)
Abstract:
The radical scavenging activity (RSA) of coffee brews obtained from different types of coffee was studied as a function of the roasting degree and equivalent thermal effect (expressed as), and the relative contribution of the phenolic fraction (PF) and non-phenolic fraction (NPF) to the overall RSA was evaluated. Brews extracted from medium roasted coffee showed a higher RSA than those from green coffee due to an increase of the RSA of the NPF upon roasting. The RSA of the NPF increased with increasing roasting degree together with the accumulation of brown coloured Maillard reaction products (MRPs). Brews from dark coffee showed lower RSA than those from medium roasted coffee due to polyphenols degradation which, in turn, caused an RSA depletion not counterbalanced by an increase of the RSA of NPF. The relative contribution of NPF to the

overall RSA of the brew is in fact much lower than that of the PF. Roasting processes with similar values resulted in the same RSA independent of an average temperature variation from 170 to 190 [degree sign]C and coffee type.
The AOA changes in brews from commercial coffee samples (medium and dark roasted) were more dependent on roasting severity than on the type of coffee.
Keywords: Coffee; Antioxidant activity; Roasting; Equivalent thermal effect; Browning; Maillard reaction; Polyphenols

Vazquez-Ovando Alfredo, Rosado-Rubio Gabriel, Chel-Guerrero Luis, Betancur-Ancona David, Physicochemical properties of a fibrous fraction from chia (Salvia hispanica L.), LWT - Food Science and Technology, Volume 42, Issue 1, 2009, Pages 168-173, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.05.012.
(http://www.sciencedirect.com/science/article/B6WMV-4SK633F-4/2/780862f25d97b4339470ccef3b9d895d)
Abstract:
An evaluation was done of some physicochemical properties of a fiber-rich fraction (FRF) obtained by dry processing of defatted chia (Salvia hispanica) flour. The fiber-rich fraction (FRF) had 29.56 g/100 g crude fiber content and 56.46 g/100 g total dietary fiber (TDF) content, of which 53.45 g/100 g was insoluble dietary fiber (IDF) and 3.01 g/100 g was soluble dietary fiber (SDF). The FRF water-holding capacity was 15.41 g/g, its water absorption capacity 11.73 g/g, and its organic molecule absorption capacity 1.09 g/g. The FRF also had low oil-holding (2.02 g/g) and water adsorption (0.3 g/g) capacities. Emulsifying activity in this fraction was 53.26% and emulsion stability was 94.84%. Its evaluated antioxidant activity was 488.8 [mu]mol/L Trolox equivalents/g FRF, which is higher than for many cereals and similar to drinks such as wine, tea, coffee and orange juice. The chia FRF values for the evaluated properties, particularly for water-holding, oil-holding and organic molecule absorption capacity, suggest it could be a useful ingredient in dietetic products such as baked and fried foods, among others.
Keywords: Chia; Salvia hispanica; Dietary fiber; Physicochemical properties; Functional properties

Adriana Pavesi Arisseto, Maria Cecilia de Figueiredo Toledo, Yasmine Govaert, Joris van Loco, Stephanie Fraselle, Jean-Marie Degroodt, Daniela Cristina Rosseto Caroba, Contribution of selected foods to acrylamide intake by a population of Brazilian adolescents, LWT - Food Science and Technology, Volume 42, Issue 1, 2009, Pages 207-211, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.05.024.
(http://www.sciencedirect.com/science/article/B6WMV-4SNWW9N-1/2/d65d47c008a48a9611ee7d3c77ce5f1e)
Abstract:
Acrylamide dietary intakes from selected foods are estimated in this work for Brazilian adolescents from Sao Paulo State. The exposure assessment was carried out by combining levels of acrylamide in foods determined analytically by an accredited LC-MS/MS method, with individual food consumption data, using a deterministic approach. Data on food consumption were generated using 24 h recall applied to 578 individuals aged from 11 to 17 years, between July and August 2001. The mean and maximum acrylamide intakes were estimated to be 0.12 and 1.92 [mu]g/kg bw/day, respectively. At 50th, 95th and 97.5th percentiles, the average intakes were 0.04, 0.55 and 0.77 [mu]g/kg bw/day, respectively. Boys presented exposure levels lower than girls, while the acrylamide intake by younger adolescents (11-14 years) was higher compared to the older group (15-17 years). The foods that contributed most to acrylamide exposure were French fries, French bread, water and salt biscuit and coffee.
Keywords: Acrylamide; Exposure assessment; Adolescents; Carcinogen

Shalene Jha, Christopher W. Dick, Shade coffee farms promote genetic diversity of native trees, Current Biology, Volume 18, Issue 24, 23 December 2008, Pages R1126-R1128, ISSN 0960-9822, DOI: 10.1016/j.cub.2008.11.017.
(http://www.sciencedirect.com/science/article/B6VRT-4V6JFJV-D/2/b7754e790a44926b7b402d01f241a890)
Abstract: Summary
Coffee is cultivated across 11 million hectares (ha) of land within the world's richest centers of terrestrial biodiversity [1]. In tropical America, coffee is traditionally grown under a diverse canopy of overstory shade trees, which enhances the quality of the coffee farm as a conservation matrix and supports a broad spectrum of pollinators that increase fruit set per bush [2], [3] and [4]. Unlike sun coffee monocultures, shade coffee also sustains a diverse array of vertebrates, including bats and migratory birds, which provide farmers with many ecological services, such as insect predation [5], and may also conserve seed dispersal processes necessary for native tree re-establishment [6]. However, little is known about the capacity of shade coffee farms to maintain gene flow and genetic diversity of remnant tree populations across this common tropical landscape. In this study, we conducted genetic analyses that reveal recent colonization and extensive gene flow of a native tree species in shade coffee farms in Chiapas, Mexico. The high genetic diversity and overlapping deme structure of the colonizing trees also show that traditional coffee farms maintain genetic connectivity with adjacent habitats and can serve as foci of forest regeneration.

Jose A. Rufian-Henares, Francisco J. Morales, Microtiter plate-based assay for screening antimicrobial activity of melanoidins against E. coli and S. aureus, Food Chemistry, Volume 111, Issue 4, 15 December 2008, Pages 1069-1074, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.05.027.
(http://www.sciencedirect.com/science/article/B6T6R-4SH0Y55-6/2/4524a1260566e1e86c57a02670aa83e3)
Abstract:
A rapid plate reader based method examining the antimicrobial activity of both model and food melanoidins (coffee, beer, sweet wine) is described. Antimicrobial activity against Escherichia coli and Staphylococcus aureus is evaluated as area under the growth curve compared to a control. Method was settled for an aqueous melanoidin concentration of 2 mg/ml inoculated to 106 cfu/ml culture. All tested model and food melanoidins exerted antimicrobial activity in some extent, but inhibition was significantly higher over S. aureus (Gram-positive) than E. coli (Gram-negative). Antimicrobial activity can be further quantified by expressing it as OTEV (oxytetracyclin equivalent value, [mu]g/l) which could serve to compare the results obtained within different laboratories, methodologies and/or compounds. Results indicate that both strains have different sensitivity against the presence of melanoidins and probably different mechanism of inhibition. Procedure can be used for a rapid screening of the potential antimicrobial properties of melanoidins, and subsequently to Maillard reaction products as well, against pathogenic strains in order to isolated substances with biological activity.
Keywords: Antimicrobial activity; Heat treated foods; Maillard reaction; Melanoidins

Paramee Noonim, Warapa Mahakarnchanakul, Kristian F. Nielsen, Jens C. Frisvad, Robert A. Samson, Isolation, identification and toxigenic potential of ochratoxin A-producing Aspergillus species from coffee beans grown in two regions of Thailand, International Journal of Food Microbiology, Volume 128, Issue 2, 10 December 2008, Pages 197-202, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.08.005.
(http://www.sciencedirect.com/science/article/B6T7K-4T8JX8R-1/2/100ab764dd0082c49cea53923e335223)
Abstract:

In 2006 and 2007, 32 Thai dried coffee bean samples (Coffea arabica) from two growing sites of Chiang Mai Province, and 32 Thai dried coffee bean samples (Coffea canephora var. robusta) from two growing sites of Chumphon Province, Thailand, were collected and assessed for the distribution of fungi with the potential to produce ochratoxin A (OTA). The overall percentage of fungal contamination in coffee was 98% and reduced to 60% after surface disinfection. There were remarkable ecological differences in the composition of ochratoxigenic species present in these two regions. Arabica coffee bean samples from the North had an average of 78% incidence of colonization with Aspergillus of section Circumdati with Aspergillus westerdijkiae and A. melleus as the predominant species. Aspergillus spp. of section Nigri were found in 75% of the samples whereas A. ochraceus was not detected. Robusta coffee beans from the South were 98-100% contaminated with predominantly A. carbonarius and A. niger. A. westerdijkiae was only found in one sample. The diversity of the fungal population was probably correlated with the geographical origin of the coffee, coffee cultivar, and processing method. Representative isolates of section Circumdati (52) and Nigri (82) were examined for their OTA production using HPLC with fluorescence detection. Aspergillus westerdijkiae (42 isolates out of 42), A. steynii (13/13), and A. carbonarius (35/35) in general produced large amounts of OTA, while one isolate of A. sclerotiorum produced intermediate amounts of OTA. 13% of the A. niger isolates produced OTA in intermediate amounts. OTA levels in coffee bean samples were analyzed using the Ridascreen(R) OTA ELISA kits. Of the 64 coffee bean samples analyzed, 98% were contaminated with OTA in levels of < 0.6-5.5 [micro sign]g/kg (Arabica) and 1-27 [micro sign]g/kg (Robusta). Presence of OTA in representative coffee samples was also confirmed by LC-MS/MS after ion-exchange purification.
Keywords: Aspergillus; Ochratoxin A; Coffee; Phylogenetic analysis

Robert A. Rice, Agricultural intensification within agroforestry: The case of coffee and wood products, Agriculture, Ecosystems & Environment, Volume 128, Issue 4, December 2008, Pages 212-218, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.06.007.
(http://www.sciencedirect.com/science/article/B6T3Y-4T24FJM-2/2/60241fa3039684a08697eb214b685359)
Abstract:
Compared to the environmental and conservation value as refuges for biodiversity, less is known about the social and economic value of shaded coffee systems. The agroforestry system can serve as a source of non-coffee products for diverse purposes. This study focuses on the role of shade trees in smallholder coffee farms, examining the wood products derived from the shaded coffee system. Data presented from surveys with 185 growers in Peru and 153 growers in Guatemala show that the consumption and sale of all non-coffee products account for a fifth to a third of the total value realized from the agroforestry system. Fuelwood and construction materials account for much of this value. Differences seen between countries can be traced to agricultural intensification - the degree to which the coffee agroforestry system is 'technified' (i.e., managed with a reduced shade tree cover and diversity, high-yielding cultivars, agrochemical inputs, etc.) - as well as the relative demand for wood resources and farmers' access to natural forest systems.
Keywords: Agroforestry; Shade coffee; Peru; Guatemala; Fuelwood; Lumber; Intensification

Cristina Ferreira Silva, Luis Roberto Batista, Lucas Magalhaes Abreu, Eustaquio Souza Dias, Rosane Freitas Schwan, Succession of bacterial and fungal communities during natural coffee (Coffea arabica) fermentation, Food Microbiology, Volume 25, Issue 8, December 2008, Pages 951-957, ISSN 0740-0020, DOI: 10.1016/j.fm.2008.07.003.
(http://www.sciencedirect.com/science/article/B6WFP-4SYJS59-1/2/6d9b0977c997c36768cf4f7b0876eb0d)
Abstract:

Bacteria, yeasts and filamentous fungi were isolated during natural coffee processing. Bacteria were isolated in greater numbers at the beginning of the fermentation, when the moisture of the coffee beans was around 68%. Gram-positive bacteria represented 85.5% of all bacteria isolated, and Bacillus was the predominant genus (51%). Gram-negative species of the genera Serratia, Enterobacter and Acinetobacter were also found. Approximately 22% of 940 randomly chosen isolates of microorganisms were yeasts. Debaryomyces (27%), Pichia (18.9%) and Candida (8.0%) were the most commonly found genera, and these three genera tended to appear more often as the fruit was fermented and dried. Aspergillus was the most abundant genus besides Penicillium, Fusarium and Cladosporium, with 42.6% of the total fungi isolates. The genera and species identified included members known to have pectinase and cellulase activities. Of the 10 organic acids analyzed and quantified in coffee beans, acetic and lactic acids may have been generated by microbial activity. Butyric acid was not detected in any sample.
Keywords: Bacteria; Yeasts; Filamentous fungi; Coffee processing; Microbial succession

T. Husoy, M. Haugen, M. Murkovic, D. Jobstl, L.H. Stolen, T. Bjellaas, C. Ronningborg, H. Glatt, J. Alexander, Dietary exposure to 5-hydroxymethylfurfural from Norwegian food and correlations with urine metabolites of short-term exposure, Food and Chemical Toxicology, Volume 46, Issue 12, December 2008, Pages 3697-3702, ISSN 0278-6915, DOI: 10.1016/j.fct.2008.09.048.
(http://www.sciencedirect.com/science/article/B6T6P-4TJ1HR5-4/2/cb061b537e7b680cb055c5bf15e16c99)
Abstract:
5-Hydroxymethylfurfural (HMF) is formed in carbohydrate-rich food during acid-catalysed dehydration and in the Maillard reaction from reducing sugars. HMF is found in mg quantities per kg in various foods. HMF is mainly metabolised to 5-hydroxymethyl-2-furoic acid (HMFA), but unknown quantities of the mutagenic 5-sulphoxymethylfurfural (SMF) may also be formed, making HMF potentially hazardous to humans. We determined the HMF content in Norwegian food items and estimated the dietary intake of HMF in 53 volunteers by means of 24 h dietary recall. The estimated intakes of HMF were correlated with urinary excretion of HMFA. Coffee, prunes, dark beer, canned peaches and raisins had the highest levels of HMF. The 95th percentile of the estimated daily dietary intake of HMF and the 24 h urinary excretion of HMFA were 27.6 and 28.6 mg, respectively. Coffee, dried fruit, honey and alcohol were identified as independent determinants of urinary HMFA excretion. Most participants had lower estimated HMF intake than the amount of HMFA excreted in urine. In spite of this there was a significant correlation ($r = 0.57$, $P < 0.001$) between the estimated HMF intake and urinary HMFA. Further studies are needed to reveal alternative sources for HMF exposure.
Keywords: Food; 5-Hydroxymethylfurfural; Human exposure; Urinary metabolite

Mai Yamada, Kentaro Murakami, Satoshi Sasaki, Yoshiko Takahashi, Hitomi Okubo, Soft Drink Intake Is Associated with Diet Quality Even among Young Japanese Women with Low Soft Drink Intake, Journal of the American Dietetic Association, Volume 108, Issue 12, December 2008, Pages 1997-2004, ISSN 0002-8223, DOI: 10.1016/j.jada.2008.09.033.
(http://www.sciencedirect.com/science/article/B758G-4V03C8S-N/2/c542a03c2be2f1cedcaef5cece4afa32)
Abstract: Background
Unsweetened traditional Japanese tea has long been the main beverage consumed in Japan, with soft drinks only recently forming a part of people's diets. Evidence suggests an association between soft drink intake and poor diet quality among youth in the United States. The association is not yet fully examined in the population with relatively low intake level of soft drinks such as the current Japanese population.Objective
To investigate the association of soft drink intake with dietary intake among young Japanese women.Design

A cross-sectional survey assessed dietary intake using a validated, self-administered, diet history questionnaire.Subjects/setting
Female dietetics students aged 18 to 20 years (n=3,931) in April 2005 in Japan.Statistical analyses
Multivariate linear regression analyses examined the relationship of soft drink intake with that of foods, beverages, energy, and nutrients.Results
Mean+/-standard deviation soft drink intake was 70.6+/-93.0 g/1,000 kcal. Soft drink intake was significantly associated positively with intake of confections, fat and oil, noodles, 100% vegetable and fruit juices, diet soft drinks, energy, and carbohydrates and negatively with intake of vegetables, fruits, pulses, fish and shellfish, rice, eggs, potatoes, milk, coffee and black tea, traditional Japanese tea, protein, dietary fiber, cholesterol, and most of the micronutrients examined.Conclusions
Not only among Western populations, but also among non-Western populations, soft drink intake may be an important factor to consider in evaluating overall dietary intake and diet quality.

S. Guerra, C. Lagazio, L. Manzocco, M. Barnaba, R. Cappuccio, Risks and pitfalls of sensory data analysis for shelf life prediction: Data simulation applied to the case of coffee, LWT - Food Science and Technology, Volume 41, Issue 10, December 2008, Pages 2070-2078, ISSN 0023-6438, DOI: 10.1016/j.lwt.2008.01.011.
(http://www.sciencedirect.com/science/article/B6WMV-4RR900R-3/2/3775f8ec4cf4ddff73d1019b6f04bfac)
Abstract:
Shelf life determination by means of sensory analysis is thought to be of paramount importance even in case of a microbiologically stable food. Several approaches are found in literature, both in terms of data collection and data processing. Whatever method is used, the subjectivity in the choice of some parameters for data collection and analysis can deeply influence the final result. We put in evidence some typical pitfalls that the researcher should avoid when planning the test and analysing data. A comparison between the most utilized techniques in sensory data processing for shelf life prediction is reported, taking as a fil rouge the case of coffee. In particular, a non-linear regression, a logistic regression and a survival models were applied to simulated data frames of coffee. We evaluated the influence of the choice of acceptability limits, as well as the effect of data variability and we found out that they strongly influence predictions, as well as the panel and the batch of product do. We suggest that in case of microbiologically stable food, like coffee, shelf life is not univocal and it is a choice of the company or the researcher, rather than the result of the interaction between product and consumer.
Keywords: Shelf life; Sensory analysis; Logistic regression; Weibull model; Coffee

I. Valencia, M.N. O'Grady, D. Ansorena, I. Astiasaran, J.P. Kerry, Enhancement of the nutritional status and quality of fresh pork sausages following the addition of linseed oil, fish oil and natural antioxidants, Meat Science, Volume 80, Issue 4, December 2008, Pages 1046-1054, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2008.04.024.
(http://www.sciencedirect.com/science/article/B6T9G-4SDGR7F-4/2/6a3e143567e04d88f311601a82719acc)
Abstract:
Fresh pork sausages (pork shoulder, pork back fat, water, rusk and seasoning) were manufactured where 15% of the pork back fat was substituted with linseed oil (LO) or fish oil (FO). Green tea catechins (GTC) and green coffee antioxidant (GCA) were added to both LO (LGTC 200 and LGCA 200) and FO (FGTC 200 and FGCA 200) substituted sausages at a level of 200 mg/kg. Raw and cooked pork sausages were either over-wrapped with oxygen permeable film (aerobic storage) or stored in modified atmosphere packages (MAP) containing 80% O2:20% CO2 or 70% N2:30% CO2, respectively for 7 days at 4 [degree sign]C. Effects on fatty acid profiles,

lipid oxidation, colour and sensorial properties were investigated. [alpha]-Linolenic acid increased from 1.34% (control) to 8.91% (LO) and up to 11.2% (LGTC 200 and LGCA 200). Addition of fish oil increased levels of EPA from 0.05% (control) to 2.83% (FO), 3.02% (FGTC 200) and 2.87% (FGCA 200) and DHA levels increased from 0.04% (control) to a maximum of 1.93% (FGTC 200). Lipid oxidation was low in raw and cooked linseed oil containing sausages. GTC (200 mg/kg) significantly ($P < 0.05$) reduced lipid oxidation in raw fish oil containing sausages after 7 days of storage. Colour parameters in raw pork sausages were unaffected by the packaging atmosphere. L* lightness values were lower ($P < 0.05$) in LGTC 200 and a* redness values lower ($P < 0.05$) in LGTC 200 and FGTC 200 after 7 days of storage. Sensory scores of cooked pork sausages were unaffected by linseed oil addition. Flavour and overall acceptability scores in cooked fish oil containing sausages were improved by GTC addition. Results obtained demonstrate potential for the production of nutritionally enhanced fresh pork sausages.
Keywords: Linseed oil; Fish oil; Green tea catechins; Green coffee antioxidant; Lipid oxidation

Jesper Karehed, Inge Groeninckx, Steven Dessein, Timothy J. Motley, Birgitta Bremer, The phylogenetic utility of chloroplast and nuclear DNA markers and the phylogeny of the Rubiaceae tribe Spermacoceae, Molecular Phylogenetics and Evolution, Volume 49, Issue 3, December 2008, Pages 843-866, ISSN 1055-7903, DOI: 10.1016/j.ympev.2008.09.025.
(http://www.sciencedirect.com/science/article/B6WNH-4TN0KWD-1/2/fcf9c8f30abb24a0d6c0d7b2138de203)
Abstract:
The phylogenetic utility of chloroplast (atpB-rbcL, petD, rps16, trnL-F) and nuclear (ETS, ITS) DNA regions was investigated for the tribe Spermacoceae of the coffee family (Rubiaceae). ITS was, despite often raised cautions of its utility at higher taxonomic levels, shown to provide the highest number of parsimony informative characters, in partitioned Bayesian analyses it yielded the fewest trees in the 95% credible set, it resolved the highest proportion of well resolved clades, and was the most accurate region as measured by the partition metric and the proportion of correctly resolved clades (well supported clades retrieved from a combined analysis regarded as 'true'). For Hedyotis, the nuclear 5S-NTS was shown to be potentially as useful as ITS, despite its shorter sequence length. The chloroplast region being the most phylogenetically informative was the petD group II intron.
We also present a phylogeny of Spermacoceae based on a Bayesian analysis of the four chloroplast regions, ITS, and ETS combined. Spermacoceae are shown to be monophyletic. Clades supported by high posterior probabilities are discussed, especially in respect to the current generic classification. Notably, Oldenlandia is polyphyletic, the two subgenera of Kohautia are not sister taxa, and Hedyotis should be treated in a narrow sense to include only Asian species.
Keywords: 5S-NTS; Accuracy; atpB-rbcL; Bayesian inference; ETS; ITS; petD; rps16; Phylogenetic utility; Partition metric; Phylogeny; Rubiaceae; Spermacoceae; trnL-F

Stephane Dussert, Andreina Laffargue, Alexandre de Kochko, Thierry Joet, Effectiveness of the fatty acid and sterol composition of seeds for the chemotaxonomy of Coffea subgenus Coffea, Phytochemistry, Volume 69, Issue 17, December 2008, Pages 2950-2960, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2008.09.021.
(http://www.sciencedirect.com/science/article/B6TH7-4TVX5DW-2/2/11124200016d3c7ef4d4c946f07026e7)
Abstract:
The chemotaxonomic relationships between Coffea (subgenus Coffea) species have been poorly studied to date and the compounds tested so far - chlorogenic acids, diterpenoids and purine alkaloids - did not enable the establishment of phylogenetic relationships analogous to those revealed by chloroplast and nuclear DNA studies. In the present study, the relationships between African Coffea species were assessed on the basis of their seed lipid composition. Fatty acids and

sterols were determined in 59 genotypes belonging to 17 distinct Coffea species/origins. Principal Component Analysis of fatty acid and sterol data enabled easy identification of the few species for which one or several compounds could serve as a quantitative signature. Hierarchical Clustering classified the Coffea species in seven groups with both fatty acids and sterols. However, while groupings based on seed fatty acid composition showed remarkable ecological and geographical coherence, no phylogeographic explanation was found for the clusters retrieved from sterol data. When compared with previous phylogenetic studies, the groups deduced from seed fatty acid composition were remarkably congruent with the clades inferred from nuclear and plastid DNA sequences.
Keywords: Coffea; Coffee; Seed; Phylogeny; Chemotaxonomy; Fatty acids; Sterols

Juliana C.F. Mendonca, Adriana S. Franca, Leandro S. Oliveira, Marcella Nunes, Chemical characterisation of non-defective and defective green arabica and robusta coffees by electrospray ionization-mass spectrometry (ESI-MS), Food Chemistry, Volume 111, Issue 2, 15 November 2008, Pages 490-497, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.03.080.
(http://www.sciencedirect.com/science/article/B6T6R-4S6P25R-5/2/ef25dd02f96f2edc46614f08b41fe9f9)
Abstract:
The coffee roasted in Brazil is considered to be of low quality, due to the presence of defective coffee beans that depreciate the beverage quality. These beans, although being separated from the non-defective ones prior to roasting, are still commercialized in the coffee trading market. Thus, it was the aim of this work to verify the feasibility of employing ESI-MS to identify chemical characteristics that will allow the discrimination of Arabica and Robusta species and also of defective and non-defective coffees. Aqueous extracts of green (raw) defective and non-defective coffee beans were analyzed by direct infusion electrospray ionization mass spectrometry (ESI-MS) and this technique provided characteristic fingerprinting mass spectra that not only allowed for discrimination of species but also between defective and non-defective coffee beans. ESI-MS profiles in the positive mode (ESI(+)-MS) provided separation between defective and non-defective coffees within a given species, whereas ESI-MS profiles in the negative mode (ESI(-)-MS) provided separation between Arabica and Robusta coffees.
Keywords: Coffee; Defective beans; Fingerprinting; Chemometrics

Jan Malik, Jirina Szakova, Ondrej Drabek, Jiri Balik, Ladislav Kokoska, Determination of certain micro and macroelements in plant stimulants and their infusions, Food Chemistry, Volume 111, Issue 2, 15 November 2008, Pages 520-525, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.04.009.
(http://www.sciencedirect.com/science/article/B6T6R-4S80XN9-2/2/b8e51f45f0c7990881b7c7a9720201bf)
Abstract:
The quantitative analysis of Al, B, Cu, Fe, Mn, P and Zn by inductively coupled plasma optical emission spectrometry (ICP-OES) and Ca, K and Mg by atomic absorption spectrometry (AAS) has been carried out in both the raw material and infusions from 31 samples of traditional plant stimulants (tea and coffee) and mate, rooibos, honeybush and chamomile. The results were discussed with respect to differences to the beverage quality and their role in the human diet. The levels of elements not significantly differ between tea types (black, green, oolong, white), and between Arabica and Robusta coffee. In comparison with tea, coffee was found to be a poor source of elements with the exception of Ca and Fe. High levels of B, Ca, Cu, Mn, Mg and Zn were found in mate (mainly green type) and of B, Ca, Cu, Fe and P in chamomile, whereas the amounts of all elements in rooibos and honeybush infusions were low (except of Ca). Apart from tea, other stimulants appeared to not represent important sources of potentially harmful amounts of Al for the human diet.

Keywords: Stimulants; Infusion; Nutrient elements; ICP-OES; AAS

Mary Yannakoulia, Demosthenes B. Panagiotakos, Christos Pitsavos, Efi Tsetsekou, Evaggelia Fappa, Charalabos Papageorgiou, Christodoulos Stefanadis, Eating habits in relations to anxiety symptoms among apparently healthy adults. A pattern analysis from the ATTICA Study, Appetite, Volume 51, Issue 3, November 2008, Pages 519-525, ISSN 0195-6663, DOI: 10.1016/j.appet.2008.04.002.
(http://www.sciencedirect.com/science/article/B6WB2-4S7J545-2/2/abda98195bd73786fdcb57ae5ef69fc3)
Abstract:
The effect of anxiety on dietary intake of humans has been investigated through a number of laboratory, clinical and cross-sectional studies; no prior study, however, has examined potential associations between anxiety and overall dietary patterns. Aim of the present work was to describe dietary patterns in relation to anxiety trait in a nationally representative sample of Greek adults from the ATTICA Study. A sample of 453 men and 400 women were randomly selected from various areas of Attica region, Greece. Anxiety levels were assessed through Spielberger State-Trait Anxiety Inventory. Dietary habits, socio-demographic and lifestyle characteristics were recorded for all participants. Principal component analysis was used for the extraction of dietary patterns. More anxious, compared to less anxious, men and women exhibited different dietary patterns. In particular, the 'light' dietary patterns that were emerged in the less anxious men and women did not appear as distinct patterns among men and women in the upper anxiety tertile. In women, a 'Western-type' diet explained two times greater variance of food intake of those in the upper-anxiety tertile, compared to their counterparts in the low tertile. A vegetarian pattern was found only among the less anxious women, who also exhibited the lowest consumption of red meat and sweets. Regression analysis supported and further elucidated previous results: after adjusting for potential confounders, sweets intake, as well as meat and products intake, were positively associated with anxiety score in females; in males a negative association was found with legumes/cereals intake. From a public health point of view, given the increased prevalence of anxiety and other mental disorders, these findings should be taken into account when designing and evaluating interventions for the general population.
Keywords: Anxiety; Eating patterns; Dietary patterns analysis; Sweets consumption; Alcohol intake; Coffee; High-fat foods

J.A. Hernandez, B. Heyd, G. Trystram, Prediction of brightness and surface area kinetics during coffee roasting, Journal of Food Engineering, Volume 89, Issue 2, November 2008, Pages 156-163, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.04.026.
(http://www.sciencedirect.com/science/article/B6T8J-4SF2YYT-1/2/25f7eb74b275d4861163d8f2d143099d)
Abstract:
The amount of heat transferred to green coffee beans is essential in the coffee roasting. During this process, several parameters can be used as indicators to determine the degree of roasting (color, aroma, volume, bean temperature). Consequently, two predictive models, using artificial neural networks, are proposed to determine the quality of coffee roasting. A bean brightness model took account of bean temperature (simulated by a physical model) and roasting time. A second model predicting the bean surface area, focused on roasting air temperature and roasting time. The color changes affecting coffee beans during the process were studied experimentally in a pilot roaster equipped with a CCD video camera and a lighting system consisting of two small optic fiber spotlights. Arabica green coffee beans of Colombian origin were roasted using different air temperatures (190, 200, 210, ... 300 [degree sign]C), for 10 min. Two separate feedforward networks with one hidden layer were used to brightness and surface kinetics. The best fitting training data set was obtained using three neurons in the hidden layer, which enable prediction of

brightness and bean surface kinetics with an accuracy that was at least as good as the experimental error, over the entire experimental range. Using the validation data set, simulations and experimental data were in good agreement (R2 > 0.98). This study showed that real-time simulations were possible so that the roasting process could be stopped when the simulated brightness was similar to a target fixed by the roast master. The model thus developed could contribute to the on-line estimation of product quality, thus providing a parameter to control coffee roasting.
Keywords: Coffee roasting; Brightness kinetics; Neural networks

Wangyang Shen, Zhengyu Jin, Xueming Xu, Jianwei Zhao, Li Deng, Hanqing Chen, Chao Yuan, Dandan Li, Xuehong Li, New source of [alpha]-d-galactosidase: Germinating coffee beans, Food Chemistry, Volume 110, Issue 4, 15 October 2008, Pages 962-966, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.03.002.
(http://www.sciencedirect.com/science/article/B6T6R-4S0YXTG-4/2/35330f9cf804328eaf0604c074f40386)
Abstract:
Enzyme activities of [alpha]-Gal from dormant and germinating coffee beans (Coffea arabica) were studied and compared to develop one new source of [alpha]-d-galactosidase ([alpha]-Gal). During the germination, enzyme activity showed a continuous improvement: it increased slowly within 25 days and then rapidly increased. At the beginning of the germination, enzyme activity was lower than that from dormant coffee beans (DCB). It became higher than the latter around the 30th day, and rose to a maximum at the 35th day. The partially purified enzymes from germinating coffee beans (GCB) and DCB were obtained through ammonium sulphate precipitation, acetone precipitation and DEAE Sepharose ion exchange chromatography. The results showed that enzyme activity of purified [alpha]-Gal from GCB was 1.73 times greater than that from DCB. It was most stable for six weeks at its optimal pH (4.8) during the storage. GCB could become a new source of [alpha]-Gal instead of DCB.
Keywords: [alpha]-Galactosidase; Enzyme activity; Coffee beans; Germination

Daniel Perrone, Carmen Marino Donangelo, Adriana Farah, Fast simultaneous analysis of caffeine, trigonelline, nicotinic acid and sucrose in coffee by liquid chromatography-mass spectrometry, Food Chemistry, Volume 110, Issue 4, 15 October 2008, Pages 1030-1035, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.03.012.
(http://www.sciencedirect.com/science/article/B6T6R-4S33NBT-G/2/c791157913d537e4b8e388aa7d062276)
Abstract:
A rapid liquid chromatography-mass spectrometry method for the simultaneous quantification of caffeine, trigonelline, nicotinic acid and sucrose in coffee was developed and validated. The method involved extraction with hot water, clarification with basic lead acetate and membrane filtration, followed by chromatographic separation using a Spherisorb(R) S5 ODS2, 5 [mu]m chromatographic column and gradient elution with 0.3% aqueous formic acid/methanol at a flow rate of 0.2 mL/min. The electrospray ionization source was operated in the negative mode to generate sucrose ions and in the positive mode to generate caffeine, trigonelline and nicotinic acid ions. Ionization suppression of all analytes was found due to matrix effect. Calibrations curves prepared in green and roasted coffee extracts were linear with r2 > 0.999. Roasted coffee was spiked and recoveries ranged from 93.0% to 105.1% for caffeine, from 85.2% to 116.2% for trigonelline, from 89.6% to 113.5% for nicotinic acid and from 94.1% to 109.7% for sucrose. Good repeatibilities (RSD < 5%) were found for all analytes in the matrix. The limit of detection (LOD), calculated on the basis of signal-to-noise ratios of 3:1, was 11.9, 36.4, 18.5 and 5.0 ng/mL for caffeine, trigonelline, nicotinic acid and sucrose, respectively. Analysis of 11 coffee samples (regular or decaffeinated green, ground roasted and instant) gave results in agreement with the

literature. The method showed to be suitable for different types of coffee available in the market thus appearing as a fast and reliable alternative method to be used for routine coffee analysis.
Keywords: Coffee; Caffeine; Trigonelline; Nicotinic acid; Sucrose; LC-MS

Stacy M. Philpott, Brenda B. Lin, Shalene Jha, Shannon J. Brines, A multi-scale assessment of hurricane impacts on agricultural landscapes based on land use and topographic features, Agriculture, Ecosystems & Environment, Volume 128, Issues 1-2, October 2008, Pages 12-20, ISSN 0167-8809, DOI: 10.1016/j.agee.2008.04.016.
(http://www.sciencedirect.com/science/article/B6T3Y-4SRDF3M-2/2/130d98d2b2e3d9aca9b1bbf26c55a40b)
Abstract:
Agricultural systems are increasingly vulnerable to the effects of extreme climate events. Yet strategies to reduce risk and vulnerability have not been greatly explored. Here, we examine the vulnerability of coffee agroforestry systems varying in management intensity (e.g. land use) and topographic features to disturbance related to Hurricane Stan in Chiapas, Mexico--a hurricane categorized by heavy rains and mild winds. An approximately 50 km2 area was chosen within a coffee-growing region where data were collected on a variety of topographic and landscape features (aspect, slope, elevation, distance to river) and vegetation characteristics (canopy cover, vegetation structure, tree density) as predictive factors of vegetation, economic, and landslide damage at three distinct spatial scales. At the plot level, we collected vegetation data later compiled into a vegetation complexity index. At the farm level, we collected data to understand the effect of the hurricane on economic damage and farm area affected by landslides. We also recorded number and volume of roadside landslides as a measure of post-hurricane disturbance. We then conducted a geo-spatial analysis to determine which factors contribute most to landslide occurrence at landscape scales. We found no effect of coffee management on vegetation damage or on economic losses at the plot or farm scale. At the farm scale, increasing management intensity (i.e. reduction in vegetation complexity) correlated with increased proportion of farm area affected by landslides (P = 0.014). Additionally, reduction in vegetation complexity was correlated with increased number (P = 0.0224) and volume (P = 0.062) of roadside landslides at the landscape level. Topographic and landscape features, such as distance to river (P = 0.004) and wind exposure/aspect (P = 0.044) strongly influenced landslide frequency at the landscape scale. Forest proximity and proportion of forest cover did not significantly influence the frequency or extent of landslide damage. We created hazard maps using the vegetation complexity index, distance to river, and wind exposure as the heaviest weighted factors to assess areas of the terrain with the greatest vulnerability. These maps present a practical result of this study, and offer a template in which land management policy can develop to lower regional vulnerability to landslide risk. These results show that farmers may be able to reduce vulnerability to extreme storm events by carefully managing their farms. Although farmers may not be able to control negative topographic features of their farms, increasing vegetation complexity within farms may be an efficient strategy to reduce some susceptibility to hurricane disturbance.
Keywords: Chiapas; Mexico; Coffee agroecosystem; Ecosystem service; Erosion; Global change; Heavy rainfall; Landslides

Joao Valente Nabais, Peter Carrott, M.M.L. Ribeiro Carrott, Vania Luz, Angel L. Ortiz, Influence of preparation conditions in the textural and chemical properties of activated carbons from a novel biomass precursor: The coffee endocarp, Bioresource Technology, Volume 99, Issue 15, October 2008, Pages 7224-7231, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.12.068.
(http://www.sciencedirect.com/science/article/B6V24-4RSRPWY-5/2/7c09fbf4812a25fcebcf8b9f4a29a8f4)
Abstract:

In this work a novel biomass precursor for the production of activated carbons (AC) was studied. The lignocellulosic material used as precursor is the coffee bean endocarp, which constitutes an industrial residue from the Portuguese coffee industry. Activation by carbon dioxide and potassium hydroxide produces activated carbons with small external areas and pore volumes up to 0.22 and 0.43 cm3 g-1, respectively, for CO2 and KOH activation. All the AC's produced are very basic in nature with point of zero charge higher than 8. SEM/EDX studies indicate the presence of K, O, Ca and Si. By FTIR it was possible to identify the formation on the AC's surface of several functional groups, namely phenol, alcohol, quinone, lactone, pyrone and ether as well as SiH groups. The tailoring of the porous and chemical structure of the activated carbons produced is possible by selecting the appropriate production conditions.
Keywords: Activated carbon; Coffee endocarp; Surface properties; Physical activation; Chemical activation

Ibtisam M. Kamal, V. Sobolik, Magdalena Kristiawan, Sabah M. Mounir, K. Allaf, Structure expansion of green coffee beans using instantaneous controlled pressure drop process, Innovative Food Science & Emerging Technologies, Volume 9, Issue 4, October 2008, Pages 534-541, ISSN 1466-8564, DOI: 10.1016/j.ifset.2008.01.004.
(http://www.sciencedirect.com/science/article/B6W6D-4RV7YG0-2/2/fbe911361d9ec2002732187f96dde0bf)
Abstract:
Since 1988, when the first experiments with the Instantaneous Controlled Pressure Drop (DIC) process were performed, a lot of investigations have been carried out concerning the structure expansion, processing kinetics (drying, extraction and sterilization) and the improvement of the functional and organoleptic properties of fresh and dried foods. In this study, two DIC technologies were used to expand the structure of green coffee beans. Two varieties of commercial Arabica coffee beans of different agricultural and geographical origins (Brazilian and Ethiopian) were inspected. The effect of initial moisture content (7-40% dry basis), type of heating in the DIC process (steam and microwaves), processing parameters like pressure (0.4-0.7 MPa) and heating time (20-200 s) on bean expansion were investigated. The expansion was evaluated as the ratio of the tapped density of raw beans to that of the treated material. The hydration capacity of the beans was also studied. The Response Surface Methodology was employed to optimize the processing parameters. After the steam DIC treatment, the maximum expansion ratio of the Brazilian beans (e = 1.74) was higher than that of the Ethiopian beans (e = 1.59). For Brazilian beans, the steam DIC treatment resulted in a higher value of expansion ratio than the MW DIC treatment (e = 1.39). Concerning hydration capacity, the steam DIC treatment gave values of 78.6% and 48.2% d.b. for the Ethiopian and Brazilian beans, respectively. It means almost two-fold increase in the hydration capacity using DIC treatment. The steam DIC treatment increased and accelerated in twice the weight loss of beans during roasting.Industrial relevance
Preliminary experiments have shown that the structure expansion of green coffee beans significantly reduced the roasting time, amended the bean suitability to grinding and improved the kinetics and yield of caffeine and active compounds extraction. The industrial DIC processes can be distinguished by high quality of final products, energy saving and positive environmental impact. Due to the fragile structure of coffee beans, a batch process should be applied. Industrial plant can be designed as a tower plant with several compartments separated by guillotine valves where the material falls down by gravity force or a carrousel or a linear plant with filling, DIC treatment and discharging operations. The ABCAR DIC Process Company (La Rochelle, France) develops plants with a capacity of 50 kg/h to 8 ton/h of dry coffee beans. Despite the promising experimental results concerning microwave DIC technology, the industrial applications are so far limited to the steam DIC treatment due to technical reasons.
Keywords: Coffee beans; Coffea arabica; Structure; Instantaneous Controlled Pressure Drop; DIC

Monica Pava-Ripoll, Francisco J. Posada, Bahram Momen, Chengshu Wang, Raymond St. Leger, Increased pathogenicity against coffee berry borer, Hypothenemus hampei (Coleoptera: Curculionidae) by Metarhizium anisopliae expressing the scorpion toxin (AaIT) gene, Journal of Invertebrate Pathology, Volume 99, Issue 2, October 2008, Pages 220-226, ISSN 0022-2011, DOI: 10.1016/j.jip.2008.05.004.
(http://www.sciencedirect.com/science/article/B6WJV-4SKK22Y-1/2/c642b62d110c032baa7232ade490e281)
Abstract:
Coffee berry borer (CBB) is the Worlds most devastating coffee pest causing an estimated US$500 million worth of losses annually through damage and control costs. Beauveria bassiana and Metarhizium anisopliae have been employed to control this pest but their low virulence (slow kill and large inoculums) is an important factor constraining their use. M. anisopliae (AaIT-Ma549) has been modified to express the scorpion toxin (AaIT) in insect hemolymph and this greatly increased pathogenicity against Manduca sexta and Aedes aegypti. Here, we demonstrate that AaIT-Ma549 was also dramatically more virulent against CBB, and we provide a much more comprehensive analysis of infection processes and post-mortality development than in the previous research. We evaluated several spore concentrations (101 through 107 spores/ml) of both the wild type and recombinant strain. At concentrations of 101, 102 and 103 spores/ml, the recombinant strain significantly increased mortality of CBB by 32.2%, 56.6% and 24.6%, respectively. The medial lethal concentration (LC50) was reduced 15.7-fold and the average survival time (AST) was reduced by 20.1% to 2.98 +/- 0.1 days with 107 spores/ml. This is the first occasion that an entomopathogenic fungus has been found to kill CBB in less than 3 days. However, AaIT-Ma549 produces significantly fewer spores on cadavers than the parental strain.
Keywords: Coffee; Coffee berry borer; Biocontrol; Metarhizium anisopliae; AaIT; Scorpion neurotoxin; Androctonus australis insect toxin

Wagner L. Araujo, Paulo C. Dias, Gustavo A.B.K. Moraes, Elaine F. Celin, Roberto L. Cunha, Raimundo S. Barros, Fabio M. DaMatta, Limitations to photosynthesis in coffee leaves from different canopy positions, Plant Physiology and Biochemistry, Volume 46, Issue 10, October 2008, Pages 884-890, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.05.005.
(http://www.sciencedirect.com/science/article/B6VRD-4SKB3B4-3/2/675b33b60dfe6095eba9fd6a25d07851)
Abstract:
Limitations to photosynthesis were explored in leaves from four canopy positions of field-grown, unshaded coffee (Coffea arabica L.), a tropical tree species classified as shade-obligatory. Overall, compared to shade (lower) leaves, sun (upper) leaves had higher net carbon assimilation rate (A) (4.5 against 2.0 [mu]mol m-2 s-1 at most) associated with higher electron transport rate (due to a greater irradiance availability) but unrelated to stomatal and mesophyll conductances, which were similar regardless of leaf position. Neither physiological variable directly involved with photosynthetic carbon gain nor those involved with light capture were able to adjust themselves to match the capacity of the photosynthetic machinery to the light supply. We concluded that: (i) there was no major difference in photosynthetic capacity between sun and shade leaves; (ii) the intrinsic low A in coffee was greatly associated with remarkable low diffusive limitations rather than with biochemical or photochemical constraints; and (iii) morphological (e.g., variations in specific leaf area and leaf inclination) or anatomical plasticity should be of greater acclimative value than physiological plasticity as a mean of coffee leaves to respond to changing irradiance.
Keywords: Coffea; Gas exchange; Irradiance; Leaf conductance; Phenotypic plasticity

V. Aguilera, A. Lopez-Espinoza, A.G. Martinez, A. Galindo, C. de la Torre-Ibarra, M.L. Gonzalez-Torres, E. Valdes, Coffee intake, feeding behavior and activity in rats, Appetite, Volume 51, Issue 2, September 2008, Page 350, ISSN 0195-6663, DOI: 10.1016/j.appet.2008.04.024.

(http://www.sciencedirect.com/science/article/B6WB2-4SNHNTS-3/2/afb87091d66eb853b0cc707ce5e09318)

B. Raudenbush, J. Schmitt, Scent dependent learning: The effects of ambient congruent vs. incongruent scents on recall of coffee information, Appetite, Volume 51, Issue 2, September 2008, Page 393, ISSN 0195-6663, DOI: 10.1016/j.appet.2008.04.193.
(http://www.sciencedirect.com/science/article/B6WB2-4SNHNTS-64/2/2b7a077916e8686e8df884896fc60bb7)

P.A. Delgado, J.A. Vignoli, M. Siika-aho, T.T. Franco, Sediments in coffee extracts: Composition and control by enzymatic hydrolysis, Food Chemistry, Volume 110, Issue 1, 1 September 2008, Pages 168-176, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.01.029.
(http://www.sciencedirect.com/science/article/B6T6R-4RR1NXV-3/2/f0b2580791e7c286c2ccec0c598a685e)
Abstract:
The water-insolubility of some coffee extract components is one of the major limitations in the production of instant coffee. In this work, fractions from coffee extracts and sediments were prepared, and their chemical composition determined. Based on the carbohydrate analysis, galactomannan was found to be the main polysaccharide component of the insoluble fractions and probably responsible for sediment formation. The suitability of twelve commercial enzymes for the hydrolysis of the insoluble fractions was investigated. Pectinase 444L was the most effective enzyme in releasing sugars, mainly mannose and galactose, from these substrates. Biopectinase CCM, Rohapect B1L, Pectinase 444L and Galactomannanase ACH were found to be the most effective enzymes for reducing the sediment of coffee extracts. The highest sediment reduction was obtained using Rohapect B1L and Galactomannanase ACH, at enzyme concentrations of 0.3 and 0.1 mg protein/g substrate, respectively.
Keywords: Coffee polysaccharides; Galactomannans; Instant coffee; Enzymatic hydrolysis; Coffee composition; Sediment

Carla Isabel Rodrigues, Rodrigo Maia, Marco Miranda, Miguel Ribeirinho, J.M.F. Nogueira, Cristina Maguas, Stable isotope analysis for green coffee bean: A possible method for geographic origin discrimination, Journal of Food Composition and Analysis, In Press, Corrected Proof, Available online 19 August 2008, ISSN 0889-1575, DOI: 10.1016/j.jfca.2008.06.010.
(http://www.sciencedirect.com/science/article/B6WJH-4T7XGPC-1/2/abc14d72d6246548c6bc7ce2df558158)
Abstract:
Isotope ratio mass spectrometry (IRMS) and elemental analysis (EA) were applied in order to achieve geographic origin discrimination between 68 green coffee bean samples from 20 different geographic origins distributed over Central America, Pacific, South America, Africa, Asia and Oceania. Multivariate analysis of isotopic composition of the bean ([delta]13C VPDB, [delta]15N VAIR, [delta]18O VSMOW) and elemental composition (carbon and nitrogen percentage) allowed some discrimination of the geographic origin of some of the coffees included in this study. The observed differences on stable isotopic and elemental composition were mainly explained by altitude and precipitation values associated with the different geographic locations.
Keywords: Food composition; Green coffee; Geographic origin discrimination; Stable isotope analysis; IRMS; Elemental analysis

Zhaohui Zhao, Mohammed H. Moghadasian, Chemistry, natural sources, dietary intake and pharmacokinetic properties of ferulic acid: A review, Food Chemistry, Volume 109, Issue 4, 15 August 2008, Pages 691-702, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.02.039.

(http://www.sciencedirect.com/science/article/B6T6R-4RWBT2K-5/2/3f67e56319118e866c68cc46034d17b1)
Abstract:
Ferulic acid (FA) is an abundant dietary antioxidant which may offer beneficial effects against cancer, cardiovascular disease, diabetes and Alzheimer's disease. The impact of FA on health depends on its intake and pharmacokinetic properties. In this article, the literature pertaining to chemistry, natural sources, dietary intake and pharmacokinetic properties of FA is critically reviewed. High levels of FA are found in both free and bound forms in vegetables, fruits, cereals, and coffee. We have estimated that consumption of these foods may result in approximately 150-250 mg/day of FA intake. FA can be absorbed along the entire gastrointestinal tract and metabolized mainly by the liver. The absorption and metabolism of FA seem to be dose dependent at least in experimental settings. Further pharmacokinetic and pharmacodynamic studies are required to characterize the impact of FA on human health.
Keywords: Ferulic acid; Phenolic acids; Pharmacokinetics; Dietary intake; Absorption; Metabolism; Bioavailability; Antioxidant

Anna Krejcova, Miloslav Pouzar, Tomas Cernohorsky, Kveta Peskova, The cryogenic grinding as the important homogenization step in analysis of inconsistent food samples, Food Chemistry, Volume 109, Issue 4, 15 August 2008, Pages 848-854, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.01.011.
(http://www.sciencedirect.com/science/article/B6T6R-4RMNYM1-6/2/3802d5999557bb4447955defd8b17772)
Abstract:
Some homogenisation approaches have been investigated to make easier and overcome troublesome preparation of inconsistent food samples. Contents of Na, Ca, Mg, P, Fe, Mn and Zn in muesli, seed and instant food samples were determined by inductively coupled plasma optical emission spectrometry after their grinding with an agate mortar, a kitchen coffee grinder and a cryogenic mill.
The efficiency of a grinding step was evaluated using RSDs and homogeneity factors (H-factor). For cryogenically grinded samples, RSDs were detected about 4% and H-factors on 10, what is acceptable for the analytical purpose. The results for grinding with an agate mortar as well as a coffee grinder were quite unsatisfactory (RSDs in tens percent). Differences between RSDs and H-factors for the procedures tested were detected to be statistically significant. Different element contents were observed in differently treated samples which is probably a result of an unevenly element distribution in inhomogeneous components forming sample.
Keywords: ICP-OES; Elemental analysis; Food; Sample preparation; Cryogenic grinding

J.A. Hernandez, B. Heyd, G. Trystram, On-line assessment of brightness and surface kinetics during coffee roasting, Journal of Food Engineering, Volume 87, Issue 3, August 2008, Pages 314-322, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.12.009.
(http://www.sciencedirect.com/science/article/B6T8J-4RDR168-1/2/b87783b2dcfb54c67b277f8d40c1fe99)
Abstract:
Image analysis enables the on-line measurement of essential values such as bean color and surface area. However, it is difficult to apply this technique to coffee roasting. In this industry, color (i.e. brightness) is a key variable which determines the quality of the final product, but it is evaluated experimentally in the laboratory by the roast master. In order to control the process, it is necessary to develop a technique which enables a real-time assessment of product quality. This work proposes a method to determine brightness and surface area using image analysis, on-line during coffee roasting. The changes to brightness and surface area that affect coffee bean during the process were studied experimentally in a roaster equipped with a CCD video camera, a

lighting system and two small fiber optic spotlights. Arabica green coffee beans of Colombian origin were roasted using different air temperatures (190, 200, 210, ... 300 [degree sign]C) for 10 min. The experimental results provided knowledge of the process, and also, allowed us to observe the behavior of color and surface kinetics. It was also possible to perform experiments real-time using image analysis system, stopping the roasting process when the results were optimum. When the bean temperature reached 280 [degree sign]C, the surface area stopped increasing, so that roasting was also complete. Brightness and surface area may be two indicators to ensure on-line quality during coffee roasting.
Keywords: Coffee roasting; On-line measurements; Color kinetics; Grey values; Image analysis

Yong Pil Hwang, Hye Gwang Jeong, The coffee diterpene kahweol induces heme oxygenase-1 via the PI3K and p38/Nrf2 pathway to protect human dopaminergic neurons from 6-hydroxydopamine-derived oxidative stress, FEBS Letters, Volume 582, Issue 17, 23 July 2008, Pages 2655-2662, ISSN 0014-5793, DOI: 10.1016/j.febslet.2008.06.045.
(http://www.sciencedirect.com/science/article/B6T36-4SW7KBT-4/2/f83905c01d9b5ea7f2af5b8feb3cb497)
Abstract:
In this study, we investigated the mechanisms of kahweol protection of neuronal cells from cell death induced by the Parkinson's disease-related neurotoxin 6-hydroxydopamine (6-OHDA). Pretreatment of SH-SY5Y cells with kahweol significantly reduced 6-OHDA-induced generation of ROS, caspase-3 activation, and subsequent cell death. Kahweol also up-regulated heme oxygenase-1 (HO-1) expression, which conferred neuroprotection against 6-OHDA-induced oxidative injury. Moreover, kahweol induced PI3K and p38 activation, which are involved in the induction of Nrf2, HO-1 expression, and neuroprotection. These results suggest that regulation of the anti-oxidant enzyme HO-1 via the PI3K and p38/Nrf2 signaling pathways controls the intracellular levels of ROS.
Keywords: Kahweol; Heme oxygenase-1; NF-E2 related factor 2; Phosphatidylinositol 3-kinase; p38 kinase; Neuroprotection

Andrew J. Simkin, Helene Moreau, Marcel Kuntz, Gaelle Pagny, Chenwei Lin, Steve Tanksley, James McCarthy, An investigation of carotenoid biosynthesis in Coffea canephora and Coffea arabica, Journal of Plant Physiology, Volume 165, Issue 10, 7 July 2008, Pages 1087-1106, ISSN 0176-1617, DOI: 10.1016/j.jplph.2007.06.016.
(http://www.sciencedirect.com/science/article/B7GJ7-4PXNH7S-2/2/3110ce5435bf0223955306fbd6050f96)
Abstract: Summary
Carotenoids are essential components of the photosynthetic apparatus in a wide range of organisms. They participate in the adaptation of plastids to changing environmental light conditions and prevent photo-oxidative damage of the photosynthetic apparatus by detoxifying reactive oxygen species. We identified eight cDNAs from the carotenoid biosynthetic pathway (PSY, PDS, ZDS, PTOX, LCY-E, CRTR-B, ZEP and VDE) and two cDNA encoding carotenoid cleavage dioxygenase family members (NCED3 and CCD1) in Coffea canephora. We also obtained cDNA encoding several different fibrillin proteins involved in carotenoid sequestration (FIB). Expression of the coffee carotenoid genes was determined in leaf, branch and flower tissues using quantitative RT-PCR. Expression analysis of these genes in leaf tissue from osmotically stressed plants was also carried out. These experiments showed that the transcript levels of PTOX, CRTR-B, NCED3, CCD1 and FIB1 increased under these stress conditions, while LCY-E decreased, indicating that the metabolic flux towards the xanthophyll cycle branch of the carotenoid biosynthetic pathway may be favoured in leaves under drought conditions. Functional analysis of CcCRTR-B using an in vivo method employing Escherichia coli strains engineered to make carotenoids confirmed that the [beta]-carotene hydroxylase activity of CcCRTR-B generates [beta]-

cryptoxanthin and zeaxanthin from [beta]-carotene. A similar approach was also used to show that CcCCD1 encoded a functional 9,10(9'10') carotenoid cleavage dioxygenase, and thus that this enzyme is capable of forming one or more apocarotenoids in vivo. Finally, high-performance liquid chromatography analysis of coffee leaves revealed the presence of [alpha]-carotene and suggests that Coffea arabica may have higher levels of [alpha]-carotene than C. canephora.
Keywords: Apocarotenoids; Carotenoid cleavage dioxygenase; Carotenoid synthesis; Coffea; Drought stress

Fernando E. Vega, Francisco Posada, M. Catherine Aime, Monica Pava-Ripoll, Francisco Infante, Stephen A. Rehner, Entomopathogenic fungal endophytes, Biological Control, Volume 46, Issue 1, Special Issue: Endophytes, July 2008, Pages 72-82, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.01.008.
(http://www.sciencedirect.com/science/article/B6WBP-4RM7MXY-1/2/0bc66c10f85da1ea58990b3064d126c1)
Abstract:
Fungal endophytes are quite common in nature and some of them have been shown to have adverse effects against insects, nematodes, and plant pathogens.
Our research program is aimed at using fungal endophytes-mediated plant defense as a novel biological control mechanism against the coffee berry borer, the most devastating pest of coffee throughout the world. A survey of fungal endophytes in coffee plants from Hawaii, Colombia, Mexico, and Puerto Rico has revealed the presence of various genera of fungal entomopathogens, including Acremonium, Beauveria, Cladosporium, Clonostachys, and Paecilomyces. Two of these, B. bassiana and Clonostachys rosea, were tested against the coffee berry borer and were shown to be pathogenic. This paper reviews the possible mode of action of entomopathogenic fungal endophytes.
Keywords: Acremonium; Beauveria; Biological control; Cladosporium; Clonostachys; Coffee; Endophytes; Entomopathogens; Isaria; Paecilomyces

K.N. Niladevi, P. Prema, Effect of inducers and process parameters on laccase production by Streptomyces psammoticus and its application in dye decolourization, Bioresource Technology, Volume 99, Issue 11, Exploring Horizons in Biotechnology: A Global Venture, July 2008, Pages 4583-4589, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.06.056.
(http://www.sciencedirect.com/science/article/B6V24-4PJD9KV-5/2/c6f8af413b1bdf2afde30087cde5dfd3)
Abstract:
The process parameters influencing the production of extracellular laccases by Streptomyces psammoticus MTCC 7334 were optimized in submerged fermentation. Coffee pulp and yeast extract were the best substrate and nitrogen source respectively for laccase production by this strain. The optimization studies revealed that the laccase yield was maximum at pH 7.5 and temperature 32 [degree sign]C. Salinity of the medium was also observed to be influencing the enzyme production. An agitation rate of 175 rpm and 15% inoculum were the other optimized conditions for maximum laccase yield (5.9 U/mL). Pyrogallol and para-anisidine proved to be the best inducers for laccase production by this strain and the enzyme yield was enhanced by 50% with these inducers. S. psammoticus was able to decolourize various industrial dyes at different rates and 80% decolourization of Remazol Brilliant Blue R (RBBR) was observed after 10 days of incubation in dye based medium.
Keywords: Laccases; Submerged fermentation; Aromatic inducers; Dye decolourization; Streptomyces psammoticus

P. Saragoni, J.M. Aguilera, P. Bouchon, Corrigendum to 'Changes in particles of coffee powder and extensions to caking' [Food Chem. 104 (1) (2007) 122-126], Food Chemistry, Volume 109, Issue 1, 1 July 2008, Pages 174-175, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.11.066.
(http://www.sciencedirect.com/science/article/B6T6R-4R8MDX9-6/2/0f079efb7839a891cbb34c90ac519273)

Russell S.J. Keast, Modification of the bitterness of caffeine, Food Quality and Preference, Volume 19, Issue 5, July 2008, Pages 465-472, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2008.02.002.
(http://www.sciencedirect.com/science/article/B6T6T-4RV7YBB-1/2/db225373e67c6911269981227a79773e)
Abstract:
Caffeine is the worlds most consumed psychoactive chemical and as such is a valuable commodity to the food and beverage industry. Caffeine also activates the bitter taste system causing a potential problem for manufacturers wanting to develop products containing caffeine. In the present study both oral peripheral and central cognitive strategies were used in an attempt to suppress the bitterness of caffeine. Subjects (n = 33) assessed the influence of sodium gluconate (100 mM), zinc lactate (5 mM), sucrose (125 mM and 250 mM), milk (0%, 2% and 4% milk fat), and aromas (coffee, chocolate, mocha) on the bitterness of caffeine (1.5, 3 and 4.5 mM). The oral peripheral strategies proved most effective at suppressing the bitterness of caffeine: zinc lactate (-71%, $p < 0.05$), non-fat milk (-49%, $p < 0.05$), and sodium gluconate (-31%). Central cognitive strategies were partially effective: 250 mM sucrose (-47%, $p < 0.05$) and mocha aroma (-10%) decreased bitterness, while chocolate (+32%) and coffee (+17%) aromas increased perceived bitterness. Overall, zinc lactate was the most effective bitterness inhibitor, however the utility of zinc in foods is negated by its ability to inhibit sweetness.
Keywords: Bitter; Taste; Smell; Inhibition; Suppression; Flavour modification

Sapna Kamath, Agnes Wulandewi, Hilton Deeth, Relationship between surface tension, free fatty acid concentration and foaming properties of milk, Food Research International, Volume 41, Issue 6, July 2008, Pages 623-629, ISSN 0963-9969, DOI: 10.1016/j.foodres.2008.03.014.
(http://www.sciencedirect.com/science/article/B6T6V-4S6P1Y1-2/2/9cf4444a8a0884f8f3b0f4078c093365)
Abstract:
The relationship between surface tension, free fatty acid concentration and the foaming properties of milk was investigated. The surface tension of milk with varying free fatty acid concentration was determined using the Wilhelmy plate technique and the milks were subsequently foamed by steam injection using a commercial coffee machine and by air injection using a specially designed foaming apparatus. Foaming properties of milk in terms of initial foam volume, foam stability and visual appearance of foam as functions of free fatty acid concentration were determined. Surface tension of milk showed a negative relationship with its free fatty acid concentration and foaming properties. However, natural variations in the surface tension of milk due to other surface active components such as protein, fat and phospholipids made it difficult to determine an absolute surface tension value below which the foaming properties of milk are negatively affected.
Keywords: Milk; Foam; Free fatty acids; Surface tension

Catarina Rydin, Sylvain G. Razafimandimbison, Birgitta Bremer, Rare and enigmatic genera (Dunnia, Schizocolea, Colletoecema), sisters to species-rich clades: Phylogeny and aspects of conservation biology in the coffee family, Molecular Phylogenetics and Evolution, Volume 48, Issue 1, July 2008, Pages 74-83, ISSN 1055-7903, DOI: 10.1016/j.ympev.2008.04.006.
(http://www.sciencedirect.com/science/article/B6WNH-4S8TB7H-9/2/47304b4faeb2fddaad8afca147e99ab2)
Abstract:

Despite extensive efforts, parts of the phylogeny of the angiosperm family Rubiaceae has not been resolved and consequently, character evolution, ancestral areas and divergence times of major radiations are difficult to estimate. Here, phylogenetic analyses of 149 taxa and five plastid gene regions show that three enigmatic genera are sisters to considerably species rich clades.
The rare and endangered species Dunnia, endemic to southern Guangdong, China, is sister to a large clade in the Spermacoceae alliance; the rarely collected Schizocolea from western tropical Africa is sister to the Psychotrieae alliance; and Colletoecema from central tropical Africa is sister to remaining Rubioideae. The morphology of these taxa has been considered 'puzzling'. In combination with further morphological studies, our results may help understanding the apparently confusing traits of these plants.
Phylogenetic, morphological, and geographical isolation of Dunnia, Schizocolea and Colletocema may indicate high genetic diversity. They are lone representatives of unique lineages and if extinct, the loss would not only mean loss of genetic diversity of a single species but of an entire lineage.
Keywords: Conservation biology; sMolecular data; Rubiaceae; Rubioideae

Raul O. Pedraza, Recent advances in nitrogen-fixing acetic acid bacteria, International Journal of Food Microbiology, Volume 125, Issue 1, Vinegars and Acetic Acid Bacteria 2005, 30 June 2008, Pages 25-35, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.11.079.
(http://www.sciencedirect.com/science/article/B6T7K-4R8WJMK-5/2/2a43ec89656823a41ac6f769585bada9)
Abstract:
Nitrogen is an essential plant nutrient, widely applied as N-fertilizer to improve yield of agriculturally important crops. An interesting alternative to avoid or reduce the use of N-fertilizers could be the exploitation of plant growth-promoting bacteria (PGPB), capable of enhancing growth and yield of many plant species, several of agronomic and ecological significance.
PGPB belong to diverse genera, including Azospirillum, Azotobacter, Herbaspirillum, Bacillus, Burkholderia, Pseudomonas, Rhizobium, and Gluconacetobacter, among others. They are capable of promoting plant growth through different mechanisms including (in some cases), the biological nitrogen fixation (BNF), the enzymatic reduction of the atmospheric dinitrogen (N2) to ammonia, catalyzed by nitrogenase.
Aerobic bacteria able to oxidize ethanol to acetic acid in neutral or acid media are candidates of belonging to the family Acetobacteraceae. At present, this family has been divided into ten genera: Acetobacter, Gluconacetobacter, Gluconobacter, Acidomonas, Asaia, Kozakia, Saccharibacter, Swaminathania, Neoasaia, and Granulibacter. Among them, only three genera include N2-fixing species: Gluconacetobacter, Swaminathania and Acetobacter.
The first N2-fixing acetic acid bacterium (AAB) was described in Brazil. It was found inside tissues of the sugarcane plant, and first named as Acetobacter diazotrophicus, but then renamed as Gluconacetobacter diazotrophicus. Later, two new species within the genus Gluconacetobacter, associated to coffee plants, were described in Mexico: G. johannae and G. azotocaptans. A salt-tolerant bacterium named Swaminathania salitolerans was found associated to wild rice plants. Recently, N2-fixing Acetobacter peroxydans and Acetobacter nitrogenifigens, associated with rice plants and Kombucha tea, respectively, were described in India.
In this paper, recent advances involving nitrogen-fixing AAB are presented. Their natural habitats, physiological and genetic aspects, as well as their association with different plants and contribution through BNF are described as an overview.
Keywords: Acetobacteraceae; Nitrogen fixation; Gluconacetobacter diazotrophicus; G. johannae; G. azotocaptans; Swaminathania salitolerans; Acetobacter peroxidans; A. nitrogenifigens

Sergio Tinoco V. Magalhaes, Raul Narciso C. Guedes, Eraldo R. Lima, Antonio J. Demuner, Coffee leaf volatiles and egg laying by the coffee leaf miner Leucoptera coffeella, Crop Protection,

Volume 27, Issue 6, June 2008, Pages 1038-1041, ISSN 0261-2194, DOI: 10.1016/j.cropro.2007.12.005.
(http://www.sciencedirect.com/science/article/B6T5T-4RM892R-1/2/56549d931d64bc21de65100aa831f61d)
Abstract:
Recent reports of coffee genotypes resistant to one of its key pests in the Neotropical region, the leaf miner Leucoptera coffeella (Lepidoptera: Lyonetiidae), sparked studies trying to recognize the underlying causes of resistance. An association between increased egg laying by the leaf miner and increased caffeine levels in coffee leaves was recently recognized. However, since caffeine is not volatile, its effect on egg laying is likely aided by a volatile compound. This was the hypothesis tested here. Coffee leaf volatiles from 12 coffee genotypes were collected, analyzed (gas chromatograph coupled with a mass spectrometer (CG/MS)) and tested for electrophysiological activity (EAG). The active volatiles thus recognized were subjected to partial correlation against the density of eggs laid by the leaf miner in each coffee genotype. The volatile showing significant positive correlation, p-cymene, was subjected to an attraction test in a four-arm olfactometer confirming its biological activity and providing evidence of its role stimulating egg laying by the coffee leaf miner.
Keywords: Coffea arabica; Egg-laying preference; Lepidoptera; Lyonetiidae; p-Cymene

Aline T. Toci, Adriana Farah, Volatile compounds as potential defective coffee beans' markers, Food Chemistry, Volume 108, Issue 3, 1 June 2008, Pages 1133-1141, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.11.064.
(http://www.sciencedirect.com/science/article/B6T6R-4R8MDX9-5/2/73c7c016a348763e8ce5e77eda66150b)
Abstract:
Although Brazil is the largest raw coffee producer and exporter in the world, a large amount of its Arabica coffee production is considered inappropriate for exportation. This by-product of coffee industry is called PVA due to the presence of black (P), green (V) and sour (A) defective beans, which are known to contribute considerably for cup quality decrease. Data on the volatile composition of Brazilian defective coffee beans are scarce. In this study, we evaluated the volatile composition of defective coffee beans (two lots) compared to good quality beans from the respective lots. Potential defective beans' markers were identified. In the raw samples, 2-methylpyrazine and 2-furylmethanol acetate were identified only in black-immature beans and butyrolactone only in sour beans, while benzaldehyde and 2,3,5,6-tetramethylpyrazine showed to be potential markers of defective beans in general. In the roasted PVA beans, pyrazine, 2,3-butanediol meso, 2-methyl-5-(1-propenyl)pyrazine, hexanoic acid, 4-ethyl-guayacol and isopropyl p-cresol sulfide also showed to be potential defective coffee beans' markers.
Keywords: Defective coffee beans; PVA; Coffee quality; Coffee flavor; Volatile; Mass spectrometry

Hirotoshi Utsunomiya, Masao Ichinose, Misao Uozaki, Kazuko Tsujimoto, Hisashi Yamasaki, A. Hajime Koyama, Antiviral activities of coffee extracts in vitro, Food and Chemical Toxicology, Volume 46, Issue 6, June 2008, Pages 1919-1924, ISSN 0278-6915, DOI: 10.1016/j.fct.2008.01.031.
(http://www.sciencedirect.com/science/article/B6T6P-4RP0MSR-7/2/cddeb0219e5a0f2ddd624c2901cbc993)
Abstract:
Both hot water extracts of coffee grinds and instant coffee solutions inhibited the multiplication of herpes simplex virus type 1, a representative enveloped DNA virus, when they were added to the culture medium of the virus-infected cells at a dose of one fifth the concentration suitable for drinking. The antiherpetic activity was independent of the suppliers (companies) of the coffee grinds and of the locations where the coffee beans were produced. Further characterization

revealed that there are two different mechanisms, by which the coffee extracts exert inhibitory activities on the virus infection; (1) a direct inactivation of the infectivity of virus particle (i.e., a virucidal activity) and (2) the inhibition of progeny infectious virus formation at the late stage of viral multiplication in the infected cells. Caffeine, but not quinic acid and chlorogenic acid, inhibited the virus multiplication to some extent, but none of them showed the virucidal activity, suggesting that other component(s) in the coffee extracts must play a role in the observed antiviral activity. In addition, the coffee extracts inhibited the multiplication of poliovirus, a non-enveloped RNA virus, but showed no virucidal effect on this virus.
Keywords: Antiviral; Virucidal; Coffee; Herpes simplex virus; Poliovirus

Adenir Teodoro, Alexandra-Maria Klein, Teja Tscharntke, Environmentally mediated coffee pest densities in relation to agroforestry management, using hierarchical partitioning analyses, Agriculture, Ecosystems & Environment, Volume 125, Issues 1-4, May 2008, Pages 120-126, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.12.004.
(http://www.sciencedirect.com/science/article/B6T3Y-4RNK3VX-2/2/c0fe3070ef73f0e25f004e5408655999)
Abstract:
Understanding pest density patterns in the field is important to account for distinct environmental variables potentially influencing populations across different habitat types. Here, we assessed the relative importance of single environmental abiotic and biotic variables on densities of three major coffee pests, i.e., spider mites, leaf miners and berry borers, in simple, complex and abandoned agroforests of coastal Ecuador, using hierarchical partitioning methods. Most of the variation in spider mite and leaf miner densities was accounted for by the abiotic variables temperature and relative humidity, while agroforestry type, relative humidity and tree diversity were more important in explaining densities of berry borers. Furthermore, densities of spider mites and berry borers, but not leaf miners, were affected by agroforestry type, with lower densities in structurally complex agroforests. In conclusion, very different environmental variables influence coffee pest population density. Understanding such species density-environmental relationships provide insights on how to predict and manage populations in the field.
Keywords: Spider mites; Leaf miners; Berry borers; Abiotic and biotic habitat variables

Leandro S. Oliveira, Adriana S. Franca, Rodrigo R.S. Camargos, Vany P. Ferraz, Coffee oil as a potential feedstock for biodiesel production, Bioresource Technology, Volume 99, Issue 8, May 2008, Pages 3244-3250, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.05.074.
(http://www.sciencedirect.com/science/article/B6V24-4PDK9VX-3/2/383566f9b7c908f2be54d798719d263c)
Abstract:
A preliminary evaluation of the feasibility of producing biodiesel using oil extracted from defective coffee beans was conducted as an alternative means of utilizing these beans instead of roasting for consumption of beverage with depreciated quality. Direct transesterifications of triglycerides from refined soybean oil (reference) and from oils extracted from healthy and defective coffee beans were performed. Type of alcohol employed and time were the reaction parameters studied. Sodium methoxide was used as alkaline catalyst. There was optimal phase separation after reactions using both soybean and healthy coffee beans oils when methanol was used. This was not observed when using the oil from defective beans which required further processing to obtain purified alkyl esters. Nevertheless, coffee oil was demonstrated to be a potential feedstock for biodiesel production, both from healthy and defective beans, since the corresponding oils were successfully converted to fatty acid methyl and ethyl esters.
Keywords: Biodiesel; Defective coffee beans

Norbert Niederhauser, Thomas Oberthur, Sibylle Kattnig, James Cock, Information and its management for differentiation of agricultural products: The example of specialty coffee, Computers and Electronics in Agriculture, Volume 61, Issue 2, May 2008, Pages 241-253, ISSN 0168-1699, DOI: 10.1016/j.compag.2007.12.001.
(http://www.sciencedirect.com/science/article/B6T5M-4RR20VP-1/2/6e6c7f77d5a017b0d48342483ac8a49f)
Abstract:
Prices of most of agricultural commodities show a long-term declining trend. Increasingly markets are signaling demand for differentiated products and in order to increase their incomes farmers and traders are looking to higher value options, including differentiated products. Product differentiation occurs when a product offering is perceived by the consumer to differ from its competition on any physical or non-physical characteristic including price. The differentiation can be based both on perceptual differences and also on actual product differences, based on measurable characteristics. The information requirements for supply chain management of differentiated high value products are much more stringent than for traditional agricultural commodities requiring a two-way information flow from the producer to the customer. The conceptual base for information systems to support supply chain management of differentiated products is described in this paper. An Internet-based coffee information system (CINFO), illustrates how these principles can be applied to the case of specialty coffee. CINFO provides farmers information on where and how to produce coffee with particular features, whilst at the same time providing traders with information on the availability of products with particular traits. Furthermore, CINFO traces individual product batches indicating where and how they were produced, processed and distributed to the end consumer so as to facilitate identity preservation, which is the key to obtaining added value from differentiation.
Keywords: Information management; Agricultural product differentiation; Agricultural supply chains; Internet-based; Specialty coffee

Abebe Belay, Kassahun Ture, Mesfin Redi, Araya Asfaw, Measurement of caffeine in coffee beans with UV/vis spectrometer, Food Chemistry, Volume 108, Issue 1, 1 May 2008, Pages 310-315, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.10.024.
(http://www.sciencedirect.com/science/article/B6T6R-4PWSYCK-1/2/31258ef435b5c870fc2eaf7e72e1ad7a)
Abstract:
In this research work using UV/vis spectrophotometer the molar decadic absorption coefficients and transitional dipole moment of pure caffeine in water and dichloromethane were obtained at 272 and 274.7 nm. The molar decadic absorption coefficients of caffeine in water and dichloromethane at these wavelengths are 1115 and 1010 m2 mol-1, respectively. The calculated values for the transitional dipole moment of caffeine in water and in dichloromethane are 10.40 x 10-30 and 10.80 x 10-30 C m, respectively. After characterizing caffeine in water and dichloromethane, fast and simple methods were developed that enable to quantify the content of caffeine in coffee beans. The methods helped in extracting caffeine from coffee dissolved in water by dichloromethane, and Gaussian fit was applied to eliminate the possible interference with the caffeine spectra.
Keywords: Absorbance; Caffeine; Characterization; Extraction; UV/vis spectrophotometer

W.N. Hernandez-Diaz, I.I. Ruiz-Lopez, M.A. Salgado-Cervantes, G.C. Rodriguez-Jimenes, M.A. Garcia-Alvarado, Modeling heat and mass transfer during drying of green coffee beans using prolate spheroidal geometry, Journal of Food Engineering, Volume 86, Issue 1, May 2008, Pages 1-9, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.08.025.
(http://www.sciencedirect.com/science/article/B6T8J-4PRRBCM-1/2/8ff4e8e4edbe16acfbe7fc785231b90b)

Abstract:
A heat and mass transfer model in prolate spheroidal coordinates system was proposed to describe the drying of green coffee beans. The model describes the 3D moisture and temperature profiles inside the bean. The results were integrated over volume in order to obtain a drying kinetic equation for prolate spheroidal geometry. The average effective diffusivity of water as function of temperature and moisture was estimated at 45 and 60 [degree sign]C by slope method from experimental drying kinetic of green coffee beans. The expression obtained applied to drying kinetic equation reproduced approximately the experimental behavior.
Keywords: Green coffee drying; Diffusivity; Prolate spheroidal geometry

Yenny P. Cardona, Carlos E. Oliveros, Diego F. Arias, Fernando Alvarez, Alfonso Devia, Epicarp characterization of coffee fruits by atomic force microscopy, Journal of Food Engineering, Volume 86, Issue 2, May 2008, Pages 167-171, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.09.031.
(http://www.sciencedirect.com/science/article/B6T8J-4PVPVH3-1/2/8ee15a3d60fa752b00948292480686e4)
Abstract:
The superficial characterization of epicarp of the coffee fruits was made in two states of development: mature and green. The roughness of the area, and also the line for the parameters of roughness average (Ra) and quadratic root average of the roughness (Rq), were found by means of atomic force microscopy (AFM). In addition, the densities and dimensions of the coffee cells were found. The Ra range of the mature fruit was found to be between 0.03 and 0.19 [mu]m, and for the green fruit it was between 0.23 and 0.38 [mu]m. The Rq range of the mature fruit was found to be between 0.05 and 0.24 [mu]m, and for the green fruit it was between 0.29 and 0.49 [mu]m. These values delimit ranges of roughness for each state of development analyzed, and there is a difference among them without appearing interpolation of the data. It was determined that the cells have ellipsoidal form with an average area of 194.62 [mu]m2, and the density average is 4.206 cell/mm2.
Keywords: Epicarp; Coffee fruits; Roughness; AFM

Fernando M. Nunes, Ana Reis, Artur M.S. Silva, M. Rosario M. Domingues, Manuel A. Coimbra, Rhamnoarabinosyl and rhamnoarabinoarabinosyl side chains as structural features of coffee arabinogalactans, Phytochemistry, Volume 69, Issue 7, May 2008, Pages 1573-1585, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2008.01.021.
(http://www.sciencedirect.com/science/article/B6TH7-4S2VG0Y-2/2/da9ce705305b94d57543e034368c41b0)
Abstract:
The hot water soluble green coffee arabinogalactans, representing nearly 7% of total coffee bean arabinogalactans, were characterized by 1H and 13C NMR and, after partial acid hydrolysis, by ESI-MS/MS. Data obtained showed that these are highly branched type II arabinogalactans covalently linked to proteins (AGP), with a protein moiety containing 10% of 4-hydroxyproline residues. They possess a [beta]-(1 --> 3)-Galp/[beta]-(1 --> 3,6)-Galp ratio of 0.80, with a sugars composition of Rha:Ara:Gal of 0.25:1.0:1.5, and containing 2 mol% of glucuronic acid residues. Beyond the occurrence of single [alpha]-l-Araf residues and [[alpha]-l-Araf-(1 --> 5)-[alpha]-l-Araf-(1-->] disaccharide residues as side chains, these AGPs contain unusual side chains at O-3 position of the [beta]-(1 --> 6)-linked galactopyranosyl residues composed by [[alpha]-l-Rhap-(1 --> 5)-[alpha]-l-Araf-(1-->] and [[alpha]-l-Rhap-(1 --> 5)-[alpha]-l-Araf-(1 --> 5)-[alpha]-l-Araf-(1-->] oligosaccharides. Rhamnoarabinosyl and rhamnoarabinoarabinosyl side chains are reported for the first time as structural features of plant arabinogalactan-proteins.
Keywords: Coffee; Polysaccharides; Oligosaccharides; AGP; NMR; Mass spectrometry

Clara Geromel, Lucia Pires Ferreira, Fabrice Davrieux, Bernard Guyot, Fabienne Ribeyre, Maria Brigida dos Santos Scholz, Luiz Filipe Protasio Pereira, Philippe Vaast, David Pot, Thierry Leroy, Armando Androcioli Filho, Luiz Gonzaga Esteves Vieira, Paulo Mazzafera, Pierre Marraccini, Effects of shade on the development and sugar metabolism of coffee (Coffea arabica L.) fruits, Plant Physiology and Biochemistry, Volume 46, Issues 5-6, May-June 2008, Pages 569-579, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2008.02.006.
(http://www.sciencedirect.com/science/article/B6VRD-4S0203Y-2/2/120f41c98e2e763a2c2b1f670caeeb17)
Abstract:
Coffee fruits grown in shade are characterized by larger bean size than those grown under full-sun conditions. The present study assessed the effects of shade on bean characteristics and sugar metabolism by analyzing tissue development, sugar contents, activities of sucrose metabolizing enzymes and expression of sucrose synthase-encoding genes in fruits of coffee (Coffea arabica L.) plants submitted to full-sun (FS) and shade (SH) conditions. Evolution of tissue fresh weights measured in fruits collected regularly from flowering to maturation indicated that this increase is due to greater development of the perisperm tissue in the shade. The effects of light regime on sucrose and reducing sugar (glucose and fructose) contents were studied in fresh and dry coffee beans. Shade led to a significant reduction in sucrose content and to an increase in reducing sugars. In pericarp and perisperm tissues, higher activities of sucrose synthase (EC 2.4.1.13) and sucrose-phosphate synthase (SPS: EC 2.4.1.14) were detected at maturation in the shade compared with full sun. These two enzymes also had higher peaks of activities in developing endosperm under shade than in full sun. It was also noted that shade modified the expression of SUS-encoding genes in coffee beans; CaSUS2 gene transcripts levels were higher in SH than in FS. As no sucrose increase accompanied these changes, this suggests that sucrose metabolism was redirected to other metabolic pathways that need to be identified.
Keywords: Bean composition; Coffea arabica; Fruit development; Gene expression; Shade; Sucrose synthase; Sugar metabolism

Tadesse Woldemariam Gole, Thomas Borsch, Manfred Denich, Demel Teketay, Floristic composition and environmental factors characterizing coffee forests in southwest Ethiopia, Forest Ecology and Management, Volume 255, Issue 7, Large-scale experimentation and oak regeneration, 20 April 2008, Pages 2138-2150, ISSN 0378-1127, DOI: 10.1016/j.foreco.2007.12.028.
(http://www.sciencedirect.com/science/article/B6T6X-4S0HBYC-1/2/6b111a3c6c94f1fd12590b975fed00a6)
Abstract:
Afromontane rainforest stands in Ethiopia with a high frequency of wild populations of Coffea arabica are commonly known as `coffee forests'. These forests are important for the conservation of the genetic diversity of wild Arabica coffee, and for subsistence coffee production. This study analyses the floristic composition and environmental factors of such coffee forests, using the Yayu forest as a case. Fifty-eight plots of 20 m x 20 m were assessed, and a total of 220 plant species, representing 73 families, were recorded, of which 71 were trees, 28 shrubs, 27 climbers and 94 herbs. A cluster analysis, coupled with indicator species analysis, revealed three plant community types, which can designated as C. arabica-Cassipourea malosana, Argomuellera macrophylla-Celtis africana and Dracaena fragrans-Teclea noblis communities. The C. arabica-C. malosana and D. fragrans-T. noblis communities occur at relatively higher altitudes (1450 and 1435 m on average) on gentle and steep slopes, respectively, while the A. macrophylla-C. africana community occurs on steep slopes at lower altitudes (1380 m on average). C. arabica is one of the most frequent species in the Yayu forest, and its abundance is strongly negatively correlated with slope. These habitat differences, together with the predominance of Coffea in the understorey, support the floristic circumscription of a coffee forest. Forests commonly known as 'coffee forests'

have, therefore, to be viewed as a complex mosaic of different plant communities, which needs to be taken into consideration in the designation of conservation areas and differential management planning.
The plant species composition of Yayu forest is predominantly Afromontane rainforest type, with several dry peripheral semi-deciduous Guineo-Congolian forest type species. Hence, Yayu forest can best be described as transitional between these lowland and montane forest types.
Keywords: Afromontane rainforest; Coffea arabica; Guineo-Congolian rainforest; Indicator species; In situ conservation

Ana M. Lopez-Gomez, Guadalupe Williams-Linera, Robert H. Manson, Tree species diversity and vegetation structure in shade coffee farms in Veracruz, Mexico, Agriculture, Ecosystems & Environment, Volume 124, Issues 3-4, April 2008, Pages 160-172, ISSN 0167-8809, DOI: 10.1016/j.agee.2007.09.008.
(http://www.sciencedirect.com/science/article/B6T3Y-4R0CPJC-2/2/1fe454994315cf85960f161739045705)
Abstract:
Using 15 shade coffee farms and two forest reserves located in central Veracruz, Mexico, we evaluated how tree vegetation structure and richness changed as a function of management type and compared to that remnant forest fragments. Coffee farms were classified as shade monocultures (SMs), simple polycultures (SPs), or diverse polycultures (DPs). A total of 124 sampling units representing 15.19 ha were randomly located in farms with the number of sampling units varying as a function of farm area. Twenty additional plots were sampled in two nearby cloud forest fragments. Forest vegetation structure was higher than in farms, except for mean canopy height that was similar to that in SP and DP farms. Within farms, tree density was generally higher in SM, whereas basal area and both mean and maximum height were higher in SP and DP sites. We recorded 2833 individuals representing 107 tree species >=5 cm dbh in coffee farms, including 24 non-native species, and 83 native species (33 primary, and 50 secondary tree species). Patterns of richness followed the expected pattern with 11 +/- 1.4 (S.E.) tree species in SM farms, 14 +/- 1.8 in SP farms, 29 +/- 2.3 in DP farms, and 38 +/- 16 in forest control sites; however, rarefaction strongly suggests that DP sites are actually richer in species than the forests studied. The proportion of native tree species in each coffee management type was consistently elevated (78%). Since the majority of species (71%) were rare and found only in one or two farms, complementarity among types of coffee management (68-77%), and coffee managements and forest (90-92%) was very high. SP and DP farms had the highest proportions of animal-dispersed species and were similar to forest. Species richness was positively correlated with tree density for DP, and to basal area for SM farms. Our results suggest that shade diversity is actively managed by coffee farmers and that all three types of coffee management studied may have an important role to play in the conservation of regional biodiversity. Considering factors such as complementarity, landscape heterogeneity, functional diversity, and the rigor of vegetation surveys may also help improve the validity, and thus the impact, of coffee certification programs designed with the goal of conserving tropical montane biodiversity.
Keywords: Coffee agroecosystems; Tree diversity; Vegetation structure; Veracruz

Rani Devi, Vijender Singh, Ashok Kumar, COD and BOD reduction from coffee processing wastewater using Avacado peel carbon, Bioresource Technology, Volume 99, Issue 6, April 2008, Pages 1853-1860, ISSN 0960-8524, DOI: 10.1016/j.biortech.2007.03.039.
(http://www.sciencedirect.com/science/article/B6V24-4NP3P1V-5/2/b225cbb89826e5b63fb82eb4616c98e2)
Abstract:
The aim of this study was the assessment of reduction of chemical oxygen demand (COD) and biological oxygen demand (BOD) of wastewater from coffee processing plant using activated

carbon made up of Avacado Peels. The complete study was done in batch mode to investigate the effect of operating parameters. The results of the COD and BOD concentration reduction with avocado peel carbon (APC) and commercial activated carbon (CAC) were compared and optimum operating conditions were determined for maximum reduction. Adsorption isotherm was also studied besides the calculation of optimum treatment parameters for maximum reduction of COD and BOD concentration from effluent of the coffee processing plant. The maximum percentage reduction of COD and BOD concentration under optimum operating conditions using APC was 98.20% and 99.18% respectively and with CAC this reduction was 99.02% and 99.35% respectively. As the adsorption capacity of APC is comparable with that of CAC for reduction of COD and BOD concentration, it could be a lucrative technique for treatment of domestic wastewater generated in decentralized sectors.
Keywords: Adsorption; Avacado; BOD; COD; Coffee processing wastewater/effluent

Wolfgang W. Huber, Walter Rossmanith, Michael Grusch, Elisabeth Haslinger, Sonja Prustomersky, Barbara Peter-Vorosmarty, Wolfram Parzefall, Gerlinde Scharf, Rolf Schulte-Hermann, Effects of coffee and its chemopreventive components kahweol and cafestol on cytochrome P450 and sulfotransferase in rat liver, Food and Chemical Toxicology, Volume 46, Issue 4, Molecular and Physiological Effects of Bioactive Food Components, April 2008, Pages 1230-1238, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.09.094.
(http://www.sciencedirect.com/science/article/B6T6P-4PRRBSJ-1/2/8c3573a2ea45da8eaa62833a9fc98c4a)
Abstract:
Coffee drinking appears to reduce cancer risk in liver and colon. Such chemoprevention may be caused by the diterpenes kahweol and cafestol (K/C) contained in unfiltered beverage. In animals, K/C treatment inhibited the mutagenicity/tumorigenicity of several carcinogens, likely explicable by beneficial modifications of xenobiotic metabolism, particularly by stimulation of carcinogen-detoxifying phase II mechanisms. In the present study, we investigated the influence of K/C on potentially carcinogen-activating hepatic cytochrome P450 (CYP450) and sulfotransferase (SULT). Male F344 rats received 0.2% K/C (1:1) in the diet for 10 days or unfiltered and/or filtered coffee as drinking fluid. Consequently, K/C decreased the metabolism of four resorufin derivatives representing CYP1A1, CYP1A2, CYP2B1, and CYP2B2 activities by ~50%. For CYP1A2, inhibition was confirmed at the mRNA level, accompanied by decreased CYP3A9. In contrast to K/C, coffee increased the metabolism of the resorufin derivatives up to 7-fold which was only marginally influenced by filtering. CYP2E1 activity and mRNA remained unchanged by K/C and coffee. K/C but not coffee decreased SULT by ~25%. In summary, K/C inhibited CYP450s by tendency but not universally. Inhibition of CYP450 and SULT may contribute to chemoprevention with K/C but involvement in the protection of coffee drinkers is unlikely. The data confirm that the effects of complex mixtures may deviate from those of their putatively active components.
Keywords: Coffee components; Cytochrome P450; Sulfotransferase; Liver; Rat; Kahweol; Cafestol

C. Cavin, M. Marin-Kuan, S. Langouet, C. Bezencon, G. Guignard, C. Verguet, D. Piguet, D. Holzhauser, R. Cornaz, B. Schilter, Induction of Nrf2-mediated cellular defenses and alteration of phase I activities as mechanisms of chemoprotective effects of coffee in the liver, Food and Chemical Toxicology, Volume 46, Issue 4, Molecular and Physiological Effects of Bioactive Food Components, April 2008, Pages 1239-1248, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.09.099.
(http://www.sciencedirect.com/science/article/B6T6P-4PRYG77-5/2/3927276cd6cfc98ee847b99d32dd4984)
Abstract:
Coffee consumption has been associated with a significant decrease in the risk of developing chronic diseases such as Parkinson disease, diabetes type-2 and several types of cancers (e.g. colon, liver). In the present study, a coffee-dependent induction of enzymes involved in xenobiotic

detoxification processes was observed in rat liver and primary hepatocytes. In addition, coffee was found to induce the mRNA and protein expression of enzymes involved in cellular antioxidant defenses. These inductions were correlated with the activation of the Nrf2 transcription factor as shown using an ARE-reporter luciferase assay. The induction of detoxifying enzymes GSTs and AKR is compatible with a protection against both genotoxicity and cytotoxicity of aflatoxin B1 (AFB1). This hypothesis was confirmed in in vitro and ex vivo test systems, where coffee reduced both AFB1-DNA and protein adducts. Interestingly, coffee was also found to inhibit cytochrome CYP1A1/2, indicating that other mechanisms different from a stimulation of detoxification may also play a significant role in the chemoprotective effects of coffee. Further investigations in either human liver cell line and primary hepatocytes indicated that the chemoprotective effects of coffee against AFB1 genotoxicity are likely to be of relevance for humans. These data strongly suggest that coffee may protect against the adverse effects of AFB1. In addition, the coffee-mediated stimulation of the Nrf2-ARE pathway resulting in increased endogenous defense mechanisms against electrophilic but also oxidative insults further support that coffee may be associated with a protection against various types of chemical stresses.
Keywords: Coffee; Chemoprotection; Mechanisms; Nuclear factor-erythroid 2 p45-related factor 2; Glutathione S-transferases; Cytochromes P450

Wolfram Parzefall, Minireview on the toxicity of dietary acrylamide, Food and Chemical Toxicology, Volume 46, Issue 4, Molecular and Physiological Effects of Bioactive Food Components, April 2008, Pages 1360-1364, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.08.027.
(http://www.sciencedirect.com/science/article/B6T6P-4PJ0523-2/2/f70fea5a5f032cb3bf625811f7c87dd7)
Abstract:
Acrylamide is a commodity chemical with many industrial and laboratory uses. It is also formed from carbohydrate and amino acid containing food by heating (primarily in fried potato products, bread, coffee). Neurotoxicity was detected as the primary toxic effect after occupational exposure. In rats and mice AA is toxic for reproduction and development and to male germ cells, is genotoxic through a reactive metabolite, glycidamide, and carcinogenic to several organs. Epidemiological studies did not point to an association between either occupational or dietary exposure and an excess of cancer incidence. Health risks of the general population are based on an average exposure to 1 [mu]g/kg bw/day increasing for high consumers to 4 [mu]g/kg bw/day. For average consumers a margin of exposure of 200 for neurotoxicity can be regarded as sufficiently protective. However, a margin of 300 for carcinogenic risks appears not sufficient when applying a precautionary principle. This is also illustrated when the benchmark dose lower confidence limit for cancer is divided by an uncertainty factor of 300, which arrives at a tolerable daily intake of 1 [mu]g/kg bw/day, and thus is in the range of average consumption. Further measures to minimize acrylamide formation in food should therefore be explored to reduce human exposure.
Keywords: Acrylamide; Food; Risk assessment; Neurotoxicity; Genotoxicity; Carcinogenicity

A. Olchev, A. Ibrom, J. Priess, S. Erasmi, C. Leemhuis, A. Twele, K. Radler, H. Kreilein, O. Panferov, G. Gravenhorst, Effects of land-use changes on evapotranspiration of tropical rain forest margin area in Central Sulawesi (Indonesia): Modelling study with a regional SVAT model, Ecological Modelling, Volume 212, Issues 1-2, Selected papers from the Fifth European Conference on Ecological Modelling, 19-23 September 2005, Pushchino, Russia, 24 March 2008, Pages 131-137, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2007.10.022.
(http://www.sciencedirect.com/science/article/B6VBS-4R71KN3-1/2/96149b5127f34df07cfd24dbd47e64ee)
Abstract:
The impact of deforestation and land-use changes on evapotranspiration of mountainous tropical rain forest area in the northern part of the Lore-Lindu National Park (LLNP) in Central Sulawesi

(Indonesia) was quantified using a regional process-based SVAT model 'SVAT-Regio'. Description of evapotranspiration of a non-uniform land surface in local and regional scales in SVAT-Regio is based on equations of energy and water balances of individual plants, plant canopy and soil layers for each of many grid cells into which the entire study area is divided. The model uses a multi-layered representation of vegetation cover and soil structure that allows to describe the partitioning of energy and H2O-fluxes among different canopy layers and soil, and to quantify more precisely the total ecosystem fluxes. Selective integration of grid cell fluxes on space and time allows estimating the energy and water fluxes for e.g. ecosystems, catchments or entire study area for different time spans from 1 day to several years.
September of 2004 was selected as a test period for modelling experiments. The regional patterns of meteorological parameters were reconstructed using measurements provided by 10 mobile meteorological stations. Ecophysiological parameters for different vegetation types were determined from own measurements as well as from results of previous scientific studies in the area. The present spatial distribution of the different land-use types was described from analysis of LANDSAT ETM+ observations. The spatial pattern of leaf area index (LAI) was derived from analysis of NDVI data (calculated from LANDSAT ETM+ data) and field measurements at key experimental plots.
A deforestation scenario (allowing for mainly anthropogenic impacts) which was applied in this study assumes a relatively strong decrease of the areas covered by tropical rain forests, i.e. about 15%, and an increase of agricultural (coffee plantations, corn and rice fields) and urban areas. Moreover, the scenario assumes a small increase of grassland areas as well. The results of modelling experiments show that 15% deforestation of the study area results in relatively small decrease of monthly evapotranspiration by about 2%, transpiration by about 6% and interception evaporation by about 5%, as well as an increase of soil evaporation by about 21%. The evapotranspiration decrease was highest in days with cloudy and rainy weather conditions, and lowest in sunny and dry days.
Keywords: Regional SVAT model; Land-use changes; Evapotranspiration; Tropical rain forest margins

A. Mekoya, S.J. Oosting, S. Fernandez-Rivera, A.J. Van der Zijpp, Multipurpose fodder trees in the Ethiopian highlands: Farmers' preference and relationship of indigenous knowledge of feed value with laboratory indicators, Agricultural Systems, Volume 96, Issues 1-3, March 2008, Pages 184-194, ISSN 0308-521X, DOI: 10.1016/j.agsy.2007.08.001.
(http://www.sciencedirect.com/science/article/B6T3W-4PP1YX2-1/2/9f769a2b43e0aea001e6e3f636fd34c8)
Abstract:
In the tropics, numerous organizations have promoted multipurpose fodder trees (MPFT) with an emphasis on exotic species. These species have generally been selected and recommended by the research system through the conventional nutritional and agronomic experimentation for use as animal feed and soil conservation. In Ethiopia, the introduction of exotic MPFT started in the 1970s. However, despite its apparent benefits, the adoption of exotic MPFT by smallholder farmers has been slow and in some cases farmers ceased using exotic MPFT in their farming systems. The objectives of the present study were to assess farmers' preference criteria, compare their preference between exotic and local MPFT, and evaluate the relationship of farmers' knowledge of feed value assessment with laboratory indicators. Focus group discussions and preference ranking and scoring by a total of 40 farmers were conducted in two districts representing two production systems (cereal and coffee-based livestock production systems) in the Ethiopian highlands. The comparison between exotic and local MPFT for their benefits and desired tree characteristics showed that farmers preferred local MPFT to exotics for biomass production, multi-functionality, life span, and compatibility to the cropping system. In terms of feed value, ease of propagation, and growth potential local MPFT were ranked lower than or

comparable to exotics. There was also a strong correlation between farmers' feed value score and laboratory results. Farmers were able to discriminate effectively MPFT species that had high and low protein and fibre content using their indigenous feed value indicator system for all pairwise comparisons. We concluded from this study that farmers' preference criteria encompass multiple objectives beyond feed value and soil rehabilitation. The different merits that farmers associate with exotic and local MPFT could provide the opportunity to use both MPFT types and to improve farm bio-diversity. Hence, incorporating locally available MPFT, farmers' indigenous knowledge and preference criteria at the research inception process is vital to maximize the likelihood of farmers' adopting and maintaining these technologies.
Keywords: Farm households; Multipurpose fodder trees; Highlands; Indigenous knowledge; Preference ranking; Nutrient composition

A. Attwood, P. Terry, S. Higgs, Evidence of conditioned cognitive and mood effects of caffeine in humans using a differential conditioning paradigm, Appetite, Volume 50, Issues 2-3, March-May 2008, Page 556, ISSN 0195-6663, DOI: 10.1016/j.appet.2007.09.019.
(http://www.sciencedirect.com/science/article/B6WB2-4RW4RRV-3/2/3843c5df2913fe1b8baabf1ced5fbccf)
Abstract:
Caffeine is a well-known psychostimulant drug, capable of facilitating psychomotor and cognitive performance, improving mood and attenuating fatigue. Moreover, caffeine-related stimuli (e.g. smell and/or taste of coffee) have been associated with increases in physiological and subjective arousal and improvements in vigilance performance. These effects may have been due to classical conditioning but may also have been potentiated by expectancy due to the use of commonly consumed caffeinated beverages. The current study examined the role of classical conditioning, by examining whether a novel caffeine-paired context could acquire the ability to elicit caffeine-like facilitation on performance and mood. A differential conditioned paradigm was used in which one context was paired with caffeine ingestion (400 mg in a capsule) and a second context was paired with placebo. After four pairings in each condition, a test of conditioning was conducted in which placebo was administered in each context. The findings demonstrated significantly faster reaction time performance after placebo in the context previously paired with caffeine ingestion compared to the context previously paired with placebo. Furthermore, these conditioned effects were acquired quickly, after just two caffeine-context pairings and were acquired despite a reported absence of CS-US contingency awareness.

C. Haskell, D. Kennedy, A. Milne, K. Wesnes, A.B. Scholey, Caffeine at levels found in decaffeinated beverages is behaviourally active, Appetite, Volume 50, Issues 2-3, March-May 2008, Page 559, ISSN 0195-6663, DOI: 10.1016/j.appet.2007.09.033.
(http://www.sciencedirect.com/science/article/B6WB2-4RW4RRV-K/2/07d260566b6de38d0120fb6d31b77589)
Abstract:
It has previously been assumed that levels of caffeine typically found in decaffeinated beverages have no behavioural effects. However, recent findings from our laboratory indicate that caffeine doses as low as 9 mg have psychoactive properties which can endure for several hours. The current study aimed to establish the lowest active dose of caffeine and to ascertain the duration of any effects. Twenty participants took part in this randomised, placebo-controlled, double-blind, balanced-crossover study assessing the effects of three different doses of caffeine (2.5, 5, and 10 mg) administered in fruit juice. Cognitive performance, mood, autonomic activity and salivary caffeine were assessed pre-dose and at 1, 3, 6 and 9 h post-dose. Compared with placebo, performance was impaired by 2.5 mg, whilst 5 mg had negative effects on mood and mixed effects on performance and 10 mg improved performance. A number of these effects were apparent at 9 h post-treatment. Given that the average cup of decaffeinated coffee contains 3-5 mg caffeine,

these results demonstrate that decaffeinated coffee is not inert as previously believed and this has implications for research which utilises decaffeinated coffee as placebo. Effects of caffeine are also longer-lasting than previously thought with effects apparent 9 h post-dose. This finding may offer an alternative explanation to withdrawal models for differing results in the literature pertaining to baseline performance in consumers and non-consumers of caffeine.

M. Madhava Naidu, G. Sulochanamma, S.R. Sampathu, P. Srinivas, Studies on extraction and antioxidant potential of green coffee, Food Chemistry, Volume 107, Issue 1, 1 March 2008, Pages 377-384, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.08.056.
(http://www.sciencedirect.com/science/article/B6T6R-4PJ6GP1-1/2/711c6881b0c7b77500310bec531f56ff)
Abstract:
Green coffee conserves were prepared from the species Coffea arabica and Coffea robusta by flaking, powdering and extraction with solvent mixtures of isopropanol and water in different ratios and their antioxidant properties were investigated. The yields of conserves were highest 27% for C. arabica and 29% for C. robusta, when isopropanol and water in ratio of 60:40 was employed. The total polyphenol content was determined and found to be higher (31.7-32.2%) in these conserves. At a concentration of 200 ppm, coffee conserves from Arabica and Robusta, exhibited 92% and 88% antioxidant activity respectively in comparison to 95% for BHA. The conserves were analyzed by HPLC and three phenolic compounds could be identified. The chlorogenic acid, the major compound in the purified extracts (56 +/- 10%), was isolated and characterized by 1H and 13C NMR spectral data. While the caffeic acid part of the molecule was confirmed from the signals for aromatic protons and olefenic protons, the quinic acid group was evident from the signals for methine protons [alpha] to hydroxyl groups as well as for the methylene protons of the cyclohexane moiety. Similarly, 13C spectra showed signals for two carbonyl carbons, apart from eight signals corresponding to six aromatic and two olefenic carbons and signals for the six carbons in the cycloalkane side chain.
Keywords: Coffee conserves; Antioxidant; Solvent mixtures; Chlorogenic acid; Polyphenols

Stelios Spaniolas, Maroussa Tsachaki, Malcolm J. Bennett, Gregory A. Tucker, Evaluation of DNA extraction methods from green and roasted coffee beans, Food Control, Volume 19, Issue 3, March 2008, Pages 257-262, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.04.002.
(http://www.sciencedirect.com/science/article/B6T6S-4NHM53V-1/2/4e4edcb58e64e52783d216f02ae0bcfb)
Abstract:
This paper describes a generic approach to the evaluation of DNA extraction methodology using green and roasted coffee beans as a model commodity. The use of Design-Expert(R) software was used in the design of experimental work to compare and optimize yields using a variety of commercial DNA extraction kits. The quality of the extracted DNA in terms of PCR inhibitor content is assessed and a judgment made that GeneSpin represents perhaps the best methodology in this instance. Coffee is a major commercial crop and there is the potential for fraudulent adulteration of the more expensive Arabica with Robusta beans. It is demonstrated that the DNA extracted from both green and roasted beans could be used in a PCR-RFLP based analysis to differentiate between Arabica and Robusta types of coffee.
Keywords: Coffee authentication; DNA extraction; DNA quantification

L. Piazza, J. Gigli, A. Bulbarello, Interfacial rheology study of espresso coffee foam structure and properties, Journal of Food Engineering, Volume 84, Issue 3, February 2008, Pages 420-429, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.06.001.
(http://www.sciencedirect.com/science/article/B6T8J-4P1928D-1/2/b6d67e268f55ed073947ed54a20787e2)

Abstract:
The espresso coffee beverage is a polyphasic colloidal system, in which the liquid phase is topped by a wet foam of tiny sphere-shaped gas bubbles. Each sphere is surrounded by a liquid film (lamellae) that isolates it from its neighbours and that hosts biopolymers and natural surfactants. Foaming biopolymers of coffee (total fraction and its sub-fractions: proteins/melanoidins fraction and polysaccharides fraction) were extracted from defatted and raw, commercially roasted ground coffee. In order to study the viscoelastic behaviour of the surface-adsorbed layer, all the extracted fractions were analyzed using a commercial interfacial rheometer CIR 100 operating in time sweep mode. The growth of the interfacial elasticity of the lamella implicitly contains all the information about the molecular interaction at the foam air/liquid interface. These interactions are described to be responsible for the foam stabilization. Results indicate that the kinetics of the film formation is mediated by the polysaccharide component and that the protein/melanoidin component of the coffee foaming fraction exhibits the highest viscoelastic interfacial properties. Lipids play a major role in the interfacial film formation due to their interaction with protein-like macromolecules, the melanoidins. A correlation was established between air/water interface properties of the foaming systems and the respective foam volumes evaluated by means of the image analysis. A new mathematical description of surface viscoelastic phenomena, covering the terms of transport of surfactant biopolymers to the interface and describing the coagulation of particles here taking place, is proposed. The suggested equation overcomes the Warburton model, taking into account the complexity of real food systems as in the case of the espresso coffee beverage.
Keywords: Interfacial rheology; Foam; Espresso coffee; Image analysis

Arnulfo J. Monzon, Falguni Guharay, Ingeborg Klingen, Natural occurrence of Beauveria bassiana in Hypothenemus hampei (Coleoptera: Curculionidae) populations in unsprayed coffee fields, Journal of Invertebrate Pathology, Volume 97, Issue 2, February 2008, Pages 134-141, ISSN 0022-2011, DOI: 10.1016/j.jip.2007.07.008.
(http://www.sciencedirect.com/science/article/B6WJV-4PB0PYH-1/2/f29c1efa4865e0e1da964c06c14534fc)
Abstract:
Three unsprayed coffee farms (farm 1, 2 and 3) were studied for the natural occurrence of the insect pathogenic fungus Beauveria bassiana in Hypothenemus hampei populations throughout the rainy season of 2004 (July-November) and 2005 (July-December). B. bassiana infections were found during most sampling dates in both years, on all three farms. The B. bassiana infection levels were higher in 2005 than in 2004 with mean prevalence of 12.1% and 2.7%, respectively. No consistent significant differences in infection level between farms were found in any of the years. B. bassiana infection levels fluctuated widely throughout the season, and peaked at 13.5% on farm 3 in 2004 and at 44.0% on farm 1 in 2005. The H. hampei population was significantly higher in 2004 than in 2005, with 6.9% of the berries infested in 2004 and only 0.7% in 2005. In both years, the H. hampei infestation level was significantly higher on farm 2. No consistent significant differences in H. hampei infestation levels were found between sampling dates on any of the farms. H. hampei infestation levels fluctuated throughout both seasons, and peaked at 15.3% on farm 2 in 2004 and 2.2% on farm 2 in 2005. No consistent density dependent correlation between H. hampei infestation level and B. bassiana infection level was found. Correlations between climatic conditions and B. bassiana or H. hampei were not found.
Keywords: Coffee berry borer; Hypothenemus hampei; Infestation level; Beauveria bassiana; Infection level; Biological control; Natural occurrence; Natural enemy

Hiroshi Ashihara, Hiroshi Sano, Alan Crozier, Caffeine and related purine alkaloids: Biosynthesis, catabolism, function and genetic engineering, Phytochemistry, Volume 69, Issue 4, February 2008, Pages 841-856, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2007.10.029.

(http://www.sciencedirect.com/science/article/B6TH7-4RCW7WP-1/2/48370b6c2717b11c86549153c7678352)
Abstract:
Details of the recently elucidated biosynthetic pathways of caffeine and related purine alkaloids are reviewed. The main caffeine biosynthetic pathway is a sequence consisting of xanthosine --> 7-methylxanthosine --> 7-methylxanthine --> theobromine --> caffeine. Genes encoding N-methyltransferases involved in three of these four reactions have been isolated and the molecular structure of N-methyltransferases investigated. Pathways for the catabolism of caffeine have also been studied, although there are currently no reports of enzymatic and genetic studies having been successfully carried out. Metabolism of purine alkaloids in species including Camellia, Coffea, Theobroma and Ilex plants is summarised, and evidence for the involvement of caffeine in chemical defense and allelopathy is discussed. Finally, information is presented on metabolic engineering that has produced coffee seedlings with reduced caffeine content, and transgenic caffeine-producing tobacco plants with enhanced disease resistance.
Keywords: Camellia sinensis; Theaceae; Coffea sp.; Rubiaceae; Theobroma cacao; Sterculiaceae; Review; Metabolism; Caffeine

Yun-Soo Kim, Hiroshi Sano, Pathogen resistance of transgenic tobacco plants producing caffeine, Phytochemistry, Volume 69, Issue 4, February 2008, Pages 882-888, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2007.10.021.
(http://www.sciencedirect.com/science/article/B6TH7-4R718M3-1/2/a0c93ea17a0ee87954951e1f6cbb6024)
Abstract:
Caffeine (1,3,7-trimethylxanthine) is a typical purine alkaloid, and produced by a variety of plants such as coffee and tea. Its physiological function, however, is not completely understood, but chemical defense against pathogens and herbivores, and allelopathic effects against competing plant species have been proposed. Previously, we constructed transgenic tobacco plants, which produced caffeine up to 5 [mu]g per gram fresh weight of leaves, and showed them to repel caterpillars of tobacco cutworms (Spodoptera litura). In the present study, we found that these transgenic plants constitutively expressed defense-related genes encoding pathogenesis-related (PR)-1a and proteinase inhibitor II under non-stressed conditions. We also found that they were highly resistant against pathogens, tobacco mosaic virus and Pseudomonas syringae. Expression of PR-1a and PR-2 was higher in transgenic plants than in wild-type plants during infection. Exogenously applied caffeine to wild-type tobacco leaves exhibited the similar resistant activity. These results suggested that caffeine stimulated endogenous defense system of host plants through directly or indirectly activating gene expression. This assumption is essentially consistent with the idea of chemical defense, in which caffeine may act as one of signaling molecules to activate defense response. It is thus conceivable that the effect of caffeine is bifunctional; direct interference with pest metabolic pathways, and activation of host defense systems.
Keywords: Caffeine; Nicotiana tabacum; Solanaceae; Pathogenesis-related genes; Pseudomonas syringae pv. glycinea; Tobacco mosaic virus

Pamela D.C. Mancha Agresti, Adriana S. Franca, Leandro S. Oliveira, Rodinei Augusti, Discrimination between defective and non-defective Brazilian coffee beans by their volatile profile, Food Chemistry, Volume 106, Issue 2, 15 January 2008, Pages 787-796, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.06.019.
(http://www.sciencedirect.com/science/article/B6T6R-4P2S96B-K/2/638799cdfd84333b3d4ac864384c51e4)
Abstract:
The coffee roasted in Brazil is considered to be of low quality, due to the presence of defective coffee beans that depreciate the beverage quality. In view of the fact that coffee flavour is directly

related to the volatile compounds produced during roasting, the objective of the present study was to perform a comparative evaluation of the volatile fraction of defective (black, immature, sour) and healthy coffee beans, in order to find possible chemical markers for detection of defective coffee beans in roasted coffee. Volatiles extraction and concentration was performed by solid phase micro-extraction (SPME) of the roasted coffee headspace, using a triple phase (divinylbenzene/carboxen/polydimethylsiloxane) fiber. Analysis of the volatile profiles was performed by GC-MS. The results obtained showed that the proposed methodology was adequate for extraction, concentration and analysis of the coffees volatile profile. Several substances were identified as possible markers for differentiating black, sour and immature beans from healthy coffee beans. Statistical analysis of the data by principal components (PCA) demonstrated that the volatile profile enables the differentiation of healthy and defective coffees. The data were separated into two major groups, one represented by immature and black beans and the other by healthy and sour coffee beans. Such results indicated that black and sour beans can be associated to fermentation of immature and of healthy beans, respectively.
Keywords: Coffee; Defective beans; Volatiles profile; Roasting; SPME; GCMS; PCA analysis

Daniel Perrone, Adriana Farah, Carmen M. Donangelo, Tomas de Paulis, Peter R. Martin, Comprehensive analysis of major and minor chlorogenic acids and lactones in economically relevant Brazilian coffee cultivars, Food Chemistry, Volume 106, Issue 2, 15 January 2008, Pages 859-867, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.06.053.
(http://www.sciencedirect.com/science/article/B6T6R-4P429G1-2/2/0b1aa11f7c92468523675bd0aad34b9d)
Abstract:
Coffee is the most consumed beverage in the world and a significant source of phenolic compounds, particularly chlorogenic acids (CGA). During coffee roasting, some CGA are partially transformed into chlorogenic acid lactones (CGL). Both CGA and CGL are important compounds for flavor and potentially beneficial to human health. In the present study, using LC-MS and synthetic standards, we investigated major and minor CGA and CGL isomers in green and roasted samples of economically relevant Brazilian Coffea arabica and Coffea canephora coffee cultivars. For the first time, in addition to nineteen previously identified CGA and CGL, 1-feruloylquinic acid, 1-feruloylquinic lactone and 3,4-diferuloylquinic acid were quantified in C. arabica and C. canephora, the contents of 3- and 4-p-coumaroylquinic lactones were reported in C. canephora and 3,4-di-p-coumaroylquinic acid was identified in C. arabica. Despite their low concentrations, the implications of these findings for flavor, cup quality and the biological properties of coffee merit further investigation.
Keywords: Coffee; Chlorogenic acids; Lactones; Quinides; LC-MS; Coffee roasting

Ondrej Masek, Miki Konno, Sou Hosokai, Nozomu Sonoyama, Koyo Norinaga, Jun-ichiro Hayashi, A study on pyrolytic gasification of coffee grounds and implications to allothermal gasification, Biomass and Bioenergy, Volume 32, Issue 1, January 2008, Pages 78-89, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2007.07.007.
(http://www.sciencedirect.com/science/article/B6V22-4PF0X7R-3/2/db48ef29933dd9c283a8373ee1485401)
Abstract:
The increasing interest in biomass, as a renewable source of energy, is stimulating a search for suitable biomass resources as well as the development of technologies for their effective utilization. This work concentrated on characteristics of processes occurring during pyrolytic gasification of upgraded food industry residues, namely residue from industrial production of liquid coffee, and assessed its suitability for conversion in an allothermal gasifier. The influence of several operating parameters on product composition was examined with three different laboratory-scale reactors, studying the primary pyrolysis and secondary pyrolysis of nascent

volatiles, and the steam gasification of char. The experimental results show that a high degree of conversion of UCG into volatiles and gases (up to 88% C-basis) can be achieved by fast pyrolysis even at temperatures as low as 1073 K. In addition, the degree of conversion is not influenced by the presence or concentration of steam, which is an important factor in allothermal gasification. Mathematical simulation of an allothermal gasifier showed that net cold-gas efficiency as high as 86% can be reached.
Keywords: Pyrolysis; Gasification; Biomass; Residue; Tar; Allothermal; Coffee; Simulation

F.M. Borem, E.R. Marques, E. Alves, Ultrastructural analysis of drying damage in parchment Arabica coffee endosperm cells, Biosystems Engineering, Volume 99, Issue 1, January 2008, Pages 62-66, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2007.09.027.
(http://www.sciencedirect.com/science/article/B6WXV-4R5H1V8-3/2/ce5a225a01de74cfd095c0ba40435ce7)
Abstract:
The objective of this work was to evaluate and compare the alterations in the structure of coffee seed endosperm subjected to different temperatures and drying conditions. The seeds were dried at 40, 50 and 60, with an airflow of 0.33 m3 s-1 m-2. After drying, 10 seeds were randomly selected and prepared for the histochemical tests with Sudan IV and scanning and transmission electron microscopy, according to the laboratory's routine techniques. The histochemical results showed that, for the coffee parchment beans dried at 40 [degree sign]C, there was no change in the cellular integrity of the plasma membrane and vesicles. In contrast, in the endosperm of parchment coffee beans dried at 60 [degree sign]C, fused oil bodies that gave rise to large droplets in the intercellular space were observed, indicating a rupture of the vesicles and plasma membrane. Scanning electron microscopy showed that, for the parchment Arabica coffee beans dried at 40 [degree sign]C, the internal cellular content remained intact and full of cellular material and the space between the plasma membrane and the cell wall was empty. However, in seeds dried at 60 [degree sign]C, a rupture of the cells was observed, represented by occluded intercellular spaces, indicating a leaking of part of the protoplasm. The results from the transmission electron microscopy corroborated the undamaged and the damaged structure of the coffee parchment beans dried at 40 and 60 [degree sign]C, respectively.

K. Fujioka, T. Shibamoto, Chlorogenic acid and caffeine contents in various commercial brewed coffees, Food Chemistry, Volume 106, Issue 1, 1 January 2008, Pages 217-221, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.05.091.
(http://www.sciencedirect.com/science/article/B6T6R-4NYD8WM-1/2/31043f6898962986bf5cdace0bc3b4a3)
Abstract:
Twelve commercial brewed coffees (seven regular and five decaffeinated) were analyzed for chlorogenic acids (CGA) and caffeine by HPLC. Their pH and UV-Vis absorbances were also measured. The CGAs identified were three caffeolylquinic acids (3-CQA, 4-CQA, and 5-CQA), three feruloylquinic acids (3-FQA, 4-FQA, and 5-FQA), and three dicaffeoylquinic acids (3,4-diCQA, 3,5-diCQA, and 4,5-diCQA). The total CGAs ranged from 5.26 mg/g to 17.1 mg/g in regular coffees and from 2.10 mg/g to 16.1 mg/g in decaffeinated coffees. Among CGA, 5-CQA was present at the highest level, ranging from 2.13 mg/g to 7.06 mg/g coffee, and comprising 36-42% and 37-39% of the total CGA in the regular and decaffeinated coffees, respectively. CGA isomer contents were, in decreasing order, 5-CQA > 4-CQA > 3-CQA > 5-FQA > 4-FQA > 3-FQA > 3,4-diCQA > 4,5-diCQA, 3,5-diCQA. The caffeine content in regular and decaffeinated coffees ranged from 10.9 mg/g to 16.5 mg/g and from 0.34 mg/g to 0.47 mg/g, respectively. The pH of regular and decaffeinated coffees ranged from 4.95 to 5.99 and from 5.14 to 5.80, respectively. The relationship between the pH and the UV-Vis absorbance at 325 nm was moderately correlated ($R2 = 0.7829$, $p < 0.001$, $n = 12$).

Keywords: Acid contents; Brewed coffee; Caffeine; Chlorogenic acids

Michael N. Clifford, Jo Kirkpatrick, Nikolai Kuhnert, Hajo Roozendaal, Paula Rodrigues Salgado, LC-MSn analysis of the cis isomers of chlorogenic acids, Food Chemistry, Volume 106, Issue 1, 1 January 2008, Pages 379-385, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.05.081.
(http://www.sciencedirect.com/science/article/B6T6R-4NX8N1J-3/2/18ed867bac6e6e5a1e3f8dc6da5b2f54)
Abstract:
The behaviour of cis isomers of selected mono- and di-acyl chlorogenic acids produced by UV-irradiation has been investigated by LC-MSn. cis Isomers fragment identically to the more common trans isomers. cis-5-Acyl chlorogenic acids are more hydrophobic and elute later than their mono- or di-trans counterparts whereas the reverse is true for cis-3-acyl and cis-4-acyl chlorogenic acids. The cis isomers of 1,3-dicaffeoylquinic acid, the only 1-acyl chlorogenic acid investigated, are also more hydrophobic than the di-trans isomer. Coffee leaves had a proportionately greater content of cis isomers relative to trans isomers compared with coffee beans suggesting that UV-irradiation in vivo may also cause geometric isomerisation.
Keywords: Caffeoylquinic acids; Chlorogenic acids; Coffee; p-Coumaroylquinic acids; Cynarin; Dicaffeoylquinic acids; Feruloylquinic acids; LC-MSn; Leaves; UV-irradiation

K. Ramalakshmi, I. Rahath Kubra, L. Jagan Mohan Rao, Antioxidant potential of low-grade coffee beans, Food Research International, Volume 41, Issue 1, 2008, Pages 96-103, ISSN 0963-9969, DOI: 10.1016/j.foodres.2007.10.003.
(http://www.sciencedirect.com/science/article/B6T6V-4PWF0J2-3/2/8873b5bd06ab9242655f0546d0a3a004)
Abstract:
Low-grade coffee beans (triage) are widely known to adversely affect the beverage quality. These represent about 15-20% of coffee production on weight basis and attempts are being explored for their utilization. These beans were evaluated for the physico-chemical characteristics and subjected to soxhlet extraction using the solvents (viz., hexane, chloroform, acetone and methanol successively). The extracts were evaluated for antioxidant potential through in vitro models such as radical scavenging activity ([alpha],[alpha]-diphenyl-[beta]-picrylhydrazyl radical), antioxidant activity ([beta]-carotene-linoleate model system), reducing power (iron reducing activity) and antioxidant capacity (phosphomolybdenum complex). Highest yield of extract (12%) was obtained with methanol followed by hexane (8%) and chloroform (1.5%). Lowest was obtained with acetone (<1%). Also, it was observed that methanol extract was found to exhibit maximum radical scavenging activity (92.5%) followed by extracts obtained with acetone (81%) and chloroform (25%) at 100 ppm concentration. Further, the methanol extract showed antioxidant activity (58%) at 100 ppm concentration, while the other extracts viz., acetone, chloroform and hexane exhibited 44%, 28%, and 14%, respectively, at the same concentration. The antioxidant capacity of the methanol extract and propyl gallate showed 1367 +/- 54.17 and 5098 +/- 34.08 [mu]mol/g (as equivalents to ascorbic acid). Reducing power of the extract and standard compounds is in the following order ascorbic acid > chlorogenic acid > BHA > methanol extract. The methanol extract was found to contain total phenolics (21.90 +/- 0.50%), chlorogenic acid (34.16 +/- 0.27%) and caffeine (8.25 +/- 0.36%). The high antioxidant potential of the methanol extract of low-grade coffee beans is due to the presence of phenolic compounds including chlorogenic acids, which make them more suitable as a source of natural antioxidant and their utility can be explored in food industry.
Keywords: Coffea Arabica; Coffea canephora; Coffee beans; Low-grade; Triage; Antioxidant and radical scavenging activity; Antioxidant capacity; Reducing power

Gulab N. Jham, Helcio Vidigal Muller, Paulo Cecon, Triacylglycerol molecular species variation in stored coffee beans determined by reverse-high-performance liquid chromatography/refractive index detector, Journal of Stored Products Research, Volume 44, Issue 1, 2008, Pages 82-89, ISSN 0022-474X, DOI: 10.1016/j.jspr.2007.05.003.
(http://www.sciencedirect.com/science/article/B6T8Y-4R2HKR1-2/2/647f9d8388ad00ec98fa5c6c8f99f91e)
Abstract:
Samples of three types of coffee beans (immature, random mixture and cherry) were each divided into roughly two halves and dried by two widely known procedures (conventional dryer and open air cement floor patio) to attain about 14% moisture. All samples were stored on wood shelves without temperature or moisture control. After 4, 7, 10, 13, 16 and 19 months, portions of all samples were withdrawn and the relative percentages of the nine triacylglycerol (TAG) molecular species determined by reverse-high-performance liquid chromatography with a refractive index detector. The experiment consisted of 36 treatments (combinations of bean types, drying procedures and storage times) in a randomized block design with three repetitions. Nine TAG molecular species were identified in all the coffee samples. While apparently random variation was observed in TAG composition in a few cases, no significant effects of storage time, storage type or coffee type on TAG composition were observed.
Keywords: Triacylglycerols; Coffee; Storage; Bean type; Drying

Carolyn M. Menzie, Lisa B. Yanoff, Blakeley I. Denkinger, Teresa McHugh, Nancy G. Sebring, Karim A. Calis, Jack A. Yanovski, Obesity-Related Hypoferremia Is Not Explained by Differences in Reported Intake of Heme and Nonheme Iron or Intake of Dietary Factors that Can Affect Iron Absorption, Journal of the American Dietetic Association, Volume 108, Issue 1, January 2008, Pages 145-148, ISSN 0002-8223, DOI: 10.1016/j.jada.2007.10.034.
(http://www.sciencedirect.com/science/article/B758G-4RDH61V-11/2/d0bfaa500dab767610a963e63bf0b1b4)
Abstract:
Hypoferremia is more prevalent in obese than nonobese adults, but the reason for this phenomenon is unknown. To elucidate the role dietary factors play in obesity-related hypoferremia, the intake of heme and nonheme iron and the intake of other dietary factors known to affect iron absorption were compared cross-sectionally from April 2002 to December 2003 in a convenience sample of 207 obese and 177 nonobese adults. Subjects completed 7-day food records, underwent phlebotomy for serum iron measurement, and had body composition assessed by dual-energy x-ray absorptiometry, during a 21-month period. Data were analyzed by analysis of covariance and multiple linear regression. Serum iron (mean+/-standard deviation) was significantly lower in obese than nonobese individuals (72.0+/-61.7 vs 85.3+/-58.1 [mu]g/dL [12.888+/-11.0443 vs 15.2687+/-10.3999 [mu]mol/L]; P<0.001). The obese cohort reported consuming more animal protein (63.6+/-34.5 vs 55.7+/-32.5 g/day; P<0.001) and more heme iron (3.6+/-2.8 vs 2.7+/-2.6 mg/day; P<0.001). Groups did not differ, however, in total daily iron consumption, including supplements. Obese subjects reported consuming less vitamin C (77.2+/-94.9 vs 91.8+/-89.5 mg/day; P=0.01), which may increase absorption of nonheme iron, and less calcium (766.2+/-665.0 vs 849.0+/-627.2 mg/day; P=0.038), which may decrease nonheme iron absorption, than nonobese subjects. Groups did not significantly differ in intake of other dietary factors that can impact absorption of iron, including phytic acid, oxalic acid, eggs, coffee, tea, zinc, vegetable protein, or copper. After accounting for demographic covariates and dietary factors expected to affect iron absorption, fat mass (P=0.007) remained a statistically significant negative predictor of serum iron. This cross-sectional, exploratory study suggests that obesity-related hypoferremia is not associated with differences in reported intake of heme and nonheme iron or intake of dietary factors that can affect iron absorption.

M.C. Silva, L. Guerra-Guimaraes, A. Loureiro, M.R. Nicole, Involvement of peroxidases in the coffee resistance to orange rust (Hemileia vastatrix), Physiological and Molecular Plant Pathology, Volume 72, Issues 1-3, January-March 2008, Pages 29-38, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2008.04.004.
(http://www.sciencedirect.com/science/article/B6WPC-4SV5V51-1/2/fc4c95779cbefcd31d1a81f83e53f4ca)
Abstract:
Coffea arabica plants with the SH5 and SH4SH5 genotypes were inoculated with isolates of the coffee orange rust (Hemileia vastatrix) races II and VI, in order to establish two incompatible interactions (I1 and I2) and a compatible one. Both incompatible interactions were characterized by restricted fungal growth associated with rapid hypersensitive plant cell death, monitored by cell autofluorescence and/or browning. Cytological and biochemical studies were performed to investigate the association of peroxidases (PODs) with coffee resistance to rust. In both incompatible interactions, in contrast with the compatible one, investigations revealed a peak of POD activity prior or at the same time, as the beginning of cell death. During the first peak, the isoenzyme pattern for peroxidases obtained by IEF (isoelectric focusing electrophoresis) showed an increase in activity of anionic and cationic isoenzymes. Cytochemically, POD and H2O2 were localized at the interface between the cuticle and fungal pre-penetration structures, and at infection sites. In both incompatible interactions, a later increase in POD activity was determined which can be related to host cell wall lignification. This peak coincided with the one observed in the compatible interaction. Treatments of coffee leaves (I2 incompatible interaction) with 2,4-dichlorophenol, an activator of peroxidases and other oxidases, significantly increased cell autofluorescence. On the contrary, salicyl hydroxamic acid, an inhibitor of the same enzymes, and diphenyleneiodonium chloride, an inhibitor of NADPH oxidases, decreased cell autofluorescence. These results suggested that POD, NADPH oxidases and eventually other oxidases are involved in the coffee resistance to H. vastatrix.
Keywords: Coffea arabica; Hemileia vastatrix; Cytochemistry; Biochemistry; Resistance; Hypersensitive reaction; Peroxidases; H2O2

G.H.J. de Koning, P.C. Benitez, F. Munoz, R. Olschewski, Modelling the impacts of payments for biodiversity conservation on regional land-use patterns, Landscape and Urban Planning, Volume 83, Issue 4, 7 December 2007, Pages 255-267, ISSN 0169-2046, DOI: 10.1016/j.landurbplan.2007.04.010.
(http://www.sciencedirect.com/science/article/B6V91-4NWN321-2/2/156c2e335fe28602a8f2f59964f7d85b)
Abstract:
We present a land-use allocation model that evaluates the impact of payments for ecosystem services such as biodiversity conservation on land-use patterns. In a non-linear optimisation procedure, land use is allocated at farm level, taking into account risk behaviour, and spatial as well as temporal variability of net revenues of land-use alternatives, using a spatial resolution of 29 m x 29 m. The model is applied to a study area of 30 km x 34 km in western Ecuador, considered a hotspot for biodiversity. In this coffee growing region, agroforestry systems with shade-coffee are important for biodiversity conservation at the landscape level, but under pressure due to low revenues. Through scenario analyses, we analyse the effects of price premiums per kg, payments per ha, and price buffering for coffee, as well as incentives leading to coffee yield increases, and payments per ha of forest remnants. We compare different risk aversion levels of the involved agents. We conclude that payments per ha are more efficient to maintain or increase coffee areas than payments per kg. Price buffering may be the most cost-effective way to support coffee production, especially at high-risk aversion levels. Significant yield increases are necessary to make coffee more attractive compared to the other alternatives. Relatively low payments per ha of forest can significantly increase forested land. Risk behaviour turns out to be an important factor

when determining the possible effect of payments for ecosystem services. We conclude that the model is a versatile tool to support planning of payments for conserving ecosystems.
Keywords: Land-use allocation model; Payments for ecosystem services; Biodiversity; Ecuador

Paulo C. Dias, Wagner L. Araujo, Gustavo A.B.K. Moraes, Raimundo S. Barros, Fabio M. DaMatta, Morphological and physiological responses of two coffee progenies to soil water availability, Journal of Plant Physiology, Volume 164, Issue 12, 3 December 2007, Pages 1639-1647, ISSN 0176-1617, DOI: 10.1016/j.jplph.2006.12.004.
(http://www.sciencedirect.com/science/article/B7GJ7-4N0XN88-1/2/d7c91b88b3b689bca649f2df095c3f2a)
Abstract: Summary
Drought is a major environmental constraint affecting growth and production of coffee. The effects of water supply on growth, biomass allocation, water relations, and gas exchange in two coffee progenies representing drought-tolerant (Siriema) and drought-sensitive (Catucai) genotypes were compared. They were grown in 12-L pots until 4-months old, when they were submitted to two watering treatments for 60 d: plants receiving either 100% transpired water (control plants) or a fraction (about 40%) of the amount of water transpired by control plants (drought-stressed plants). Under control conditions, Siriema grew faster than Catucai. Regardless of the watering regimes and progenies, relative growth rate (RGR) was positively correlated both with net assimilation rate (NAR) and long-term water-use efficiency (WUE), but not with differences in biomass allocation. Both progenies responded to drought stress through (i) similar decreases in both RGR and NAR with marginal, if any, changes in allocation; (ii) decreases in leaf water potential, which occurred to a greater extent in Catucai than in Siriema, even though they have showed similar abilities to adjust osmotically and elastically; (iii) similar reductions in net photosynthesis due mainly to nonstomatal factors; and (iv) decreases in transpiration rate coupled with increased long-term WUE. However, the lower transpiration rate and the higher long-term WUE as found in Siriema relative to Catucai under control conditions persisted under drought conditions. Overall, the major differences between these progenies were largely associated with differences in plant water use, which was likely related to the improved water status of Siriema. The possible implications of selecting coffee genotypes for high WUE are discussed.
Keywords: Coffea; Drought stress; Growth; Transpiration; Water-use efficiency

Michele Ferrari, Luciano Navarini, Libero Liggieri, Francesca Ravera, Furio Suggi Liverani, Interfacial properties of coffee-based beverages, Food Hydrocolloids, Volume 21, Issue 8, December 2007, Pages 1374-1378, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2006.10.016.
(http://www.sciencedirect.com/science/article/B6VP9-4MJJCC2-4/2/b49a51216ac0f2ca1256655daaf6ff0e)
Abstract:
The coffee brewing technique enhances several surface phenomena such as foam and emulsion formation and stabilisation.
Recently the authors have been investigated the possibility to study the different contribution of the components of commercially available coffees well known as arabica and robusta.
In the present work, dynamic experimental techniques such as maximum bubble pressure and contact angle have been used to characterise the air- coffee beverage interface at two different temperatures (20 [degree sign]C and 37 [degree sign]C).
Different coffee-based beverage have been investigated ranging from espresso to soluble coffee.
Beverage samples at different brewing times and methods have been prepared following standard procedures by using commercially relevant varieties and products. The role of the chemical components on tensiometric behaviour of the beverage is discussed.
This behaviour is definitely related to the good wetting properties of the beverage on oral mucosa.
Keywords: Espresso; Coffee; Wetting; Foarms; Surface tension

Carmelina A. Summa, Beatriz de la Calle, Marcel Brohee, Richard H. Stadler, Elke Anklam, Impact of the roasting degree of coffee on the in vitro radical scavenging capacity and content of acrylamide, LWT - Food Science and Technology, Volume 40, Issue 10, December 2007, Pages 1849-1854, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.11.016.
(http://www.sciencedirect.com/science/article/B6WMV-4N3P9R4-1/2/52166b8fee9246c134e2811f2a7cb630)
Abstract:
Due to the recognized toxicity of acrylamide, intensive efforts have been made to reduce the concentration of this undesired Maillard by-product in food. This work reports the results obtained from a series of experiments aimed at determining the concentration of acrylamide and the in vitro radical scavenging capacity in the same roasted and ground coffee samples, as it is well established that a significant part of the antioxidant activity in coffee is linked to the melanoidins, which are also considered as Maillard reaction products (MRPs). The radical scavenging capacity was measured using electroparamagnetic resonance (EPR). Coffee samples from the Robusta and Arabica varieties were roasted at 236 [degree sign]C over different time periods to obtain very light, light, medium and dark roast. Color analyses were performed on all samples. Increasing the roasting degree led to a decrease in acrylamide concentration as well as radical scavenging capacity. The results of this work indicate that any mitigation efforts must also take into account the potential loss of desired food constituents and consequently changes to the risk/benefit characteristics of foods.
Keywords: Acrylamide; Coffee; Antioxidants; Melanoidins; Maillard reaction

Elena Velasquez, Patrick Lavelle, Mercedes Andrade, GISQ, a multifunctional indicator of soil quality, Soil Biology and Biochemistry, Volume 39, Issue 12, December 2007, Pages 3066-3080, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2007.06.013.
(http://www.sciencedirect.com/science/article/B6TC7-4P83B0N-1/2/87cc34bf7b666b4fa09c4fa5f8c454b5)
Abstract:
We present here an indicator of soil quality that evaluates soil ecosystem services through a set of 5 subindicators, and further combines them into a single general Indicator of Soil Quality (GISQ). We used information derived from 54 properties commonly used to describe the multifaceted aspects of soil quality. The design and calculation of the indicators were based on sequences of multivariate analyses. Subindicators evaluated the physical quality, chemical fertility, organic matter stocks, aggregation and morphology of the upper 5 cm of soil and the biodiversity of soil macrofauna. A GISQ combined the different subindicators providing a global assessment of soil quality.
Research was conducted in two hillside regions of Colombia and Nicaragua, with similar types of land use and socio-economic context. However, soil and climatic conditions differed significantly. In Nicaragua, soil quality was assessed at 61 points regularly distributed 200 m apart on a regular grid across the landscape. In Colombia, 8 plots representing different types of land use were arbitrarily chosen in the landscape and intensively sampled. Indicators that were designed in the Nicaragua site were further applied to the Colombian site to test for their applicability.
In Nicaragua, coffee plantations, fallows, pastures and forest had the highest values of GISQ (1.00; 0.80; 0.78 and 0.77, respectively) while maize crops and eroded soils (0.19 and 0.10) had the lowest values. Examination of subindicator values allowed the separate evaluation of different aspects of soil quality: subindicators of organic matter, aggregation and morphology and biodiversity of macrofauna had the maximum values in coffee plantations (0.89; 0.72 and 0.56, respectively on average) while eroded soils had the lowest values for these indicators (0.10; 0.31 and 0.33, respectively).

Indicator formulae derived from information gained at the Nicaraguan sites were not applicable to the Colombian situation and site-specific constants were calculated.
This indicator allows the evaluation of soil quality and facilitates the identification of problem areas through the individual values of each subindicator. It allows monitoring of change through time and can guide the implementation of soil restoration technologies. Although GISQ formulae computed on a set of data were only valid at a regional scale, the methodology used to create these indices can be applied everywhere.
Keywords: Macrofauna; Multivariate analyses; Soil quality; Organic fractions; Respirometry; Morphology

Katsuya Kaikake, Keiji Hoaki, Hiromasa Sunada, Rabindra Prasad Dhakal, Yoshinari Baba, Removal characteristics of metal ions using degreased coffee beans: Adsorption equilibrium of cadmium(II), Bioresource Technology, Volume 98, Issue 15, November 2007, Pages 2787-2791, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.02.040.
(http://www.sciencedirect.com/science/article/B6V24-4ND70C4-2/2/634d256b6d0efc13c857fc44b81e6764)
Abstract:
The feasibility of using coffee beans after being dripped and degreased (DCB) as an adsorbent for base metals such as copper(II), zinc(II), lead(II), iron(III) and cadmium(II) were examined. The compositions of the DCB were characterized by Fourier transform infrared spectroscopy, scanning electronic micrograph and fluorescent X-ray. It was found that DCB contain sulfur and calcium from the analysis using fluorescent X-ray. The plant cell wall in DCB has the porous structure from the scanning electron microscopy (SEM) analysis, and the specific surface area was determined to be 1.2 m2/g using the specific surface area analyzer. Batch adsorption experiments on DCB were carried out at various pHs in order to elucidate the selectivity of metal ions. All metals were adsorbed at low pH region (3.0-5.0). Of particular interest was the adsorption characteristics of cadmium(II) on DCB. The adsorption isotherm for cadmium(II) at pH 8 fitted with a Langmuir equation to yield an adsorption equilibrium constant of 55.2 mmol dm-3 and an adsorption capacity of 5.98 x 10-2 mmol g-1. The desorption of cadmium(II) was easily achieved over 90% by a single batchwise treatment with an aqueous solution of hydrochloric acid or nitric acid at more than 0.01 mol dm-3. These results suggested that DCB behaves as a cation exchanger.
Keywords: Degreased coffee beans; Heavy metals; Cadmium(II); Adsorption; Desorption

Kyung Jin Lee, Jea Ho Choi, Hye Gwang Jeong, Hepatoprotective and antioxidant effects of the coffee diterpenes kahweol and cafestol on carbon tetrachloride-induced liver damage in mice, Food and Chemical Toxicology, Volume 45, Issue 11, November 2007, Pages 2118-2125, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.05.010.
(http://www.sciencedirect.com/science/article/B6T6P-4NT84W3-2/2/954123139755b72223958369d203a18d)
Abstract:
The hepatoprotective effects of kahweol and cafestol, coffee-specific diterpenes, on the carbon tetrachloride (CCl4)-induced liver damage as well as the possible mechanisms involved in these protections were investigated. Pretreatment with kahweol and cafestol prior to the administration of CCl4 significantly prevented the increase in the serum levels of hepatic enzyme markers (alanine aminotransferase and aspartate aminotransferase) and reduced oxidative stress, such as reduced glutathione content and lipid peroxidation, in the liver in a dose-dependent manner. The histopathological evaluation of the livers also revealed that kahweol and cafestol reduced the incidence of liver lesions induced by CCl4. Treatment of the mice with kahweol and cafestol also resulted in a significant decrease in the cytochrome P450 2E1 (CYP2E1), the major isozyme involved in CCl4 bioactivation, specific enzyme activities, such as p-nitrophenol and aniline hydroxylation. Kahweol and cafestol exhibited antioxidant effects on FeCl2-ascorbate induced lipid

peroxidation in a mouse liver homogenate, and on superoxide radical scavenging activity. These results suggest that the protective effects of kahweol and cafestol against the CCl4-induced hepatotoxicity possibly involve mechanisms related to their ability to block the CYP2E1-mediated CCl4 bioactivation and free radical scavenging effects.
Keywords: Kahweol; Cafestol; Hepatoprotective effects; Carbon tetrachloride; CYP2E1; Antioxidant

Primrose P.E. Freestone, Nicholas J. Walton, Richard D. Haigh, Mark Lyte, Influence of dietary catechols on the growth of enteropathogenic bacteria, International Journal of Food Microbiology, Volume 119, Issue 3, 1 November 2007, Pages 159-169, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.07.039.
(http://www.sciencedirect.com/science/article/B6T7K-4PB0PFR-4/2/653c79d62328ba287ac2b5b83749f69c)
Abstract:
The dietary constituents that may act, in the broadest sense, as co-factors to enable bacterial enteropathogens to replicate in gastrointestinal environments are still largely unknown. Recent work has demonstrated that certain non-nutritional components of food, such as the catecholamines, can contribute to the ability of Gram-negative pathogens to replicate in iron-restrictive media that may be reflective of gastrointestinal environments. The present report examines whether other, non-catecholamine, dietary catechols, which occur widely in plant foods, can also influence enteropathogen growth in an iron-restrictive environment such as might be found in the gastrointestinal tract.
In the present study, we have examined the ability of a range of catechol-rich foodstuffs, ranging from beverages (tea and coffee) to fruit and vegetable extracts, as well as purified preparations of commonly consumed dietary catechols (catechins, chlorogenic acid, caffeic acid and tannic acid), to modulate the growth of the Gram-negative enteric pathogens Escherichia coli O157:H7 and Salmonella enterica SV Enteriditis. Time-dependent growth in response to dietary catechols (0.05-5.0% v/v of beverage or fruit/vegetable extracts; 10-200 [mu]M of purified catechols) was examined in an iron-replete, rich medium as well as in an iron-limited, basal medium designed to reflect the iron-restricted environment that is more characteristic of human and animal tissues. Results obtained in iron-replete, rich medium demonstrated dose-dependent bacteriostatic effects for certain catechols, consistent with previous studies. However, in iron-restricted medium, all of the dietary catechols produced marked growth stimulation of up to 4 logs greater than non-supplemented controls. Mechanistic studies measuring the uptake of radiolabelled 55Fe from 55Fe-labelled lactoferrin and transferrin in bacteria grown in the presence or absence of dietary catechols demonstrated that the ability of catechols to stimulate bacterial growth was dependent on the provision of iron from iron-sequestering glycoproteins. Urea gel analysis of transferrin incubated in the presence of the dietary catechols confirmed that these compounds were directly chelating and removing transferrin-complexed iron. Analysis using E. coli O157:H7 entA and tonB mutants further showed that a functional siderophore synthesis and uptake system was required for the growth-stimulatory response.
In contrast to previous studies, which have reported the anti-microbial activity of dietary catechols, the present study demonstrates that these non-nutritional components of foods can, under iron-restrictive conditions, provide iron and enable the growth of enteric bacterial pathogens.
Keywords: Catechols; Iron; Lactoferrin; Transferrin; Escherichia coli O157:H7; Salmonella enterica

Luis Gustavo Morello, Daniele Sartori, Andre Luiz de Oliveira Martinez, Maria Lucia Carneiro Vieira, Marta Hiromi Taniwaki, Maria Helena Pelegrinelli Fungaro, Detection and quantification of Aspergillus westerdijkiae in coffee beans based on selective amplification of [beta]-tubulin gene by using real-time PCR, International Journal of Food Microbiology, Volume 119, Issue 3, 1 November 2007, Pages 270-276, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.08.009.

(http://www.sciencedirect.com/science/article/B6T7K-4PFW629-6/2/911be3a66e3609f72d01209ab6e89274)
Abstract:
Aspergillus westerdijkiae is a new species of fungus that was recently dismembered from Aspergillus ochraceus taxon. Most isolates of A. westerdijkiae are able to produce large amounts of a mycotoxin called ochratoxin A (OA). OA has been found in food and beverages, such as coffee. A. westerdijkiae is very similar to A. ochraceus, and several isolates previously identified as A. ochraceus are now identified as A. westerdijkiae. By using sequences of the [beta]-tubulin gene, we analyzed several isolates from Brazilian coffee bean samples, previously identified as A. ochraceus, to compare with those of A. westerdijkiae. In fact, most (84%) were identified as A. westerdijkiae. Since this species consistently produces large amounts of OA, we developed a specific primer-pair for detecting and quantifying it in coffee beans by using real-time PCR. The primers Bt2Aw-F 5'TGATACCTTGGCGCTTGTGACG and Bt2Aw-R 5'CGGAAGCCTAAAAAATGAAGAG provided an amplicon of 347 bp in all A. westerdijkiae isolates, and no cross-reaction was observed using DNA from A. ochraceus. The sensitivity of real-time PCR was more than 100 times higher than the cfu technique.
Keywords: Ochratoxin A; Aspergillus ochraceus; Aspergillus westerdijkiae; Real-time PCR

Andrea Astoreca, Carina Magnoli, Maria L. Ramirez, Mariana Combina, Ana Dalcero, Water activity and temperature effects on growth of Aspergillus niger, A. awamori and A. carbonarius isolated from different substrates in Argentina, International Journal of Food Microbiology, Volume 119, Issue 3, 1 November 2007, Pages 314-318, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2007.08.027.
(http://www.sciencedirect.com/science/article/B6T7K-4PJM9DS-1/2/e1c10f2357c37e290d65450e07b37a79)
Abstract:
The objectives of this study were to determine the effect of water activity, temperature, and their interactions on a) mycelial growth rate and b) the lag phase prior to grow of seven isolates of Aspergillus section Nigri isolated from peanuts, maize kernels, dried grapes and coffee cherries from Argentina. Three Aspergillus niger, three A. awamori and one A. carbonarius isolates examined showed optimum aW level for growth at 0.97 with optimal temperature of 30 [degree sign]C. for most of the isolates and 25 [degree sign]C for only one (A. awamori RCP176). Minimal aW for growth was 0.85 at the highest temperature tested. Overall growth was reduced up to 50% at 0.93 aW. Growth was also to a large extend inhibited at 0.85 aW for most isolates even after 21 days of incubation at temperatures lower than 30 [degree sign]C. The analysis of variance of the effect of single (isolate, aW and temperature), two- and three-way interaction showed that all factors alone and all interactions were statistically significant ($P < 0.001$) in relation to growth rates and lag phase for A. niger, A. awamori and A. carbonarius isolates. These data are relevant since these species are isolated in high frequency on numerous substrates for human and animal consumption in Argentina.
Keywords: Aspergillus section Nigri; Fungal growth; Water activity; Temperature

P.J. Fito, M.L. Castello, A. Arguelles, P. Fito, Application of the SAFES (systematic approach to food engineering systems) methodology to roasted coffee process, Journal of Food Engineering, Volume 83, Issue 2, EFFoST 2005 Annual Meeting: Innovations in Traditional Foods, November 2007, Pages 211-218, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.02.020.
(http://www.sciencedirect.com/science/article/B6T8J-4N3NYX8-8/2/e6c534295f3e31387155969d9366de76)
Abstract:
This work is the application of SAFES technique for roasting bean coffee. The roasting operation was divided in to three changing stages, determined with the beginning of the pyrolysis and the

cooling bean. All data were based on bibliographical search, where the raw material was bean coffee (Arabian from Brazil), the roasting operation variables were 200 [degree sign]C of temperature and 12 min. of roasting time and the rest of the bibliography data were all the necessary tools to develop all tensors (relationship between components, phases and aggregation state). The energy generated in the pyrolysis reaction is included in the enthalpy variation. The transformation tensor was calculated using the weight loss curve and the roasting tensor described all changes, dehydration, glass transition, sugar degradation and chemical and biochemical reactions. The energy balances are described in enthalpy and entropy variations.
In short, the SAFES technique works to describe this operation, is useful to determine and predict all changes in the food matter and permits us to determine the behaviors involved in this operation.
Keywords: Roasting coffee; SAFES; Pyrolysis

Emille R.B.A. Prata, Leandro S. Oliveira, Fresh coffee husks as potential sources of anthocyanins, LWT - Food Science and Technology, Volume 40, Issue 9, November 2007, Pages 1555-1560, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.10.003.
(http://www.sciencedirect.com/science/article/B6WMV-4MJBTYY-1/2/9dcfb950e24a076719bbaeca25fdcd95)
Abstract:
Fresh coffee husks, comprised of outer skin and pulp, were investigated as potential sources of anthocyanins for applications as natural food colorants. The extracted pigments were analysed by HPLC with photodiode array detection. Partial hydrolysis and analysis of the resulting fragments were helpful in the characterization procedure. Cyanidin 3-rutinoside was characterized as the dominant anthocyanin in fresh coffee husks and its quantification suggested the fresh coffee husks to be a good candidate as source of this pigment.
Keywords: Agricultural waste; Food colorants; Coffee

A.K. Chapagain, A.Y. Hoekstra, The water footprint of coffee and tea consumption in the Netherlands, Ecological Economics, Volume 64, Issue 1, 15 October 2007, Pages 109-118, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2007.02.022.
(http://www.sciencedirect.com/science/article/B6VDY-4NC5V6F-3/2/30db59ca0656beac36909f9441de5c3d)
Abstract:
A cup of coffee or tea in our hand means manifold consumption of water at the production location. The objective of this study is to assess the global water footprint of the Dutch society in relation to its coffee and tea consumption. The calculation is carried out based on the crop water requirements in the major coffee and tea exporting countries and the water requirements in the subsequent processing steps. In total, the world population requires about 140 billion cubic metres of water per year in order to be able to drink coffee and tea. The standard cup of coffee and tea in the Netherlands costs about 140 l and 34 l of water respectively. The largest portions of these volumes are attributable to growing the plants. The Dutch people account for 2.4% of the world coffee consumption. The total water footprint of Dutch coffee and tea consumption amounts to 2.7 billion cubic metres of water per year (37% of the annual Meuse runoff). The water needed to drink coffee or tea in the Netherlands is not Dutch water. The most important sources for the Dutch coffee are Brazil and Colombia and for the Dutch tea Indonesia, China and Sri Lanka. The major volume of water to grow the coffee plant comes from rainwater. For the overall water need in coffee production, it makes hardly any difference whether the dry or wet production process is applied, because the water used in the wet production process is a very small fraction (0.34%) of the water used to grow the coffee plant. However, the impact of this relatively small amount of water is often significant. First, it is blue water (abstracted from surface and ground water), which is sometimes scarcely available. Second, the wastewater generated in the wet production process is often heavily polluted.

Keywords: Global water resources; Water footprint; Virtual water; Coffee; Tea; Trade

Sagratini Gianni, Fabbri Armando, Marucci Gabriella, Ricciutelli Massimo, Vittori Sauro, Ammendola Sergio, HPLC-MS validation of QualisaFoo(R) biosensor kit for cost-effective control of acrylamide levels in Italian coffee, Food Control, Volume 18, Issue 10, October 2007, Pages 1267-1271, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.08.005.
(http://www.sciencedirect.com/science/article/B6T6S-4M6SBCP-2/2/384dc21a9106035c112c93bf337068b4)
Abstract:
Acrylamide is a carcinogenic and mutagenic compound found in many industrially processed foods and beverages, including coffee. The aim of this work is to determine the acrylamide level in some Italian coffees by using a mass spectrometry method and an enzymatic test kit. Comparison of average values in four Italian coffees determined using the two methods permitted us to validate the results obtained with the kit, hence the kit itself, showing that acrylamide is present in low amount.
The amount of acrylamide was also determined in other foods, by using the kit. This work shows that there is a correspondence between the two methods and that the kit provides a cost-effective method to determine the amount of acrylamide in food.
Keywords: Food; Safety; Acrylamide; Enzymatic test; HPLC-MS analysis; QualisaFoo(R) kit

Dick Durevall, Demand for coffee in Sweden: The role of prices, preferences and market power, Food Policy, Volume 32, Issues 5-6, October-December 2007, Pages 566-584, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2006.11.005.
(http://www.sciencedirect.com/science/article/B6VCB-4MX54TB-1/2/6bd0dbc49d34b66f5ae994f9f889e460)
Abstract:
There is a widespread belief that consumer coffee prices are high relative to bean prices and that lower consumer prices would lead to substantial increases in bean exports from Third-World countries. This issue is evaluated by analysing how retail prices, preferences and market power influence coffee demand in Sweden. A demand function is estimated for the period 1968-2002 and used, together with information on import prices of coffee beans, to simulate an oligopoly model. This approach gives estimates of the maximum average degree of market power and shows how coffee demand would react to reductions in marginal cost to its minimum level. The maximum level of market power is found to be low, but it generates large spreads between consumer and bean prices because the price elasticity has low absolute values. Moreover, the impact of a price decrease would be small because long-run coffee demand is dominated by changes in the population structure in combination with different preferences across age groups. Hence, a change to perfect competition would only have a negligible effect on bean imports.
Keywords: Coffee exports; Coffee price; Market power; Multinationals; Sweden; Commodity markets

Brenda B. Lin, Paul L. Richards, Soil random roughness and depression storage on coffee farms of varying shade levels, Agricultural Water Management, Volume 92, Issue 3, 16 September 2007, Pages 194-204, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.05.014.
(http://www.sciencedirect.com/science/article/B6T3X-4P7FHKK-2/2/5e781d7eb26cb41504b902e322d69c08)
Abstract:
Water availability in rainfed coffee agroecosystems is an important factor in determining the production success of the crop. In this study, an estimate of soil water capture and storage was conducted in order to understand the differences of soil water availability among coffee farms or various management intensities, distinguished here by differences in shade cover level.

Measurements of effective soil depression storage, leaf litter and soil moisture were taken in each of the sites. These measurements were taken to better understand how different shade coffee systems may gain or lose opportunities to keep water within the system due to contributions of shade. Three sites of varying shade were chosen in the Soconusco region of Chiapas, Mexico. The medium (30-50% cover) shade site was found to be more effective for precipitation capture when compared to the low (10-30% cover) shade site because of a larger value of effective depression storage (t-test, p = 0.05) due to increased soil roughness. This conclusion was supported by significantly higher soil moisture measurements in the medium shade site when compared to the low shade site in the dry season (repeated measure GLM, p = 0.001). The high shade (60-80% cover) site was found to have a greater slope than the other two sites, yielding smaller effective storage capacities; yet the high shade site was able to retain 15% of the available rainfall during the dry season through surface storage, possibly because of greater leaf litter and other shade contributions. Farmers may consider the use of shade trees within coffee farms as a practical method toward preserving water within the agroecosystem.
Keywords: Soil roughness; Depression storage; Soil moisture; Agroforestry systems; Coffee agriculture; Adaptive management

Fidel Payan, Davey L. Jones, John Beer, Dynamics of size-density fractions of soil organic matter following the addition of tree litter to organic coffee farms, Geoderma, Volume 141, Issues 1-2, 15 September 2007, Pages 15-22, ISSN 0016-7061, DOI: 10.1016/j.geoderma.2007.02.017.
(http://www.sciencedirect.com/science/article/B6V67-4NVK1XD-1/2/6ba153a3fddac13140ef03ed636200db)
Abstract:
The addition of organic matter to soil is frequently viewed as a vital intervention to maintain soil quality. The aim of this study was to investigate the temporal response of the soil macroorganic fraction to different organic coffee farming practices (e.g., plant residue, earthworm and microbial inocula addition). Three density fractions of macroorganic matter (> 150 [mu]m) were studied during 1 year after adding shade tree (Erythrina poeppigiana) pruning residues to the soil (5 t ha- 1 twice at 6 monthly intervals). Soil macroorganic matter represented only a small proportion of total soil organic matter (SOM) (3-6% of total). Even though the total amount of SOM did not change over time, significant temporal changes in the size of the macroorganic fraction were observed that appeared to be largely independent of the management regime. The light density fraction seemed to be the most responsive fraction and this study suggests that it may provide a qualitative indicator of the `active' fraction of SOM; the size of the macroorganic fraction did not provide a reliable indicator of the rate of litter decomposition or nutrient release. The addition of microbial inoculants and earthworms had only a small and inconsistent effect on macroorganic matter dynamics and these practices appeared to offer little agronomic benefit. This study highlights the need for continued organic matter inputs to maintain soil C reserves and preserve soil organic quality in tropical organic farming systems.
Keywords: Coffea arabica; Litter decomposition; Mineralization; Organic farming; Shade trees; Soil organic matter; Soil quality

Archana Bali, Ajith Kumar, Jagdish Krishnaswamy, The mammalian communities in coffee plantations around a protected area in the Western Ghats, India, Biological Conservation, Volume 139, Issues 1-2, September 2007, Pages 93-102, ISSN 0006-3207, DOI: 10.1016/j.biocon.2007.06.017.
(http://www.sciencedirect.com/science/article/B6V5X-4PDT000-1/2/3f25f310c203d8e5d80d096e24fbea5f)
Abstract:
Forest reserves are increasingly becoming isolated, embedded in a matrix of various kinds of human land-use. Coffee plantations form the dominant matrix around many forest reserves in the

tropics. In such a situation, the species richness and abundance of animals in coffee plantations can be expected to be determined by their proximity to the forest reserve and characteristics of the local vegetation. We tested this hypothesis with data on mammals (excluding bats, murids and insectivores) collected from 15 coffee plantations around the Bhadra Wildlife Sanctuary in the Western Ghats mountain ranges in India, between December 2005 and May 2006. We estimated mammal species richness and abundance from indirect evidence in belt transects and track plots, and from sightings during night surveys. We sampled the vegetation of the plantations from 36 plots of 5 m x 5 m, in each estate. Twenty-eight species of mammals were recorded from 15 plantations. The number of species recorded in individual estates ranged from 5 to 19, with an average of 11.8. Distance from the Sanctuary was the most important factor that negatively influenced species richness, and the abundance of many species. Local vegetation characteristics influenced only the abundance of some small species. Coffee plantations can be a buffer around forest reserves and improve connectivity between them. However, increasing conversion of native shade into silver oak and hunting are two issues that must be addressed if coffee plantations are to form high-quality matrix around forest reserves in the Western Ghats.
Keywords: Agroforestry; Matrix; Buffer; Biodiversity hotspot; Silver oak; Conservation

C.P. Sampaio, R.M. Nogueira, C.D. Roberto, J.S. Silva, Development of a dryer with airflow reversal and a pneumatic system for grain movement, Biosystems Engineering, Volume 98, Issue 1, September 2007, Pages 33-38, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2007.02.014.
(http://www.sciencedirect.com/science/article/B6WXV-4P3M898-1/2/80ea161a372f53eb48a22419d9b24745)
Abstract:
The objectives of this work were elaboration, construction and evaluation of a new dryer model for coffee. For evaluation, three tests were conducted for each type of coffee. In tests with natural coffee, the drying times were 11.5, 10.3 and 9.6 h. The coffee with initial moisture content of 24.6+/-1.8% w.b. was dried to storage moisture of 11.9+/-1.3% w.b. For the parchment coffee, drying times were 14.0, 12.5 and 12.2 h. The coffee with initial moisture content of 33.9+/-2.1% w.b. was dried to storage moisture of 12.0+/-1.5% w.b. The drying time of natural coffee was less because the moisture content of natural coffee was less in comparison with that of parchment coffee. The coffee dried with the new drying system was considered as a coffee of high cup quality, and was classified as types 6 and 4 for natural and parchment coffee, respectively.

P.C. Afonso Junior, P.C. Correa, F.A.C. Pinto, D.M. Queiroz, Aerodynamic properties of coffee cherries and beans, Biosystems Engineering, Volume 98, Issue 1, September 2007, Pages 39-46, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2007.03.010.
(http://www.sciencedirect.com/science/article/B6WXV-4P5RVXK-1/2/b3f452d85a3ac9d1685a18d6bbdd3180)
Abstract:
Aerodynamic properties of coffee cherry and beans for two varieties, viz., Coffea arabica (cv Catuai) and Coffea canephora (cv Conilon), were studied for moisture content ranges of 9-54% w.b. and 8-56% w.b., respectively. The increase in both moisture content and true density affected the aerodynamic properties of the product by promoting an increase in the terminal velocity and a reduction in the drag coefficient for both cultivars. The values of terminal velocity of the naturally preprocessed coffee cherries did not exhibit significant changes for the analysed cultivars. The values of terminal velocities for the washed coffee beans of cv Conilon were higher than those found for the beans of cv Catuai. The values of the drag coefficient for both coffee cherries and beans slightly changed during the drying process. However, the variation in the drag coefficient as a function of the moisture content and true density was more evident for the washed beans of Conilon coffee than for Catuai coffee.

Ben Desbrow, Roger Hughes, Michael Leveritt, Pieter Scheelings, An examination of consumer exposure to caffeine from retail coffee outlets, Food and Chemical Toxicology, Volume 45, Issue 9, September 2007, Pages 1588-1592, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.02.020.
(http://www.sciencedirect.com/science/article/B6T6P-4N43RYW-1/2/ecba8d87fb57fde108f7b219a3639451)
Abstract: Objective
To analyse the distribution of caffeine doses obtainable from espresso coffee sold by a sample of commercial coffee vendors located on the Gold Coast, Qld, Australia.Design
A cross section of 'Espresso/short black' coffee samples were purchased and analysed for their caffeine content using micellar electrokinetic capillary chromatography (MEKC). Coffees were collected using systematic cluster sampling across five major retail centres.Results
Ninety-seven espresso samples were analysed. The mean (+/-SD) quantity of caffeine was 106 +/- 38 mg/serve with a concentration of 2473 +/- 1092 mg/l. There was considerable variation in caffeine content. The range per serve was 25-214 mg whilst the concentration range was 580-7000 mg/l. Twenty-four samples (24.7%) contained 120 mg of caffeine or higher and 12 samples (12.3%) exceeded 167 mg per serve.Conclusions and implications
The number of heavily caffeinated samples differentiates these findings from frequently cited caffeine values and supports similar data recently collected throughout the United Kingdom. As a result, the accuracy of any previous intake modelling regarding caffeine use in the Australian population is in doubt. The present data suggests that the probability of consumer exposure to high caffeine doses is greater than previously anticipated. Greater sample numbers from a broader selection of venues is required to confirm the extent of caffeine content variance within retail ground coffees.
Keywords: Caffeine; Coffee; Variability; Consumer exposure

Tania Maria Leite da Silveira, Erico Tavares, Maria Beatriz Abreu Gloria, Profile and levels of bioactive amines in instant coffee, Journal of Food Composition and Analysis, Volume 20, Issue 6, September 2007, Pages 451-457, ISSN 0889-1575, DOI: 10.1016/j.jfca.2007.02.003.
(http://www.sciencedirect.com/science/article/B6WJH-4N68NGH-1/2/4c826eeb1e3e6aeb295c8210132b4587)
Abstract:
The levels of ten free bioactive amines, as well as pH and color characteristics, were determined in different types and brands of instant coffee. The amines were extracted with trichloroacetic acid and quantified by ion-pair HPLC, post-column derivatization with o-phthalaldehyde and fluorimetric detection. Overall, nine amines were detected: serotonin, cadaverine, tyramine, spermidine, putrescine, histamine, agmatine, phenyletylamine and spermine. Tryptamine was not detected in any sample. Tyramine was present in every sample, followed by cadaverine and serotonin. Total amine levels in the dry instant coffee varied from 0.28 to 2.76 mg/100 g. Overall, serotonin was present at higher levels followed by cadaverine, tyramine and spermidine. Significantly higher tyramine levels were found in decaffeinated coffee and higher cadaverine levels were detected in decaffeinated and organic coffee. The levels of amines varied among lots of the same brand and among brands. The color characteristics varied among types of instant coffee. The pH of the beverage varied from 4.86 to 5.15, with higher levels in decaffeinated coffee. There was significant positive correlation between pH and the levels of tyramine and agmatine. Investigations are needed to ascertain the impact of these amines on coffee flavor and on human health, and to determine the factors which affect amine formation and accumulation in instant coffee.
Keywords: Instant coffee; Bioactive amines; pH; Color; Decaffeinated; Organic

Juliana C.F. Mendonca, Adriana S. Franca, Leandro S. Oliveira, A comparative evaluation of methodologies for water content determination in green coffee, LWT - Food Science and

Technology, Volume 40, Issue 7, September 2007, Pages 1300-1303, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.08.013.
(http://www.sciencedirect.com/science/article/B6WMV-4M2WTN8-4/2/5565abadbdb3876340396b5a19ea6f1a)
Abstract:
The main objective of this study was to compare methods for mass loss evaluation in green coffee to water content determination by Karl Fischer titration (KFT). The following methodologies were tested: (i) ISO 6673 (oven drying at 105 [degree sign]C for 16 h); (ii) the reference method employed by the Brazilian Agriculture Ministry (oven drying at 105 [degree sign]C for 24 h)--BRAMw, employing whole beans and BRAMg, employing ground beans; and (iii) infrared drying (IRD). Reference oven drying methodologies ISO 6673 and BRAMw presented results statistically equivalent ($p>0.05$) to those from KFT in the moisture content range that is of interest for green coffee commercialization (8-13 g/100 g), whereas IRD results were lower than those for KFT. ISO 6673 and BRAMw also presented the highest values of correlation coefficients to KFT. Differences in moisture content determination became more significant for lower moisture content values (4-7 g/100 g), probably due to loss of organic volatile substances during drying and occurrence of moisture loss during sample grinding.
Keywords: Green coffee; Moisture content; Karl Fischer; Oven drying; Infrared drying

Wendy Ann P. Isaac, Richard A.I. Brathwaite, Jane E. Cohen, Isaac Bekele, Effects of alternative weed management strategies on Commelina diffusa Burm. infestations in Fairtrade banana (Musa spp.) in St. Vincent and the Grenadines, Crop Protection, Volume 26, Issue 8, August 2007, Pages 1219-1225, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.10.019.
(http://www.sciencedirect.com/science/article/B6T5T-4MJRYV1-2/2/16a8808013fc770808b3475b3eb23afd)
Abstract:
Alternatives to herbicides are needed for weed management in banana cultivated under the Fairtrade system in the Windward Islands. Field trials were conducted in established banana orchards under irrigated and non-irrigated regimes in the rainy and dry seasons, 2003-2004, to evaluate the effects of selected treatments on the weed composition response in fields previously infested with Commelina diffusa Burm. The treatments consisted of three leguminous live mulches (Desmodium heterocarpon (L.) DC., Mucuna pruriens Bak. and Arachis pintoi Krap. & Greg.), three non-living mulches (coffee hulls, banana mulch and clear plastic mulch), two herbicides (fomesafen and glufosinate-ammonium) and two organic treatments (corn gluten meal and concentrated vinegar and acetic acid). Treatments significantly shifted the species composition away from Commelina diffusa to annual weed species such as Spermacoce latifolia Aubl. and Cleome aculeate L. Banana mulch treatment provided the best control by significantly reducing weed biomass and weed species composition and was followed by Fomesafen, coffee hulls, clear plastic mulch and Desmodium heterocarpon. This study indicates further research to refine mulched based weed management systems is needed in banana orchards.
Keywords: Commelina diffusa; Fairtrade banana; Mulch; Weed composition; Weed biomass

J. Bichler, C. Cavin, T. Simic, A. Chakraborty, F. Ferk, C. Hoelzl, R. Schulte-Hermann, M. Kundi, G. Haidinger, K. Angelis, S. Knasmuller, Coffee consumption protects human lymphocytes against oxidative and 3-amino-1-methyl-5H-pyrido[4,3-b]indole acetate (Trp-P-2) induced DNA-damage: Results of an experimental study with human volunteers, Food and Chemical Toxicology, Volume 45, Issue 8, August 2007, Pages 1428-1436, ISSN 0278-6915, DOI: 10.1016/j.fct.2007.02.001.
(http://www.sciencedirect.com/science/article/B6T6P-4N1T1XF-3/2/ef25a5e129daa12fed2cfe3ab01eb856)
Abstract:

Aim of the study was to investigate the impact of coffee on DNA-stability in humans. DNA-damage was monitored in lymphocytes of eight individuals with single cell gel electrophoresis assays before and after consumption of 600 ml coffee (400 ml paper filtered and 200 ml metal filtered/d) for five days. Under standard conditions, no alteration of DNA-migration was seen, but a strong reduction of DNA-migration attributable to endogenous formation of oxidised purines and pyrimidines was detected with restriction enzymes; furthermore DNA-damage caused by reactive oxygen radicals (H2O2 treatment) and by the heterocyclic aromatic amine 3-amino-1-methyl-5H-pyrido[4,3-b]indole-acetate was significantly reduced after coffee consumption by 17% and 35%, respectively. Also in in vitro experiments, inhibition of H2O2 induced DNA-damage was observed with coffee at low concentrations ([less-than-or-equals, slant]25 [mu]l/ml) whereas the diterpenoids cafestol and kahweol caused only marginal effects indicating that the effects of coffee are due to scavenging effects of other constituents. Enzyme measurements showed that additionally induction of antioxidant enzymes may play a role: while the activity of glutathione peroxidase was only marginally increased after coffee consumption, a significant (38%) increase of superoxide dismutase activity was detected. Comparisons with results of earlier studies suggest that coffee consumption may prevent oxidative DNA-damage to a higher extent as diets enriched in fruits and vegetables.
Keywords: Coffee; Comet assay; DNA-damage; Human intervention study; Trp-P-2

Carla Isabel Rodrigues, Liliana Marta, Rodrigo Maia, Marco Miranda, Miguel Ribeirinho, Cristina Maguas, Application of solid-phase extraction to brewed coffee caffeine and organic acid determination by UV/HPLC, Journal of Food Composition and Analysis, Volume 20, Issue 5, August 2007, Pages 440-448, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.08.005.
(http://www.sciencedirect.com/science/article/B6WJH-4MSHXYY-1/2/b94db36f99023ea268f6bb3c9a546997)
Abstract:
A solid-phase extraction (SPE) method was adapted to perform brewed coffee sample clean-up for seven organic acids (acetic, citric, formic, malic, pyruvic, quinic and succinic) and caffeine determination by reversed-phase UV high performance liquid chromatography (RP/UV-HPLC). For all analytes the method showed good precision and linearity and, as an application, 20 brewed coffee samples from the two types of coffee (robusta vs. arabica) were tested. Brewed coffee samples were prepared according to ISO 6668 [1991. Green coffee--preparation of samples for use in sensory analysis] and the results were compared to sensory evaluation obtained from a panel of coffee tasters. Robusta coffee demonstrated the highest content of caffeine. Total acid content varied with coffee type and also with the geographic origin of the green coffee. Roasting conditions also seem to affect final acidity in brewed coffee for both coffee types analysed.
Keywords: Organic acids; Caffeine; Brewed coffee; UV/HPLC; Solid-phase extraction

M.-L. Mateus, D. Champion, R. Liardon, A. Voilley, Characterization of water mobility in dry and wetted roasted coffee using low-field proton nuclear magnetic resonance, Journal of Food Engineering, Volume 81, Issue 3, August 2007, Pages 572-579, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.12.015.
(http://www.sciencedirect.com/science/article/B6T8J-4MT5JTS-3/2/0b4cf3844e6d9cb57a0b4dcff6877a68)
Abstract:
Roasted and ground coffee was studied by low-field 1H nuclear magnetic resonance at various water contents and temperatures. The spin-spin relaxation times (T2) were measured with single pulse free induction decay (FID) and Carr-Purcell-Meiboom-Gill (CPMG) sequences. Four relaxing components were distinguished: the solid population was observed with FID sequence at T2s ~9 [mu]s; the other three populations, measured with the CPMG sequence, corresponded to an apolar phase, the coffee oil, and two polar phases. The two polar populations, observed at T2m ~6

ms and ~27 ms (for coffee with 50% water content at 90 [degree sign]C) were attributed to water in cell wall polymers and in water filling cells lumen. The T2 values appeared relatively insensitive to temperature, showing an Arrhenius type evolution with no break due to an important structure change. Furthermore, the intensity of the mobile phase increased as a function of time up to ~10 min after wetting, providing information about water absorption dynamics in roasted coffee.
Keywords: Roasted coffee; Water mobility; Spin-spin relaxation

Vania Battestin, Gabriela Alves Macedo, Tannase production by Paecilomyces variotii, Bioresource Technology, Volume 98, Issue 9, July 2007, Pages 1832-1837, ISSN 0960-8524, DOI: 10.1016/j.biortech.2006.06.031.
(http://www.sciencedirect.com/science/article/B6V24-4M3BC4G-1/2/27b8b846e6ce53bee7ab75f6af923060)
Abstract:
Surface response methodology was applied to the optimization of the laboratory scale production of tannase using a lineage of Paecilomyces variotii. A preliminary study was conducted to evaluate the effects of variables, including temperature ([degree sign]C), residue (%) (coffee husk:wheat bran), tannic acid (%) and salt solutions (%) on the production of tannase during 3, 5 and 7 days of fermentation. Among these variables, temperature, residues and tannic acid had significant effects on tannase production. The variables were optimized using surface response methodology. The best conditions for tannase production were: temperature (29-34 [degree sign]C); tannic acid (8.5-14%); % residue (coffee husk:wheat bran 50:50) and incubation time of 5 days. The supplementation of external nitrogen and carbon sources at 0.4%, 0.8% and 1.2% concentration on tannase production were studied in the optimized medium. Three different nitrogen sources included yeast extract, ammonia nitrate and sodium nitrate along with carbon source (starch) were studied. Only ammonia nitrate showed a significant effect on tannase production. After the optimization process, the tannase activity increased 8.6-fold.
Keywords: Tannase; Response surface; Residues

E. Alpizar, H. Etienne, B. Bertrand, Intermediate resistance to Meloidogyne exigua root-knot nematode in Coffea arabica, Crop Protection, Volume 26, Issue 7, July 2007, Pages 903-910, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.08.018.
(http://www.sciencedirect.com/science/article/B6T5T-4M4CVGV-1/2/3cd8a7e8b90ae2073c91a2b3b25698be)
Abstract:
The root-knot nematode Meloidogyne exigua is a huge threat in major Arabica coffee growing areas in Latin America. The development of nematode-resistant coffee trees constitutes the most promising option for controlling the pest. Coffea arabica resistance to M. exigua is controlled by a simply inherited major gene, called the Mex-1 gene. The objective of this study was to determine the level of expression (complete or incomplete) of the Mex-1 gene within homozygous or heterozygous C. arabica genotypes, and the stability of that expression under field conditions. Resistant and susceptible pure line cultivars were compared with clones of hybrid cultivars derived from crosses between resistant and susceptible lines. The results under controlled conditions in a greenhouse revealed that reproduction of the nematode was significantly higher on hybrid cultivars than on resistant pure line cultivars, but much lower than on a susceptible pure line cultivar. The same result was confirmed under field conditions. There were fewer galls in the hybrid cultivar than in the susceptible pure line cultivar. A significant number of the galls in the susceptible cultivar were large, whilst in the hybrid cultivar, only small galls were found. A histological analysis of galls did not reveal any differences in patterns of giant syncytial cells between susceptible and homozygous or heterozygous resistant genotypes. After being monitored for 4 years, a M. exigua field population was multiplied by a factor 14 on a susceptible cultivar and by a factor 1.9 on the hybrid cultivar. We concluded that Mex-1 could have incomplete dominant expression that allowed

nematode penetration, but inhibited the durable reproduction of the nematode. Finally we introduce the 'gall diameter' as a new parameter that could be used to characterize the intermediate resistant phenotype for breeding purposes in coffee.
Keywords: Gene incomplete dominant expression; Meloidogyne exigua; Root-knot nematode; Mex-1; Coffea arabica

J.D. Espinoza-Perez, A. Vargas, V.J. Robles-Olvera, G.C. Rodri'guez-Jimenes, M.A. Garci'a-Alvarado, Mathematical modeling of caffeine kinetic during solid-liquid extraction of coffee beans, Journal of Food Engineering, Volume 81, Issue 1, July 2007, Pages 72-78, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.10.011.
(http://www.sciencedirect.com/science/article/B6T8J-4MFKCWW-3/2/0ba47de96ad16a7d0e6aa0064642995d)
Abstract:
Rigorous and simplified models were proposed for caffeine kinetic description during the solid-liquid extraction process of coffee decaffeination. The evolution of caffeine concentration was measured both in extract and refined phases by gas chromatograph. The rigorous model is a non-steady diffusion equation for the coffee beans couple with macroscopic mass transfer equation for solvent. The simplified one is the analytical solution of macroscopic mass transfer equations for beans and solvent. In both models, rectangular coordinates were assumed. Caffeine internal mass diffusivity was estimated by fitting the simplified model to experimental results. The caffeine diffusivity in coffee beans yields 3.209 x 10-10 m2 s-1 at 90 [degree sign]C. The simplified model reproduce adequately the experimental kinetic of caffeine in both phases.
Keywords: Caffeine extraction; mass transfer, solid-liquid extraction

Thomas S. Bianchi, John J. Galler, Mead A. Allison, Hydrodynamic sorting and transport of terrestrially derived organic carbon in sediments of the Mississippi and Atchafalaya Rivers, Estuarine, Coastal and Shelf Science, Volume 73, Issues 1-2, June 2007, Pages 211-222, ISSN 0272-7714, DOI: 10.1016/j.ecss.2007.01.004.
(http://www.sciencedirect.com/science/article/B6WDV-4N55TP0-3/2/3a6f0f498055df0b4f9838b7a00dccca)
Abstract:
Over the course of two years, four cruises were conducted at varying levels of discharge in the lower Mississippi and Atchafalaya Rivers (MR and AR) where grab samples were collected from sand- and mud-dominated sediments. The tetramethylammonium hydroxide (TMAH) thermochemolysis method was used to determine sources of terrestrially derived organic carbon (OC) in these two sediment types, to examine the effects of hydrodynamic sorting on lignin sources in river sediments.
Average lignin concentrations in the lower MR were 1.4 +/- 1.1 mg gOC-1 at English Turn (ET) and 10.4 +/- 27.4 mg gOC-1 at Venice. Using these concentrations, annual lignin fluxes to the Gulf of Mexico, from tidal and estuarine mud remobilization at ET and Venice, were 3.1 +/- 2.5 x 105 kg and 11.4 +/- 30.0 x 105 kg, respectively. Much of the lignin-derived materials in muddy sediments appeared to be derived from non-woody grass-like sources - which should decay more quickly than the woody materials typically found in the sandy deposits. The average total OC% (1.93 +/- 0.47) of English Turn sands yields an annual flux of 0.34 +/- 0.09 x 109 kg. Lignin flux in the English Turn sands (3.6 +/- 2.6 mg gC-1) using the numbers above would be 12.2 +/- 9.4 x 105 kg. The extensive amounts of sand-sized woody materials (coffee-grinds) found in the sandy sediments in both the AR and MR are likely derived from woody plant materials. This is the first time it has been demonstrated that sandy sediments in the MR provide an equally important pathway (compared to muds) for the transport of terrestrially derived organic matter to the northern Gulf of Mexico. Using the AR average %OC in sand (1.16 +/- 0.72), we estimated an annual flux of OC to the shelf of 0.13 +/- 0.07 x 109 kg. Lignin flux for AR sands was estimated to be 12.4 +/-

12.1 x 105 kg. Despite the high error associated with these numbers, we observe for the first time that the flux of lignin in sandy sediments in the AR to the northern Gulf of Mexico is comparable to that found in the MR. These results further support the likelihood of grain-size related hydrodynamic sorting of terrestrially derived organic carbon in the lower Mississippi and Atchafalaya Rivers, suggesting that there is a distinct sandy sediment organic fraction contributed by major rivers to the global carbon cycle.
Keywords: sediment transport; lignin; organic carbon; hydrodynamic sorting; river discharge; USA; Louisiana; Mississippi River

Thomas Bjellaas, Linn Helene Stolen, Margaretha Haugen, Jan Erik Paulsen, Jan Alexander, Elsa Lundanes, Georg Becher, Urinary acrylamide metabolites as biomarkers for short-term dietary exposure to acrylamide, Food and Chemical Toxicology, Volume 45, Issue 6, June 2007, Pages 1020-1026, ISSN 0278-6915, DOI: 10.1016/j.fct.2006.12.007.
(http://www.sciencedirect.com/science/article/B6T6P-4MM1P5K-1/2/ee34bf801a0c2f9ffbfb57f509fb3c32)
Abstract:
It has previously been reported that heat-treated carbohydrate rich foods may contain high levels of acrylamide resulting in consumers being inadvertently exposed to acrylamide. Acrylamide is mainly excreted in the urine as mercapturic acid derivatives of acrylamide and glycidamide. In a clinical study comprising of 53 subjects, the urinary excretion of these metabolites was determined using solid-phase extraction and liquid chromatography with positive electrospray MS/MS detection. The median (range) total excretion of acrylamide in urine during 24 h was 16 (7-47) [mu]g acrylamide for non-smokers and 74 (38-106) [mu]g acrylamide for smokers, respectively. It was found that the median intake estimate in the study based on 24 h dietary recall was 21 (13-178) and 26 (12-67) for non-smokers and smokers, respectively. The median dietary exposure to acrylamide was estimated to be 0.47 (range 0.17-1.16) [mu]g/kg body weight per day. In a multiple linear regression analysis, the urinary excretion of acrylamide metabolites correlated statistically significant with intake of aspartic acid, protein, starch and coffee. Consumption of citrus fruits correlated negatively with excretion of acrylamide metabolites.
Keywords: Urinary metabolites; Biomarkers; Dietary exposure; Acrylamide; Glycidamide; Food

Francisco Posada, M. Catherine Aime, Stephen W. Peterson, Stephen A. Rehner, Fernando E. Vega, Inoculation of coffee plants with the fungal entomopathogen Beauveria bassiana (Ascomycota: Hypocreales), Mycological Research, Volume 111, Issue 6, June 2007, Pages 748-757, ISSN 0953-7562, DOI: 10.1016/j.mycres.2007.03.006.
(http://www.sciencedirect.com/science/article/B7XMR-4N8BN4S-3/2/d9aaaed782331776ce516621519f2883)
Abstract:
The entomopathogenic fungus Beauveria bassiana was established in coffee seedlings after fungal spore suspensions were applied as foliar sprays, stem injections, or soil drenches. Direct injection yielded the highest post-inoculation recovery of endophytic B. bassiana. Establishment, based on percent recovery of B. bassiana, decreased as time post-inoculation increased in all treatments. Several other endophytes were isolated from the seedlings and could have negatively influenced establishment of B. bassiana. The recovery of B. bassiana from sites distant from the point of inoculation indicates that the fungus has the potential to move throughout the plant.
Keywords: Coffea; Coffee berry borer; Endophytes; Hypothenemus

Brenda B. Lin, Agroforestry management as an adaptive strategy against potential microclimate extremes in coffee agriculture, Agricultural and Forest Meteorology, Volume 144, Issues 1-2, 14 May 2007, Pages 85-94, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2006.12.009.

(http://www.sciencedirect.com/science/article/B6V8W-4N6FV5K-1/2/3261a3b5f4addd440021e6eb65f3e7f4)
Abstract:
Current climate change patterns may cause more extreme and variable climates in the future, threatening agricultural productivity in many areas of the world. Because many smallholder, rural farmers depend on subsistence, rainfed agriculture, priorities should be focused on coping mechanisms that protect these farmers from future vulnerabilities. This paper examines one possible adaptive strategy for coffee agriculture. A high (60-80%), medium (35-65%), and low (10-30%) shade coffee site were chosen in the Soconusco region of Chiapas, Mexico. Microclimate and soil moisture data were collected to examine the ability of shade tree cover in an agroforestry system to protect crop plants against extremes in microclimate and soil moisture fluctuation. Site and site by time effects were analyzed using linear mixed models to compare mean differences of microclimate measurements (temperature, relative humidity, and solar radiation) by site as well as by time of the day. Although there were not large differences in seasonal means for these factors, site by time effects show that temperature, humidity, and solar radiation fluctuations increase significantly as shade cover decreases. Soil data showed significantly larger fluctuations in soil moisture gain and loss in the low shade site respective of patterns of precipitation. Overall, the amount of shade cover was directly related to the mitigation of variability in microclimate and soil moisture for the crop of interest. The use of agroforestry systems is an economically feasible way to protect crop plants from extremes in microclimate and soil moisture and should be considered a potential adaptive strategy for farmers in areas that will suffer from extremes in climate.
Keywords: Adaptive management; Agroforestry systems; Climate change; Coffee agriculture; Microclimate management; Soil moisture fluctuation

Silvia B. Filippi, Ricardo A. Azevedo, Ladaslav Sodek, Paulo Mazzafera, Allantoin has a limited role as nitrogen source in cultured coffee cells, Journal of Plant Physiology, Volume 164, Issue 5, 3 May 2007, Pages 544-552, ISSN 0176-1617, DOI: 10.1016/j.jplph.2006.03.005.
(http://www.sciencedirect.com/science/article/B7GJ7-4JXPS07-6/2/dc0cfab7794bfedae6041cff27da4a5d)
Abstract: Summary
In plants the ureides allantoin (ALN) and allantoic acid (ALA) are formed in purine metabolism, and in some legumes both compounds play an important role as nitrogen (N) sources. In coffee plants, ALN and ALA are catabolites of caffeine degradation. Caffeine is found throughout the coffee plant and in some parts this alkaloid can accumulate up to 4% dry basis. Therefore, caffeine degradation via ureides may make an important contribution to N metabolism of the plant. Using coffee cell suspension as a model we investigated the contribution of ALN as a source of N in coffee. ALN was incorporated in the liquid medium and after 20 d of cultivation, cell mass, NO_3, NH_4, amino acids, soluble proteins, ALN and caffeine were determined in the cells. The activity of glutamine synthetase was also studied. The results showed that despite being taken up by cells ALN does not contribute significantly as a source of N in coffee cells. Compared with mineral N sources, cells grown with ALN-N accumulated much less mass. The inclusion of ALN in the medium caused significant alterations in the content of some N compounds indicating a stress condition.
Keywords: Caffeine; Coffea arabica; Glutamine synthetase; Nitrogen; Ureides

Maike Schaefer, Filser Juliane, The influence of earthworms and organic additives on the biodegradation of oil contaminated soil, Applied Soil Ecology, Volume 36, Issue 1, May 2007, Pages 53-62, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2006.11.002.
(http://www.sciencedirect.com/science/article/B6T4B-4MJS01G-1/2/577cf4e25b3f645c2105e9ffba33f4ef)
Abstract:

Oil pollution is a world-wide prevalent threat to the environment and the remediation of oil contaminated soils, sediments and water is a major challenge for environmental research. Bioremediation is a useful method for soil remediation, if pollutant concentrations are moderate and non-biological techniques are not economical. The scope of this study was to investigate if earthworms and/or additives (organic material) can enhance the microbial degradation of petroleum hydrocarbons in soil.
Two experiments were conducted. The aim of the first was to investigate the influence of three different earthworm species (Eisenia fetida, Allolobophora chlorotica, and Lumbricus terrestris) on the degradation of a crude oil contaminated soil (9500 mg total petroleum hydrocarbons (TPH)/kg soil dry wt.). A significant decrease in the TPH concentration was observed in treatments with earthworms, compared with the samples without worms. A decrease of the marker components phytane and pristane in the earthworm treatments indicated microbial degradation. Correspondingly, increased microbial activity (soil respiration) was observed in these samples, probably due to earthworm stimulation. Mixing of the soil (simulating burrowing activities of the earthworms), however, did not lead to a decrease in the TPH concentration.
The aim of the second experiment was to investigate the influence of additives and/or earthworms (Lumbricus terrestris) on TPH degradation in a crude oil polluted soil (5000 mg/kg TPH). Criteria for the choice of the additives were cost effectiveness and short transport distances. Industrial waste products were therefore chosen: (i) coffee grounds; (ii) horticultural waste (grass and wood chips); and (iii) brewery mash. Additives were either mixed into the soil or dispersed on the soil surface in mass concentrations 1:10 (additive:soil). After 28 days, significant TPH degradation (30-35%) was only observed in treatments with mash (mixed) and with earthworms without additives, although soil respiration measurements showed enhanced microbial activity in all treatments with worms or additives. It was assumed that micro-organisms prefer the more easily available additives as nutrient sources over the less easily degradable, nitrogen deficient, long-chain crude oil. Thus, the application of additives does not necessarily enhance bioremediation. Despite high mortality, earthworms may trigger the degradation process and might therefore, be applied in the remediation of oil contaminated soil with moderate TPH concentrations.
Keywords: Bioremediation; Crude oil; Earthworms; Organic amendments

Oscar Gonzalez-Rios, Mirna L. Suarez-Quiroz, Renaud Boulanger, Michel Barel, Bernard Guyot, Joseph-Pierre Guiraud, Sabine Schorr-Galindo, Impact of 'ecological' post-harvest processing on the volatile fraction of coffee beans: I. Green coffee, Journal of Food Composition and Analysis, Volume 20, Issues 3-4, The essential balance: Risks and benefits in food safety and quality, May 2007, Pages 289-296, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.07.009.
(http://www.sciencedirect.com/science/article/B6WJH-4MR7D7J-1/2/9e84254fbf935046a95a4c499194cbcb)
Abstract:
Green coffees produced by three variants of the wet process and a new 'ecological' process were characterised for their aroma using combined headspace solid-phase microextraction/gas chromatography-mass spectroscopy (HS-SPME/GC-MS) and headspace solid-phase microextraction/gas chromatography-olfactometry (HS-SPME/GC-O). The effect of each post-harvest processing operation on the volatile fraction of the coffee produced was studied, particularly the effect of reducing the amount of water used in the process. The comparison of the green coffees from the different treatments revealed the importance of mucilage removal in distinguishing between the samples, and showed the merits of microbial mucilage removal in water to obtain coffees with a better aroma quality. These latter coffees were in fact characterised by pleasant and fruity aromatic notes, whereas those obtained after mechanical mucilage removal used in the ecological process were characterised by volatile compounds with an unpleasant note.
Keywords: Green coffee; Post-harvest process; Aroma; Solid-phase microextraction (SPME); Gas chromatography-olfactometry (GC-O); Food safety

Oscar Gonzalez-Rios, Mirna L. Suarez-Quiroz, Renaud Boulanger, Michel Barel, Bernard Guyot, Joseph-Pierre Guiraud, Sabine Schorr-Galindo, Impact of 'ecological' post-harvest processing on coffee aroma: II. Roasted coffee, Journal of Food Composition and Analysis, Volume 20, Issues 3-4, The essential balance: Risks and benefits in food safety and quality, May 2007, Pages 297-307, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.12.004.
(http://www.sciencedirect.com/science/article/B6WJH-4MNR0HY-1/2/d7cf883e9a6400b69c2383c4ffdc098b)
Abstract:
The purpose of this study was to determine how water and microbial stages in post-harvest processing affect the volatile content of coffee. Following our aroma analysis carried out on green coffees, we turned our attention to roasted coffees. Coffees produced by three variants of the wet method, and by an ecological process, were compared after roasting. Three degrees of roasting were applied to gain a clearer picture of the differences in roasted coffee aromas by means of a volatile compound analysis. Changes in the post-harvest process actually led to aroma differences in roasted coffees, and with light roasting it was possible to more effectively distinguish between the four treatments based on aroma criteria. Coffee produced by the traditional wet method, with microbial stages, had a better aroma quality than coffee produced by the ecological method, which was purely mechanical. Moreover, in the microbial method, mucilage removal under water gave coffees with more fruity, floral and caramel notes, whereas dry mucilage removal gave more neutral coffees. These results confirmed the importance of microbial mucilage removal under water and tallied with the results of our previous study on green coffee. This work provides coffee producers and roasters with an insight into the volatile composition of roasted coffee depending on the post-harvest process used and degree of roasting applied.
Keywords: Roasted coffee; Post-harvest treatment; Aroma; SPME; GCO; Food safety

Gabriel Nama Medoua, Carl M.F. Mbofung, Kinetics studies of some physico-chemical substances during roasting and preparation of beverage made by Cassia occidentalis seeds, LWT - Food Science and Technology, Volume 40, Issue 4, May 2007, Pages 730-736, ISSN 0023-6438, DOI: 10.1016/j.lwt.2006.03.004.
(http://www.sciencedirect.com/science/article/B6WMV-4JS1TMD-2/2/b896f18cf1820a709881621b24f58a7d)
Abstract:
Cassia occidentalis seeds are commonly used in West of Africa to prepare a beverage which serves as a substitute for coffee. A study was carried out to investigate the effect of roasting conditions on some organic compounds in the seeds and to determine the extraction rate of some physico-chemical constituents into an aqueous infusion. With the exception of phytate, the results showed that roasting significantly decreased (P[less-than-or-equals, slant]0.05) the level of the chemical parameters measured (proteins, carbohydrates, total phenols and tannins). Degradation of these compounds during roasting follows first-order reaction and this degradation conforms to the Arrhenius equation. From the rates of increase of the physico-chemical concentration of beverage with extraction time, first order rate constants of infusion were determined and kinetic extraction was found to follow the quasi-steady-state theory of extraction from spherical particles.
Keywords: Cassia occidentalis; Roasting; Extraction; Kinetic rate; Beverage

Maud Lepelley, Gerald Cheminade, Nicolas Tremillon, Andrew Simkin, Victoria Caillet, James McCarthy, Chlorogenic acid synthesis in coffee: An analysis of CGA content and real-time RT-PCR expression of HCT, HQT, C3H1, and CCoAOMT1 genes during grain development in C. canephora, Plant Science, Volume 172, Issue 5, May 2007, Pages 978-996, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2007.02.004.

(http://www.sciencedirect.com/science/article/B6TBH-4N1464G-2/2/5921dac7f6df9ca9105e48514d0ed1a6)
Abstract:
The mature coffee grain contains a high level of chlorogenic acids (CGA). We have quantified the main caffeoylquinic acids (CQA) and dicaffeoylquinic acids (diCQA) in Coffea canephora (robusta) grain during late development. This analysis indicates the CQA levels remain relatively steady during the final stages of grain development, but the levels of diCQA fall significantly. Analysis of quinic acid, a key CGA precursor in coffee, shows it is present at a high level in the early grain, but then drops to a low level as development progresses. To better understand coffee CGA synthesis, and to learn why diCQA and quinic acid levels fall late in grain development, we have cloned cDNA encoding four key enzymes for CGA synthesis in coffee; HCT, HQT, C3H1 and CCoAOMT1. The characterization of recombinant HCT, HQT and CCoAOMT1 proteins is also described. Quantitative real-time RT-PCR data is presented for different stages of grain and pericarp development, as well as several other C. canephora tissues. Elevated HCT and CCoAOMT1 expression in branch tissues strongly suggests the products of these genes are associated with increased lignin synthesis, while higher HQT expression appears to be more closely correlated with CGA accumulation. The data presented forms an important base for designing new experiments aimed at improving our understanding of CGA synthesis in coffee and other plants, and could facilitate the development of new strategies to increase the CGA content of plant foods.
Keywords: Coffee; Chlorogenic acid (CGA) metabolism; Seed development; Health benefits

Uwe Herpin, Thomas Vincent Gloaguen, Adriel Ferreira da Fonseca, Celia Regina Montes, Fernando Campos Mendonca, Roque Passos Piveli, Gerhard Breulmann, Maria Cristina Forti, Adolpho Jose Melfi, Chemical effects on the soil-plant system in a secondary treated wastewater irrigated coffee plantation--A pilot field study in Brazil, Agricultural Water Management, Volume 89, Issues 1-2, 16 April 2007, Pages 105-115, ISSN 0378-3774, DOI: 10.1016/j.agwat.2007.01.001.
(http://www.sciencedirect.com/science/article/B6T3X-4N0XNHY-2/2/8946f40ed496a4a138f883c81527f1d3)
Abstract:
Wastewater reuse in agriculture is recognized worldwide as an alternative water and/or nutrient source. In this study, secondary treated wastewater (STW) from an anaerobic/facultative pond system at the city of Lins (Sao Paulo State, Brazil) was used over 3 years and 7 months to irrigate coffee (Coffea arabica L.). The soil type was Typic Haplustox and the crops were fertilized according to regional agronomical recommendations. Soil and leaf samples from three sampling campaigns were used to study effects on chemical quality parameters, macronutrients and Na within the soil-plant system.
Due to high Na contents of the STW applied, Na concentrations showed increases throughout the soil profile compared to untreated soil conditions. Both, low C/N ratio of STW and fertilizer amendments stimulated soil microbial activity and encouraged nitrification and mineralization of wastewater organic components and soil organic matter (SOM) causing significant decreases of SOM and cation exchange capacity (CEC). Over time exchangeable sodium percentages (ESP) in the topsoil decreased due to Na exchange mainly by Ca and Mg, resulting in increasing exchangeable calcium percentage (ECP) and exchangeable magnesium percentage (EMP) associated with lower soil sodicity. Exchanged Na and available soluble Na from STW led to both elevated ESP at depth by soil migration and high plant uptake. The superficial increase of ECP and EMP favored continuous replenishment of Ca and Mg in the soil solution leading to increasing plant contents over time. The plant Ca, Mg and K contents remained high after fertilization stop and continued STW irrigation. This is expected to be rather a short-lived effect due to a reduction of the essential cation store through constantly provided Na and insufficient supply of essential cations via STW, associated with decrease of SOM and CEC and higher sodicity risk, suggesting

the need of continued fertilizer use for soil maintenance. On the other hand, the plant contents of P, N and S dropped back to deficient values when irrigated solely with STW mainly due to insufficient replenishment by STW and the anion exchange complex (AEC) indicating moreover the need to continue fertilization to maintain anion levels in soil for optimum plant growth. The study revealed that STW can effectively increase water resources for irrigation, however, innovative and adapted fertilizer/STW management strategies are needed to diminish sodicity risks and to sustain adequate and balanced nutritional conditions in the soil-plant system.
Keywords: Treated wastewater; Recycling; Na; Fertilization; Nutrients; Coffea arabica L.

Elena Velasquez, Celine Pelosi, Didier Brunet, Michel Grimaldi, Marlucia Martins, Ana Carolina Rendeiro, Edmundo Barrios, Patrick Lavelle, This ped is my ped: Visual separation and near infrared spectra allow determination of the origins of soil macroaggregates, Pedobiologia, Volume 51, Issue 1, 10 April 2007, Pages 75-87, ISSN 0031-4056, DOI: 10.1016/j.pedobi.2007.01.002.
(http://www.sciencedirect.com/science/article/B7CW5-4N1SNK7-1/2/a648b708135eb9d8b6cb5091cebc228a)
Abstract: Summary
Macroaggregation is a highly dynamic attribute of soils that is claimed to have a significant impact on their ability to store C and conserve nutrients. A major obstacle to the description and modelling of macroaggregate dynamics, and of the associated processes, is an almost complete ignorance of the real origin of the different types of aggregates found in soils, their turnover times and positions in the soil matrix. We present here a general methodological approach in which the origin of aggregates separated according to visual criteria could be determined by comparing their specific organic matter signatures assessed by Near Infrared Spectrometry (NIRS) to signatures of biogenic structures produced by soil ecosystem engineers (invertebrates and roots) living in the same soil.
Macroaggregates and other soil components were separated visually from samples taken at 61 locations regularly distributed across a watershed in Nicaragua and representing crops, pastures, forests, coffee plantations and fallows. Coinertia analyses among soil macroinvertebrate communities and the matrix of soil morphological variables showed highly significant relationships. In Amazonian forest patches and pastures from the state of Para in Brazil, 75 different types of biogenic structures were collected at the soil surface and on tree trunks, and analysed by the NIRS spectral method. Significant differences among the different types of structures allowed grouping according to their broad phylogenetic origin with large interspecifc differences.
In a field experiment conducted at the same site, soils previously under pastures were planted in 16 possible combinations of four plant species, in a fully randomized design replicated three times in different sites. Surface casts of the earthworm species Andiodrilus pachoensis and soil macroaggregates separated by our visual technique had significantly different spectral signatures depending on the location of the plot and the composition of plant cover. However, the comparison of NIRS signatures of soil macroaggregates and casts suggested that Andiodrilus pachoensis was not responsible for the production of the biogenic aggregates that comprised a large proportion on the soil volume in this soil.
Keywords: Soil aggregation; Macroinvertebrates; NIRS; Soil morphology; Tropical soils

J.R.D. Finzer, M.A. Sfredo, G.D.B. Sousa, J.R. Limaverde, Dispersion coefficient of coffee berries in vibrated bed dryer, Journal of Food Engineering, Volume 79, Issue 3, April 2007, Pages 905-912, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.03.011.
(http://www.sciencedirect.com/science/article/B6T8J-4JKC5N4-3/2/03240185f09adda02b06e2170636d1ec)
Abstract:
This paper interprets the experimentally measured residence time distribution of coffee berries on a vibrated tray dryer with recycle by means of the dispersion coefficients and the Peclet number.

Drying was carried out on a vibrated tray dryer operating with recycle consisting of four parts: a vertical drying tunnel, vibration system, warm air supply to the drying tunnel and recycle system of coffee berries. Using the stimulus-response method the flow behavior of the coffee berries was examined. The dispersion coefficients were calculated by the Taylor Dispersion Model and Free Dispersion Model. The differences in prediction of the dispersion coefficient between the two models were appreciable, but the more reliable values for the dispersion coefficients Ez were those obtained by the Free Dispersion Model. The dispersion coefficient (Free Dispersion) ranged from 2.32 x 10-4 to 76.81 x 10-4 m2/s. The average Peclet number, Pe was approximately equal to 6.5, despite greatest variation of the Ez. Therefore, flow velocity variation of coffee berries was the same magnitude of the dispersion coefficient variation.
Keywords: Coffee drying; Drying with recycle; Dispersion coefficient; Peclet number

Diriba Muleta, Fassil Assefa, Sileshi Nemomissa, Ulf Granhall, Composition of coffee shade tree species and density of indigenous arbuscular mycorrhizal fungi (AMF) spores in Bonga natural coffee forest, southwestern Ethiopia, Forest Ecology and Management, Volume 241, Issues 1-3, 30 March 2007, Pages 145-154, ISSN 0378-1127, DOI: 10.1016/j.foreco.2007.01.021.
(http://www.sciencedirect.com/science/article/B6T6X-4N14D5W-1/2/9e50546e0505bfb6a2510026f8c9cfc2)
Abstract:
The composition of coffee shade tree species and density of arbuscular mycorrhizal fungi (AMF) spores in Bonga natural coffee forest of southwestern Ethiopia were investigated. This study is the first report on AMF populations of Ethiopian natural coffee forests. The main purposes were to systematically identify the dominant coffee shade tree species, evaluate their densities and quantify and characterize populations of arbuscular mycorrhizal fungi particularly in the rhizosphere of coffee plants. Sample plots of 400 m2 with coffee plants and dominant shade tree species were selected. Sampling of soil was carried out at a depth of 0-15 cm from the rooting areas of shaded and unshaded coffee plants for analysis of some soil parameters and quantification of AMF spores. Nineteen dominant shade tree species belonging to 14 plant families were identified in considered 10 quadrates. In terms of their stand dominance, Millettia ferruginea (Hochst.) Baker had the highest frequency of occurrence (22.3%) followed by O. welwitschii Friis & P.S. Green (15.5%). High density (503 stems/ha) and/or percentage (66%) of Coffea arabica L. were recorded. All soil samples yielded AMF spores and the counts ranged from 4 to 67 spores 100 g-1 of dry soil. Notably higher mean counts of AMF spores were found under leguminous shade trees compared to non-leguminous ones. AMF spore counts were significantly positively correlated with coffee counts and available soil P content. Five genera of AMF were identified based on spore morphology. Glomus dominated members of Glomeromycota. The other genera found were Gigaspora, Acaulospora, Entrophospora and Scutellospora in order of occurrence. The present investigation has documented species richness among dominant coffee shade tree species along with a fair distribution of relevant numbers and types (genera) of AMF to stimulate coffee growth. Thus, Bonga natural coffee forest seems to be an ideal focal forest for in situ coffee genetic resources conservation and promotion of organic coffee production.
Keywords: Arbuscular mycorrhizal fungi spore density; Bonga natural coffee forest; Coffee shade tree species

Tannya Lozada, G.H.J. de Koning, Raphael Marche, Alexandra-Maria Klein, Teja Tscharntke, Tree recovery and seed dispersal by birds: Comparing forest, agroforestry and abandoned agroforestry in coastal Ecuador, Perspectives in Plant Ecology, Evolution and Systematics, Volume 8, Issue 3, 16 March 2007, Pages 131-140, ISSN 1433-8319, DOI: 10.1016/j.ppees.2006.10.001.
(http://www.sciencedirect.com/science/article/B7GVV-4MYFG43-1/2/04653c60b4a1eb37b6965a7a50c0fd46)

Abstract:
We used a highly replicated study to examine vegetation characteristics between patches of intervened forest, abandoned agroforestry systems with coffee and actively managed agroforestry systems with coffee in a tropical landscape. In all habitats, plant structural characteristics, individual abundance, species richness and composition were recorded for the three plant size classes: adult trees, saplings and seedlings. Furthermore, bird species richness and composition, and seeds dispersed by birds were recorded. Tree abundance was higher in forest habitats while saplings and seedlings were more abundant in abandoned coffee sites. Although species richness of adult trees was similar in the three habitats, species richness of saplings and seedlings was much higher in forest and abandoned coffee than in managed coffee sites. However, in spite of their relatively low species richness, managed coffee sites are an important refuge for tree species common to the almost disappeared mature forest in the area. Floristic similarity for adult trees was relatively low between land use types, but clearly higher for seedlings, indicating homogenizing processes at the landscape level. More than half of the saplings and seedling were not represented by adults in the canopy layer, suggesting the importance of seed dispersal by birds between habitats. Our results show that each of the studied ecosystems plays a unique and complementary role as seed source and as habitat for tree recovery and tree diversity.
Keywords: Agroforestry systems; Coffee plantation; Intervened forest; Species richness; Structural characteristics; Tropical landscape

Florence de Ferran, Klaus G. Grunert, French fair trade coffee buyers' purchasing motives: An exploratory study using means-end chains analysis, Food Quality and Preference, Volume 18, Issue 2, March 2007, Pages 218-229, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2005.11.001.
(http://www.sciencedirect.com/science/article/B6T6T-4HSY4RN-1/2/acafcaa6c9dccee9bf750db52b9ed57c)
Abstract:
Considering the growth of fair trade product consumption in European countries and the expansion of its distribution to different kinds of distribution networks in reply to increasing consumer sensitivity to the ethical characteristics of a product, it becomes important to understand it better. In this paper, we examine the motives and the values underlying this purchase through a laddering methodology with 54 French fair trade coffee purchasers. A quantitative analysis of the ladders allows us to define several groups of motives that are socially and individually oriented. Moreover, our results demonstrate that the retail store chosen (supermarket (SM) or specialized store (SS)) have to be taken into account to implement efficient marketing strategies because there are different motives for purchase in the two locations. SS purchaser is motivated by a wish to protect the environment and to participate in alternative economy, whereas SM purchaser is more focused on a respect for the human rights.
Keywords: Fair trade; Means-end chains; Retail store type; Motives; Values

Andreina Laffargue, Alexandre de Kochko, Stephane Dussert, Development of solid-phase extraction and methylation procedures to analyse free fatty acids in lipid-rich seeds, Plant Physiology and Biochemistry, Volume 45, Issues 3-4, March-April 2007, Pages 250-257, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2007.01.012.
(http://www.sciencedirect.com/science/article/B6VRD-4MY0MF7-2/2/93d906a22a7e4e51da776fb3c2c896bf)
Abstract:
In order to develop a sensitive and reliable method for FFA quantification in lipid matrices of seeds, two SPE procedures employed in meat and dairy chemistry were compared using a 100/1 mixture of triolein/heptadecanoic acid. The overall efficiency of the SPE procedure retained was satisfactory since it allowed removal of 99.8% of triacylglycerols (TAG) and recovery of 99.2% of FFA as quantified by gas chromatography of fatty acid methyl esters (FAME). However, the low

amount of TAG eluted in the FFA fraction represented a non-negligible percentage (17%) of FAME and the procedure thus required further improvement. TAG pollution was successively decreased to 12%, 8% and finally 1.5% by: i) modifying the volume of elution of TAG; ii) removing the saponification step initially performed according to the standard FAME procedure; and iii) reducing the duration of the BF3-catalyzed methylation reaction to 1 min. The new SPE/methylation procedure described here was then compared to the most widely used method for FFA measurement in plants which is based on thin-layer chromatography (TLC). Both procedures were applied to coffee seeds stored for 0-18 months at 15 [degree sign]C under 62% relative humidity and provided consistent results. A very clear negative correlation was observed between the loss of seed viability and the accumulation of FFA in seeds during the course of storage independent of the method employed for FFA quantification. However, we demonstrated that the TLC/on-silica methylation procedure underestimates FFA contents in comparison with the new SPE/methylation procedure because of a selective loss of unsaturated FA.
Keywords: Ageing; Coffee seed; Free fatty acid; Plant; Purification; Solid-phase extraction; Thin-layer chromatography

Adriana Lucia da Silva, Klaus Reichardt, Renato Roveratti, Osny O.S. Bacchi, Luis Carlos Timm, Julio Cesar M. Oliveira, Durval Dourado-Neto, On the use of soil hydraulic conductivity functions in the field, Soil and Tillage Research, Volume 93, Issue 1, March 2007, Pages 162-170, ISSN 0167-1987, DOI: 10.1016/j.still.2006.03.024.
(http://www.sciencedirect.com/science/article/B6TC6-4JXY3JM-2/2/56434954465e382c513792e55d033f50)
Abstract:
The estimation of soil water fluxes using the Darcy-Buckingham flux-gradient approach is, after a century of use, still problematic under field conditions. Two features of the soil hydraulic conductivity (K) function are the main causes of failure, first the exponential character of the K versus soil water content ([theta]) relations, which lead to large variations in K for minimal variations of [theta]. Due to this, the level of precision of field measurements of [theta] and the spatial variability of [theta] itself, make the deterministic estimation of soil water fluxes unfeasible using this approach. Secondly, the spatial variability of the parameters of the K([theta]) relations also contribute heavily to errors in soil water flux estimation from site to site. In a coffee crop water balance experiment, soil water fluxes below the root zone were estimated over one year, comparing the use of a soil hydraulic conductivity function obtained in the field, with an indirect climatologic approach in which the deep drainage is estimated from a water balance excess. Five replicates gave the possibility of calculating variances of both forms of calculation and their respective coefficients of variation (CV). Results show that CVs of the estimates made through the Darcy-Buckingham approach varied from 78 to 122%, in comparison to 8-23 for the indirect climatologic approach. It is therefore concluded that Darcy-Buckingham approach used deterministically under field conditions does not yield consistent results.
Keywords: Darcy-Buckingham equation; Soil hydraulic conductivity; Soil water flux; Soil variability

V. Ernesto Mendez, Stephen R. Gliessman, Gregory S. Gilbert, Tree biodiversity in farmer cooperatives of a shade coffee landscape in western El Salvador, Agriculture, Ecosystems & Environment, Volume 119, Issues 1-2, February 2007, Pages 145-159, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.07.004.
(http://www.sciencedirect.com/science/article/B6T3Y-4KTMTNM-1/2/35d6454d5a78290807396b9391482d1f)
Abstract:
Conservation of tropical biodiversity in agricultural landscapes has become more important as the area covered by natural ecosystems decreases. We analyzed the effects of local livelihoods, cooperative types, and selected biophysical variables (elevation, slope, percent shade, distance to

the forest, coffee density, and coffee age) on tree biodiversity in shade coffee cooperatives of El Salvador.
Tree inventories from 51 quadrats in coffee cooperatives included 2743 individuals from 46 families and 123 identified tree species. Species richness and tree diameters differed among some cooperatives, with greater richness associated with greater stem density; other biophysical variables had little impact on diversity. The amount of shade in the coffee plantations differed among cooperatives, particularly in the wet season. Of the tree species reported in a recent study of a neighboring forest and in the cooperatives (N = 227 species combined), 16% were present at both sites. The three coffee plantations shared 35% of total species reported from all cooperatives. Our research shows that the number of tree species found in a coffee plantation increases with the density of shade trees included in the system. In turn, agroecological management, as influenced by farmer livelihood strategies and cooperative types, directly affects shade canopy composition. Important factors to take into account are the types of farmer organizations present, the cost of maintaining species of conservation concern, and the potential benefits that conservation could bring to the livelihood strategies of farm households.
Keywords: Agroecology; Agroforestry; Farmer livelihoods; Tropical tree species richness

J.A. Hernandez, B. Heyd, C. Irles, B. Valdovinos, G. Trystram, Analysis of the heat and mass transfer during coffee batch roasting, Journal of Food Engineering, Volume 78, Issue 4, February 2007, Pages 1141-1148, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.12.041.
(http://www.sciencedirect.com/science/article/B6T8J-4J90VS5-2/2/913552f6fce8790d4b86397d5b3eefc8)
Abstract:
In this paper, an experimental and theoretical analysis of the heat and mass transfer was carried out to evaluate the coffee bean's temperature and moisture content during the roasting in batch system. Arabica coffee from Colombian origin was roasted using different air temperatures between 190 and 300 [degree sign]C, during 10 min. Bean's temperature and weight loss have been measured on-line by robust sensors. The experimental results allowed better understanding of the phenomena that appears during roasting. For example, an evident increase of the bean's temperature curve tendency is observed when this one exceeds the 250 [degree sign]C, it is probably due to the end of exothermic reactions and to the beginning of the bean burn. The experimental data of moisture shown a decrease of 10.5% d.b. to 0-7% d.b. A dynamic model is evaluated and analyzed to predict bean's temperature and moisture content during roasting. The results (simulations and experimental kinetics) were in good agreement. This model can be used for on-line estimation and control of coffee roasting.
Keywords: Heat and mass transfer; Coffee roasting; On-line measures

Caleb Gordon, Robert Manson, Jeffrey Sundberg, Andrea Cruz-Angon, Biodiversity, profitability, and vegetation structure in a Mexican coffee agroecosystem, Agriculture, Ecosystems & Environment, Volume 118, Issues 1-4, January 2007, Pages 256-266, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.05.023.
(http://www.sciencedirect.com/science/article/B6T3Y-4KBDW95-2/2/9307ca6cfd479ab8a3d9c929f6245170)
Abstract:
We studied the relationships of bird and small mammal species richness, composition, and abundance to vegetation structure and economic profitability across a coffee intensification gradient in central Veracruz, Mexico. We conducted 2 years of point count censuses for summer resident birds, 2 years of Sherman live trapping for small mammals, and gathered vegetation structure data at 147 sampling points distributed over 16 sites spanning a cultivation intensification gradient. We calculated net annual revenue per hectare as an index of profitability from economic and management data collected during interviews with plantation owners/managers. Both the

species richness and abundance of forest-affiliated birds were significantly greater in floristically and structurally diverse `bajo monte' coffee and forest compared with commercial polyculture coffee, which was, in turn, significantly richer than statistically indistinguishable specialized shade and sun coffee. Mammal capture rates were extremely low at all but two sites. Forest bird species richness and abundance were explained by multiple linear regression models that included statistically significant effects of shade cover, percent of trees with epiphytes, and canopy height. We found no clear relationship between profitability and biodiversity, with biodiverse bajo monte coffee plantations ranking among the most profitable under all price scenarios. The high profitability of biodiverse bajo monte coffee systems was not dependent on the inclusion of long-term environmental costs or premium pricing systems. Our results demonstrate that high-biodiversity coffee cultivation can be compatible with high profitability, and has significant potential for conserving biodiversity in coffee-growing regions, but only as a substitute for low-biodiversity coffee cultivation, not forest.
Keywords: Agroecology; Birds; Mammals; Coffee; Economics; Mexico

Kevin P. Myers, Robust preference for a flavor paired with intragastric glucose acquired in a single trial, Appetite, Volume 48, Issue 1, January 2007, Pages 123-127, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.07.077.
(http://www.sciencedirect.com/science/article/B6WB2-4KXDR07-1/2/ebf6b67543ef818ba7b4780a8b51d869)
Abstract:
Rats learn to prefer flavors followed by postingestive action of nutrients. This experiment demonstrates that such preferences can be acquired with only a single, brief pairing of a novel flavor with intragastric (IG) glucose infusion. Male rats with IG catheters consumed unflavored saccharin in daily 10-min sessions, and then received in counterbalanced order on separate days a single pairing of coffee- or vinegar-flavored saccharin with IG glucose, and of the opposite flavor with IG water. Rats subsequently preferred the glucose-paired flavor in a choice test in the absence of glucose infusion. Preference was robust, persisting through repeated non-reinforced testing.
Keywords: Flavor preferences; Conditioning; One-trial learning; Extinction

M. Cuadra, J. Bjorklund, Assessment of economic and ecological carrying capacity of agricultural crops in Nicaragua, Ecological Indicators, Volume 7, Issue 1, January 2007, Pages 133-149, ISSN 1470-160X, DOI: 10.1016/j.ecolind.2005.11.003.
(http://www.sciencedirect.com/science/article/B6W87-4HYN561-1/2/f6fda7d124de4b6a1cf6cb980f21df1d)
Abstract:
The relationships between, and usefulness of, three different analysis methods: (1) economic cost and return estimation (CAR), (2) ecological footprint (EF) and (3) emergy analysis (EA) in assessing economic viability, ecological carrying capacity and sustainability in tropical crop production was the focus for this study. The analyses were conducted on six agricultural crop production systems in Nicaragua: common bean (Phaseolus vulgaris L.), tomato (Lycopersicum esculentum L. Mill), cabbage (Brassica oleraceae L. var. capitata), maize (Zea mays L.), pineapple (Ananas comosus L. Merr.) and coffee (Coffea arabica L.). The economic indices studied were revenues and profitability. The ecological footprint indices were ecological footprint per hectare of crop (EFcrop), ecological footprint per 1000 USD revenues (EFrev) and ecological footprint per gigacalorie of food energy produced (EFGcal). The emergy analysis indices used were emergy-based profitability (EAprof) and emergy-based ecological footprint (EAEF). The study indicated that cabbage and tomato were the most profitable crops, both in economic and emergy terms, and that coffee was the least profitable crop to grow. On the other hand, beans, coffee and maize were most sustainable when sustainability was measured as ecological carrying capacity, assessed by

EF or emergy-based EF, while cabbage and tomato were the least sustainable. Moreover, maize turned out to be the crop with the lowest area demand per production of gigacalorie. Profitability assessed in economic terms or in relation to emergy use (EAprof) or to ecological footprint showed similar patterns and gave the same rankings between the crops. However, profitability assessed by CAR was higher than when assessed by EAprof, due to the fact that no environmental appropriation is included in the CAR. Area appropriation assessed with emergy or with ordinary ecological footprint also resulted in mainly the same rankings between the crops, while the actual size of the areas was at most 10 times larger when assessed in emergy than with plain ecological footprint. Our results add to the body of knowledge on the poor coherence between economic profitability and ecological sustainability. However, we argue that these evaluations may be used as methods for quantitatively assessing different production systems, leading to indices weighting together economic and environmental aspects that may be used to make decisions.
Keywords: Environmental indicators; Economic viability; Sustainability; Nicaragua

Anna Luiza S. Vasconcelos, Adriana S. Franca, Maria Beatriz A. Gloria, Juliana C.F. Mendonca, A comparative study of chemical attributes and levels of amines in defective green and roasted coffee beans, Food Chemistry, Volume 101, Issue 1, 2007, Pages 26-32, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.12.049.
(http://www.sciencedirect.com/science/article/B6T6R-4JDMVDB-2/2/f2e0324b5aee0a4aef21f416fbdab6a4)
Abstract:
Differences in chemical attributes (proximate composition, water activity, sucrose, acidity and pH levels) and amine levels between defective and healthy coffee beans were studied. Before roasting, significant differences ($p < 0.05$) were observed for the ash contents of the coffee samples, with the highest values found for black beans. Moisture content was higher for non-defective beans in comparison to defective beans. Non-defective coffee beans had higher lipids contents than both sour and black beans. There were no significant differences ($p > 0.05$) for protein levels between defective and non-defective beans. After roasting, protein levels remained constant, there was a small decrease in ash contents and a slight increase in oil contents of black and sour beans. Both black and sour beans had higher acidity levels than immature and non-defective beans. Acidity levels decreased after roasting. Water activity levels also decreased with roasting, with slightly higher levels for defective beans in comparison to non-defective ones. Sucrose levels were much higher in non-defective beans, and the lowest values were in black beans, prior to roasting. After roasting, only traces of sucrose were found. Total amine levels were much lower for black beans, in comparison to the other coffee samples. Putrescine was the prevailing amine in all samples. Histamine was only detected in the defective coffee samples. Small amounts of serotonin, cadaverine and tryptamine were found in some of the samples. After roasting to a light degree, only traces of serotonin were detected and no amines were detected after roasting to medium and dark degrees.
Keywords: Coffee; Defective beans; Chemical composition; Amines; Roasting

P. Parras, M. Martinez-Tome, A.M. Jimenez, M.A. Murcia, Antioxidant capacity of coffees of several origins brewed following three different procedures, Food Chemistry, Volume 102, Issue 3, 2007, Pages 582-592, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.05.037.
(http://www.sciencedirect.com/science/article/B6T6R-4KDBM99-6/2/2aba16f8e42f32a2e3b8b149d6f051b3)
Abstract:
The antioxidant capacity of coffees (Arabica and Robusta) from 12 different points of origin (Uganda, Papua, Jamaica, Ethiopia, Kenya, Puerto Rico, 'Caracolillo' Puerto Rico, Nicaragua, Colombia, Vietnam, Brazil and Guatemala) and two decaffeinated coffees from Colombia and Brazil prepared by three commonly used procedures (espresso, filter and Italian) were evaluated

and compared with antioxidant standards and other phenolic compounds which have been described in coffee. All the coffees studied were very effective as scavengers of lipoperoxyl and OH radicals. The results also showed that there are no significant differences ($p < 0.05$) between the three ways of brewing (espresso, filter and Italian). The H_2O_2 scavenging capacity was analysed in freshly made coffee and 6 h later, the antioxidant activity slightly increasing with time. The filtered coffee showed a greater capacity to react with H_2O_2 ($p < 0.05$) than the Italian and espresso coffees. All the coffee samples improved the oxidative stability of butter (Rancimat test), espresso and Italian coffee providing greater protection ($p < 0.05$) than the filtered beverages.
The coffee beverages from different origins did not show significant differences during 28 days of storage as regards the autoxidation of linoleic acid. However, filter brews produced stronger antioxidant activity ($p < 0.05$) during storage than espresso and Italian brewing techniques. The TEAC value provided a ranking in decreasing order of antioxidant capacity for samples at 6 min: Vietnam, Uganda, Nicaragua, Colombia, Brazil, 'caracolillo', Puerto Rico, Guatemala, Kenya, Papua, decaffeinated Colombia, Ethiopia, Jamaica, and decaffeinated Brazil. In general, decaffeinated coffees (Colombia and Brazil) showed lower TEAC values than coffees with caffeine. Filter and Italian coffee analysed after 6 min exhibited higher TEAC value than espresso coffees.
All the coffees studied are good antioxidants regardless of their cost, origin and way in which they are brewed (espresso, filter or Italian), which is a point worth considering.
Keywords: Free radical; Antioxidant; Coffee; Coffee brewing; Procedures; Origins

P. Saragoni, J.M. Aguilera, P. Bouchon, Changes in particles of coffee powder and extensions to caking, Food Chemistry, Volume 104, Issue 1, 2007, Pages 122-126, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.11.029.
(http://www.sciencedirect.com/science/article/B6T6R-4MY117R-2/2/d3441c957b80e9afabee853e2a42c96c)
Abstract:
Changes in the projected area (PA) of particles of an instant coffee powder were followed in real time by videomicroscopy and image analysis. Particles were placed inside a transparent acrylic chamber (7 x 7 x 3 cm) where the relative humidity RH (43%, 52%, 67% and 74%) and temperature T (20, 25 and 30 [degree sign]C) were controlled and measured in the head space. A 'caking index', [phi], was defined as the change in PA at any time t with respect to the initial PA. At any temperature, there was an increasing effect in [phi] as RH increased and the shape of [phi] versus time curves closely followed that of caking, measured by sieving techniques. The exponential kinetic model adequately fitted the data. The PA method could be used as a first approximation to predict the tendency to caking of amorphous particles.
Keywords: Caking; Glass transition; Coffee powder; Microscopy; Kinetics

Julio M.A. Araujo, Delcio Sandi, Extraction of coffee diterpenes and coffee oil using supercritical carbon dioxide, Food Chemistry, Volume 101, Issue 3, 2007, Pages 1087-1094, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.03.008.
(http://www.sciencedirect.com/science/article/B6T6R-4JT38RR-B/2/d236de7218753ec3a8f989eb72f46149)
Abstract:
Commercial green and roasted coffee beans were used to maximize oil extraction and conditions were studied to obtain the highest and lowest diterpene levels on green and roasted coffee oil, respectively. Thus, operational temperatures (60-90 [degree sign]C) and pressure (235-380 bar) were optimized for coffee oil extraction. Oil content levels and diterpene oil concentration were compared to the results obtained with the extraction with Soxhlet apparatus, using hexane as solvent. In general, an inverse correlation was observed between the amount of extracted oil and diterpene concentration levels. As a result, different oil contents with different diterpene

concentrations could be obtained. The HPLC analysis of cafestol and kahweol in the oil extracted from green coffee beans at 70 [degree sign]C/253 bar resulted in the highest concentration (453.3 mg 100 g-1), which was 48% lower than in the oil extracted with hexane while in the oil extracted from roasted coffee beans at 70 [degree sign]C/371 bar, resulted in 71.2% reduction of diterpenes.
Keywords: Supercritical carbon dioxide extraction; Green coffee oil; Roasted coffee oil; Cafestol; Kahweol; HPLC

Eder Muller Risso, Renato G. Peres, Jaime Amaya-Farfan, Determination of phenolic acids in coffee by micellar electrokinetic chromatography, Food Chemistry, Volume 105, Issue 4, 2007, Pages 1578-1582, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.03.028.
(http://www.sciencedirect.com/science/article/B6T6R-4N9DK35-5/2/6a66afbe657b68e5798bcfedba4629bf)
Abstract:
A seven-minute micellar electrokinetic chromatography analytical procedure capable of resolving the five principal phenolic acids in coffee, including the isomers of 5-caffeoylquinic acid (5-CQA), 4-CQA and 3-CQA, caffeic acid and ferulic acid is reported. The electrophoretic conditions consisted of an SDS (70 mM)-phosphate (17.6 mM)-methanol (5% v/v) buffer system, pH 2.5, 22.1 [degree sign]C, -17 kV and detection at 325 nm. The Joule effect and the possible interactions between the buffer components and temperature with respect to peak quality, resolution and selectivity were assessed in the concentration range of 25-900 [mu]g/mL. Performance evaluation of the system used a 33-7 factorial design at the 95% confidence level. The lowest correlation coefficient for linearity was 0.99888 for the 4-CQA. Limits of detection and quantification were 0.98 and 4 [mu]g/mL. The method was tested with both green and roasted coffee beans using four systems of extraction.
Keywords: HPCE; Capillary electrophoresis; MEKC; Phenolic acids; Chlorogenic acid; Ferulic acid; Caffeic acid

S. Ayabe, H. Aoshima, Aqueous extract of citrus peel reduces production of hydrogen peroxide in catechin-enriched green tea, Food Chemistry, Volume 104, Issue 4, 2007, Pages 1594-1598, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.03.009.
(http://www.sciencedirect.com/science/article/B6T6R-4N7XPF9-4/2/bd9101fe7be4ea40d77805c4fde63806)
Abstract:
Hydrogen peroxide (H2O2) is gradually produced in bottle-packed beverages, including tea and coffee, after the cap has been opened, i.e, through exposure to air, though only a small amount of H2O2 is detected in the beverage immediately after the bottle is opened. Since, H2O2 is toxic, it is necessary to develop safe and simple ways of reducing its production in bottled beverages. The addition of an aqueous extract of citrus peel reduced the concentration of H2O2 in green tea. To characterise the active constituents in the citrus peel, the aqueous extract of the peel was fractionated using chloroform, ethyl acetate, and butanol, in that order, and subjected to gel chromatography. The active constituents in the citrus peel were water-soluble compounds of various molecular weights.
Keywords: Antioxidant; Catechin; Hydrogen peroxide; Polyphenol; Tea; Citrus peel

H. Aoshima, S. Hirata, S. Ayabe, Antioxidative and anti-hydrogen peroxide activities of various herbal teas, Food Chemistry, Volume 103, Issue 2, 2007, Pages 617-622, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.08.032.
(http://www.sciencedirect.com/science/article/B6T6R-4M63RWS-2/2/b01457af0100682492829125782970de)
Abstract:

Herbal teas, i.e., extracts of herbs, are popular because of their fragrance and antioxidative activity. Since the antioxidative activity comes mainly from polyphenols, total polyphenol concentrations and 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging activities in herbal teas were measured and compared. Levels of H2O2 in the teas were also examined, since the production of H2O2 in beverages such as coffee and green tea, has been reported. Only a small amount of H2O2 was detected in the herbal teas just after their preparation with hot water. However, H2O2 was gradually produced during incubation at 25 [degree sign]C after extraction with hot water, especially when the teas were incubated in phosphate buffer at pH 7.4. To examine the anti-H2O2 activity of herbal teas, various teas were added to a catechin-enriched green tea, which produce much H2O2, and they were incubated at 25 [degree sign]C for one day. Addition of hibiscus and thorn apple tea decreased the production of H2O2 in the catechin-enriched green tea, possibly because of a lowering of the pH of the mixture.
Keywords: Antioxidant; Herbal tea; Hibiscus; Hydrogen peroxide; Polyphenol; Thorn apple

H. Aoshima, S. Ayabe, Prevention of the deterioration of polyphenol-rich beverages, Food Chemistry, Volume 100, Issue 1, 2007, Pages 350-355, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.09.052.
(http://www.sciencedirect.com/science/article/B6T6R-4HNSGFD-4/2/81b9b883a89286aeccdb8d058c31bb02)
Abstract:
Only a small amount of H2O2 was detected in beverages, such as tea or coffee, immediately after opening caps of bottles, but H2O2 was gradually produced in the beverages after opening the caps, i.e. exposure to air. The beverages with high concentrations of polyphenols showed high 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical-scavenging activities, but produced relatively high concentrations of H2O2 when they were exposed to air, possibly due to oxygen. The production of H2O2 increased both with duration of the exposure to air and rise in temperature. Since H2O2 is toxic, ways to prevent the deterioration of catechin-enriched green tea, i.e. H2O2 production, were studied. The addition of catalase, which is an enzyme decomposing H2O2, reduced the H2O2 concentration, but it was inactivated at a high temperature. The addition of l-cysteine or glutathione (reduced form), with a thiol residue, reduced the H2O2 concentration. Addition of citric acid, malic acid, succinic acid, fumaric acid, l-ascorbic acid, l-glutamic acid and l-aspartic acid also reduced it, possibly because they lower the pH of the tea.
Keywords: Antioxidant; Catechin; Hydrogen peroxide; Polyphenol; Tea

E. Ceci, G. Bozzo, E. Bonerba, A. Di Pinto, M.G. Tantillo, Ochratoxin A detection by HPLC in target tissues of swine and cytological and histological analysis, Food Chemistry, Volume 105, Issue 1, 2007, Pages 364-368, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2006.12.019.
(http://www.sciencedirect.com/science/article/B6T6R-4MNR0NC-2/2/5d2f6e529b3bca8889cda7340a6dd839)
Abstract:
Ochratoxins are fungal secondary metabolites that may contaminate a broad variety of foodstuff, such as grains, vegetables, coffee, dried fruits, beer, wine and meats. Ochratoxin A (OTA) is a potent nephrotoxin, carcinogen, teratogen and immunotoxin. Samples of kidney, urinary bladder, intestine, stomach, liver, lymph nodes and muscles were obtained from 5 swine fed with OTA-contaminated feed. In the 5 swine, microscopical lesions were evidenced exclusively in the kidneys and in the urinary bladder, that displayed the highest concentrations of OTA by HPLC-FLD analysis, 23.9-27.5 [mu]g/kg and 9.8-11.5 [mu]g/kg, respectively.
Keywords: Ochratoxin A; Kidney; Urinary bladder; HPLC

C. Petit, J.M. Sieffermann, Testing consumer preferences for iced-coffee: Does the drinking environment have any influence?, Food Quality and Preference, Volume 18, Issue 1, January 2007, Pages 161-172, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2006.05.008.
(http://www.sciencedirect.com/science/article/B6T6T-4KPP469-1/2/4a47d2c239161939de74e86b086abf29)
Abstract:
A consumer study was conducted on iced-coffee in order to investigate the effect of the physical testing environment on liking and consumption of this refreshing drink by French consumers.
A water-based product and a milk-based product were tested, and four testing procedures were compared:
- a classic laboratory test in a controlled environment;
- two situational consumer tests performed outside the laboratory in natural drinking situations;
- a situational laboratory consumer test in an environment which was modified to evoke such a natural consumption situation.
Results show that liking and consumption are both dependent on the testing situation, involving specific location and surroundings, and a specific consumers' population. The two laboratory tests gave very similar results, which differ from those obtained outside the laboratory. This work raises methodological questions and clearly emphasizes the need for future studies comparing laboratory consumer tests and tests in natural consumption situations.
Keywords: Iced-coffee; Consumer test; Natural consumption situation; Environment; Evocation

Paulo C. Sentelhas, Terry J. Gillespie, Mark L. Gleason, Jose Eduardo B.M. Monteiro, Jose Ricardo M. Pezzopane, Mario J. Pedro Jr., Evaluation of a Penman-Monteith approach to provide 'reference' and crop canopy leaf wetness duration estimates, Agricultural and Forest Meteorology, Volume 141, Issues 2-4, 20 December 2006, Pages 105-117, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2006.09.010.
(http://www.sciencedirect.com/science/article/B6V8W-4M7CD7H-1/2/293e0089edcb5c382a913d3e724bc045)
Abstract:
Leaf wetness duration (LWD) is a key parameter for plant disease-warning systems since the risk of outbreaks of many plant diseases is directly proportional to this environmental variable. However, LWD is not widely measured so several methods have been developed to estimate it from weather data. Methods based on the physical principles of dew deposition and dew or rain evaporation have shown good portability and sufficiently accurate results for operational use. A Penman-Monteith approach to modeling LWD on a 'reference' wetness sensor located at a weather station was investigated as well as the use of an empirical wetness coefficient (W) to convert 'reference' LWD into crop LWD. This study was undertaken because recent observations revealed that an LWD sensor located about 30 cm above a turfgrass surface provided useful estimates of LWD in various nearby crops, suggesting that modeling such a sensor and location may be a simpler 'reference' alternative to modeling LWD in a crop canopy. LWD was measured over mowed turfgrass at different heights (30, 110, and 190 cm above the ground) and at the top of the canopy of eight crops - apple, coffee, cotton, maize, muskmelon, grape, soybean, and tomato - using painted flat-plate sensors. At the same times and places, automatic weather stations measured air temperature, relative humidity, wind speed, and net radiation over turfgrass. A Penman-Monteith approach estimated sensor LWD over turfgrass with very good accuracy and precision, using an additional aerodynamic resistance based on wind speed to estimate LWD at 110 and 30 cm. The model overestimated LWD by 3.3% at 190 cm (R2 = 0.92), 1.5% at 110 cm (R2 = 0.87), and 5.7% at 30 cm (R2 = 0.89). When modeled LWD for a 30-cm height over turfgrass was correlated with LWD measured at the top of crop canopies, strong agreement was observed, with an average overestimation of 6.3% and a coefficient of determination of 0.92 for five crops combined. The use of both general and specific W coefficients reduced the average

overestimation and the mean absolute error in LWD to less than 1 h/day. When independent data from four crops were use to evaluate crop LWD estimates by this two-step Penman-Monteith approach, mean absolute error was <1.6 h when both general and specific W coefficients were used. We concluded that a Penman-Monteith model for a fixed sensor size, albedo and exposure over turfgrass may be a very useful 'reference' index to estimate crop LWD for use in plant disease management schemes.
Keywords: Dew; Rain; Physical model; Plant disease; Warning system; Integrated pest management

Maureen L. Storey, Richard A. Forshee, Patricia A. Anderson, Beverage Consumption in the US Population, Journal of the American Dietetic Association, Volume 106, Issue 12, December 2006, Pages 1992-2000, ISSN 0002-8223, DOI: 10.1016/j.jada.2006.09.009.
(http://www.sciencedirect.com/science/article/B758G-4MDGN86-G/2/9362c7ec2cc9abd52aea99e882ba0c52)
Abstract: Objective
The purpose of this study was to examine beverage consumption across age, sex, and race/ethnicity categories using the most current data available, the National Health and Nutrition Examination Survey 1999-2002.Design
Beverage consumption that included fluid milk, fruit juices, regular and diet carbonated soft drinks, regular and diet fruit drinks/ades, coffee, and tea was examined among white, African-American, and Mexican-American persons in age groups 6 to 11 years, 12 to 19 years, 20 to 39 years, 40 to 59 years, and >60 years. Data from the National Health and Nutrition Examination Survey 1999-2002 were used in this study.Statistical Analysis
Group means were estimated for the age group, sex, and race/ethnicity subgroups. The probability that any of these group means were equal to one another was tested using statistical software.Results
The data showed marked differences in beverage consumption depending on age, sex, and race/ethnicity. In general, males consumed more beverages than did females. Specifically, white and Mexican-American persons of all ages consumed more milk than did African-American persons. On average, African-American males and females of all ages consumed significantly more fruit drinks/ades than did other race/ethnicity groups. In contrast, white persons consumed more carbonated soft drinks than did other race/ethnicity groups.Conclusion
Average beverage consumption varied depending on age, sex, and race/ethnicity. Knowledge of differences in beverage consumption patterns is important for food and nutrition professionals and nutrition policymakers. Better understanding of the many factors that influence beverage consumption levels is needed.

Ivette Perfecto, John Vandermeer, The effect of an ant-hemipteran mutualism on the coffee berry borer (Hypothenemus hampei) in southern Mexico, Agriculture, Ecosystems & Environment, Volume 117, Issues 2-3, November 2006, Pages 218-221, ISSN 0167-8809, DOI: 10.1016/j.agee.2006.04.007.
(http://www.sciencedirect.com/science/article/B6T3Y-4K427K9-1/2/9239d3db49e63f73b6a51bcb03ace81f)
Abstract:
The indirect effect of an ant-hemipteran mutualism was investigated in the coffee agroecosystem of Southern Mexico. The ant, Azteca instabilis, forms a mutualistic relationship with the coccid, Coccus viridis, on coffee plants. Through field surveys and experimental studies, the indirect effect of this mutualism on the main coffee pest in the region, Hypothenemus hampei, the coffee berry borer (CBB), was investigated. Results indicate a significant negative relationship between the number of coccids on a plant and the proportion of berries with damage by the CBB. Results also indicate that the effect of the ants is significant on per plant basis but not on per branch basis.

Finally, a significant negative linear relationship was found between ant activity and the time it took ants to remove artificially placed borers on coffee berries. This study indicates that the mutualistic relationship between Azteca ants and the coccids has a positive indirect effect on the plant by reducing the numbers of the main insect pest of coffee.
Keywords: Integrated pest management; Coffee; Natural enemies; Pest control; Shade trees; Mutualism; Ants

Eve Jochnowitz, 'Fulfillment of a collective dream': Culinary pilgrimage to Russian-Jewish New York, Appetite, Volume 47, Issue 3, November 2006, Page 391, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.08.026.
(http://www.sciencedirect.com/science/article/B6WB2-4M62JN4-V/2/60954100bc673f0169ea5a8375ddbf09)
Abstract:
Since the early 1990s a new wave of Jewish immigration from the former Soviet Union has dramatically reshaped the gastronomic landscapes of many New York neighborhoods, most notably Brighton Beach, Rego Park, Washington Heights, Flatbush and Ocean Parkway. A new culinary infrastructure has emerged to support the culinary preferences and practices of these communities in homes, restaurants, bars, coffee shops, nightclubs and catering halls. Alongside this new culinary infrastructure, a new culinary practice, that of culinary pilgrimage to the food worlds of Russian Jewish New York has emerged among New Yorkers and visitors to New York, many but by no means all of whom are Jewish. Culinary pilgrims visit restaurants and nightclubs, come shopping for items unavailable elsewhere, and take part in one or more of the rapidly multiplying culinary walking tours that offer what historian (and tour guide) Seth Kamil calls 'micro-histories' of New York's Russian-Jewish neighborhoods. These visitors are seeking more than just a good meal. Folklorist Lucy Long has found that culinary pilgrims seek a deeper and more personal understanding of foodways that are in some way more authentic than those of their everyday lives. Within the Jewish context, the cuisines of the former Soviet Union evoke both a places and times of heightened significance. This is the case when a young Russian journalist suggests that certain restaurants can provide 'the fulfillment of a collective dream'.

Lars Hein, Franz Gatzweiler, The economic value of coffee (Coffea arabica) genetic resources, Ecological Economics, Volume 60, Issue 1, 1 November 2006, Pages 176-185, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2005.11.022.
(http://www.sciencedirect.com/science/article/B6VDY-4J2W0JJ-1/2/0da1ec62271517591c598355cfb6bc20)
Abstract:
Whereas the economic value of genetic diversity is widely recognized there are, to date, relatively few experiences with the actual valuation of genetic resources. This paper presents an analysis of the economic value of Coffea arabica genetic resources contained in Ethiopian highland forests. The valuation is based on an assessment of the potential benefits and costs of the use of C. arabica genetic information in breeding programs for enhanced coffee cultivars. The study considers the breeding for three types of enhanced cultivars: increased pest and disease resistance, low caffeine contents and increased yields. Costs and benefits are compared for a 30 years discounting period, and result in a net present value of coffee genetic resources of 1458 and 420 million US$, at discount rates of 5% and 10%, respectively. The value estimate is prone to considerable uncertainty, with major sources of uncertainty being the length of breeding programs required to transfer valuable genetic information into new coffee cultivars, and the potential adoption rate of such enhanced cultivars. Nevertheless, the study demonstrates the high economic value of genetic resources, and it underlines the need for urgent action to halt the currently ongoing, rapid deforestation of Ethiopian highland forests.
Keywords: Genetic resources; Coffee; Coffea arabica; Damage costs; Economic value; Ethiopia

Carlos Garcia Estrada, Anne Damon, Cornelio Sanchez Hernandez, Lorena Soto Pinto, Guillermo Ibarra Nunez, Bat diversity in montane rainforest and shaded coffee under different management regimes in southeastern Chiapas, Mexico, Biological Conservation, Volume 132, Issue 3, October 2006, Pages 351-361, ISSN 0006-3207, DOI: 10.1016/j.biocon.2006.04.027.
(http://www.sciencedirect.com/science/article/B6V5X-4K606PH-1/2/7ec0dae64fa923e54b82a18add7af691)
Abstract:
Differences in alpha and beta bat diversity among montane rainforest and five shaded coffee plantations under different management regimes, as well as some environmental factors and vegetation parameters influencing bat richness, were evaluated for the first time in southeastern Chiapas, Mexico. In each site, bats were captured every 2 months from March 2004 to July 2005, with six mist-nets, during two nights, using the capture-recapture method. We captured 2970 individuals of 43 bat species. Montane rainforest had the greatest alpha diversity (H' = 2.681; n = 37), whereas alpha diversity was similar among coffee plantations (H' = 2.229-2.364; n = 23-26). The number of frugivorous and nectarivorous species was similar among the sites; the greatest exchange in species composition (beta diversity) occurred for insectivorous bats, which reduce their number in coffee plantations as pesticides are incorporated. Bat richness species was significantly related to the number of vegetation strata, height, and cover of trees. We suggest that coffee plantations could act as corridors, facilitating connection among different elements of the landscape in the Sierra Madre de Chiapas for some frugivorous and nectarivorous bats.
Keywords: Bats; Alpha and beta diversity; Montane rainforest; Coffee plantations

A. Esteban, M.L. Abarca, M.R. Bragulat, F.J. Cabanes, Study of the effect of water activity and temperature on ochratoxin A production by Aspergillus carbonarius, Food Microbiology, Volume 23, Issue 7, October 2006, Pages 634-640, ISSN 0740-0020, DOI: 10.1016/j.fm.2005.12.006.
(http://www.sciencedirect.com/science/article/B6WFP-4J9X2WD-1/2/9e769b34e6885ff047c15862ebab6a64)
Abstract:
The effect of water activity (aw) (0.78-0.99) and temperature (15 and 30 [degree sign]C) on growth and production of ochratoxin A (OTA) of six Aspergillus carbonarius strains was studied in two culture media: Czapek yeast autolysate (CYA) agar and yeast extract sucrose (YES) agar, during a period of 30 days. The strains were selected to include different sources and different reported abilities to produce OTA and were characterized by RAPD and ITS-5.8S rDNA sequencing. CYA showed to be better culture medium than YES for OTA production in the isolates tested. OTA concentration was higher at 15 [degree sign]C than at 30 [degree sign]C. At 30 [degree sign]C, ranges for OTA production were more restrictive than those for growth. OTA was produced from 0.86, 0.90 or 0.94 aw depending on the strain. At 15 [degree sign]C, growth and OTA production were detected only in the 0.94-0.99 aw range. The molecular study performed showed that five of the strains were conspecific and no correlation was found between molecular data and the OTA production level or origin. The remaining strain had never been able to produce OTA and will probably represent a new species in the Aspergillus section Nigri. Our results show that A. carbonarius is able to grow and produce OTA in a wide range of water activities at both high and low temperatures.
Keywords: Aspergillus carbonarius; Coffee; Grapes; Ochratoxin A; Temperature; Water activity; Wine

Franz W. Gatzweiler, Organizing a public ecosystem service economy for sustaining biodiversity, Ecological Economics, Volume 59, Issue 3, 20 September 2006, Pages 296-304, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2005.10.017.

(http://www.sciencedirect.com/science/article/B6VDY-4J0WRGG-1/2/101a02413bb8e825916e5d7a5fbe0e7c)
Abstract:
The core question this paper attempts to address is how social organization needs to respond to biodiversity features and functions in order to achieve its sustainable use. Scholars have suggested that the governance of complex systems should be dispersed across multiple centers of authority and that any regulative system needs as much variety in the actions that it can take as exists in the system it is regulating. Further, it has been argued that complex ecosystems and biodiversity can successfully be maintained by complex, polycentric, multi-layered governance systems which have a variety of response mechanisms. But how should polycentric governance of biodiversity be organized? Borrowing from the organization of public economies in metropolitan areas we distinguish between production and provision of public ecosystem services and suggest the direction of institutional change for the organization of a public ecosystem service economy. If the market alone cannot solve the allocation of public ecosystem services, economic efficiency criteria based on hypothetical markets are not sufficient. Therefore, we suggest design principles which go beyond economic efficiency and provide examples of the emergence of polycentric governance from an Ethiopian coffee forest conservation project.
Keywords: Biodiversity features and functions; Polycentric governance; Institutions; Economic efficiency; Complexity

Seok Jun Moon, Michael Kottgen, Yuchen Jiao, Hong Xu, Craig Montell, A Taste Receptor Required for the Caffeine Response In Vivo, Current Biology, Volume 16, Issue 18, 19 September 2006, Pages 1812-1817, ISSN 0960-9822, DOI: 10.1016/j.cub.2006.07.024.
(http://www.sciencedirect.com/science/article/B6VRT-4KXDWXW-W/2/e9b4b2a7164045ebd8a91c6e62661ee2)
Abstract: Summary
Caffeine is a methylxanthine present in the coffee tree, tea plant, and other naturally occurring sources and is among the most commonly consumed drugs worldwide. Whereas the pharmacological action of caffeine has been studied extensively, relatively little is known concerning the molecular mechanism through which this substance is detected as a bitter compound. Unlike most tastants, which are detected through cell-surface G protein-coupled receptors, it has been proposed that caffeine and related methylxanthines activate taste-receptor cells through inhibition of a cyclic nucleotide phosphodiesterase (PDE) [1]. Here, we show that the gustatory receptor Gr66a is expressed in the dendrites of Drosophila gustatory receptor neurons and is essential for the caffeine response. In a behavioral assay, the aversion to caffeine was specifically disrupted in flies missing Gr66a. Caffeine-induced action potentials were also eliminated, as was the response to theophylline, the methylxanthine in tea. The Gr66a mutant exhibited normal tastant-induced action potentials upon presentation of theobromine, a methylxanthine in cocoa. Given that theobromine and caffeine inhibit PDEs with equal potencies [2] and [3], these data further support the role of Gr66a rather than a PDE in mediating the caffeine response. Gr66a is the first gustatory receptor shown to be essential for caffeine-induced behavior and activity of gustatory receptor cells in vivo.
Keywords: SYSNEURO

P.J. Rogers, S.V. Heatherley, E.L. Mullings, M.A. Tidbury, Coffee, tea, cigarettes and body weight, Appetite, Volume 47, Issue 2, September 2006, Page 275, ISSN 0195-6663, DOI: 10.1016/j.appet.2006.07.058.
(http://www.sciencedirect.com/science/article/B6WB2-4KPX8F2-2D/2/1a3d64ccd994932cafc38e50b87bb1aa)

Stephen A. Rehner, Francisco Posada, Ellen P. Buckley, Francisco Infante, Alfredo Castillo, Fernando E. Vega, Phylogenetic origins of African and Neotropical Beauveria bassiana s.l. pathogens of the coffee berry borer, Hypothenemus hampei, Journal of Invertebrate Pathology, Volume 93, Issue 1, September 2006, Pages 11-21, ISSN 0022-2011, DOI: 10.1016/j.jip.2006.04.005.
(http://www.sciencedirect.com/science/article/B6WJV-4K8SC82-1/2/635428accdaa45913d42bbf521acb9b8)
Abstract:
A phylogenetic epidemiological study of Beauveria bassiana s.l. was conducted for African and Neotropical pathogens of the coffee berry borer (CBB), Hypothenemus hampei, based on inferences from two nuclear intergenic regions, EFutr and Bloc. CBB pathogens were distributed among four terminal clades, however, the majority of African and Neotropical isolates cluster in a well-supported monophyletic group, informally designated AFNEO_1. Although the relationship between African and Neotropical AFNEO_1 is unresolved, the majority of alleles detected were exclusive to either the African or the Neotropical populations. These fixed genetic differences suggest that their disjunction predates the world trade in coffee. Neotropical AFNEO_1 have a broad host range and CBB pathogens are intermixed phylogenetically with isolates from diverse indigenous insects. Several Neotropical AFNEO_1 isolates were isolated from coffee plants as epiphytes or endophytes, thus plants themselves may potentially serve as reservoirs of pathogens against their insect pests. Topological incongruence between the EFutr and Bloc phylogenies of Neotropical AFNEO_1 may signify that individuals within this population are recombining.
Keywords: Beauveria bassiana; Hypothenemus hampei; Coffee berry borer; Coffee; Biogeography; Phylogeny; EF1-[alpha]; Nuclear intergenic regions; EFutr; Bloc

Railene de Azevedo Pereira, Joao Aguiar Nogueira Batista, Maria Cristina Mattar da Silva, Osmundo Brilhante de Oliveira Neto, Edson Luiz Zangrando Figueira, Arnubio Valencia Jimenez, Maria Fatima Grossi-de-Sa, An [alpha]-amylase inhibitor gene from Phaseolus coccineus encodes a protein with potential for control of coffee berry borer (Hypothenemus hampei), Phytochemistry, Volume 67, Issue 18, September 2006, Pages 2009-2016, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2006.06.029.
(http://www.sciencedirect.com/science/article/B6TH7-4KKWVX2-1/2/4887e70690a40a341dcef807bbd1b395)
Abstract:
Plant [alpha]-amylase inhibitors are proteins found in several plants, and play a key role in natural defenses. In this study, a gene encoding an [alpha]-amylase inhibitor, named [alpha]AI-Pc1, was isolated from cotyledons of Phaseolus coccineus. This inhibitor has an enhanced primary structure to P. vulgaris [alpha]-amylase inhibitors ([alpha]-AI1 and [alpha]-AI2). The [alpha]AI-Pc1 gene, constructed with the PHA-L phytohemaglutinin promoter, was introduced into tobacco plants, with its expression in regenerated (T0) and progeny (T1) transformant plants monitored by PCR amplification, enzyme-linked immunosorbent assay (ELISA) and immunoblot analysis, respectively. Seed protein extracts from selected transformants reacted positively with a polyclonal antibody raised against [alpha]AI-1, while no reaction was observed with untransformed tobacco plants. Immunological assays showed that the [alpha]AI-Pc1 gene product represented up to 0.05% of total soluble proteins in T0 plants seeds. Furthermore, recombinant [alpha]AI-Pc1 expressed in tobacco plants was able to inhibit 65% of digestive H. hampei [alpha]-amylases. The data herein suggest that the protein encoded by the [alpha]AI-Pc1 gene has potential to be introduced into coffee plants in order to increase their resistance to the coffee berry borer.
Keywords: Coffee berry borer; Phaseolus coccineus; Digestive enzymes; Insect

Marie-Christine Larre-Larrouy, Laurent Thuries, Does the methoxyl group content of the humic acid-like fraction of composts provide a criterion to evaluate their maturity?, Soil Biology and

Biochemistry, Volume 38, Issue 9, September 2006, Pages 2976-2979, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2006.04.025.
(http://www.sciencedirect.com/science/article/B6TC7-4K00C50-2/2/a4bde03687e189de0f8891ef6193958a)
Abstract:
To be considered beneficial, nutrient-rich, and be applied safely to soil, a batch of compost should be assessed for its maturity. We tested a new method to follow the time course of maturation on a compost consisting of sheep manure, grape and coffee by-products. This method was based upon the content of the humic acid-like compost fraction in methoxyl (-OCH3) groups, functional groups characteristic of lignin structural units. It involved the conversion of OCH3 groups to the corresponding alkyl iodide (ICH3) groups by treatment with boiling hydriodic acid, before gas chromatography determination. Among the various characteristics studied (ash, organic C, N, lignin), the OCH3 content appeared to be a good tracer of compost maturity.
Keywords: Compost maturity; Lignin; Methoxyl groups; Humic acid-like fraction

J. Avelino, H. Zelaya, A. Merlo, A. Pineda, M. Ordonez, S. Savary, The intensity of a coffee rust epidemic is dependent on production situations, Ecological Modelling, Volume 197, Issues 3-4, 25 August 2006, Pages 431-447, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2006.03.013.
(http://www.sciencedirect.com/science/article/B6VBS-4JW7X1Y-1/2/8d4ab5fc99905616b4c682adc6f257f2)
Abstract:
To gain a clearer understanding of conditions conducive to the development of coffee rust and improve disease control, we monitored the development of rust epidemics in 73 plots in Honduras, over 1-3 years depending on the case, focusing on coffee tree characteristics, crop management patterns, and the environment. A simple correspondence analysis was used to show that a link could be found between certain production situations and the intensity of coffee rust epidemics. Local characteristics specific to each plantation were particularly well linked to the intensity of coffee rust epidemics, whereas regional factors such as rainfall appeared to be of secondary importance. The yield and the number of leaves of the coffee trees were positively linked to epidemic development. Soil pH and fertilisation were negatively associated with epidemic development. Shade, when it did not limit yield, probably affected the microclimate in such a way that coffee rust incidence increased. Altitude was a serious constraint in disease development. These links were illustrated by a segmentation tree, which helped to define risk domains and rationalise coffee rust control. It also provided an understanding of how intensifying Arabica cultivation, through its effects on yield and soil acidification, increased the risk of a serious coffee rust epidemic occurring.
Keywords: Coffea arabica; Hemileia vastatrix; Climate; Soil; Crop management; Yield; Foliage; Disease control; Correspondence analysis; Cluster analysis; Segmentation tree; Honduras

Feyera Senbeta, Manfred Denich, Effects of wild coffee management on species diversity in the Afromontane rainforests of Ethiopia, Forest Ecology and Management, Volume 232, Issues 1-3, 15 August 2006, Pages 68-74, ISSN 0378-1127, DOI: 10.1016/j.foreco.2006.05.064.
(http://www.sciencedirect.com/science/article/B6T6X-4KCGHW7-1/2/28fcc71f2b6a25552c0fef94670c22a1)
Abstract:
Coffea arabica L. is native to the Afromontane forests of Ethiopia. The local communities living in and around the forests manage the forest in traditional ways for coffee production. The level of management practices ranges from the relatively undisturbed forest coffee (FC), where little or no human inference is observed to the disturbed semi-forest coffee (SFC) system. This study analyzes the effects of wild coffee management on the floristic diversity and vegetation structure in these systems, in the Berhane-Kontir and Harenna forest sites. A total 114 quadrats, of 20 m x 20

m were laid along transects in both forest sites. Species richness was highest in the FC and lowest in the SFC system although the scale varies between the two forests. Shannon diversity and evenness indices exhibit high variation between the two forest systems and the lowest in the SFC system. The type of growth-form dominance also varies between the two forest systems, with up to 50% reduction in the number of species of lianas, small trees and shrubs were observed in the SFC system. In the SFC system in both forests, coffee plants occupy greater than 88% of plant density in the diameter class between 2 and 10 cm compared to less than 23% in the FC system. The ordination analysis also demonstrates the importance of human management influence and shows clear distinction between the FC and SFC plots of both forests. The continuous wild coffee management in the SFC system suppresses tree regeneration, reduces tree density and eventually leads to the disappearance of forest species, while promoting coffee plants. Therefore, conservation strategies of the Afromontane forest with wild coffee populations should focus on the balance between plant diversity and coffee production.
Keywords: Biodiversity; Conservation; Deforestation; Forest coffee; Floristic composition; Management practices

Ulrich Krings, Lena Johansson, Holger Zorn, Ralf G. Berger, In vitro DNA-protective activity of roasted wheat germ and fractions thereof, Food Chemistry, Volume 97, Issue 4, August 2006, Pages 712-718, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.05.050.
(http://www.sciencedirect.com/science/article/B6T6R-4GV9SPC-2/2/eb36762833847704b7ea5d454d973ca4)
Abstract:
An ethanolic extract of roasted wheat germ was shown to scavenge free radicals, using the DPPH-test, and to protect DNA efficiently in vitro, using the 3D-assay. The DNA-protective activity of a coffee extract was comparatively lower and strongly dependent on the concentration applied. Fractionation of the wheat germ extract by preparative HPLC demonstrated that most of the DNA protecting properties were generated during the roasting process. Coupled GC-MS and HPLC-MS allowed identification of the main constituents of the active fractions. The contribution of genuine phenolic compounds was minor. Activity profiles of the radical-scavenging and of the 3D-assay test were not congruent. The attempt to extrapolate from in vitro measurements to the human in vivo situation is discussed.
Keywords: Roasted wheat germ; Coffee; 3D-assay; DNA repair; Radical scavenging

A. Montilla, A.I. Ruiz-Matute, M.L. Sanz, I. Martinez-Castro, M.D. del Castillo, Difructose anhydrides as quality markers of honey and coffee, Food Research International, Volume 39, Issue 7, August 2006, Pages 801-806, ISSN 0963-9969, DOI: 10.1016/j.foodres.2006.03.002.
(http://www.sciencedirect.com/science/article/B6T6V-4JH6C6N-1/2/c1d2f71c8f49245453bbfef012398203)
Abstract:
Difructose anhydrides (DFAs) are pseudodisaccharides produced by condensation of two fructose molecules by means of caramelization reaction which takes place during heating of sugars or sugar-rich foodstuffs. The aim of this research was to evaluate the feasibility of DFAs as chemical markers of honey authenticity and sugar-roasted torrefacto coffee. DFAs were analysed by gas chromatography coupled to mass spectrometry after conversion to their trimethylsilyl (TMS) derivatives. [alpha]-d-fructofuranoside-1,2':2,1'-[alpha]-d-fructofuranoside (DFA7) and [alpha]-d-fructofuranoside-1,2':2,1'-[beta]-d-fructopyranoside (DFA9) can be used as quality markers of honey and coffee. DFA7 and DFA9 were detected in honey added with 5% fructose and sucrose caramels and 15% of glucose caramels. Torrefacto coffees showed DFAs values ranged from 0.195 to 0.570 g/100 g whereas only traces were found in natural roasted coffees. Quantities from 0.073 to 0.189 g/100 g were measured in blends of natural and torrefacto roasted coffees. A relationship between DFAs content in torrefacto coffees and roasting conditions was observed. In

conclusion, this study indicated that DFAs are useful chemical indicators to control honey authenticity and torrefacto coffee roasting.
Keywords: Difructose anhydrides; Caramelization; Honey; Coffee; Authenticity; Torrefacto

Wafa Masoud, Lene Jespersen, Pectin degrading enzymes in yeasts involved in fermentation of Coffea arabica in East Africa, International Journal of Food Microbiology, Volume 110, Issue 3, 1 August 2006, Pages 291-296, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2006.04.030.
(http://www.sciencedirect.com/science/article/B6T7K-4K717MF-2/2/1c83cee29be0fde58549f041d9a0c70a)
Abstract:
The ability of six strains of Pichia anomala, four strains of Pichia kluyveri and two strains of Hanseniaspora uvarum predominant during coffee processing to produce polygalacturonase (PG), pectin esterase (PE) and pectin lyase (PL) in yeast polygalacturonic acid medium (YPA) and in coffee broth (CB) was studied. For comparison, a reference strain of Kluyveromyces marxianus CCT 3172 isolated from cocoa and reported to produce high amount of PG was included.
Initial screening of PG activity using YPA medium showed that K. marxianus CCT 3172, P. anomala S16 and P. kluyveri S13Y4 had the strongest activity. Enzymatic assays showed that the four yeast species secreted PG, but none of the yeasts investigated was found to produce PE or PL. P. anomala S16 and P. kluyveri S13Y4 were found to produce higher amounts of PG when grown in CB than in YPA. When K. marxianus CCT 3172, P. anomala S16 and P. kluyveri S13Y4 were grown in YPA broth adjusted to pH of 3.0-8.0 and incubated at temperatures of 15-40 [degree sign]C, the three yeast species secreted the highest amount of PG at pH 6.0 and at 30 [degree sign]C. For PG secreted by K. marxianus CCT 3172 and P. anomala S16, the optimum pH and temperature for the enzymatic activity were 5.5 and 40 [degree sign]C, respectively. On the other hand, PG produced by P. kluyveri S13Y4 showed the highest activity at pH 5.0 and 50 [degree sign]C.
Significant differences in the extracellular activity of PG were found between the yeasts species as well as between strains within same species. High amounts of PG were produced by two strains of P. anomala and P. kluyveri. It is therefore likely that strains of those two species may be involved in the degradation of pectin during coffee fermentation.
Keywords: Coffee; Pichia anomala; Pichia kluyveri; Hanseniaspora uvarum; Polygalacturonase

Jaspreet K.C. Ahuja, Joseph D. Goldman, Betty P. Perloff, The effect of improved food composition data on intake estimates in the United States of America, Journal of Food Composition and Analysis, Volume 19, Supplement 1, 28th US National Nutrient Databank Conference, August 2006, Pages S7-S13, ISSN 0889-1575, DOI: 10.1016/j.jfca.2005.12.007.
(http://www.sciencedirect.com/science/article/B6WJH-4JRVDVS-3/2/6e23f2a9add64c28a8e46ffbc8495bd6)
Abstract:
The effect of improved food composition data on nutrient intake estimates was determined by re-analyzing dietary intake data from the Continuing Survey of Food Intake by Individuals (CSFII) 1994-1996, 1998 with the multi-year version of the Food and Nutrient Database for Dietary Studies (FNDDS) 1.0, wherein only the data improvements such as those due to new analytical data replaced the older values. Mean differences between the old and revised estimates were determined. Improved data resulted in minor but statistically significant (P=0.001) differences in mean intake estimates for most nutrients. Nutrients or food components with greatest differences included vitamin C, riboflavin, magnesium, and caffeine. As a result of these changes, 4-7% more adults have inadequate intakes of vitamin C and magnesium. Caffeine intakes were lower by about 25%. Changes in the food composition values for fluid milk, tomatoes, coffee, and mixed dishes appear to have had the most impact. These artifactual changes require adjustments to the earlier intake estimates to improve comparability with more current intakes.

Keywords: Food composition data; Nutrient intakes; Data improvements; Trends Analysis system; Food and Nutrient Database for Dietary Studies (FNDDS); Multi-year FNDDS; Continuing Survey of Food Intake by Individuals (CSFII)

R.N. Gallaher, K. Gallaher, A.J. Marshall, A.C. Marshall, Mineral analysis of ten types of commercially available tea, Journal of Food Composition and Analysis, Volume 19, Supplement 1, 28th US National Nutrient Databank Conference, August 2006, Pages S53-S57, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.02.006.
(http://www.sciencedirect.com/science/article/B6WJH-4JRVDVS-C/2/e1a83e76638733436ed6359ab30f9004)
Abstract:
Many herbal infusions (teas) are being studied for their impact on health, yet little research has examined their mineral content. The purpose of this study was to determine the mineral content of 10 commercially available dry teas and the infusions produced from them. Herbal infusions studied included commercial blends of peppermint, Echinacea, red clover, Siberian ginseng, dandelion, red raspberry leaf, blueberry leaf and green tea. None of the infusions was a good source of Ca, Mg, P, K, Na, Cu, Fe, Mn, or Zn in a single serving. Extraction rates (excluding Siberian ginseng) were for K (71%), P (43%), Mg (38%), Na (34%), Ca (18%), Cu (33%), Fe (6%), Mn (24%) and Zn (35%). K levels were high enough that 3.5 cups of dandelion infusion and 4.5 cups of Echinacea infusion provide a good source (10% Daily Value). By comparison, standard reference levels for both brewed black tea and coffee indicate these beverages contain several times as much K as dandelion and Echinacea infusions. These data suggest that these infusions will not interfere with low Na diets.
Keywords: Herbs; Tea; Calcium; Magnesium; Phosphorus; Potassium; Sodium; Copper; Iron; Manganese; Zinc

C.E. Prince, M.H. Renfroe, P.B. Brevard, R.E. Lee, L.R. Wager, Antioxidant Content of Mild, Medium, and Dark Home Roasted Coffee Beans Compared with Commercial Brand Coffees, Journal of the American Dietetic Association, Volume 106, Issue 8, Supplement 1, ADA FNCE Food & Nutrition Conference & Expo 2006, August 2006, Page A43, ISSN 0002-8223, DOI: 10.1016/j.jada.2006.05.279.
(http://www.sciencedirect.com/science/article/B758G-4KG2GYR-44/2/d74ee982ce0e5bc67fb0d40e49377255)

Yukiko Koshiro, Xin-Qiang Zheng, Ming-Li Wang, Chifumi Nagai, Hiroshi Ashihara, Changes in content and biosynthetic activity of caffeine and trigonelline during growth and ripening of Coffea arabica and Coffea canephora fruits, Plant Science, Volume 171, Issue 2, August 2006, Pages 242-250, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2006.03.017.
(http://www.sciencedirect.com/science/article/B6TBH-4JTRM35-1/2/0d806d95b51c147a6f3d2cb9b932f5ed)
Abstract:
Caffeine and trigonelline are major nitrogenous alkaloids found in coffee seeds. Accumulation of these alkaloids in two cultivars of Coffea arabica and in a cultivar of Coffea canephora seeds was monitored. Growth stages are specified by letters, A to G. They correspond to the pinhead and small (A), rapid expansion and pericarp growth (B), endosperm formation (C), early dry matter accumulation (D), mature (green) (E), ripening (pink) (F) and fully ripened (red) (G) stages. Caffeine and trigonelline content increased at stages D and E. The concentrations of caffeine in ripe seeds (stage G) of the two cultivars of C. arabica and C. canephora seeds were respectively 1.0% and 1.9% dry weight. A high biosynthetic activity of caffeine, which was estimated via the incorporation of [8-14C]adenine into purine alkaloids, was found in whole fruits (perisperm and pericarp) in stages B and C, and in developing seeds (endosperm) in stages D and E. The

biosynthetic activities of caffeine were reduced in both pericarp and seeds in stages F and G. In C. arabica cv. Mokka and in C. canephora, the transcripts of CmXRS1, CTS2 and CCS1, three N-methyltransferase genes for caffeine biosynthesis, and of methionine synthase gene (MS) were detected in every stage of growth, although the amounts of these transcripts were significantly less in stage G. The pattern of expression of genes for caffeine synthesis during growth is roughly related to the in situ synthesis of caffeine from adenine nucleotides, although exceptions were found in the very early and later stages of fruit growth. The amounts of the transcripts of CmXRS1, CTS2 and CCS1 were higher in seeds than in pericarp, but reverse was true for MS transcripts in developing coffee fruits. Similarly, caffeine synthase (N3-methyltransferase) activity was also higher in seeds than in pericarp. Concentrations of trigonelline in ripe seeds (stage G) of C. arabica cv. Mokka, C. arabica cv. Catimor and C. canephora were ca. 1.3%, 1.0% and 1.4% of dry weight, respectively. High biosynthetic activity of trigonelline was found in young fruits (stages A-C) and in the pericarp of developing fruits (stage E). The biosynthetic activity was reduced markedly in seeds at stages F and G. These results suggest that active trigonelline biosynthesis occurs in the pericarp of coffee fruits. Although the final concentration of caffeine and trigonelline varies in the three Coffea plants, the patterns of fluctuations of the caffeine and trigonelline biosynthetic activity in all Coffea plants are all similar.
Keywords: Biosynthesis; Caffeine; Coffee; Fruits development; Gene expression; Trigonelline

M. Cuadra, T. Rydberg, Emergy evaluation on the production, processing and export of coffee in Nicaragua, Ecological Modelling, Volume 196, Issues 3-4, 25 July 2006, Pages 421-433, ISSN 0304-3800, DOI: 10.1016/j.ecolmodel.2006.02.010.
(http://www.sciencedirect.com/science/article/B6VBS-4JHMJ3Y-5/2/30b835e5347d6e901ec6a59821df38e2)
Abstract:
An emergy evaluation was conducted on the systems of coffee (Coffea arabica L.) production, processing and export in Nicaragua in order to evaluate the environmental contributions to the tradeable products and thus enrich the discussion about fair trade. The emergy indices calculated were: transformities, % renewable, environmental loading ratio and emergy exchange ratio. The different emergy indices showed that coffee processing and industrialization are intensive activities, requiring large environmental support. The calculated transformities for coffee cherries, green coffee, roasted coffee and instant coffee were 3.35E+05, 1.77E+06, 3.64E+06 and 1.29E+07 sej/J, respectively. The emergy exchange ratio demonstrated that almost all purchasers benefit when buying green coffee from Nicaragua. The sales of roasted or instant coffee is of benefit for Nicaragua. This means that Nicaragua exports much more emergy in the green coffee sold than it imports in the money received for the coffee, thereby depleting its local natural resources. A fair price to pay for green coffee would range from 0.7 to 3 times the actual price paid now. Emergy analysis is a powerful tool in assessing the direct and indirect environmental requirements for a good or service and it is thereby able to evaluate trade in a much more comprehensive way than is usually done using standard economic measures. Inequity in international trade can be detected with this evaluation methodology. Therefore, we propose the use of emergy exchange ratio (EER), emdollars and emprice values as useful measures when trying to develop more sustainable and fair trade conditions.
Keywords: Coffee; Emergy analysis; Trade; Sustainability; Emergy exchange ratio; Nicaragua

Atanas G. Atanasov, Anna A. Dzyakanchuk, Roberto A.S. Schweizer, Lyubomir G. Nashev, Evelyne M. Maurer, Alex Odermatt, Coffee inhibits the reactivation of glucocorticoids by 11[beta]-hydroxysteroid dehydrogenase type 1: A glucocorticoid connection in the anti-diabetic action of coffee?, FEBS Letters, Volume 580, Issue 17, 24 July 2006, Pages 4081-4085, ISSN 0014-5793, DOI: 10.1016/j.febslet.2006.06.046.

(http://www.sciencedirect.com/science/article/B6T36-4K8R2XG-6/2/0bc0ec1f7634a990669fc907dfd36b9b)
Abstract:
Recent epidemiological studies demonstrated a beneficial effect of coffee consumption for the prevention of type 2 diabetes, however, the underlying mechanisms remained unknown. We demonstrate that coffee extract, corresponding to an Italian Espresso, inhibits recombinant and endogenous 11[beta]-hydroxysteroid dehydrogenase type 1 (11[beta]-HSD1) activity. The inhibitory component is heat-stable with considerable polarity. Coffee extract blocked 11[beta]-HSD1-dependent cortisol formation, prevented the subsequent nuclear translocation of the glucocorticoid receptor and abolished glucocorticoid-induced expression of the key gluconeogenic enzyme phosphoenolpyruvate carboxykinase. We suggest that at least part of the anti-diabetic effects of coffee consumption is due to inhibition of 11[beta]-HSD1-dependent glucocorticoid reactivation.
Keywords: 11[beta]-Hydroxysteroid dehydrogenase; Glucocorticoid; Coffee; Cortisol; Diabetes

Sidney C. Praxedes, Fabio M. DaMatta, Marcelo E. Loureiro, Maria A. G. Ferrao, Antonio T. Cordeiro, Effects of long-term soil drought on photosynthesis and carbohydrate metabolism in mature robusta coffee (Coffea canephora Pierre var. kouillou) leaves, Environmental and Experimental Botany, Volume 56, Issue 3, July 2006, Pages 263-273, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2005.02.008.
(http://www.sciencedirect.com/science/article/B6T66-4FXG2TX-2/2/bed4edf6592c69cfd4b95a00713cd96b)
Abstract:
Four clones of robusta coffee representing drought-tolerant (14 and 120) and drought-sensitive (46 and 109A) genotypes were submitted to a slowly imposed water deficit. Sampling and measurements were performed when predawn leaf water potential ([Psi]pd) approximately -2.0 and -3.0 MPa was reached. Regardless of the clone evaluated, drought led to sharper decreases in stomatal conductance than in photosynthesis, which was accompanied by significant declines in internal to ambient CO2 concentration ratio. Little or no effect of drought on chlorophyll a fluorescence parameters was observed. Regardless of the stress intensity, starch decreased remarkably. This was not accompanied by significant changes in concentration of soluble sugars, with the exception of clone 120 in which a rise in sucrose and hexose concentrations was found when [Psi]pd reached -3.0 MPa. At [Psi]pd = -2.0 MPa, activity of acid invertase increased only in clone 120; at [Psi]pd = -3.0 MPa, it increased in clones 14, 46 and 120, while activity of sucrose synthase declined, but only in clone 109A. Drought-induced decrease in ADP-glucose pyrophosphorylase activity was found only in clones 14 and 46, irrespective of stress intensity. At [Psi]pd = -3.0 MPa, maximal extractable and activation state of sucrose-phosphate synthase (SPS) decreased in all clones with the exception of clone 120, in which SPS activity was maintained in parallel to a rising activity of fructose-1,6-bisphosphatase. Changes in SPS activity could neither be explained by the CO2 decrease linked to stomatal closure nor by differences in leaf water status.
Keywords: Carbon metabolism; Chlorophyll fluorescence; Coffee; Gas exchange; Sucrose-phosphate synthase; Water deficit

Helder P. Cristo, Marcio A. Martins, Leandro S. Oliveira, Adriana S. Franca, Transverse flow of coffee beans in rotating roasters, Journal of Food Engineering, Volume 75, Issue 1, July 2006, Pages 142-148, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.04.010.
(http://www.sciencedirect.com/science/article/B6T8J-4GBD7VJ-1/2/0cb57204191249b1efaee4333b6a5276)
Abstract:

The processing of particles in rotating cylinders is heavily influenced by the types of flow regimes within the cylinders during rotation. Conventional industrial coffee roasting is performed in rotating cylinders. Coffee beans undergo drastic physical and chemical changes during roasting and, due to that fact, the types of flow regime within the roaster will also vary. The types of flow regimes will, in turn, affect the uniformity of processing and ultimately the quality of the roasting. In this study, a small scale acrylic model of a cylindrical roaster was built and used to study the different forms of transverse motion of a bed of coffee beans during rotating motion. The model has internal mixing bars similar to those of industrial roasters. The model allowed the visualization of the flow regimes and their transitions, giving a preliminary idea of the regimes to be recommended for operation of conventional industrial roasters.
Keywords: Coffee; Roasting; Physical properties; Rotating cylinder

Ziad Matta, Edgar Chambers IV, Jane Mertz Garcia, Jennifer McGowan Helverson, Sensory Characteristics of Beverages Prepared with Commercial Thickeners Used for Dysphagia Diets, Journal of the American Dietetic Association, Volume 106, Issue 7, July 2006, Pages 1049-1054, ISSN 0002-8223, DOI: 10.1016/j.jada.2006.04.022.
(http://www.sciencedirect.com/science/article/B758G-4K96R4J-G/2/9b2c7964e5611bded2ee96ddd3264903)
Abstract: Objective
To describe and compare sensory characteristics of six beverages prepared with four commercial thickeners used in dysphagia diets.Design
The study used a completely randomized design within a test of each beverage.Subjects/setting
Five highly trained descriptive sensory analysis panelists conducted the testing in a laboratory environment.Intervention
Coffee, milk, apple juice, orange juice, Ensure (Abbott Laboratories, Abbott Park, IL), and water were thickened using two starch-based and two gum-based commercial thickeners according to manufacturers' instructions to achieve nectar-like and honey-like consistencies.Main Outcome Measures
Sensory attributes of the original beverages and the thickened samples were defined and scored.Statistical Analyses Performed
Sensory scores were analyzed by analysis of variance using general linear models and Fisher's least significant difference test to determine specific differences.Results
All thickeners suppressed the main flavors of the base beverages and imparted slight off-flavors (bitter, sour, metallic, or astringent) in some beverages. Starch-based thickeners imparted a starchy flavor and grainy texture, whereas gum-based thickeners gave added slickness to the beverages. Although thickeners mixed well with some beverages, they were difficult to disperse in others, making some thickened beverages lumpy.Conclusions
All thickeners added either a starchy, grainy, or slick flavor or texture and tended to suppress the base flavor of beverages, especially at honey-like consistencies. Thus, individual decisions about which characteristics are more negative (eg, slick vs grainy texture) for specific patients must be made. Additional development of thickening agents seems necessary for improved sensory properties. Information from this article should help professionals and their patients with dysphagia better understand the sensory issues associated with the use of commercial thickening agents in various beverages.

L. Neves, R. Ribeiro, R. Oliveira, M.M. Alves, Enhancement of methane production from barley waste, Biomass and Bioenergy, Volume 30, Issue 6, June 2006, Pages 599-603, ISSN 0961-9534, DOI: 10.1016/j.biombioe.2005.12.003.
(http://www.sciencedirect.com/science/article/B6V22-4J3WH9K-3/2/d0d0dfeefffeb3899142740b54b4b8f8)
Abstract:

Two different approaches were attempted to try and enhance methane production from an industrial waste composed of 100% barley, which results from production of instant coffee substitutes. In previous work, this waste was co-digested with an excess of activated sludge produced in the wastewater treatment plant located in same industrial unit, resulting in a very poor methane yield (25 LCH4(STP)/kgVSinitial), and low reductions in total solids (31%) and in volatile solids (40%).
When the barley waste (BW) was subjected to alkaline hydrolysis pre-treatment before co-digestion with activated sludge, the methane production increased to 222 LCH4(STP)/kgVSinitial and the total and volatile solids reductions increased to 67% and 84%, respectively.
The second approach, followed in the present work, consisted of co-digestion with kitchen waste (40% BW, 60% kitchen waste). The methane production was 363 LCH4(STP)/kgVSinitial and the total and volatile solids reductions were 61% and 67%, respectively.
Keywords: Anaerobic co-digestion; Biogas; Kitchen waste; Alkaline hydrolysis pre-treatment; Barley waste

L. Lopez-Curto, J. Marquez-Guzman, D.M. Diaz-Pontones, Invasion of Coffea arabica (Linn.) by Cuscuta jalapensis (Schlecht): in situ activity of peroxidase, Environmental and Experimental Botany, Volume 56, Issue 2, June 2006, Pages 127-135, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2005.02.002.
(http://www.sciencedirect.com/science/article/B6T66-4FPN9PN-2/2/ad27e733d7ec804c60045ba228a3f3b2)
Abstract:
One of the factors leading to a decline in quality and productivity of certain plantations is the presence of parasitic plants. This study was conducted to determine the role played by peroxidase in the process of invasion of coffee stems by Cuscuta jalapensis. The in situ activity of peroxidase during the phases of attachment and host penetration, was determined by histochemical tests. These tests indicate the activity of peroxidase in relation to morphological changes that take place, during the development of the haustorial cushion on the cell walls and vacuoles of the epidermal cells, and during the processes of disorganization of the tissue of Cuscuta stems and formation of the haustorium. The activity of peroxidase was shown to be associated with the processes of invasion and destruction of tissues of the host up until the moment when the haustorium makes contact with the vascular bundle. The activity of peroxidase in the cell walls of Cuscuta jalapensis is intimately associated to the morphogenesis of the adherence structures, as well as to the processes leading to the invasion of the host. We propose that this enzyme be included within the set of compounds elements needed to initiate an invasion of a host by a parasitic angiosperm. The information acquired gives significance to the probable participation of free radicals and their reactivity in relation to the morphogenesis and invasion processes.
Keywords: Peroxidase; Cuscuta jalapensis; Coffea arabica; Invasion; Histochemistry

C.T. Reh, A. Gerber, J. Prodolliet, G. Vuataz, Water content determination in green coffee - Method comparison to study specificity and accuracy, Food Chemistry, Volume 96, Issue 3, 3rd International Workshop on Water in Foods, June 2006, Pages 423-430, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.02.055.
(http://www.sciencedirect.com/science/article/B6T6R-4GWC297-1/2/8327259e57b436609065c9bf6ef17bb0)
Abstract:
Green coffee behaves very differently at high and low water content with a number of unwanted consequences like microbial growth, mycotoxin formation, altered sensorial quality of end product, instable production conditions and unclear trade issues. Generally, a water content ranging between 8.0% and 12.5% is considered to be adequate to avoid the mentioned issues. ISO has therefore issued a number of standards for reference, routine and rapid methods. Nevertheless,

on-going discussions on how effective the methods are capable to principally determine the water content lead to modifications of the official approach. This work was therefore focused on clarifying the specificity and accuracy of several available methods. We could demonstrate that only ISO 1446 exclusively measures water but leaves some residual water content difficult to extract from the dried coffee matrix. For all drying oven based methods we observe degradation of the product contributing to the overall weight loss. We used near-infrared spectroscopy and color measurement to establish the degree of degradation and the completeness of the drying process. Repeatability was found excellent for all methods despite degradation and incomplete drying which should negatively affect accuracy.
Keywords: Green coffee; Water content; Weight loss; Drying; Oven; Coffee

E. Pardo, V. Sanchis, A.J. Ramos, S. Marin, Non-specificity of nutritional substrate for ochratoxin A production by isolates of Aspergillus ochraceus, Food Microbiology, Volume 23, Issue 4, June 2006, Pages 351-358, ISSN 0740-0020, DOI: 10.1016/j.fm.2005.05.005.
(http://www.sciencedirect.com/science/article/B6WFP-4GK1GGG-1/2/d96f15e71f77335ed24204589c867862)
Abstract:
Aspergillus ochraceus is an important contaminant of diverse substrates, such as cereals, coffee, grapes and derivates. This fungus produce a nephrotoxic metabolite, ochratoxin A (OTA), whose presence on food and feeds may be an important risk for animal and human health.
The aim of this work was to evaluate the significance of the origin of A. ochraceus isolates on their OTA production patterns on different substrates (yeast extract sucrose (YES) broth, irradiated barley grains, irradiated green coffee beans and sterilized grapes) and under different environmental conditions.
Results did not show a significant influence of the isolation source on OTA-production profiles by A. ochraceus isolates on several substrates, since the isolates which produced the highest OTA amounts in vitro (YES medium) were also the isolates with the highest OTA yields on the other substrates.
Abiotic factors assayed (water activity, temperature and substrate) affected significantly OTA productions by A. ochraceus. Maximum OTA amounts were detected at 25 [degree sign]C and 0.98 aw on all substrates tested. The highest OTA accumulations found on the different substrates were: green coffee beans (> 2 mg g-1), barley grains (~1 mg g-1), YES medium (13.9 [mu]g ml-1) and grape (~3 ng g-1).
Keywords: A. ochraceus; Barley; Grape; Green coffee; Ochratoxin A; Temperature; Water activity

C.S. MacLeod, J.A. McKittrick, J.P. Hindmarsh, M.L. Johns, D.I. Wilson, Fundamentals of spray freezing of instant coffee, Journal of Food Engineering, Volume 74, Issue 4, June 2006, Pages 451-461, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.03.034.
(http://www.sciencedirect.com/science/article/B6T8J-4G4XBHM-4/2/2b7c57114b4c2ceba417cca15f947a30)
Abstract:
The freezing of single 2 mm diameter droplets of coffee solution in cold moving air down to -15 [degree sign]C has been studied for 10-50 wt.% coffee solutions in a novel temperature monitoring apparatus and in a similar device installed within a nuclear magnetic resonance (NMR) spectrometer. Heat transfer measurements and modelling confirmed that droplet internal temperatures were almost uniform (low Biot number regime), which was consistent with the microstructures generated. Fundamental parameters which could be extracted from the data included nucleation temperature, degree of recalescence, freezing temperature, and extent of freezing and freeze concentration. The mode of nucleation (spontaneous or forced) was observed to depend on concentration, cooling rate and air temperature.
Keywords: Spray freezing; Coffee; Nucleation; NMR

D. Ganesh, A.-S. Petitot, M.C. Silva, R. Alary, A.-C. Lecouls, D. Fernandez, Monitoring of the early molecular resistance responses of coffee (Coffea arabica L.) to the rust fungus (Hemileia vastatrix) using real-time quantitative RT-PCR, Plant Science, Volume 170, Issue 6, June 2006, Pages 1045-1051, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2005.12.009.
(http://www.sciencedirect.com/science/article/B6TBH-4HYM1SH-4/2/7ab98d8f8467d9f95cee8929139eb570)
Abstract:
Molecular resistance responses of coffee (Coffea arabica L.) to the orange rust fungus Hemileia vastatrix were monitored by real-time quantitative RT-PCR analysis of gene expression. Significant activation of coffee genes by fungal infection could be observed around 12-16 h post inoculation (hpi) in the incompatible interaction. Microscopic observations indicated that, at this time, only a limited number of fungal germlings already differentiated a penetration hypha through the stomata. Activation of the CaWRKY1 gene, putatively encoding a WRKY transcription factor also occurred in the compatible interaction, but was delayed to 24 hpi. In contrast, activation of the CaR111 gene encoding a protein of unknown function only occurred in the incompatible interaction. The CaNDR1 gene, an homolog of the Arabidopsis non-race specific disease resistance (ndr1) gene was only poorly induced by fungal infection. Wounding and salicylic acid treatment markedly activated CaWRKY1, CaNDR1 and CaR111 gene expression. These results showed that specific transcriptional responses of coffee were detected before penetration of H. vastatrix into the leaf had occurred, and suggest a possible role of activated genes in the molecular resistance responses of coffee to the rust fungus.
Keywords: Plant-pathogen interactions; Coffee-rust; Disease resistance; WRKY transcription factor; Abiotic stresses; NDR1

Andrew J. Simkin, Tingzhi Qian, Victoria Caillet, Franck Michoux, Mohamed Ben Amor, Chenwei Lin, Steve Tanksley, James McCarthy, Oleosin gene family of Coffea canephora: Quantitative expression analysis of five oleosin genes in developing and germinating coffee grain, Journal of Plant Physiology, Volume 163, Issue 7, 3 May 2006, Pages 691-708, ISSN 0176-1617, DOI: 10.1016/j.jplph.2005.11.008.
(http://www.sciencedirect.com/science/article/B7GJ7-4J4B8YS-1/2/4745283924a8ec3b397624bb0060d8b0)
Abstract: Summary
Coffee grains have an oil content between 10% and 16%, with these values associated with Coffea canephora (robusta) and C. arabica (arabica), respectively. As the majority of the oil stored in oil seeds is contained in specific structures called oil bodies, we were interested in determining whether there are any differences in the expression of the main oil body proteins, the oleosins, between the robusta and arabica varieties. Here, we present the isolation, characterization and quantitative expression analysis of six cDNAs representing five genes of the coffee oleosin family (CcOLE-1 to CcOLE-5) and one gene of the steroleosin family (CcSTO-1). Each coffee oleosin cDNA encodes for the signature structure for oleosins, a long hydrophobic central sequence containing a proline KNOT motif. Sequence analysis also indicates that the C-terminal domain of CcOLE-1, CcOLE-3 and CcOLE-5 contain an 18-residue sequence typical of H-form oleosins. Quantitative RT-PCR showed that the transcripts of all five oleosins were predominantly expressed during grain maturation in robusta and arabica grain, with CcOLE-1 and CcOLE-2 being more highly expressed. While the relative expression levels of the five oleosins were similar for robusta and arabica, significant differences in the absolute levels of expression were found between the two species. Quantitative analysis of oleosin transcripts in germinating arabica grain generally showed that the levels of these transcripts were lower in the grain after drying, and then further decreased during germination, except for a small spike of expression for CcOLE-2 early in germination. In contrast, the levels of CcSTO-1 transcripts remained relatively constant during

germination, in agreement with suggestions that this protein is actively involved in the process of oil body turnover. Finally, we discuss the implications of the coffee oleosin expression data presented relative to the predicted roles for the different coffee oleosins during development and germination.
Keywords: Coffea; Grain; Oil body; Oleosin; Steroleosin

Julio C. Rojas, Alfredo Castillo, Armando Virgen, Chemical cues used in host location by Phymastichus coffea, a parasitoid of coffee berry borer adults, Hypothenemus hampei, Biological Control, Volume 37, Issue 2, May 2006, Pages 141-147, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2006.01.009.
(http://www.sciencedirect.com/science/article/B6WBP-4JBGJ4B-2/2/96dce1cf68f5c0a23a339b685d4e36c9)
Abstract:
The wasp Phymastichus coffea LaSalle is a primary parasitoid that attacks adults of the coffee berry borer, Hypothenemus hampei Ferrari, the most serious pest of coffee in the world. We carried out a series of experiments in the laboratory to elucidate the role of chemical cues used by P. coffea during host location. In Y-tube olfactometer bioassays, P. coffea females were attracted to mechanically damaged and infested coffee berries, but not to uninfested ones. Immature stages and adults of H. hampei isolated from infested berries were not attractive to parasitoids, whereas the mixture of dust and frass collected from the infested berries was highly attractive. A dose-response experiment indicated a clear positive relationship between wasp response and the amount of dust/frass present. Females were significantly attracted to dust/frass originating from arabica (Coffea arabica L.) and robusta coffee (Coffea canephora Pierre ex Frohner), but not to dust/frass originating from an artificial diet used for rearing H. hampei, or to dust/frass from a non-target host, Hypothenemus crudiae (Panzer). The results are discussed in relation to the natural history of P. coffea.
Keywords: Host location; Phymastichus coffea; Specialist parasitoid; Hypothenemus hampei; Coffee; Chemical cues; Dust/frass

Abdellatif Mohamed, Steven C. Peterson, Linda A. Grant, Patricia Rayas-Duarte, Effect of jet-cooked wheat gluten/lecithin blends on maize and rice starch retrogradation, Journal of Cereal Science, Volume 43, Issue 3, May 2006, Pages 293-300, ISSN 0733-5210, DOI: 10.1016/j.jcs.2005.12.012.
(http://www.sciencedirect.com/science/article/B6WHK-4JMKMTS-2/2/f119c6091213ae6c92c0c22924636a92)
Abstract:
Vital wheat gluten and lecithin (GL) (50:50, w/w) were dry blended in a coffee grinder and a 9.5% (w/v) aqueous slurry was jet-cooked (steam pressures of 65 psi/g inlet and 40 psi/g outlet) to disaggregate wheat gluten and facilitate better dispersion of the two components. The jet-cooked material was freeze-dried and stored at 0 [degree sign]C for future use. The GL blend was added to pure food grade common maize and rice starch at concentrations of 0 (control), 6, 11, 16, and 21%. Starch gelatinization and retrogradation temperature transitions were determined using Differential Scanning Calorimetry (DSC). From the DSC profiles, the change in the [Delta]H value was used as an indication of starch retrogradation, where a higher [Delta]H value indicated higher retrogradation. The [Delta]H values of the blends at 4 [degree sign]C had higher values than the -20 [degree sign]C and the ambient (25 [degree sign]C) storage temperatures. Overall, the 21% GL/starch blends reduced retrogradation by 50%. The lower amylose content of rice starch relative to maize starch was reflected in Rapid Visco Amylograph (RVA) measurements of peak viscosity, and similarly, Texture Analyzer (TA) measurements indicated that maize starch gel is firmer than rice starch gel. Retrogradation was also evaluated by observing G', the shear storage modulus, as a function of time after running a standard pasting curve. Using this method, it appears that GL

has a significant effect on maize starch retrogradation, since low concentrations (<0.4%, w/w) reduced G' up to 40%. The opposite behavior was seen in rice starch, where G' increased directly with added GL. It appears that the amylose level in the rice starch is too low to be affected by the GL, and the increase seen in G' is most likely due to added solids.
Keywords: Jet cooked; Lecithin; Maize starch; Rice starch; Retrogradation; Gel firmness

Gikuru Mwithiga, Stephen Njoroge Kigo, Performance of a solar dryer with limited sun tracking capability, Journal of Food Engineering, Volume 74, Issue 2, May 2006, Pages 247-252, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2005.03.018.
(http://www.sciencedirect.com/science/article/B6T8J-4G1R3FX-3/2/ad7dba46ed5365bf47bb9aa8d51f5968)
Abstract:
A small solar dryer with limited sun tracking capabilities was designed and tested. The dryer had a mild steel absorber plate and a polyvinyl chloride (pvc) transparent cover and could be adjusted to track the sun in increments of 15[degree sign]. The performance was tested by adjusting the angle the dryer made with the horizontal either once, three, five or nine times a day when either loaded with coffee beans or under no load conditions. The temperature distribution in the plenum and also the drying rate of parchment coffee were determined. The temperature inside the plenum chamber could reach a maximum of 70.4 [degree sign]C and the dryer could lower the moisture content of coffee beans from 54.8% to below 13% (w.b.) in 2 days as opposed to the 5-7 days required in sun drying. Tracking the sun though allowing a faster rate of drying did not offer a significant advantage in terms of length of drying duration.
Keywords: Solar dryer; Tracking; Coffee; Temperature distribution; Drying

Hiroshi Ashihara, Xin-Qiang Zheng, Riko Katahira, Masayuki Morimoto, Shinjiro Ogita, Hiroshi Sano, Caffeine biosynthesis and adenine metabolism in transgenic Coffea canephora plants with reduced expression of N-methyltransferase genes, Phytochemistry, Volume 67, Issue 9, May 2006, Pages 882-886, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2006.02.016.
(http://www.sciencedirect.com/science/article/B6TH7-4JRVD5K-1/2/7434c21dae94e9b6567011d7ed67fc16)
Abstract:
In anti-sense and RNA interference transgenic plants of Coffea canephora in which the expression of CaMXMT1 was suppressed, caffeine biosynthesis from [8-14C]adenine was investigated, together with the overall metabolism of [8-14C]adenine. Compared with wild type control plants, total purine alkaloid biosynthesis from adenine and conversion of theobromine to caffeine were both reduced in the transgenic plants. As found previously, [8-14C]adenine was metabolised to salvage products (nucleotides and RNA), to degradation products (ureides and CO2) and to purine alkaloids (theobromine and caffeine). In the transgenic plants, metabolism of [8-14C]adenine shifted from purine alkaloid synthesis to purine catabolism or salvage for nucleotides. HPLC analysis revealed a significantly reduced caffeine content in the transgenic plants. A small quantity (less than 20 nmol g-1 fresh weight) of xanthosine had accumulated in at least one of the transgenic plants.
Keywords: Coffea canephora; Rubiaceae; Coffee; Transgenic plants; RNAi; Caffeine biosynthesis; N-methyltransferase; Purine metabolism

R.A. Gomes-Junior, C.A. Moldes, F.S. Delite, P.L. Gratao, P. Mazzafera, P.J. Lea, R.A. Azevedo, Nickel elicits a fast antioxidant response in Coffea arabica cells, Plant Physiology and Biochemistry, Volume 44, Issues 5-6, May-June 2006, Pages 420-429, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2006.06.002.
(http://www.sciencedirect.com/science/article/B6VRD-4K5SS1B-2/2/6588f850b38f54a5ca5a069320ad110b)

Abstract:
The antioxidant responses of coffee (Coffea arabica L.) cell suspension cultures to nickel (Ni) were investigated. Ni was very rapidly accumulated in the cells and the accumulation could be directly correlated with the increase of NiCl2 concentration in the medium. At 0.05 mM NiCl2 growth was stimulated, but at 0.5 mM NiCl2, the growth rate was reduced. An indication of alterations in the presence of reactive oxygen species was detected by an increase in lipid peroxidation at 0.5 mM NiCl2. Catalase (CAT; EC 1.11.1.6), glutathione reductase (GR; EC 1.6.4.2), ascorbate peroxidase (APX; EC 1.11.1.11), guaiacol peroxidase (GOPX; EC 1.11.1.7) and superoxide dismutase (SOD; EC 1.15.1.1) activities were increased, particularly at earlier NiCl2 exposure times and the activities were higher at 0.5 mM NiCl2 for most of exposure times tested. Non-denaturing PAGE revealed one CAT isoenzyme, nine SOD isoenzymes and four GR isoenzymes. The SOD isoenzymes were differentially affected by NiCl2 treatment and one GR isoenzyme was increased by NiCl2. NiCl2 at 0.05 mM did not induce lipid peroxidation and the main response appeared to be via the induction of SOD, CAT, GOPX and APX activities for the removal of the reactive oxygen species and through the induction of GR to ensure the availability of reduced glutathione.
Keywords: Coffea arabica; Oxidative stress; Lipid peroxidation; Nickel; Catalase; Glutathione reductase; Superoxide dismutase

Atsushi Suzuki, Akihiko Fujii, Naoki Yamamoto, Masaki Yamamoto, Hideo Ohminami, Akiyo Kameyama, Yusuke Shibuya, Yoshinori Nishizawa, Ichiro Tokimitsu, Ikuo Saito, Improvement of hypertension and vascular dysfunction by hydroxyhydroquinone-free coffee in a genetic model of hypertension, FEBS Letters, Volume 580, Issue 9, 17 April 2006, Pages 2317-2322, ISSN 0014-5793, DOI: 10.1016/j.febslet.2006.03.047.
(http://www.sciencedirect.com/science/article/B6T36-4JJGFH3-9/2/1834129950c1985148a5cb3c07f5a4dc)
Abstract:
Chlorogenic acid, a polyphenol found in coffee, has antihypertensive actions, but epidemiologic data on the effects of coffee on blood pressure are controversial. Specific coffee components that inhibit the hypotensive effect of chlorogenic acid and the physiologic mechanisms underlying the effects of coffee without these components were investigated. One component, hydroxyhydroquinone (HHQ), inhibited the hypotensive effects of chlorogenic acid in spontaneously hypertensive rats (SHR). The attenuation of hypertension by HHQ-free coffee was associated with nitric oxide, the suppression of mRNA expression of NAD(P)H oxidase, and the improvement in endothelium-dependent vasodilation in the aorta. Thus, HHQ-free coffee might regulate vascular tone by improving the bioavailability of nitric oxide in SHR.
Keywords: Blood pressure; Chlorogenic acid; Nitric oxide; Spontaneously hypertensive rat; Vasodilation

Karin Sahmer, Evelyne Vigneau, El Mostafa Qannari, A cluster approach to analyze preference data: Choice of the number of clusters, Food Quality and Preference, Volume 17, Issues 3-4, Seventh Sensometrics Meeting, Davis, USA, 28-30 July 2004, April-June 2006, Pages 257-265, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2005.03.007.
(http://www.sciencedirect.com/science/article/B6T6T-4G1R3PM-3/2/6d9ba0ef37dd38106fbbfa4ad15f0656)
Abstract:
We consider the clustering of a panel of consumers according to their scores of liking. The procedure is based on a cluster of variables approach proposed by Vigneau et al. [Vigneau, E., Qannari, E. M., Punter, P. H., & Knoops, S. (2001). Segmentation of a panel of consumers using clustering of variables around latent directions of preference. Food Quality and Preference, 12, 259-363]. We aim at setting up a hypothesis-testing framework in order to determine the

appropriate number of clusters. The procedure consists of two steps. Firstly, a cluster tendency test determines if there is more than one cluster. Secondly, a hierarchical algorithm is performed and cluster validity tests at the different levels of the hierarchy indicate the appropriate number of clusters. Once the number of clusters is determined, a partitioning algorithm is implemented by considering as a starting point the partition obtained from the hierarchical algorithm. We illustrate the method on preference data from a European sensory and consumer study on coffee [ESN (1996). A European sensory and consumer study: A case study on coffee. European Sensory Network] and we undergo a simulation study in order to assess the efficiency of the procedure.
Keywords: Bootstrap; Clustering; Cluster tendency; Cluster validity; Preference data

Leandro S. Oliveira, Adriana S. Franca, Juliana C.F. Mendonca, Mario C. Barros-Junior, Proximate composition and fatty acids profile of green and roasted defective coffee beans, LWT - Food Science and Technology, Volume 39, Issue 3, April 2006, Pages 235-239, ISSN 0023-6438, DOI: 10.1016/j.lwt.2005.01.011.
(http://www.sciencedirect.com/science/article/B6WMV-4FTS371-1/2/134849279730377 4653a8916ba1ad033)
Abstract:
Defective coffee beans are responsible for the depreciation of the quality of roasted coffee consumed in Brazil. The extraction of the oil of defective beans for applications in the food and pharmaceutical sectors is being considered as an alternative use for those beans. The objective of this work was to determine the composition of the fatty acid fraction of the pressed oil and the proximate composition of crude defective beans in order to provide subsidiary information for proposals of alternative uses for these beans. The amounts of oil extracted from the defective beans were smaller than the amounts extracted from healthy mature beans. The fatty acid composition of oils from defective beans was not significantly different than that from healthy mature coffee beans.
Keywords: Defective coffee beans; Coffee oil quality

Luis R. Osses, Cesar A. Godoy, Characterizing plasma membrane H+-ATPase in two varieties of coffee leaf (Coffea arabica L.) and its interaction with an elicitor fraction from the orange rust fungus (H. vastatrix Berk and Br.) race II, Plant Physiology and Biochemistry, Volume 44, Issue 4, April 2006, Pages 226-235, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2006.01.009.
(http://www.sciencedirect.com/science/article/B6VRD-4JD0XX7-1/2/dff8d06dead0e1ca4287b5d8186d295f)
Abstract:
Early intercellular signaling in Coffea arabica L.-Hemileia vastatrix host-pathogen interaction was studied, using inside-out plasma membrane from two varieties of coffee leaf and a fungal fraction to determine the plant's biochemical responses. Microsomal pellets (100,000 x g) from the susceptible (Caturra) and resistant (Colombia) coffee leaf varieties were purified by partitioning in two-polymer DEX (6.3% w/w) and PEG (6.3% w/w) system aqueous phase. Fungal material was obtained from orange rust Hemileia vastatrix Berk and Br. race II urediospore germ tubes. Plasma membrane vesicles were preferentially localized to PEG phase, as indicated by its enzyme marker distribution. Both H+-ATPase activities displayed similar kinetic and biochemical characteristics, comparable to those described for P-type ATPases. Several enzymes may play pivotal roles in plants regarding early interaction with fungal elicitors. Studies of fungal fractions' effects on H+-ATPase and both varieties' proton pumping activities were thus carried out. Concentration as low as 0.1 Gluc eq. ml-1 fungal fraction induced specific inhibition of H+-ATPase and the resistant variety's proton pumping activities. The present work describes characterizing the H+-ATPase plasma membrane from two Coffea arabica L. varieties (Caturra and Colombia) for the first time and the race specific inhibitory effect of a crude fungal fraction on both H+-ATPase and the resistant variety's proton pumping activities.

Keywords: H+-ATPase; Coffea arabica L; Plasma membrane; Two-phase system; Host-pathogen interaction; Signal transduction; Hemileia vastatrix Berk and Br

J.M. Grossman, C. Sheaffer, D. Wyse, B. Bucciarelli, C. Vance, P.H. Graham, An assessment of nodulation and nitrogen fixation in inoculated Inga oerstediana, a nitrogen-fixing tree shading organically grown coffee in Chiapas, Mexico, Soil Biology and Biochemistry, Volume 38, Issue 4, April 2006, Pages 769-784, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2005.07.009.
(http://www.sciencedirect.com/science/article/B6TC7-4GY83H9-1/2/7c013247cf2d8ff0914b9d0193cd24b3)
Abstract:
Coffee (Coffea arabica) production provides a source of income for small-scale farmers in Chiapas, Mexico. Organic production regulations prohibit the use of synthetic nitrogen (N) fertilizers, therefore farmers are dependent upon N-sources accepted by organic certification agencies. In the state of Chiapas, little is known about effectiveness of rhizobia and nodule development, location and structure of the common coffee shade tree genus Inga. The objectives of this study were to (1) evaluate the symbiotic effectiveness of selected rhizobia isolates as inoculants for Inga oerstediana under greenhouse and field conditions, (2) describe the morphological and histochemical characteristics of I. oerstediana root nodules, and (3) apply the 15N natural abundance technique to investigate nitrogen fixation in two stands of I. oerstediana of different ages intercropped with C. arabica. To meet objectives one and two, we assessed shoot biomass, nodule number, nodule mass and total shoot N of inoculated I. oerstediana seedlings at 90 and 150 days after planting (DAP) in the greenhouse and field. Light microscopy, and in situ hybridization of nodule sections for leghemoglobin and Nif H cDNA determination were used to describe nodule morphology and histology. Results indicated that tested isolates appear not to be fixing N2 150 DAP and inoculation with isolated bacteria, and that inoculated treatment nodules lacked leghemoglobin and Nif H mRNA transcript, however contained infected bacteroids. An unidentified brown-pigmented granular substance was present in all nodules examined. I. oerstediana appears slow to nodulate, with negligible nodulation at 90 DAP, and limited nodulation at 150 DAP. Using the natural abundance method to meet objective three, recycling of fixed N in older 5-7 year plots is thought to have caused great 15N value variation in both reference and leguminous trees and data could not be used to estimate % N derived from Biological Nitrogen Fixation (BNF). I. oerstediana found in younger 1-3 year old plots was found to derive 20% of its N from BNF. As fixation appears to be low in young Inga, recommendations for organic C. arabica shade tree management include supplementation of N during early growth of Inga-C. arabica intercrop, and longer-term nodulation studies combined with additional N2-fixation assessment using 15N natural abundance methods.
Keywords: Chiapas; Coffee; Mexico; Organic; Nitrogen-fixation; Root nodule bacteria; Agroforestry; Leguminous trees; Inga

Kurniatun Hairiah, Hermi Sulistyani, Didik Suprayogo, Widianto, Pratiknyo Purnomosidhi, Rudy Harto Widodo, Meine Van Noordwijk, Litter layer residence time in forest and coffee agroforestry systems in Sumberjaya, West Lampung, Forest Ecology and Management, Volume 224, Issues 1-2, Catchment Processes in Southeast Asia, 15 March 2006, Pages 45-57, ISSN 0378-1127, DOI: 10.1016/j.foreco.2005.12.007.
(http://www.sciencedirect.com/science/article/B6T6X-4J4404J-2/2/67c8094d47d39d280234d83a91cf8be0)
Abstract:
Forest conversion to coffee-based agroforestry leads to sudden disappearance of the litter layer and a decrease in the rate of litter fall, reducing food for ecosystem engineers such as earthworms. With time, however, a new litter layer is created potentially returning to forest-like conditions at the soil surface. This research quantified litter thickness, earthworm populations and

soil macroporosity in response to land use change in the Sumberjaya benchmark area (West Lampung, Indonesia) by comparing: (a) remnant forest (control); (b) multistrata shaded coffee with fruit and timber trees, as well as nitrogen-fixing shade trees; (c) shaded coffee (nitrogen-fixing shade trees, but less than five tree species per plot); and (d) sun coffee (`monoculture') with coffee forming more than 80% of total stem basal area. Plots were selected with tree ages of 7-10 years in three slope classes: (a) flat (0-10[degree sign]); (b) medium (10-30[degree sign]); and (c) steep (>30[degree sign]). The mean standing necromass was 6.1, 4.5, 3.8 and 3.0 Mg ha-1 for forest, multistrata, shade coffee and sun coffee, respectively, without significant influences of slope. Fine, partly decomposed litter was 33-40% of total necromass, coarse leaf litter 14-16%, and twigs and branches comprised the remaining 43-52%. Soil organic carbon content (Corg) was highest in the forest. The largest annual litter input was found in the remnant forest (14 Mg ha-1 year-1), followed by multistrata, shaded and monoculture coffee systems, i.e., 9.8, 6.6 and 4.0 Mg ha-1 year-1, respectively. The population density of earthworms in the forest was 50% lower than in multistrata coffee gardens (150 individuals m-2), but its biomass (31 g m-2) was twice that in the multistrata coffee gardens. The lowest population density of earthworms was found in the shade coffee system (150 individuals m-2) with a biomass of 7 g m-2. A simple model suggests that the standing litter in the various land use systems is consistent with measured litter inputs and decay rates, but that the soil organic matter (SOM) content and macroporosity of the shade and multistrata systems are less than predicted. The recovery of a surface litter layer in sun coffee systems can provide protection from erosion with time, but will not be sufficient to restore macroporosity at the level of forest soils, leading to hydrologic alterations that favor overland flow.
Keywords: Litter thickness; Ecosystem engineer; Macroporosity; Litter residence time; Forest conversion

Nicola J. Richardson-Harman, David A. Booth, Do you like the sight or the feel of milk in coffee? Ecology and effortful attention in differential acuity and preference for sensed effects of milk substitute in vended coffee, Appetite, Volume 46, Issue 2, March 2006, Pages 130-136, ISSN 0195-6663, DOI: 10.1016/j.appet.2005.11.006.
(http://www.sciencedirect.com/science/article/B6WB2-4J4HK5H-1/2/e25565147afcf0c633fde858501071d3)
Abstract:
A rapid method of discrimination scaling was used to measure individuals' acuity for levels of a complex stimulus perceived through several sensory modalities at once in a familiar context. The stimulus was a replacement for fresh milk used in vended coffee. The two experiments reported here compared the performance of ratings of the coffee's milkiness and creaminess when assessors were limited to the use of visual and/or olfactory cues. Better discrimination by milkiness ratings was observed during normal drinking and in a visual-only condition than when only oronasal or oral cues were available. Ratings relative to each assessor's ideal level of milkiness or creaminess showed diversity between assessor-preferred visual and oral characteristics of the milk substitute. However, instructing the assessor to attend to a particular aspect of the sample did not prevent the use of a better-discriminated characteristic if available to the senses. These results showed that the acceptability of a beverage or food depends more on the perceptible material than on efforts to direct attention to particular aspects.
Keywords: Milkiness; Creaminess; White coffee appearance; Creamy mouthfeel; Intersensory balance; Directed attention

Massimo Marcone, Andrea Illy and Rinantonio Viani, Editors, Espresso Coffee - The Science of Quality (2nd ed.), Elsevier Academic Press (2005) ISBN 0-12-370371-9., Food Research International, Volume 39, Issue 2, March 2006, Page 256, ISSN 0963-9969, DOI: 10.1016/j.foodres.2005.07.002.

(http://www.sciencedirect.com/science/article/B6T6V-4HG69M3-1/2/bbbf5e9bc1af91ec6bc6cd11cdf8e5d3)

Pedro Rendon, John Sivinski, Tim Holler, Ken Bloem, Miguel Lopez, Anibal Martinez, Martin Aluja, The effects of sterile males and two braconid parasitoids, Fopius arisanus (Sonan) and Diachasmimorpha krausii (Fullaway) (Hymenoptera), on caged populations of Mediterranean fruit flies, Ceratitis capitata (Wied.) (Diptera: Tephritidae) at various sites in Guatemala, Biological Control, Volume 36, Issue 2, February 2006, Pages 224-231, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.10.006.
(http://www.sciencedirect.com/science/article/B6WBP-4HNYMJN-4/2/567a8bee7cea460cfd62042563bf24ee)
Abstract:
Area-wide control of the Mediterranean fruit fly (=medfly), Ceratitis capitata (Wiedemann), typically involves sterile insect technique (=SIT), and at present the 'Temperature Sensitive Lethal' (=TSL) strain is commonly mass-reared for such releases. In theory, and with some experimental support, the augmentative addition of parasitoids to sterile releases can suppress pest populations to a greater extent than either technique alone. The efficacies of TSL males, parasitoids, and TSL males and parasitoids were compared in large field cages erected over coffee grown at four locations and three altitudes (relatively high, medium and low for the crop) in Guatemala. Two species of opiine braconid parasitoids, the larval-pupal parasitoid Diachasmimorpha krausii (Fullaway) and the egg-pupal parasitoid Fopius arisanus (Sonan), were released either together or in combination with sterile males into cages along with fertile medflies. Results of this evaluation were assessed by comparing the number of pupae and adult insects that completed development (F1 generation) as a result of the reproduction of a parental generation released into each field cage. The TSL males significantly suppressed F1 fly populations but only in one of four study sites. However, the inclusion of F. arisanus and D. krausii always provided significant suppression and the effect was frequently substantial. In one site there was a significant interaction between the capacity of sterile males and parasitoids to suppress caged fly populations. There was no effect of host-fruit abundance on the numbers of flies recovered, however, there were significant interactions between maximum and minimum temperatures and the effects of sterile males and parasitoids, respectively. The results suggest that mass-reared sterile medflies and biological control agents should be tested for both consistent sexual-quality and their ability to perform in the various environments in which they will be released.
Keywords: Braconidae; Augmentative release; Sterile insect technique; Mass rearing; Field-cages

Wafa Masoud, Christa Hoj Kaltoft, The effects of yeasts involved in the fermentation of Coffea arabica in East Africa on growth and ochratoxin A (OTA) production by Aspergillus ochraceus, International Journal of Food Microbiology, Volume 106, Issue 2, 1 February 2006, Pages 229-234, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.06.015.
(http://www.sciencedirect.com/science/article/B6T7K-4H87794-4/2/708ba1fea2a3f7b67cba0816f68a0e29)
Abstract:
The effects of Pichia anomala, Pichia kluyveri and Hanseniaspora uvarum predominant during coffee processing on growth of Aspergillus ochraceus and production of ochratoxin A (OTA) on malt extract agar (MEA) and on coffee agar (CA) were studied. The three yeasts were able to inhibit growth of A. ochraceus when co-cultured in MEA and CA. Growth inhibition was significantly higher on MEA than on CA. Furthermore, P. anomala and P. kluyveri were found to have a stronger effect on growth of A. ochraceus than H. uvarum. The three yeasts were able to prevent spore germination of A. ochraceus in yeast glucose peptone (MYGP) broth. In yeast-free supernatant of MYGP broth after an incubation period of 72 h, spores of A. ochraceus were able to germinate with very short germ tubes, but further development of the germ tubes was inhibited.

The three yeasts decreased the pH of MYGP broth from 5.6 to a range of 4.4-4.7, which was found to have no effect on spore germination of A. ochraceus.
P. anomala, P. kluyveri and H. uvarum were able to prevent production of OTA by A. ochraceus when co-cultured on MEA. On CA medium, P. anomala and P. kluyveri prevented A. ochraceus from producing OTA. H. uvarum did not affect production of OTA by A. ochraceus on CA medium.
Keywords: Coffee; Pichia anomala; Pichia kluyveri; Hanseniaspora uvarum; Aspergillus ochraceus; OTA

Jeffrey H. Toney, Mipha L. Koh, Inhibition of Xylella fastidiosa Biofilm Formation via Metal Chelators, Journal of the Association for Laboratory Automation, Volume 11, Issue 1, February 2006, Pages 30-32, ISSN 1535-5535, DOI: 10.1016/j.jala.2005.10.002.
(http://www.sciencedirect.com/science/article/B75DF-4J8V4GF-B/2/cbb3143ec82a2c18add356f3a4a6d9fb)
Abstract:
Xylella fastidiosa (Xf) is the causative agent of Pierce's disease in a variety of commercially important plants such as citrus, coffee, and grapes. By blocking the xylem, Xf disrupts water and nutrient transport. Xf is a gram-negative phytopathogen that can form biofilms. Twelve genes have been identified in Xf that can regulate exopolysaccharides, a major component of biofilms, including aconitase, which responds to intracellular iron levels. We have employed a quantitative assay for biofilm formation referred to as minimal biofilm elimination concentration (MBEC) assay that is amenable for high-throughput screening. Biofilm formation by Xf (Napa, CA) can be blocked using iron chelators such as lactoferrin (LF), ethylenediaminetetraacetic acid (EDTA), and S,S'-ethylenediaminedisuccinic acid (EDDS). Incubation of Xf in the presence of LF at 1000 [mu]g/mL for 3.5 days showed inhibition of biofilm formation (42%) as well as inhibition (32%) of planktonic growth (liquid-phase bacteria). EDTA at a concentration of 15 mg/mL inhibited 99.7% of biofilm formation and 98.9% of planktonic growth in a 24 h incubation. In contrast, EDDS at a concentration of 38.2 mg/mL showed 64.7% inhibition of biofilm formation and 33.6% inhibition of planktonic growth. Iron deprivation could serve as a first step toward eradication of Pierce's disease via blockage of biofilm formation.
Keywords: biofilm; Xylella fastidiosa; metal chelators

Geraldo Aclecio Melo, Milton Massao Shimizu, Paulo Mazzafera, Polyphenoloxidase activity in coffee leaves and its role in resistance against the coffee leaf miner and coffee leaf rust, Phytochemistry, Volume 67, Issue 3, February 2006, Pages 277-285, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2005.11.003.
(http://www.sciencedirect.com/science/article/B6TH7-4HVW8CP-3/2/181fe032fef864d4293ab9f8f255e1c9)
Abstract:
In plants, PPO has been related to defense mechanism against pathogens and insects and this role was investigated in coffee trees regarding resistance against a leaf miner and coffee leaf rust disease. PPO activity was evaluated in different genotypes and in relation to methyl-jasmonate (Meja) treatment and mechanical damage. Evaluations were also performed using compatible and incompatible interactions of coffee with the fungus Hemileia vastatrix (causal agent of the leaf orange rust disease) and the insect Leucoptera coffeella (coffee leaf miner). The constitutive level of PPO activity observed for the 15 genotypes ranged from 3.8 to 88 units of activity/mg protein. However, no direct relationship was found with resistance of coffee to the fungus or insect. Chlorogenic acid (5-caffeoylquinic acid), the best substrate for coffee leaf PPO, was not related to resistance, suggesting that oxidation of other phenolics by PPO might play a role, as indicated by HPLC profiles. Mechanical damage, Meja treatment, H. vastatrix fungus inoculation and L. coffeella infestation caused different responses in PPO activity. These results suggest that coffee

resistance may be related to the oxidative potential of the tissue regarding the phenolic composition rather than simply to a higher PPO activity.
Keywords: Coffea; Coffee; Rubiaceae; Hemilea vastatrix; Leucoptera coffeela; Phenolic compounds; Plant resistance; Polyphenoloxidase

Paul Hewlett, Andrew Smith, Correlates of daily caffeine consumption, Appetite, Volume 46, Issue 1, January 2006, Pages 97-99, ISSN 0195-6663, DOI: 10.1016/j.appet.2005.10.004.
(http://www.sciencedirect.com/science/article/B6WB2-4HKCYM3-4/2/6ee57d23f3b8c0d987d716a5c11cafcb)
Abstract:
A study of 376 young British adults showed that estimated daily caffeine consumption increased with age, and was associated with smoking and greater alcohol consumption. Non-consumers of caffeine avoided tea and coffee (even the de-caffeinated form). Level of caffeine consumption was not associated with impulsivity, sociability, extraversion or trait anxiety.
Keywords: Caffeine; Tea; Coffee; Personality; Smoking; Alcohol consumption

Tim P. Batchelor, Ian C.W. Hardy, Juan F. Barrera, Interactions among bethylid parasitoid species attacking the coffee berry borer, Hypothenemus hampei (Coleoptera: Scolytidae), Biological Control, Volume 36, Issue 1, January 2006, Pages 106-118, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.07.015.
(http://www.sciencedirect.com/science/article/B6WBP-4H39324-3/2/57eb2ed5f6b22a5b658d5743913c13e9)
Abstract:
The question of whether biological control is most likely achieved by deploying single or multiple species of biological control agents is much debated. While utilizing several natural enemies may enhance control, there is also the potential for disruptive inter-specific interactions. Such interactions may be studied in the laboratory by focusing on the details of the interactions themselves and attempting to infer population level consequences from their sum, or by focusing more directly on the overall effects on natural enemy populations: we term these approaches `reductionist' and `holistic.' Here we conduct a holistic laboratory study on interactions between three species of parasitoid wasps that are parasitoids of the coffee berry borer, Hypothenemus hampei (Ferrari) (Coleoptera: Scolytidae): Cephalonomia stephanoderis Betrem, C. hyalinipennis Ashmead and Prorops nasuta Waterston (all Hymenoptera: Bethylidae). We find evidence for both intra- and inter-specific resource competition. Interactions between C. stephanoderis and P. nasuta, both indigenous to Africa, appear to be approximately symmetrical, while C. hyalinipennis, naturally found in the coffee plantations of Chiapas, Mexico, may exert a disruptive influence. C. hyalinipennis also has a low population growth rate. We now consider it to be a detrimental invader of the Mexican coffee agro-ecosystem that should not be encouraged by augmentative release or introduced into other regions. Overall, the most successful species, in terms of both emergence and female production, was P. nasuta. We compare these results with those from prior reductionist and holistic studies, and with observations on patterns of establishment of these bethylid species in the field. Given that it is increasingly clear that disruptive inter-specific interactions are generally common when multiple species are deployed in biological control, screening of potential agents should consider such interactions alongside the more `traditional' focus on host specificity.
Keywords: Bethylidae; Cephalonomia stephanoderis; Cephalonomia hyalinipennis; Prorops nasuta; Coffee berry borer; Hypothenemus hampei; Intra- and inter-specific resource competition; Multiple- versus single-species release

M. Denker, M. Parat-Wilhelms, G. Drichelt, J. Paucke, A. Luger, K. Borcherding, W. Hoffmann, H. Steinhart, Investigation of the retronasal flavour release during the consumption of coffee with

additions of milk constituents by `Oral Breath Sampling', Food Chemistry, Volume 98, Issue 2, 2006, Pages 201-208, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.03.034.
(http://www.sciencedirect.com/science/article/B6T6R-4JCBPJ9-1/2/5d6856a3578f0ce8becee9a1f124e640)
Abstract:
The aim of this study was the investigation of the influence of milk proteins (casein and whey proteins) and milk fat on the release of flavour compounds from white coffee beverages in the oral cavity. For this reason a retronasal headspace technique for measurement of the after-flavour was adapted. A `Gas Sampler' equipped with a mouthpiece was used as an `Oral Breath Sampler (OBS)'. Analyses were performed by gas chromatography with mass spectrometric detection. It was noticed that the sampling at different hours resulted in different standard deviations. The flavour release is more constant in the morning (Variation coefficient from 3% to 28%; median: 10%) than in the afternoon (7-52%; median: 23%). The relationships between flavour release and some salivary parameters like salivation rate, buffer capability and protein content were also studied. The `Oral Breath Sampling' was considered to be a valuable sampling method for the analysis of the retronasal aroma release from coffee beverages.
Keywords: Oral Breath Sampling; Retronasal; Casein; Whey proteins; Milk fat

Vural Gokmen, Hamide Z. Senyuva, Study of colour and acrylamide formation in coffee, wheat flour and potato chips during heating, Food Chemistry, Volume 99, Issue 2, 2006, Pages 238-243, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.06.054.
(http://www.sciencedirect.com/science/article/B6T6R-4H87GNS-4/2/8c64bc5634f7a3870a6f256239e97773)
Abstract:
The effects of heating on colour generation measured as CIE colour space parameters of L* a* b* and acrylamide formation were studied in various food matrices including green coffee, wheat flour and potato chips at different temperatures. Changes in both the acrylamide concentration and the redness parameter a* during heating at relatively higher temperatures followed a typical kinetic pattern in which an initial increase to an apparent maximum followed by a subsequent decrease was observed. The similarities between the changes in acrylamide and redness parameter a* during heating revealed that colour may be a reliable indicator of acrylamide levels in thermally processed foods. The overall results suggest that both acrylamide and redness parameter a* form as intermediate products during Maillard reaction. Since an apparent decrease was observed in its level during prolonged heating at certain temperatures, prediction of acrylamide level in foods during processing should be based on realistic reaction mechanism, instead of simple linear regression model.
Keywords: Acrylamide; Colour; Heating; Green coffee; Wheat flour; Potato chips

Babitha Tharappan, Rasheed Ahmad, Fungal colonization and biochemical changes in coffee beans undergoing monsooning, Food Chemistry, Volume 94, Issue 2, January 2006, Pages 247-252, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.11.016.
(http://www.sciencedirect.com/science/article/B6T6R-4F9247M-3/2/e332f17dddb96caf4c11cdb3ec152dbc)
Abstract:
Changes in the mycofloral composition and concentrations of proteins, reducing sugars, phenols and tannins in coffee beans were analysed during different weeks of monsooning in Coffea arabica L. (Arabica) and C. canephora Pierre ex Froehner (Robusta). The highest fungal populations occurred during the fourth to seventh week of the monsooning process and the dominant fungal species were Aspergillus niger, Aspergillus tamarii, Aspergillus candidus, Penicillium spp. and Absidia heterospora. The protein and reducing sugar content increased steadily while the tannin content decreased beyond the detectable limit during monsooning. The

phenolic content, however, was found to decline in the case of Robusta and increase slightly in Arabica. Throughout the study the monsooned coffee beans had different mycoflora and varied biochemical composition compared to non-monsooned coffee beans.
Keywords: Coffee; Monsooning; Mycoflora; Protein; Phenolics; Reducing sugars; Tannin

Isabel Lopez-Galilea, Susana Andueza, Isabella di Leonardo, M. Paz de Pena, Concepcion Cid, Influence of torrefacto roast on antioxidant and pro-oxidant activity of coffee, Food Chemistry, Volume 94, Issue 1, January 2006, Pages 75-80, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.10.052.
(http://www.sciencedirect.com/science/article/B6T6R-4FF8WMK-2/2/ac2dcd2ec83312fa2018a2dd27eebff0)
Abstract:
The addition of sugar at the end of the torrefacto roasting process may influence the antioxidant and pro-oxidant properties of coffee because sugar is one of the main precursors the Maillard reaction. The aim of the work was to study and to compare the antioxidant and pro-oxidant properties of some commercial roasted coffees which are selected to represent conventional roasted arabica coffee and arabica/robusta blends, and torrefacto roasted blends. Higher antioxidant activity was observed in Colombian coffees than in conventional roasted coffee blends. On the other hand, when the percentage of torrefacto coffee was increased, an increase of the antioxidant activity and a slight tendency to decrease the pro-oxidant activity were observed. Moreover, principal component analysis allowed separation of: (a) brands by PC1 (46.9%), characterised by colour parameters defined by roasting degree and (b) torrefacto roasted blends by PC2 (33.7%), characterised by antioxidant/pro-oxidant activity.
Keywords: Coffee; Antioxidant activity; Pro-oxidant activity; Torrefacto roast; Color; Maillard reaction

A. Farah, M.C. Monteiro, V. Calado, A.S. Franca, L.C. Trugo, Correlation between cup quality and chemical attributes of Brazilian coffee, Food Chemistry, Volume 98, Issue 2, 2006, Pages 373-380, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.07.032.
(http://www.sciencedirect.com/science/article/B6T6R-4H87GNS-1/2/f19c625e9402b86a508bc22f6754d733)
Abstract:
Brazilian arabica coffee is classified for trading according to the quality of the beverage obtained after roasting and brewing. In the present study, Brazilian green and roasted coffee beans were investigated for possible correlations between cup quality and the levels of sucrose, caffeine, trigonelline and chlorogenic acids, determined by HPLC analysis. Trigonelline and 3,4-dicaffeoylquinic acid levels in green and roasted coffee correlated strongly with high quality. To a lesser extent, caffeine levels were also associated with good quality. On the other hand, the amount of defective beans, the levels of caffeoylquinic acids (predominantly 5-caffeoyilquinic acid), feruloylquinic acids, and their oxidation products were associated with poor cup quality and with the Rio-off-flavor. The fact that similar correlations between cup quality and chemical attributes were observed in green and light roasted samples - the latter used for coffee cup classification - indicates that chemical analysis of green beans may be used as an additional tool for coffee quality evaluation.
Keywords: Coffee quality; Rio-off-flavor; Chlorogenic acids; Trigonelline; Caffeine

Jose A. Rufian-Henares, Francisco J. Morales, A new application of a commercial microtiter plate-based assay for assessing the antimicrobial activity of Maillard reaction products, Food Research International, Volume 39, Issue 1, January 2006, Pages 33-39, ISSN 0963-9969, DOI: 10.1016/j.foodres.2005.06.002.

(http://www.sciencedirect.com/science/article/B6T6V-4GNTFKH-4/2/c6df3aa2f9aa6c3708103e6233446adb)
Abstract:
A new application of a commercial microtiter plate-based assay was developed for the quantitative screening of antimicrobial compounds formed during the thermal treatment of foods. Such compounds called Maillard reaction products (MRP) are widely distributed in the diet of western countries. The reported method is fast, cheap and easy and facilitates the generation of a dose-response curve which allows calculating the antimicrobial activity of most substances at the same time as minimum inhibitory concentration (MIC) or as oxytetracyclin equivalent value (OTEV). The test is accurate and highly reproducible (inter- and intra-day variation of 2.3% and 1.8%, respectively). For the tested samples, the higher antimicrobial activity was found in coffee melanoidins (high molecular weight fraction of MRP) although non-covalently melanoidins-linked compounds showed antimicrobial activity too. In addition, melanoidins from more severely treated samples exerted higher inhibitory bacterial growing activity, such as CTn60 coffee (highest roasting degree) and dark beer.
Keywords: Antimicrobial activity; Heat treated foods; Maillard reaction; Melanoidins

Natalia Hoyos, Nicholas B. Comerford, Land use and landscape effects on aggregate stability and total carbon of Andisols from the Colombian Andes, Geoderma, Volume 129, Issues 3-4, December 2005, Pages 268-278, ISSN 0016-7061, DOI: 10.1016/j.geoderma.2005.01.002.
(http://www.sciencedirect.com/science/article/B6V67-4FJGWBH-2/2/0dad0dd9bcb846f1034d4cc6a92eaadc)
Abstract:
The Dosquebradas Basin, in the central coffee-growing region of the Colombian Andes, covers 58 km2 between 1350 and 2150 m of elevation. Soils in this basin are mostly Melanudands. Soil sampling units were defined on the basis of land use (sun coffee, shade coffee and pasture) and slope. Samples from 76 sites were collected during June-July of 2002 to measure water stable aggregates, aggregate carbon concentration, total carbon content and C/N ratios, and analyze the effect of aggregate size, land use, landscape position (summit, shoulder, backslope) and depth on these properties. Analyses of variance indicated an interaction effect of land use and landscape position on water stable aggregates and aggregate carbon concentration, while a main effect of land use on total carbon content and C/N ratios. Higher percentages of water stable aggregates were found under sun coffee (95%) and pasture (93%) compared to shade coffee (83%) at the backslope position. Aggregate carbon concentration was highest under pasture (95 g kg-1) at the summit position and under sun coffee (76.7 g kg-1) at the shoulder position. Aggregate size (>2 mm, 1 to 2 mm and <1 mm) did not have an effect on aggregate carbon concentration, indicating that these Andisols do not conform to the aggregate hierarchy model. Total carbon content of surface samples (0 to 5 cm) was higher under pasture (26 tC ha-1) than under shade coffee (19 tC ha-1). Carbon content under sun coffee (23 tC ha-1) was not significantly different from either one. The most notable findings were (a) the generalized high percentages of water stable aggregates (75% of sites with water stable aggregates above 90%) which point to the relatively high stability of Andisols, and (b) the significant differences in aggregate carbon concentration, particularly at the summit where pasture incorporated almost 30% more carbon into aggregates compared to the coffee systems.
Keywords: Andisol; Water stable aggregates; Soil carbon; Land use; Coffee; Colombia

Paul Van der Meeren, Mamdouh El-Bakry, Nico Neirynck, Pascal Noppe, Influence of hydrolysed lecithin addition on protein adsorption and heat stability of a sterilised coffee cream simulant, International Dairy Journal, Volume 15, Issue 12, December 2005, Pages 1235-1243, ISSN 0958-6946, DOI: 10.1016/j.idairyj.2004.12.007.

(http://www.sciencedirect.com/science/article/B6T7C-4G0YTBK-2/2/1a9c14dcf5e978b5e2c5c7952b47df0d)
Abstract:
Within an overall goal to enhance the stability of coffee cream, the influence of hydrolysed soybean lecithin addition was investigated. To avoid the seasonal variations in milk composition a model system was used containing 5% (w/w) soybean oil and 12% (w/w) skimmed milk powder with and without lecithin addition before a two-step high-pressure homogenisation. Addition of 20% (w/v) caesium chloride enabled a nearly complete recovery of the fat in the cream layer upon centrifugation of casein-stabilised emulsions. From the fat and protein content of this cream layer, it was concluded that lecithin addition did not significantly affect the protein content of the cream layer after emulsion preparation, but significantly reduced the additional milk protein adsorption at the oil/water interface upon sterilisation. The experimental data suggest that the enhanced heat stability of the lecithin-supplemented coffee cream simulant may be explained by the fact that hydrolysed lecithin largely reduces attractive protein-protein interactions during sterilisation.
Keywords: Hydrolysed lecithin; Phospholipids; Heat stability; Coffee cream

Natalia Hoyos, Peter R. Waylen, Alvaro Jaramillo, Seasonal and spatial patterns of erosivity in a tropical watershed of the Colombian Andes, Journal of Hydrology, Volume 314, Issues 1-4, 25 November 2005, Pages 177-191, ISSN 0022-1694, DOI: 10.1016/j.jhydrol.2005.03.014.
(http://www.sciencedirect.com/science/article/B6V6C-4GC1RS6-1/2/ec9f5519cf66e803511d9ed51913635f)
Abstract:
The Dosquebradas Basin, in the central coffee growing region of Colombia, covers an area of 58 km2 between 1350 and 2150 m of elevation, with an annual precipitation of 2600-3200 mm. Seasonal erosivity (EI30), as defined by the Revised Universal Soil Loss Equation (RUSLE), was calculated for 11 years of record (1987-1997) from six pluviographic stations located within 21 km of the basin. Regression models for each station indicated that storm rainfall explained 61-70% of the variation in storm erosivity. Individual storms represented as much as 25% of the annual EI30 (10,409-15,975 MJ mm ha-1 h-1 yr-1). At the seasonal scale, the explained variation increased to 75-86%. There was a significant difference between wet and dry seasons, with higher values and larger increases in erosivity per unit increase in rainfall during the wet seasons. Two pooled regression models, one for the wet and one for the dry seasons, were created and used to estimate seasonal erosivity for 10 stations with pluviometric data. Interpolation surfaces were created from seasonal values using the local polynomial algorithm. Spatial patterns of erosivity were related to (a) the regional elevation gradient, particularly important during the dry seasons, and (b) local topographic effects, particularly during the wet seasons. Our findings underscore the importance of using seasonal erosivity values and local rainfall intensity records in tropical mountainous regions characterized by marked rainfall seasonality and complex topography.
Keywords: Rainfall erosivity; RUSLE; Soil erosion; Andes; GIS

Xin-Geng Wang, Ekhlass A. Jarjees, Benjamin K. McGraw, Aime H. Bokonon-Ganta, Russell H. Messing, Marshall W. Johnson, Effects of spinosad-based fruit fly bait GF-120 on tephritid fruit fly and aphid parasitoids, Biological Control, Volume 35, Issue 2, November 2005, Pages 155-162, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.07.003.
(http://www.sciencedirect.com/science/article/B6WBP-4GXVG7M-3/2/5d4f29d568ea83a7a5328777de009ee9)
Abstract:
The spinosad-based fruit fly bait GF-120 has recently been developed as a primary tool for the area-wide control and eradication of tephritid fruit flies. In this study, we assessed the direct contact toxicity of GF-120 to three major parasitoids of tephritids in Hawaii: Fopius arisanus (Sonan), Diachasmimorpha tryoni (Cameron), and Psyttalia fletcheri (Silvestri) (Hymenoptera:

Braconidae), as well as one aphid parasitoid, Aphidius transcaspicus Telenga (Hymenoptera: Aphidiidae). All four parasitoid species were susceptible to GF-120. Males and females were equally susceptible to GF-120 for all species. The 24-h LC50 values for the opiine braconid species were in a narrow range (8.3-17.5 ppm). The aphidiid appeared to be more susceptible than the opiines, probably due to the stickiness of GF-120. We confirmed that adult F. arisanus (as a model species) do not feed directly on GF-120 either in the presence or the absence of honey and water resources. F. arisanus tasted, discriminated, and gave up GF-120 droplets after a brief (<1 s) mouth examination. Mortality following exposure to GF-120 resulted from close contact. Furthermore, we found that when female F. arisanus were allowed to freely forage on host coffee branches sprayed with droplets at the recommended field rate for use of GF-120 (80 ppm), treatment mortality was significantly higher than control mortality (sprayed with water), and also increased with exposure time. Although GF-120 appears to be the most judicious of reduced-risk fruit fly baits currently available, our results suggest that area-wide application of GF-120 needs to be carefully monitored in situations where release or conservation of parasitoids is a prime concern.
Keywords: Aphidius transcaspicus; Diachasmimorpha tryoni; Fopius arisanus; Fruit fly parasitoids; GF-120; Parasitoid feeding; Psyttalia fletcheri; Spinosad toxicity

C. Campa, S. Doulbeau, S. Dussert, S. Hamon, M. Noirot, Qualitative relationship between caffeine and chlorogenic acid contents among wild Coffea species, Food Chemistry, Volume 93, Issue 1, November 2005, Pages 135-139, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.10.015.
(http://www.sciencedirect.com/science/article/B6T6R-4F14YV8-6/2/f14b38a104ab338c34f221120bea181a)
Abstract:
Chlorogenic acids, sensu largo (CGA), are secondary metabolites of great economic importance in coffee: their accumulation in green beans contributes to coffee drink bitterness. Previous evaluations have already focussed on wild species of coffee trees, but this assessment included six new taxa from Cameroon and Congo and involved a simplified method that generated more accurate results. Five main results were obtained: (1) Cameroon and Congo were found to be a centre of diversity, encompassing the entire range of CGA content from 0.8% to 11.9% dry matter basis (dmb); (2) three groups of coffee tree species - CGA1, CGA2 and CGA3 - were established on the basis of discontinuities; (3) means were 1.4%, 5.6% and 9.9% dmb, respectively; (4) there was a qualitative relationship between caffeine and ACG content distribution; (5) only a small part of the CGA is trapped by caffeine as caffeine chlorogenate.
Keywords: Coffeae; Caffeine; Chlorogenic acids

R.J. Redgwell, C. Schmitt, M. Beaulieu, D. Curti, Hydrocolloids from coffee: physicochemical and functional properties of an arabinogalactan-protein fraction from green beans, Food Hydrocolloids, Volume 19, Issue 6, November 2005, Pages 1005-1015, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2004.12.010.
(http://www.sciencedirect.com/science/article/B6VP9-4FFN532-1/2/9351b78e0dd9c5e0004f15b9dc543f1b)
Abstract:
The arabinogalactan-protein (AGP) fraction of green coffee beans accounts for ~15% of the dry bean. A procedure was developed to solubilise most of the AGP content of the beans so that its properties as a hydrocolloid could be investigated. An AGP fraction was partially purified from green arabica coffee beans, its rheological properties characterised and compared to those of some commercially important hydrocolloids, particularly acacia gum. The coffee AGP fraction dissolved readily in water to give colourless clear solutions. The polymer was a polyelectrolyte with a high molecular weight (Mw 3.78x106), characterised by a narrow polydispersity index (Mw/Mn

1.3). The intrinsic viscosity was close to that of acacia gum ([[eta]]=0.23 dL g-1), but a 1 wt% solution of coffee AGP was three times more viscous than acacia gum at the same concentration. Coffee AGP showed Newtonian flow for concentrations below 6 wt%, but above this concentration the flow behaviour entered a shear-thinning regime. The coffee AGP fraction possessed interesting foaming properties providing that the biopolymer concentration was high enough to initially stabilize the interface that is created. The high molecular weight of coffee AGP combined with its globular structure conferred upon it a high ability to retain water within a foam thin film. However, the structure of the interfacial film was less effective than that of acacia gum to entrap efficiently the gas into the foam. In summary, coffee AGP shows some interesting rheological features which suggest that coffee beans could be used as an alternative source of the class of surface-active polymers which find many commercial applications.
Keywords: Hydrocolloids; Arabinogalactan-protein fraction; Green beans

Adriana S. Franca, Juliana C.F. Mendonca, Sami D. Oliveira, Composition of green and roasted coffees of different cup qualities, LWT - Food Science and Technology, Volume 38, Issue 7, November 2005, Pages 709-715, ISSN 0023-6438, DOI: 10.1016/j.lwt.2004.08.014.
(http://www.sciencedirect.com/science/article/B6WMV-4DHXF5Y-5/2/fd43c1c1e9cf65ace918ab64fac0a14a)
Abstract:
One of the most important criteria used for assessing coffee quality is based on sensory analysis and is referred to as cup quality. The presence of defective coffee beans is quite relevant to coffee quality. However, the majority of data on coffee properties are restricted to supposedly good quality beans. Therefore, the present study is aimed at an evaluation of physical and chemical attributes of coffees of different qualities, both green and roasted. Arabica coffee samples, previously classified by cup as soft (higher quality), hard, rioysh and rio (lower quality), were roasted at 200 [degree sign]C for 1 h. Regarding attributes of green coffee beans, both bean density and volume were higher for the soft sample compared to the rio one. The soft sample also presented higher protein levels, due to its higher caffeine contents. The rio sample presented lower lipid contents, probably associated to the presence of defective beans. Acidity increased and pH levels decreased as cup quality decreased, probably due to the effect of defective beans that undergone fermentation (sour beans). After roasting, the rio sample presented higher density and trigonelline levels, indicating that it did not roast to the same degree as the other samples.
Keywords: Coffee; Cup quality; Proximal composition; Caffeine; Trigonelline

John F. Kennedy, Rocio Martin Alanis, J.N. Wintgens (Ed.), Coffee: Growing, Processing, Sustainable Production, Weinheim, Germany: Wiley-VCH, 2004, xl +976 pp., [pound sign]205.00, ISBN 3-527-30731-1., Carbohydrate Polymers, Volume 62, Issue 1, 17 October 2005, Page 87, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2005.05.021.
(http://www.sciencedirect.com/science/article/B6TFD-4GJK8BB-3/2/eb7637ec085d7d46e082237ba51e78c0)

Belen Patino, Amaia Gonzalez-Salgado, M Teresa Gonzalez-Jaen, Covadonga Vazquez, PCR detection assays for the ochratoxin-producing Aspergillus carbonarius and Aspergillus ochraceus species, International Journal of Food Microbiology, Volume 104, Issue 2, 15 October 2005, Pages 207-214, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2005.02.011.
(http://www.sciencedirect.com/science/article/B6T7K-4GFCPK1-2/2/9abc05dcc6398e31009292246b69a262)
Abstract:
Two PCR assays have been developed to detect Aspergillus carbonarius and Aspergillus ochraceus, considered the main sources of ochratoxin A (OTA) contaminating commodities, particularly grapes, coffee and derivatives, in warm climates. The species specific primers have

been designed on the basis of ITS (internal transcribed spacers of rDNA units) sequence comparisons obtained from Aspergillus strains and have been tested in a number of strains from different origins and hosts. These PCR assays, based on multi-copy sequences, are highly sensitive and specific and represent a good tool for an early detection of OTA-producing Aspergillus species and to prevent OTA entering the food chain.
Keywords: Aspergillus carbonarius; Aspergillus ochraceus; Ochratoxin A; PCR; Detection; ITS

K.N. Ninan, Jyothis Sathyapalan, The economics of biodiversity conservation: a study of a coffee growing region in the Western Ghats of India, Ecological Economics, Volume 55, Issue 1, 5 October 2005, Pages 61-72, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2004.10.005.
(http://www.sciencedirect.com/science/article/B6VDY-4FD0N32-5/2/0d195df93ad2f5270b338bf9a82e901b)
Abstract:
This paper analyses the economics of biodiversity conservation in the context of a tropical forest ecosystem in the Western Ghats region of India, where coffee is the main competitor for land use. Using primary data covering a cross-section of coffee growers, the study notes that the opportunity costs of biodiversity conservation in terms of coffee benefits foregone are quite high. Even after including external costs due to wildlife damages and defensive expenditure to protect against wildlife, the NPVs and IRRs from coffee for all land holding groups were high. Including external costs, these NPVs across different land holding groups ranged between Rs 17 thousand to over Rs 106 thousand per acre at 12% discount rate, and the IRRs between 16.6% and 23%. Even if the expected benefits were to decrease by 20% and costs rise by a similar proportion, still the IRRs from coffee were quite high (19.5-20.1%). The study notes that the external costs accounted for between 7% and 15% of the total discounted costs of coffee cultivation, and smaller holdings proportionately incurred higher external costs as compared to large holdings. The study also notes high transaction costs incurred by the growers to claim compensation for wildlife damages. Notwithstanding these disincentives, the study notes that the local community had a positive attitude towards biodiversity conservation and were willing to pay in terms of spending time for participatory biodiversity conservation. Taking elephants, a keystone and threatened species in Asia and the study region, for the contingent valuation survey, the study notes that the respondents are willing to spend 25.8 humandays per household annually which works to over Rs 6003 per household per annum in terms of the income foregone. They also preferred a decentralized government institution for participatory biodiversity conservation.
Keywords: Biodiversity conservation; Coffee benefits and costs; External and transaction costs; Wildlife damages; Contingent valuation; Participatory elephant conservation

Tad Mutersbaugh, Just-in-space: Certified rural products, labor of quality, and regulatory spaces, Journal of Rural Studies, Volume 21, Issue 4, Certifying Rural Spaces: Quality-Certified Products and Rural Governance, October 2005, Pages 389-402, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2005.08.003.
(http://www.sciencedirect.com/science/article/B6VD9-4HCMSDV-1/2/f76d5a04d34dcfe4edb2946f95302e22)
Abstract:
Since the mid-1990s, the number and diversity of `quality-certified' products has increased dramatically. This article examines labor practices and regulatory spaces within 3rd party quality certification and suggests that this distinct configuration be termed `just-in-space' production. A privileging of space derives, on the one hand, from the character of qualities certified. `Extrinsic' qualities, such as biodiversity conservation or fair-trade labor practices, may only be introduced into the commodity through monitoring of labor at the point of production and along the commodity chain to retailer venues. This monitoring, accomplished via inspections and document production on a track that parallels the commodity movement, occurs within a semi-public space and results

in an uneasy tension between a social interest in open inspections of ecological and socially-just production and retailer interest in controlling certification information about `green' products. At the same time, transnational institutional regulation of certification (e.g., ISO), together with popular support for quality certification, limits the power of retailers and activists to alter certification practices and sustains the semi-public character of this space. Using a literature review and research on certified organic coffee, this paper examines practical and theoretical implications of just-in-space production, and concludes that while this configuration facilitates public action in support of social-justice and environmental conservation, it is also susceptible to manipulation by large retail firms that chose to evade 3rd party certification by setting up private certifications.

Peter Leigh Taylor, A Fair Trade approach to community forest certification? A framework for discussion, Journal of Rural Studies, Volume 21, Issue 4, Certifying Rural Spaces: Quality-Certified Products and Rural Governance, October 2005, Pages 433-447, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2005.08.002.
(http://www.sciencedirect.com/science/article/B6VD9-4H3Y9NV-1/2/a4fe03a52a7f694591ea1321da95086b)
Abstract:
Forest certification has gained growing attention as a market-based instrument to make globalizing markets a force for mitigating rather than fostering environmental degradation. Yet in practice, market mechanisms currently appear to encourage concentration of forest certification in Northern temperate and boreal forests, rather than in the tropical forests certification originally aimed to protect. At the same time, the share of tropical and other Southern forests under community management is increasing dramatically. Utilizing a comparative analysis of coffee and wood products commodity chains, a preliminary framework is proposed for exploring the obstacles and the possibilities of a 'Fair Trade' approach to community forest certification. Obstacles include the structure of conventional wood products commodity chains, common wood product characteristics, certification's current commitment to conventional market logics and practices, and informal governance influences favoring powerful economic actors. The paper argues, however, that other features of forest certification, especially in the FSC scheme, are potentially supportive of a Fair Trade community forestry approach.

Alma Amalia Gonzalez, Ronald Nigh, Smallholder participation and certification of organic farm products in Mexico, Journal of Rural Studies, Volume 21, Issue 4, Certifying Rural Spaces: Quality-Certified Products and Rural Governance, October 2005, Pages 449-460, ISSN 0743-0167, DOI: 10.1016/j.jrurstud.2005.08.004.
(http://www.sciencedirect.com/science/article/B6VD9-4HK5SP1-1/2/483ce027ab1988b095ab843cd4aea202)
Abstract:
Organic and other environmental and social marketing devices seek to connect producers and consumers more directly and reward environmentally and socially superior production systems. Some researchers have observed that these schemes may introduce mechanisms of exclusion, creating an elite group of certified smallholders while putting non-certified farmers at a distinct disadvantage and introducing division among people whose true interest may lie more in relations of solidarity and cooperation. The trade and regulatory environment that smallholder coops must navigate is increasingly complex and adaptation to its requirements has important implications for farmer organizations. Standards applied to certify smallholder production systems tend to be developed with regard to first-world consumer interests and imposed in a top-down fashion by certification agencies and intermediaries, with little or no farmer participation. Especially in the tropics, agricultural standards that reflect temperate country conditions may place unnecessary burdens on growers who attempt to meet agronomic norms that are irrelevant to local agroecologies. After providing a summary of organic farming and certification in Mexico over the

past two decades, we discuss three emerging trends: the advent of contract agriculture in organic production, the appearance of a new, environmentally-based coffee certification system intended to favor bird conservation, and a recent government program to support transition to organic production. All three trends involve certain contradictions, both with the foundational social and ecological goals of organic agriculture and with the interests of small farmers.

Pierre Marraccini, W. John Rogers, Victoria Caillet, Alain Deshayes, Dominique Granato, Francoise Lausanne, Sylvianne Lechat, David Pridmore, Vincent Petiard, Biochemical and molecular characterization of [alpha]-d-galactosidase from coffee beans, Plant Physiology and Biochemistry, Volume 43, Issues 10-11, October-November 2005, Pages 909-920, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2005.08.010.
(http://www.sciencedirect.com/science/article/B6VRD-4H80S9D-1/2/cf90a4a0335ac4e3311f67547193d510)
Abstract:
[alpha]-d-Galactosidase ([alpha]-Gal; EC 3.2.1.22) is one of three principal enzymes involved in the modification or degradation of plant cell wall galactomannans. In the present paper it is shown that [alpha]-galactosidase activities in field-grown coffee beans are variable amongst cultivars of the two species investigated (Coffea arabica and C. canephora var. Robusta). Higher activities were found in Arabica cultivars. Using beans from greenhouse-cultivated C. arabica as a model, we showed that [alpha]-Gal activity was undetectable in the bean perispem tissue, but increased gradually during the endosperm development, to reach a peak at approximately 30 weeks after flowering (WAF) which coincided with the hardening of the endosperm. [alpha]-Gal-specific transcripts detected at 22 and 27 WAF accompanied the peak of [alpha]-Gal activity, but were reduced to be undetectable in mature beans at 30 WAF, while [alpha]-Gal activity still persisted. Two isoforms were distinguished in 2-DE profiles of crude protein extracts by N-terminal sequencing analysis. Analysis of two-dimensional gel electrophoresis profiles demonstrated that both isoforms accumulated in a linear fashion throughout grain maturation. [alpha]-Gal activity was also observed to increase to high levels during in vitro germination of coffee beans suggesting an important function of this enzyme in this process. [alpha]-Gal cDNA sequences from Arabica and Robusta were sequenced and their deduced proteins appeared to be very similar, differing by only eight amino acids. Southern-blot analysis suggests that the enzyme was encoded by at least two genes in C. arabica that could explain the existence of the two isoforms identified in 2-DE profiles.
Keywords: [alpha]-Galactosidase; Bean development; Cell wall polysaccharide; Coffea arabica; Coffea canephora; Galactomannan; Germination

Natalia Hoyos, Spatial modeling of soil erosion potential in a tropical watershed of the Colombian Andes, CATENA, Volume 63, Issue 1, 30 September 2005, Pages 85-108, ISSN 0341-8162, DOI: 10.1016/j.catena.2005.05.012.
(http://www.sciencedirect.com/science/article/B6VCG-4GYH82B-1/2/79487be79422b72a1621ad1bb2e8f9a5)
Abstract:
Soil erosion potential of a 58 km2 watershed in the coffee growing region of the Colombian Andes was assessed using the Revised Universal Soil Loss Equation (RUSLE) in a GIS environment. The RUSLE factors were developed from local rainfall, topographic, soil and land use data. Seasonal erosivity factors (R) were calculated for six pluviographic stations (1987-1997) located within 22 km of the basin. Two regression models, one for the wet and one for the dry seasons, were created and used to estimate seasonal erosivity for 10 additional stations with pluviometric data. Erosivity was on average higher in the wet seasons (4686 MJ mm ha- 1 h- 1 season- 1) than the dry ones (2599 MJ mm ha- 1 h- 1 season- 1). Seasonal erosivity surfaces were generated using the local polynomial interpolation method, and showed increases from west to east in accordance with regional elevation. Soil erodibility was calculated from field measurements of

water stable aggregates (> 2 mm) and infiltration, which were influenced by land use. Three erodibility scenarios were considered (high, average and low) to represent the variability in infiltration measurements within each land use. The topographic and land cover factors were developed from existing contour and land use data. Model results indicated that in the dry seasons, and under the average erodibility scenario, 534 ha (11%) of the basin's rural area were within the extreme erosion potential category (above 3.5 t ha- 1 season- 1). During the wet seasons, this area increased to 1348 ha (28%). In general, areas under forest and shrub had low erosion potential values, while those under coffee and pasture varied according to topography. Modeling of probable land use change scenarios indicated that the erosion potential of the basin would decrease as a result of coffee conversion to pasture.
Keywords: Soil erosion potential; RUSLE; Andisol; Coffee; Andes; Colombia

Ivette Perfecto, John Vandermeer, Alex Mas, Lorena Soto Pinto, Biodiversity, yield, and shade coffee certification, Ecological Economics, Volume 54, Issue 4, 15 September 2005, Pages 435-446, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2004.10.009.
(http://www.sciencedirect.com/science/article/B6VDY-4FD0N32-6/2/dc1b8683d98ba56194bc862c01528191)
Abstract:
The current crisis in the coffee market provides an opportunity to explore alternative markets. In Latin America, coffee is traditionally produced under a diverse and dense canopy of shade trees. The structural and floristic diversity contained therein harbors a high biodiversity of associated organisms. The recent trend of reducing this shade cover so as to increase production raises concerns about the potential loss of biodiversity. This concern has given rise to a variety of conservation programs, including shade coffee certification, a market-based conservation strategy. Shade coffee certification programs offer the opportunity to link environmental and economic goals. Although the idea of shade certification is to compensate farmers for the biodiversity conservation service provided by their shaded plantations, the premium offered may not compensate for the low yields of the most shaded plantations. Here we present an approach for guiding the establishment of premium prices for coffee producers based on scientific information that relates shade percentage and levels of species richness with yield. Partial data from two separate studies in Chiapas, Mexico, are combined and used to illustrate this approach. In addition, further theoretical explorations are made by adapting an intercropping model and using coffee yield and biodiversity (as it relates to percent of shade of canopy trees) as the two relevant variables. This model is examined qualitatively from the point of view of optimality (balancing biodiversity preservation with production). Results suggest that price premium for shade certification should be high and go directly to the producers, especially if the intent is to conserve forest-sensitive species.
Keywords: Coffee certification programs; Yield set; Biodiversity; Agroforestry

Mirna Suarez-Quiroz, Oscar Gonzalez-Rios, Michel Barel, Bernard Guyot, Sabine Schorr-Galindo, Joseph-Pierre Guiraud, Effect of the post-harvest processing procedure on OTA occurrence in artificially contaminated coffee, International Journal of Food Microbiology, Volume 103, Issue 3, 15 September 2005, Pages 339-345, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2004.11.044.
(http://www.sciencedirect.com/science/article/B6T7K-4GMGW3V-1/2/5a409d2a641573ce409c9379dc5d6a9e)
Abstract:
The purpose of this work was to study how the type of post-harvest process, i.e. natural preparation known as the dry method, and two wet processes, affected contamination and toxin production up to the green coffee stage. Batches were contaminated with ochratoxin A or with OTA-producing strains of Aspergillus ochraceus and Aspergillus niger. For OTA artificial contamination, hulling or husk removal caused a reduction of OTA. When A. ochraceus was

inoculated at low level, its growth was hampered by indigenous mould flora contrary that observed with A. niger. The fungal counts and OTA assays showed that the best way of limiting the development and impact of contaminating toxigenic flora 'from the field' was the physical wet method.
Keywords: Coffee; Ochratoxin A; Aspergillus ochraceus; Aspergillus niger

Bruno Verbist, Andree Eka Dinata Putra, Suseno Budidarsono, Factors driving land use change: Effects on watershed functions in a coffee agroforestry system in Lampung, Sumatra, Agricultural Systems, Volume 85, Issue 3, Local Land Use Strategies in a Globalizing World: Subsistence Farming, Cash Crops and Income Diversification, September 2005, Pages 254-270, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.06.010.
(http://www.sciencedirect.com/science/article/B6T3W-4GPW3S7-3/2/5a6631e5bf29b71f29f841f7d6f8c692)
Abstract:
Forest cover in Sumberjaya declined from 60% to 10% over the past three decades; current land uses are a mosaic of smallholder coffee fields on slopes, and rice paddies and vegetables in the valleys. While deforestation was continuing at the forest frontier, farmers were already `re-treeing' the landscape and many monoculture coffee gardens were gradually transformed into mixed systems with shade trees. In this case study we illustrate that the factors driving deforestation were strong, interconnected and generally outside the forestry domain. The current agroforestry landscape generates a significantly higher discharge than in the past, allowing a hydropower dam to revise its power-production targets upwards. One of the main reasons given to justify the eviction of farmers in the watershed, based on claims that the past land use change would negatively affect the discharge and the dam's power generation, proved wrong. In this area, various myths about watershed functions - already dismissed in other parts of the world - still dominate the thinking of many foresters and policymakers; this paper illustrates how and why this situation came about.
Keywords: Deforestation; Shade coffee; Perceptions; Watershed functions; Driving factors

Eija Soini, Land use change patterns and livelihood dynamics on the slopes of Mt. Kilimanjaro, Tanzania, Agricultural Systems, Volume 85, Issue 3, Local Land Use Strategies in a Globalizing World: Subsistence Farming, Cash Crops and Income Diversification, September 2005, Pages 306-323, ISSN 0308-521X, DOI: 10.1016/j.agsy.2005.06.013.
(http://www.sciencedirect.com/science/article/B6T3W-4GP7PGY-2/2/81c7d48727a7557d922e857168585545)
Abstract:
This study is about changes in land use and interactions of land use change and livelihoods in the Chagga farming system on the slopes of Mt. Kilimanjaro, Tanzania. An aerial photo interpretation and fragmentation analysis of the years 1961, 1982 and 2000 was conducted covering approximately the Kirua Vunjo Division, a transect of 152 km2 from the forest reserve edge to the plains. Earlier changes were traced from literature review. The results show the expansion of cultivation to more marginal land down the slope, the disappearance and extreme fragmentation of bush land and appearance and expansion of settlements. The home garden area has experienced some specific internal change, but has not expanded down the slope. In the 1960s there were small open fields and patches of grazing lands amongst home gardens. In the 1980s the area was more uniformly covered by homegardens. Since then it has become patchy again as new homesteads have been built on subdivided farms and more food is produced on the higher slopes. Population pressure and the ensuing expansion of agriculture to more marginal land, intensification of the homegarden system, together with climate changes affecting the water supplies, have caused changes in farmers' livelihoods. As land scarcity now hinders expansion of agriculture, farm size has seriously decreased, common resources have become scarce, and

prices of coffee in the world market remain low, farmers are trying to intensify and diversify their farm production. Local initiative is leading to change, but the locally conceived alternatives are too few and lack integrated approaches of technical agricultural research, economic analysis, and policy studies and reforms. Non-agricultural activities and paid employment are becoming increasingly important. However, due to considerable entry barriers to remunerable off-farm jobs, not all households enjoy equal access to attractive non-farm opportunities. The future welfare of the area will depend on increasing the marketable knowledge and skills of the population that will enable it to become integrated in the economy of the region and the country.
Keywords: Home gardens; Chagga; Land use; Diversification; Occupational multiplicity; Landscape

Claudia Hemp, The Chagga home gardens - Relict areas for endemic Saltatoria species (Insecta: Orthoptera) on Mount Kilimanjaro, Biological Conservation, Volume 125, Issue 2, September 2005, Pages 203-209, ISSN 0006-3207, DOI: 10.1016/j.biocon.2005.03.018.
(http://www.sciencedirect.com/science/article/B6V5X-4G24XJN-2/2/236390b3449da55f86969b9875695aad)
Abstract:
The sub-montane cultivation belt, with its so-called Chagga home gardens on Mount Kilimanjaro, was investigated for its Saltatoria fauna. Since these cultivated fields still have the structure of a forest, differing mainly in the undergrowth, more than half of the 52 recorded species are forest species, whilst the remainder originate from open habitats. Moreover, the Chagga home gardens harbour >70% of all forest species and >50% of the endemic species of Mount Kilimanjaro. Most endemics in the plantations originate from sub-montane habitats, and contribute 72% of the total number of sub-montane endemics found in the region. More than half of all endemics from the montane zone are also found in the Chagga home gardens. Therefore, the Chagga home gardens act as an important refuge for both generalist forest species and endemic fauna. In recent years, new coffee varieties have been introduced to the gardens that are less shade demanding, and tree removal may impinge on the indigenous Saltatoria fauna.
Keywords: Orthoptera; East Africa; Biodiversity; Endemism; Conservation

Roger Guevara, Saprotrophic mycelial cord abundance, length and survivorship are reduced in the conversion of tropical cloud forest to shaded coffee plantation, Biological Conservation, Volume 125, Issue 2, September 2005, Pages 261-268, ISSN 0006-3207, DOI: 10.1016/j.biocon.2005.03.026.
(http://www.sciencedirect.com/science/article/B6V5X-4G4XC0H-1/2/9be41a1c70719ac97ed088bbfdc5b520)
Abstract:
One of the most conspicuous soil elements of the tropical cloud forest in central Veracruz, mycelial cord-forming fungi, is strongly affected by the conversion of forest into shaded coffee plantations. Mycelial cord-forming fungi are less abundant, smaller and have a sharper mortality rate in shaded coffee plantations than in relatively conserved forest sites. I present evidence that suggests that changes in soil microenvironmental conditions affect the abundance of mycelial cord forming fungi. These results lend further support to growing evidence that the biodiversity of the understorey and soil are not being conserved within shaded coffee plantations. This contrasts markedly with other studies that suggest that over storey biota is effectively conserved by this conversion.
Keywords: Evergreen cloud forest; Fungal ecology; Mycelial life form; Rustic coffee; Saprotrophic fungi; Soil biodiversity

Vitaly Roginsky, Eduardo A. Lissi, Review of methods to determine chain-breaking antioxidant activity in food, Food Chemistry, Volume 92, Issue 2, September 2005, Pages 235-254, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.08.004.

(http://www.sciencedirect.com/science/article/B6T6R-4DM2BYK-5/2/7b8a7830a9a5f62096732ecc09693e2b)
Abstract:
The beneficial influence of many foodstuffs and beverages including fruits, vegetables, tea, red wine, coffee, and cacao on human health has been recently recognized to originate from the chain-breaking antioxidant activity (AOA) of natural polyphenols, a significant constituent of the above products. For this reason, the dietary value of such products is determined to a large extent by their AOA. The latter stimulated the development of effective and reliable methods for determining AOA. Although the kinetic approach provides the basis of the majority of these methods, only a few of them have been analyzed from the viewpoint of chemical kinetics. This review is intended to close down this gap, at least partly. The most popular methods for determining chain-breaking AOA of food are considered with the aim to estimate their reliability and limitations. The main requirements imposed on these methods have been suggested. The main attention has been paid to the repeatability of the data obtained. Along with the methods that are currently popular among researchers working in food chemistry and biomedical sciences, perspectives of the application of the methods used to studying industrial antioxidants have also been considered. The review consists of two main sections. In the first general section, definitions of the main parameters used to characterize AOA are given and the kinetic basis of the methods applied is considered in some detail. The second section is devoted to particular methods including some technical details. In conclusion the data on AOA obtained by various methods are correlated with each other.

Sandy Slow, Marisa Donaggio, Peter J. Cressey, Michael Lever, Peter M. George, Stephen T. Chambers, The betaine content of New Zealand foods and estimated intake in the New Zealand diet, Journal of Food Composition and Analysis, Volume 18, Issue 6, September 2005, Pages 473-485, ISSN 0889-1575, DOI: 10.1016/j.jfca.2004.05.004.
(http://www.sciencedirect.com/science/article/B6WJH-4FFN4RJ-1/2/59fff51f9037e755a710925a4bf4ed6d)
Abstract:
We have measured the glycine betaine, proline betaine, trigonelline and dimethylsulphoniopropionate (DMSP) content of 74 predominantly processed foods. Combining these data with a previous survey (predominantly commodity based) and using data from the New Zealand National Nutrition Survey, the betaine intake in the average New Zealand diet has been estimated.
Typically, glycine betaine was primarily found at high levels ([greater-or-equal, slanted]150 [mu]g/g) in grain products (bread, pasta, flour), while proline betaine was found in fruit, especially oranges and orange juice and trigonelline was found in coffee. DMSP was only found in very small quantities (<10 [mu]g/g) in a small number of foods. Different sources of individual foods showed variation in betaine content and some food processing, particularly canning, affected betaine content, with betaine found in both the liquid and solid portions of the canned products. The mean intake (+/-) of glycine betaine, proline betaine and trigonelline in the average New Zealand diet was estimated at 298+/-4, 47+/-2 and 119+/-3 mg/day, respectively. Generally, men had higher betaine intakes than females and intake decreased with age.
Keywords: Glycine betaine; Proline betaine; Trigonelline; Dimethylsulphoniopropionate; DMSP; Dietary intake; Homocysteine; BHMT

M.A. Sfredo, J.R.D. Finzer, J.R. Limaverde, Heat and mass transfer in coffee fruits drying, Journal of Food Engineering, Volume 70, Issue 1, September 2005, Pages 15-25, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.09.008.
(http://www.sciencedirect.com/science/article/B6T8J-4DPC6HF-6/2/5523bb59d575e0f4e111c5f9c4826baa)

Abstract:
This work presents batch drying of coffee cherries on vibrated trays and in a fixed bed drier. The amplitude and the frequency of vibration were: Ax = 0.211 x 10-3 and Ay = 0.945 x 10-3 m; 60 Hz. The equipment consists of a vertical drying tunnel, in which two aluminum trays with coffee cherries were introduced. The initial moisture content was approximately 66% (wb) and the final moisture content was about 11%. The monitoring of the drying was effected by measuring the weight of the tray of coffee cherries. This data enabled the determination of the drying kinetics and of the heat and mass transfer coefficients, and the effective moisture diffusivity. In all the calculations, the shrinkage of the coffee cherries during the drying was considered. The vibration acted to increase the drying rate and the effective moisture diffusivity and consequently the heat and mass transfer coefficients. The drying time, in the vibrated system at a temperature of 45 [degree sign]C was approximately 11% smaller than in the system without vibration. The effective moisture diffusivity was between 0.1 x 10-10 and 1 x 10-10 m2/s for a temperature of 45 [degree sign]C and between 0.3 x 10-10 and 3 x 10-10 m2/s for a temperature of 60 [degree sign]C.
Keywords: Coffee; Drying; Vibration; Heat and mass transfer; Effective diffusivity

Winnie Gerbens-Leenes, Sanderine Nonhebel, Food and land use. The influence of consumption patterns on the use of agricultural resources, Appetite, Volume 45, Issue 1, August 2005, Pages 24-31, ISSN 0195-6663, DOI: 10.1016/j.appet.2005.01.011.
(http://www.sciencedirect.com/science/article/B6WB2-4GC1R44-3/2/306490f8e0fe8463ff8bf0fec2b803f1)
Abstract:
This paper assesses the relationship between food consumption patterns and the use of agricultural land. First, it calculates the amount of land needed to produce singular foods, and second, it assesses land requirements of food consumption patterns. The paper observes large differences among requirements for specific foods. Especially livestock products, fats, and coffee have large land requirements. The consumption of specific foods can change rapidly over time, causing shifts in land requirements. A rise or fall of requirements, however, depends on the initial consumption pattern. Patterns based on animal foods shifting towards market foods containing more staples require less land. This dietary change direction was shown for Dene/Metis communities in Canada. Patterns based on staples shifting toward diets containing more livestock foods and beverages require more land. This change direction was observed in the Netherlands. Per capita land requirements differ among countries. In Europe, Portugal showed the smallest requirement (1814 m2), Denmark the largest (2479 m2). The Danish pressure was mainly caused by large consumption of beer, coffee, fats, pork, and butter. The trend toward food consumption associated with affluent life styles will bring with it a need for more land. This causes competition with other claims, such as infrastructural developments or ecological forms of agriculture.
Keywords: Food consumption pattern; Per capita land requirement for food; Dietary change

C. Campa, S. Doulbeau, S. Dussert, S. Hamon, M. Noirot, Diversity in bean Caffeine content among wild Coffea species: Evidence of a discontinuous distribution, Food Chemistry, Volume 91, Issue 4, August 2005, Pages 633-637, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.06.032.
(http://www.sciencedirect.com/science/article/B6T6R-4D98XB5-3/2/c66b68168719e61cc7a105c7fdbf887a)
Abstract:
Caffeine is a metabolite of great economic importance, especially in coffee. Previous evaluations have already focussed on wild species of coffee trees, but this assessment included six new taxa from Cameroon and Congo and involved a simplified method that generated more accurate results. Two main results were obtained: (1) Cameroon and Congo were found to be a centre of diversity, encompassing the entire range of caffeine content; (2) four groups of coffee tree species - CAF1, CAF2, CAF3 and CAF4 - were established on the basis of discontinuities in the caffeine

content range. The trace levels of caffeine in CAF1 is due to an absence of accumulation in beans - a factor that is controlled by a major gene. The other classes, i.e., CAF2, CAF3 and CAF4, were characterized by the extents of their caffeine accumulation. Caffeine content was found to increase twofold from CAF2 (0.55% dmb) to CAF3 (1.1% dmb) and from CAF3 to CAF4 (2.3% dmb). This discontinuous distribution is discussed from an evolutionary standpoint.
Keywords: Coffeae; Caffeine; Diversity

Jorge Mauricio Costa Mondego, Oliveiro Guerreiro-Filho, Mario Henrique Bengtson, Rodrigo Duarte Drummond, Juliana de Maria Felix, Melina Pasini Duarte, Daniel Ramiro, Mirian Perez Maluf, Mari Cleide Sogayar, Marcelo Menossi, Isolation and characterization of Coffea genes induced during coffee leaf miner (Leucoptera coffeella) infestation, Plant Science, Volume 169, Issue 2, August 2005, Pages 351-360, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2005.03.020.
(http://www.sciencedirect.com/science/article/B6TBH-4FVH1N5-1/2/b1aaa4f6ff680c40362dc111901ba7aa)
Abstract:
Coffea arabica, one of the most important breeding species in the world, is susceptible to the leaf miner Leucoptera coffeella, which causes severe damage to coffee plantations. A closely related coffee species (Coffea racemosa) resistant to this insect was crossed with C. arabica and resulted in segregating progenies with resistance or susceptibility to coffee leaf miner. The aim of this work was to isolate and characterize the genes involved in coffee resistance to this pest. Subtracted cDNA libraries enriched in genes preferentially expressed in coffee plants resistant to L. coffeella were constructed. Approximately 1500 clones were spotted on nylon membranes and hybridized to cDNA probes derived from RNA samples from infestation experiments. Several genes were differentially expressed. We selected expressed ESTs with the most interesting expression profiles and confirmed the up-regulation of five of them (Class III Chitinase PR-8, signal peptidase complex subunit SPC25, photosystem gene psaH, a putative calcium exchanger similar to CAX9 and a homeotic gene BEL) by RNA blot. The possible functions of these genes in coffee resistance and coffee development, and a hypothetical defense mechanism against L. coffeela are discussed.
Keywords: Biotic stress; Coffee; DNA arrays; Plant-insect interactions; Subtracted cDNA libraries

P.V. Krasilnikov, N.E. Garcia Calderon, S.N. Sedov, E. Vallejo Gomez, R. Ramos Bello, The relationship between pedogenic and geomorphic processes in mountainous tropical forested area in Sierra Madre del Sur, Mexico, CATENA, Volume 62, Issue 1, 31 July 2005, Pages 14-44, ISSN 0341-8162, DOI: 10.1016/j.catena.2005.02.003.
(http://www.sciencedirect.com/science/article/B6VCG-4FXWWYF-1/2/264eec05578127db1c104ac0237967d8)
Abstract:
Both mature and underdeveloped soils are present in tropical mountainous landscapes. The spatial arrangement of mountainous soils is ascribed mainly to geomorphologic processes. We studied two soil toposequences (one on a convex, and the other on a concave slope with a gradient 40-60%) at the coffee-growing farm La Cabana, situated in the mountains of the Sierra Madre del Sur, southern Mexico. Mature (Alisols) as well as moderately developed (Luvic Phaeozems) and underdeveloped soils (Fluvic and Skeletic Phaeozems) were detected in the study area. The sequence of sediments and soils is unusual for a classical soil catena. Buried clayey reddish soils are present on the shoulder of a slope; colluvial sediments with weakly developed soils form convex and concave footslopes. The peculiarity of the slopes and spatial distribution of soils in the studied toposequences were ascribed to intensive linear erosion (due to tectonic uplift), seismically induced landslides, and K-cycles of laminar erosion. The diversity of sediments leads to considerable variation in soil texture and mineralogical composition, and, thus, to the diversity of soil properties, which is considered to be a positive feature of a landscape.

Keywords: Humid tropics; Mountains; Pedogenesis; Catena; Landform stability

J.M. Grossman, C. Sheaffer, D. Wyse, P.H. Graham, Characterization of slow-growing root nodule bacteria from Inga oerstediana in organic coffee agroecosystems in Chiapas, Mexico, Applied Soil Ecology, Volume 29, Issue 3, July 2005, Pages 236-251, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2004.12.008.
(http://www.sciencedirect.com/science/article/B6T4B-4FPJ9XJ-1/2/03615452684a52e624bf54db1c558343)
Abstract:
The leguminous tree genus Inga is thought to be critical for providing N to certified organic coffee shrubs that commonly grow beneath its shade in the state of Chiapas, Mexico. Organic certification prohibits use of synthetic N fertilizers, necessitating understanding of the Inga-rhizobia symbiosis. The objectives of this study were to: (1) establish a collection of isolates from Inga sp. nodules found on organic coffee farms in Chiapas, Mexico; (2) use phenotypic and genotypic approaches to characterize these isolates, and (3) examine cross-inoculation patterns of strains isolated from Inga sp. with other Inga species and N2-fixing trees. Eighty-three strains were isolated from root nodules of Inga oerstediana, Inga pavoniana and an unknown species of Inga. Aside from isolates of I. pavoniana, Inga isolates demonstrate characteristics consistent with Bradyrhizobium. Dendrograms generated using phylogenetic and phenotypic traits showed strains to exhibit significant diversity, even among strains originating from the same farm. Strains isolated from I. pavoniana were 95% similar, and displayed strikingly different characteristics from strains isolated from other species. Cross-inoculation experiments used three Inga strains (cowpea miscellany CB756, and isolates from I. oerstediana and I. sp.) as inoculants with I. edulis, I. fuellii, Acacia mangium, Acacia koa, Vigna unguculata and Gliricidia sepium. All three strains formed nodules containing leghaemoglobin with V. unguculata, while isolates from I. oerstediana, Inga sp. and cowpea miscellany formed nodules with I. feulli and I. edulis, but not with A. mangium and G. sepium. A. koa formed nodules containing leghaemoglobin when inoculated by cowpea miscellany strain CB756 and the strain from Inga sp., but nodules formed with the strain isolated from I. oerstediana did not contain leghaemoglobin. One and two-way ANOVA results showed that no mean biomass of inoculated seedlings was significantly greater than the -N control for each of A. koa, G. sepium, A. mangium ($p < 0.001$), supporting our hypothesis that inoculation with non-Inga strains would have no effect on biomass production. We suggest that great spatial variation exists among Inga isolates from organic coffee farms in the Chiapas highland region, both between and within farms, and that more research is needed to identify reasons for the genetic distribution and function of Inga symbionts.
Keywords: Inga; Coffee; Mexico; Characterization; N2-fixation; Root nodule bacteria

Osato Miyawaki, Ling Liu, Yoshito Shirai, Shigeru Sakashita, Kazuo Kagitani, Tubular ice system for scale-up of progressive freeze-concentration, Journal of Food Engineering, Volume 69, Issue 1, July 2005, Pages 107-113, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.07.016.
(http://www.sciencedirect.com/science/article/B6T8J-4DGDB28-B/2/b5225f2a24449c1ecc7b8b83a1225e8f)
Abstract:
Progressive freeze-concentration is a method of freeze concentration with a single ice crystal formed on the cooling plate in the system. This makes the separation of ice crystal formed from the concentrated mother solution much easier than the conventional suspension crystallization method, in which many small ice crystals are formed. Tubular ice system with a large cooling surface area was shown to be effective as a method for scale-up of progressive freeze-concentration with an increased productivity and a high yield. In this method, the slower growth rate of ice and the higher circulation rate gave the lower effective partition constant as was expected theoretically by the concentration polarization model. The effective partition constant was

also dependent on the initial solute concentration; the higher concentration gave the higher partition constant of solute. By tubular ice system, coffee extract, tomato juice, and sucrose solution were very effectively concentrated to high concentrations with good yields, showing the high potential of progressive freeze-concentration for practical applications.
Keywords: Progressive freeze-concentration; Scale-up; Ice crystal; Partition constant of solute in ice; Concentration of liquid food

J.O. Agullo, M.O. Marenya, Airflow Resistance of Parchment Arabica Coffee, Biosystems Engineering, Volume 91, Issue 2, June 2005, Pages 149-156, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2005.02.008.
(http://www.sciencedirect.com/science/article/B6WXV-4G0M3VD-1/2/7eb526e6ab3735fb0148d9e8e6d41abc)
Abstract:
Resistance to airflow of clean bulk parchment coffee at moisture contents of 36[middle dot]7, 30[middle dot]7, 19[middle dot]6 and 12[middle dot]7% (w.b.) was studied for airflow range of 0[middle dot]126-0[middle dot]72 m3 s-1 m-2 using an experimental test column. Results indicated that resistance to airflow across a column of parchment coffee increased with increasing bed depth and airflow rate and decreasing moisture content for both dense and loose fill. Densely filled columns resulted in higher resistance to airflow. The resistance to airflow through a bed of parchment Arabica coffee has been characterised by Shedd's model, Hukill and Ives model and a model giving an empirical relationship between airflow resistance and experimental variables. It also revealed that airflow rate had the highest effect on pressure drop followed by moisture content and bulk density.

Daniele Giovannucci, Stefano Ponte, Standards as a new form of social contract? Sustainability initiatives in the coffee industry, Food Policy, Volume 30, Issue 3, Private Agri-food Standards: Implications for Food Policy and Agri-food Systems, June 2005, Pages 284-301, ISSN 0306-9192, DOI: 10.1016/j.foodpol.2005.05.007.
(http://www.sciencedirect.com/science/article/B6VCB-4GSJRCH-2/2/50cc5306a5aa8a424d640ecb5cf0a394)
Abstract:
In the former age of national capitalism, the achievement of market fairness was embedded in a normative framework generated by government, labor unions, and perhaps religious authority. In the current age of global capitalism, new actors such as NGOs, industry associations and public-private partnerships provide the normative framework that corporations use for social legitimacy. In this context, standard-setting processes operate as new forms of social contract where the state, rather than being directly involved between the parties, provides a form of basic guarantee while (more or less accountable) NGOs and firms are in charge of hammering out the bargains. This article examines the dynamics of this new configuration through the case study of sustainability initiatives in the coffee sector. It addresses four questions: (1) Are these standards effective in communicating information and creating new markets? (2) To what extent do they embed elements of collective and private interests? (3) Is sustainability content actually delivered to their intended beneficiaries? and (4) What is the role of public policy in addressing their shortcomings?
Keywords: Grades and standards; Coffee

Jane Lu Hsu, Wei-Ching Hung, Packed coffee drink consumption and product attribute preferences of young adults in Taiwan, Food Quality and Preference, Volume 16, Issue 4, June 2005, Pages 361-367, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2004.06.004.
(http://www.sciencedirect.com/science/article/B6T6T-4D2FKVH-2/2/e6a3e5c16fb7eedb01b5bc35b978d9f7)
Abstract:

The objective of this study was to examine consumption patterns and attribute preferences of packed coffee drinks among young adults in Taiwan. Approximately 300 students from six universities in three metropolitan areas in Taiwan were surveyed. Based on the results, 76% of respondents between 19 and 22 years consumed packed coffee drinks at least once a week. The usual time to drink coffee was between 2 and 4 pm in the afternoon and 8 and 12 pm in the evening. Convenient stores were the preferred location to purchase packed coffee drinks. The vast majority of respondents experienced coffee before entering college. Factor analysis results indicated that the dimensions of underlying factors that young adults considered when purchasing packed coffee drinks included variety, brand/promotion, and price/volume.
Keywords: Packed coffee drinks; Attribute preferences; Young adults

Tim P. Batchelor, Ian C.W. Hardy, Juan F. Barrera, Gabriela Perez-Lachaud, Insect gladiators II: Competitive interactions within and between bethylid parasitoid species of the coffee berry borer, Hypothenemus hampei (Coleoptera: Scolytidae), Biological Control, Volume 33, Issue 2, May 2005, Pages 194-202, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.02.010.
(http://www.sciencedirect.com/science/article/B6WBP-4FSCV9F-2/2/1d2e18a70a5171efdecbe4d5ac8a4b01)
Abstract:
The coffee berry borer, Hypothenemus hampei (Ferrari) (Coleoptera: Scolytidae) causes substantial reductions in coffee production. It originates from Africa but is now present in almost all of the major coffee producing countries. Classical biological control attempts around the world, including South and Central America, the Caribbean, Indian sub-continent, Indonesia, and Polynesia, including introductions of the African bethylid wasps Prorops nasuta Waterston and Cephalonomia stephanoderis Betrem, have not yet proved sufficiently successful. In Mexico, a bethylid wasp indigenous to North America and Europe, Cephalonomia hyalinipennis Ashmead, has naturally started to attack the borer. The presence of multiple species of natural enemies has the potential to disrupt biological control via negative interspecific interactions. We evaluate both inter- and intraspecific competition among these three bethylids in the laboratory, focussing on pairs of adult females competing directly for hosts. In interspecific contests, the loser is frequently killed. C. stephanoderis is the most successful species, while P. nasuta females never killed their opponents. Intraspecific interactions often involved fighting behavior but were non-fatal. We discuss the implications of the differing strengths of such inter- and intraspecific interactions for the coexistence of these natural enemies of the coffee berry borer and for biological control.
Keywords: Bethylidae; Biological control; Cephalonomia hyalinipennis; Cephalonomia stephanoderis; Coffee berry borer; Fatal fighting; Hypothenemus hampei; Inter- and intraspecific competition; Prorops nasuta

Mercedes Sonia Garcia-Falcon, Beatriz Cancho-Grande, Jesus Simal-Gandara, Minimal clean-up and rapid determination of polycyclic aromatic hydrocarbons in instant coffee, Food Chemistry, Volume 90, Issue 4, May 2005, Pages 643-647, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.03.059.
(http://www.sciencedirect.com/science/article/B6T6R-4CS4MV2-7/2/099bfd2e8238e4382101e9afbace3c5e)
Abstract:
The essential aim of this work is the development of a simple, fast, quantitative and economic method for polycyclic aromatic hydrocarbons (PAHs) potentially generated by roasting coffee beans, which is the most important process in the coffee industry for the development of the characteristic flavour of the bean mix. The PAHs were chosen because they differed in the number of aromatic rings, had different polarity, have low residual limits, are commonly widespread in the environment and are generated by roasting. The key issue is whether or not the most polar PAHs, those with lower molecular weight or less rings, appear in the water extracts of ground roasted

coffee beans, taking into account that those PAHs with lower molecular weight are those with higher volatality. The proposed analytical method is also broadly applicable to other roasted foods or their aqueous extracts. The method was evaluated by constructing calibration curves, measurement of recovery and precision, and the limits of detection. The method involves extraction with hexane, clean-up with a silica cartridge, concentration to dryness and injection of the acetonitrile solution of the residue for HPLC analysis with fluorescence detection. The method allowed to confirm or not the presence of the selected PAHs in instant coffees.
Keywords: Polycyclic aromatic hydrocarbons; HPLC-fluorescence; Instant coffee

Francisco J. Morales, Cristina Fernandez-Fraguas, Salvio Jimenez-Perez, Iron-binding ability of melanoidins from food and model systems, Food Chemistry, Volume 90, Issue 4, May 2005, Pages 821-827, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.05.030.
(http://www.sciencedirect.com/science/article/B6T6R-4D0Y466-J/2/43684c6c7f287ee4c12ed08e52790b86)
Abstract:
Soluble high molecular weight fractions isolated from the development of the Maillard reaction in 22 different model systems and food matrices were studied in order to assess their iron-chelating ability in vitro. Melanoidins and iron were incubated in a Na-acetate buffer (0.1 M, pH 5) at different weight ratios and free iron was measured by FAAS and the bathophenantroline procedure at the steady state. Melanoidins were classified at three levels according to their number of co-ordination sites for iron. Melanoidins from coffee (medium roasted), different types of beer (Pilsener, Abbeys, and dry-stout styles), and sweet wine (Pedro Ximenez) exerted a low iron-binding effect compared with melanoidins from model systems. The type of sugar was shown to be a significant parameter for obtaining melanoidins with high iron ability, and glucose was more efficient than lactose. No relationship was observed between browning and iron binding ability of melanoidins from model systems. The chromophoric residues were not the main co-ordination sites for iron complexation in the melanoidin structure.
Keywords: Maillard reaction; Melanoidin; Iron ability; Kinetics; Color

F.P. Baijukya, N. de Ridder, K.F. Masuki, K.E. Giller, Dynamics of banana-based farming systems in Bukoba district, Tanzania: changes in land use, cropping and cattle keeping, Agriculture, Ecosystems & Environment, Volume 106, Issue 4, 30 April 2005, Pages 395-406, ISSN 0167-8809, DOI: 10.1016/j.agee.2004.08.010.
(http://www.sciencedirect.com/science/article/B6T3Y-4DTKDPX-1/2/6e18d2aede60cd9faabc0bd28f28c8eb)
Abstract:
The spatial and temporal changes of land use, cropping patterns and cattle keeping were assessed for the period 1961-1999 in Kyamtwara division, Bukoba district, Tanzania. The assessment was based on interpreting aerial photographs, surveys and a review of historical statistical data. The area of grassland declined by 40% with a concomitant increase in annual crop fields and forest of 225 and 36%, respectively. The cropping pattern changed from a predominance of banana/coffee/beans to a complex mixed cropping of banana/coffee/beans/maize and root crops in the homegarden, and increased cultivation of maize and root crops in pure stands. Farmers stopped cultivating sorghum and finger millet. The population of indigenous cattle decreased by 50% and an equal percentage of dairy cattle was introduced, but cattle-owning households decreased by 85%. Nutrient balances of homegardens ranged between -27 and 17 kg N ha-1 yr-1, -1 and 7 kg P ha-1 yr-1 and -5 and 12 kg K ha-1 yr-1, with the positive balances achieved by resource-rich households. Nutrient balances of crops in pure stand ranged between -15 and -2 kg N ha-1 yr-1, -2 and -1 kg P ha-1 yr-1 and -14 and -1 kg K ha-1 yr-1, with more negative balances observed with maize, implying that soil nutrient stocks are decreasing. Increasing population density, coupled with an unequal distribution of resources

among households, land tenure, economic policies and poor crop markets were identified as major causal factors of the above changes. Reversing soil fertility decline requires external inputs of nutrients. Within the current poor economic situation of the farming community, different potential soil fertility improvement strategies, including exploitation of N2-fixing legumes are discussed.
Keywords: Land use changes; Cropping pattern; Livestock systems; Nutrient balances; Sustainability

Dave D'haeze, Dirk Raes, Jozef Deckers, T.A. Phong, H.V. Loi, Groundwater extraction for irrigation of Coffea canephora in Ea Tul watershed, Vietnam--a risk evaluation, Agricultural Water Management, Volume 73, Issue 1, 20 April 2005, Pages 1-19, ISSN 0378-3774, DOI: 10.1016/j.agwat.2004.10.003.
(http://www.sciencedirect.com/science/article/B6T3X-4F31PTW-1/2/758723d8e086fdd7274e68ec197ecc59)
Abstract:
After the reunion of North and South Vietnam in 1975, the area under small-holder, irrigated cultivation of Coffea canephora increased by a factor of 10 in the Central Highlands. The actual acreage under coffee in Dak Lak province is estimated to be over 260,000 ha, representing 60% of the national production, with 405,000 t per year for the world market. Vietnam is presently the second largest exporter worldwide and expansion is still going on. In response to farmers' alarming reports of apparent water scarcity in the dry season, this paper assesses the groundwater recharge in the Ea Tul watershed, a representative area in the Central Highlands region. The groundwater recharge is estimated by means of a steady-state, water balance model and validated by means of historical data, stream gauge records at the basin's outlet and groundwater level fluctuations in wells nearby the study area. To account for the variability from one year to another, the input of the water balance equation was subjected to a frequency analysis. The estimates indicate that the expected annual groundwater recharge is 743 mm in a wet year, 517 mm in an average and 361 mm in a dry year. Validation and literature reviews confirm these figures. Subsequently the model is used to evaluate the issue of aquifer depletion and to verify whether a combination of optimal irrigation management and optimal land allocation for Robusta coffee could solve the apparent water shortages in the coffee sector. Allowing for a minimum river discharge under very dry circumstances (i.e. the Q90 of river base flow), the sustainable yield from the aquifer for variable climatic conditions is calculated. The results confirm that with the present irrigation application depths, the groundwater is likely to be depleted in dry years, but not in wet and average years. Reducing the irrigation application depths could keep the groundwater balance positive in all years. Optimization of land allocation for C. canephora may offer an alternative way out. A reduction by 35% of the present coffee area in Ea Tul along with irrigation efficiency improvement could keep the groundwater resources in balance and guarantees a minimum river discharge, even during severe dry seasons.
Keywords: Coffea canephora; Irrigation; Groundwater recharge; Water balance; Vietnam

Maria L. Loureiro, Justus Lotade, Do fair trade and eco-labels in coffee wake up the consumer conscience?, Ecological Economics, Volume 53, Issue 1, 1 April 2005, Pages 129-138, ISSN 0921-8009, DOI: 10.1016/j.ecolecon.2004.11.002.
(http://www.sciencedirect.com/science/article/B6VDY-4F8TK9K-2/2/a3d52da6e184d7194c8478da9835df7b)
Abstract:
In this study, a face-to-face survey was conducted in order to reveal consumer preferences for ethical and environmentally sound labeling programs in coffee. Valuation questions regarding the fair trade, shade grown, and organic coffee labels were asked using a payment card format, after consumers were previously informed about each of the labeling programs. Results suggest that consumers are very receptive toward both fair trade and shade grown coffee labels, and

consequently are willing to pay higher premiums for these labeling programs than for the organic coffee.
Keywords: Eco-labels; Fair trade; Organic coffee; Shade grown coffee; Weibull survival regression

L. Geel, M. Kinnear, H. L. de Kock, Relating consumer preferences to sensory attributes of instant coffee, Food Quality and Preference, Volume 16, Issue 3, April 2005, Pages 237-244, ISSN 0950-3293, DOI: 10.1016/j.foodqual.2004.04.014.
(http://www.sciencedirect.com/science/article/B6T6T-4CJCVTT-1/2/e2a36a2d8e2f6d6e83543fc2b56438a6)
Abstract:
The sensory profiles of 11 instant coffees including pure coffees (PC), coffee blends (CB) and a chicory instant drink (CID), commercially available in South Africa, were described and quantified. These were then related to consumer preferences (n=199) for the instant coffees using preference mapping. Based on consumer preferences, four consumer groups were identified, 'pure coffee lovers' (23%), 'coffee blend drinkers' (30%), 'general coffee drinkers' (37%) and 'not serious coffee drinkers' (10%). The 'pure coffee lovers' prefer the more astringent, bitter, roasted, nutty and full-bodied flavour of the pure coffee samples. The less intense coffee flavour character, but higher sweetness and root flavour, typical of chicory blended instant coffee, were attributes that were preferred by the 'coffee blend lovers'. The 'general coffee drinkers' seem to consume coffee out of habit and are less concerned about the specific sensory properties of the coffee.
Keywords: Instant coffee; Chicory; Preference mapping; Descriptive sensory analysis

Alena Torres Netto, Eliemar Campostrini, Jurandi Goncalves de Oliveira, Ricardo Enrique Bressan-Smith, Photosynthetic pigments, nitrogen, chlorophyll a fluorescence and SPAD-502 readings in coffee leaves, Scientia Horticulturae, Volume 104, Issue 2, 30 March 2005, Pages 199-209, ISSN 0304-4238, DOI: 10.1016/j.scienta.2004.08.013.
(http://www.sciencedirect.com/science/article/B6TC3-4FDJ75K-1/2/35aa94f72fbfe45dd7ed4ced4b5f15eb)
Abstract:
The chlorophyll meter (SPAD-502) is a simple, portable diagnostic tool that measures the greenness or relative content of leaves. Compared to the traditional destructive methods, the use of this equipment saves time, space and resources. The objective of this study was to establish a correlation between the photosynthetic pigments content extracted in DMSO, the total nitrogen content and the chlorophyll a fluorescence variables with the SPAD-502 readings in Coffea canephora Pierre leaves. The SPAD-502 has been shown to be a good tool to diagnose the integrity of the photosynthetic system in coffee leaves, and can thus help in the advanced interpretations of the photochemical process of these plants. The SPAD readings lower 40 show impairment in photosynthetic process. Thus, the portable chlorophyll SPAD-502 can be used to analyze the photosynthetic pigments, and total nitrogen can also help in interpretation of the photochemical process in coffee plants.
Keywords: Coffea canephora Pierre; Portable chlorophyll meter; Chlorophyll; Carotenoids; Fluorescence

Catherine Numa, Jose R. Verdu, Pedro Sanchez-Palomino, Phyllostomid bat diversity in a variegated coffee landscape, Biological Conservation, Volume 122, Issue 1, March 2005, Pages 151-158, ISSN 0006-3207, DOI: 10.1016/j.biocon.2004.07.013.
(http://www.sciencedirect.com/science/article/B6V5X-4D67BFW-4/2/7387d145363b87ddc7eca2135d3ca99d)
Abstract:
We examined bat diversity at two different spatial scales: habitat and matrix, in the Quindio coffee region in Colombia. Habitats were: forest, shaded coffee and associated coffee; and matrices

were: associated coffee (M1) and shaded coffee (M2). Three sampling sites from each type of habitat were located at each matrix. The forest areas of the Quindio region are severely fragmented and less structurally complex than coffee patches. The shaded coffee habitat had patches that were larger and more complex. In spite of limited patch size and lower complexity, the forest remnants were those with greatest species richness and demonstrated clear similarities even between the two matrices. This was not observed in coffee plantations, neither in associated coffee nor shaded coffee. On the landscape scale, M2 showed lower [beta] diversity and greater edge density (ED) than M1. This fact explains that greater connectivity between different habitats exists in M2 than in M1. Our results suggest that production and conservation are compatible, as maintenance of forest remnants in a mosaic structure by landowners of the vegetation is sufficient to conserve phyllostomid bats at landscape level.
Keywords: Coffee agroecosystem; [alpha] Diversity; [beta] Diversity; Forest fragmentation; Landscape matrices; Northern Andes

Dulce Salmones, Gerardo Mata, Krzysztof N. Waliszewski, Comparative culturing of Pleurotus spp. on coffee pulp and wheat straw: biomass production and substrate biodegradation, Bioresource Technology, Volume 96, Issue 5, March 2005, Pages 537-544, ISSN 0960-8524, DOI: 10.1016/j.biortech.2004.06.019.
(http://www.sciencedirect.com/science/article/B6V24-4DB591T-2/2/30ba0507c87bc81e20b9dd2f1e1f1213)
Abstract:
The results of the cultivation of six strains of Pleurotus (P. djamor (2), P. ostreatus (2) and P. pulmonarius (2)) on coffee pulp and wheat straw are presented. Metabolic activity associated with biomass of each strain was determined, as well as changes in lignin and polysaccharides (cellulose and hemicellulose), phenolic and caffeine contents in substrate samples colonized for a period of up to 36 days. Analysis were made of changes during the mycelium incubation period (16 days) and throughout different stages of fructification. Greater metabolic activity was observed in the wheat straw samples, with a significant increase between 4 and 12 days of incubation. The degradation of polysaccharide compounds was associated with the fruiting stage, while the reduction in phenolic contents was detected in both substrates samples during the first eight days of incubation. A decrease was observed in caffeine content of the coffee pulp samples during fruiting stage, which could mean that some caffeine accumulates in the fruiting bodies.
Keywords: Pleurotus; Coffee pulp; Wheat straw; Biomass; Biodegradation

Madelaine Venzon, Maria Consolacao Rosado, Marcos Antonio Matiello Fadini, Americo Iorio Ciociola Jr, Angelo Pallini, The potential of NeemAzal for the control of coffee leaf pests, Crop Protection, Volume 24, Issue 3, March 2005, Pages 213-219, ISSN 0261-2194, DOI: 10.1016/j.cropro.2004.07.008.
(http://www.sciencedirect.com/science/article/B6T5T-4D67BCJ-2/2/a188b21795858e2193efa89fb47988fb)
Abstract:
The effects of a neem seed extract (NeemAzal(TM) T/S) on two pests attacking coffee leaves, the coffee leaf miner (Leucoptera coffeella) and the coffee red mite (Oligonychus ilicis), and on the predatory mite Iphiseiodes zuluagai were evaluated. Greenhouse cage experiments were carried out to evaluate the repellence of neem on the oviposition of L. coffeella. Females of L. coffeella oviposited on coffee seedlings treated with 0.1 g/l of azadirachtin, but mine development stopped when leaves with eggs or larvae of L. coffeella were treated with 0.025 to 0.1 g/l of azadirachtin. No adults emerged from neem treated leaves. Survival of O. ilicis was shorter on leaves treated with neem, but longer than on ethion treated leaves. The instantaneous rate of increase (ri) of O. ilicis decreased linearly with increasing neem concentration and negative values of ri were obtained with concentration above 0.065 g/l of azadirachtin. Survival of the predatory mite I.

zuluagai was not affected by contacting neem-treated leaf or ingesting prey-fed neem. The potential of neem to control two important pests occurring in coffee plantations was demonstrated in this study, especially as it was not lethal to an important predator commonly found in coffee agroecosystems in Brazil.
Keywords: Coffee arabica; Leucoptera coffeella; Oligonychus ilicis; Iphiseiodes zuluagai; Azadiracta indica

Adriana S. Franca, Leandro S. Oliveira, Juliana C. F. Mendonca, Xenia A. Silva, Physical and chemical attributes of defective crude and roasted coffee beans, Food Chemistry, Volume 90, Issues 1-2, March-April 2005, Pages 89-94, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.03.028.
(http://www.sciencedirect.com/science/article/B6T6R-4CBV31M-7/2/9815b887a7939020bb50e87016933de9)
Abstract:
Defective coffee beans are widely known to negatively affect beverage quality. In Brazil, the defective beans represent a population of about 20% of the total coffee production. These defective beans are separated from the non-defective ones prior to commercialization in the international market and are dumped in the Brazilian internal market, thus depreciating the quality of the roasted coffee consumed in Brazil. In order to offer more attractive alternative uses for these beans, an assessment of their physical and chemical attributes is of relevance. In this study, physical attributes, such as bean and bulk densities, bean volume and colour, and also chemical attributes, such as caffeine, trigonelline and chlorogenic acids, were evaluated in defective and non-defective coffee beans, both in the crude and roasted state. With the determined physical and chemical attributes, it was possible to differentiate the types of defective beans, and it was also demonstrated that both black and sour beans roast to a lesser degree than the other types of beans, under the same roasting conditions.
Keywords: Defective coffee beans; Caffeine; Trigonelline; Chlorogenic acids

I. Sanchez-Gonzalez, A. Jimenez-Escrig, F. Saura-Calixto, In vitro antioxidant activity of coffees brewed using different procedures (Italian, espresso and filter), Food Chemistry, Volume 90, Issues 1-2, March-April 2005, Pages 133-139, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.03.037.
(http://www.sciencedirect.com/science/article/B6T6R-4CC7VBC-1/2/8eaf527d464b3ca6f2af1a24d3919cb5)
Abstract:
The possible effects of different preparation methods (Italian or Mocha, Filter and Espresso) on the antioxidant activities of brewed coffee were assessed using two methods: Ferric reducing power (FRAP) and scavenging capacity (ABTS). In addition, the polyphenol content was estimated. The order of ferric reducing ability per gram of dry matter (dm) of the different brewed coffees tested, in terms of the coffee-making procedure used, was freeze-dried > filter [approximate] espresso [approximate] Italian. The order of ferric reducing ability per serving was filter > espresso > freeze-dried [approximate] Italian. In the case of scavenging activity the order was similar to that described for the FRAP assay. There was a high correlation between the estimated polyphenol contents and the FRAP, or the ABTS values (r: 0.98, P<0.01; r: 0.99, P<0.01, respectively). In the case of FRAP and ABTS assays; a serving of filtered coffee was equivalent to 2653 +/- 297 and 1295 +/- 262 [mu]g trolox, respectively. In the USA and Northern Europe, the pot containing the coffee is usually kept hot (85 [degree sign]C) for several hours. We found that antioxidant activity increased significantly (by 34%) after four hours of heating. The cause of this increase would seem to be the formation of Maillard products, due to the heat process. These compounds also appear to be responsible for the fact that antioxidant capacity was higher in dark-roast than in other

brewed coffees tested. Antioxidant activity decreased when milk was added to the espresso coffee.
Keywords: Coffees; Processing; Total phenolics; Antioxidant activity; Trolox equivalent antioxidant capacity; Radical scavenging; Reductive power

Sami D. Oliveira, Adriana S. Franca, M. Beatriz A. Gloria, M. Lucia A. Borges, The effect of roasting on the presence of bioactive amines in coffees of different qualities, Food Chemistry, Volume 90, Issues 1-2, March-April 2005, Pages 287-291, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.03.056.
(http://www.sciencedirect.com/science/article/B6T6R-4CS4MV2-1/2/0cc8ee86c8a73aa83450ce62375859c6)
Abstract:
The effect of roasting on the levels of amines in high and low quality coffee was investigated. Arabica green coffee samples previously classified by cup as soft (high quality) and rio (low quality) were roasted at 220 [degree sign]C. Bean samples were collected every 4 min during roasting. HPLC analysis was carried out for detection and quantification of bioactive amines. Putrescine was the prevailing amine in both samples, followed by spermidine and spermine. Putrescine levels were significantly higher for the rio sample compared to the soft one. Also, both histamine and tryptamine were only present in the rio sample. There was a significant decrease in total amine content during roasting, with degradation of putrescine, spermine, histamine and tyramine taking place mostly during the drying stage. Degradation of spermidine occurred at a slower rate.
Keywords: Putrescine; Histamine; Tyramine; Coffee; Roasting

Gulab N. Jham, Rosiza Velikova, Boryana Nikolova-Damyavova, Sarita Candido Rabelo, Julio Cesar Teixeira da Silva, Kamila Alessandra de Paula Souza, Vania Maria Moreira Valente, Paulo Roberto Cecon, Preparative silver ion TLC/RP-HPLC determination of coffee triacylglycerol molecular species, Food Research International, Volume 38, Issue 2, March 2005, Pages 121-126, ISSN 0963-9969, DOI: 10.1016/j.foodres.2004.07.010.
(http://www.sciencedirect.com/science/article/B6T6V-4DPC6SK-1/2/ebb05547f7a235fa7d8b5e076f7b185b)
Abstract:
Preparative silver ion thin layer chromatography (Ag-TLC) was utilized for the preparative isolation of triacylglycerol (TAG) classes from cherry coffee beans according to the degree of unsaturation. The isolated TAGs were chromatographically (Ag-TLC) pure and used as standards to identify TAG molecular species by RP-HPLC using a refractive index detector (RID). Acetonitrile/acetone (1:1, v/v) was used as the solvent at a flow rate of 2 mL/min. This methodology was used to determine the % of TAG molecular species in eight coffee samples to evaluate effects of bean type, drying procedures and geographic origin. The following nine TAG molecular species were identified in all the coffee samples: LLL, SLLn, OLL, PLL, StLL + POL, PPL + OOL, ALL, PStL + POO and PStO (in elution order) (Ln, linolenic; L, linoleic; O, oleic; P, palmitic; A, arachidic and St, stearic acid residues). Quantitative evaluation was based on the relative area percentages derived directly from the data-station. The data obtained were statistically compared by variance analysis. Although resolution with RP-HPLC/RID was poorer than the previously reported RP-HPLC/LSD (light scattering detector), the procedure can be useful for a number of applications, such as determine relative % of the resolved TAG molecular species, monitor relative % of TAG molecular species of coffee stored over prolonged period of time etc. RP-HPLC/RID offers several important advantages, such as lower cost and simpler instrumentation over RP-HPLC/LSD. In agreement with our previous studies, in general no effects of bean type, drying procedures and geographic origin on TAG composition were found ($P > 0.05$).
Keywords: Triacylglycerol; HPLC; Refractive index detector; Light sensitive detector; Coffee types

M.F. Marcone, Corrigendum to 'Composition and properties of Indonesian palm civet coffee (Kopi Luwak) and Ethiopian civet coffee' [Food Research International 37 (2004) 901-912], Food Research International, Volume 38, Issue 2, March 2005, Page 233, ISSN 0963-9969, DOI: 10.1016/j.foodres.2004.10.001.
(http://www.sciencedirect.com/science/article/B6T6V-4DTKG6P-1/2/72bde188f2d471fc6981908db4e1eae5)

B.J. Majer, E. Hofer, C. Cavin, E. Lhoste, M. Uhl, H.R. Glatt, W. Meinl, S. Knasmuller, Coffee diterpenes prevent the genotoxic effects of 2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (PhIP) and N-nitrosodimethylamine in a human derived liver cell line (HepG2), Food and Chemical Toxicology, Volume 43, Issue 3, March 2005, Pages 433-441, ISSN 0278-6915, DOI: 10.1016/j.fct.2004.11.009.
(http://www.sciencedirect.com/science/article/B6T6P-4F6CR7W-1/2/aa400d360d9ddd0cfbd8c332344ecf53)
Abstract:
Aim of the present experiments was to study the genotoxic effects of coffee diterpenoids, namely cafestol palmitate and a mix of cafestol and kahweol (C + K) in human derived hepatoma (HepG2) cells. Furthermore, we investigated the potential protective properties of these substances towards carcinogens contained in the human diet, namely N-nitrosodimethylamine (NDMA) and 2-amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (PhIP). C + K and cafestol palmitate were tested over a broad dose range in micronucleus (MN) assays and no indication for genotoxic effects was seen. In combination experiments with PhIP (300 [mu]M), pronounced inhibition ([approximate]1.7-fold) of MN formation was observed with C + K and cafestol palmitate at dose levels [greater-or-equal, slanted]0.9 and 1.7 [mu]g/ml, respectively. Enzyme measurements indicate that the protection is due to inhibition of sulfotransferase, an enzyme involved in the activation of the amine, and/or to induction of UDP-glucuronosyltransferase which detoxifies the DNA-reactive metabolites of PhIP. Furthermore, a significant increase of glutathione-S-transferase was seen, whereas the activities of cytochrome P-450 1A1 and N-acetyltransferase 1 were not significantly altered. Also in combination experiments with C + K and NDMA, strong protective effects (50% reduction of genotoxicity) were seen at low dose levels ([greater-or-equal, slanted]0.3 [mu]g/ml). Since inhibition of MN was also observed when C + K were added after incubation with NDMA, it is likely that the chemoprotective effects are due to induction of DNA repair enzymes. Comparison of data on the effects of C + K on the cholesterol metabolism, which was investigated in earlier in vivo studies, with the present findings suggests that DNA-protective effects take place at exposure levels which are substantially lower than those which cause hypercholesterolemia.
Keywords: Coffee diterpenes; Cafestol; Kahweol; N-nitrosodimethylamine; PhIP; Metabolic enzymes; Antimutagenicity; Micronucleus; HepG2

Gerd Brunner, Supercritical fluids: technology and application to food processing, Journal of Food Engineering, Volume 67, Issues 1-2, IV Iberoamerican Congress of Food Engineering (CIBIA IV), March 2005, Pages 21-33, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.05.060.
(http://www.sciencedirect.com/science/article/B6T8J-4D98JSG-S/2/7749884e2ae3d1b210b8dc02971a33cc)
Abstract:
Supercritical fluids (SCFs) are substances at pressures and temperatures above their critical values. It is characteristic that properties of SCFs can be changed in a wide range. Their solvent power is the highest for non-polar or slightly polar components and decreases with increasing molecular weight. They can easily be removed from the solutes by mere expansion to ambient pressure. Carbon dioxide (CO2) is particularly advantageous for processing food materials. SCFs are used for batch extractions of solids, for multi-stage counter-current separation (fractionation) of

liquids, and for adsorptive and chromatographic separations. State of the art design for commercial plants is available, and a number of installed plants are working. Special applications to food processing include decaffeination of green coffee beans, production of hops extracts, recovery of aromas and flavours from herbs and spices, extraction and fractionation of edible oils, and removal of contaminants, among others. The application of SCFs is now extended to new areas like formulation or specific chemical reactions. Costs of SCF extraction (SCFE) processes are competitive. In certain cases SCFE processing is the only way to meet product specifications.
Keywords: Supercritical fluid; Carbon dioxide; Food processing; Extraction; Separation

Christopher A. Taylor, Kathryn S. Keim, Alicia C. Gilmore, Impact of core and secondary foods on nutritional composition of diets in Native-American women, Journal of the American Dietetic Association, Volume 105, Issue 3, March 2005, Pages 413-419, ISSN 0002-8223, DOI: 10.1016/j.jada.2004.12.001.
(http://www.sciencedirect.com/science/article/B758G-4FM3RKK-Y/2/b1f94e74901ceb7032194162559b4260)
Abstract: Objective
To identify the core and secondary foods among Native-American women in Oklahoma and to determine their impact on nutrient and Food Guide Pyramid serving intakes.Design
This descriptive study explored food intakes from 4-day weighed food records. Nutrient intakes were estimated using reference data used in national survey data.Subjects/setting
Seventy-one Native-American women receiving services from three tribal health clinics in northeast Oklahoma.Statistical analyses performed
A food-use frequency score was computed using frequencies of individuals consuming foods across each of 4 days of records. Leading contributors of nutrients and Food Guide Pyramid servings were identified from core and secondary foods.Results
Thirty foods comprised the list of core foods, led by soda, coffee, and white bread. A majority of total energy, fat, saturated fat, monounsaturated fatty acids, polyunsaturated fatty acids, cholesterol, carbohydrate, calcium, vitamin C, folate, discretionary fat, and added sugar were derived cumulatively from the core and secondary foods. Forty percent of fruit Food Guide Pyramid servings were accounted for by two core foods, bananas, and orange juice. More than half of meat and vegetable Food Guide Pyramid servings were derived from core and secondary foods.Conclusions
Food patterning data are helpful in the development of effective nutrition education programs. We identified less nutrient-dense core foods that are contributing to discretionary fat and added sugar intakes. Targeted nutrition education programs for Native Americans should promote the nutrient-dense core and secondary foods, such as whole-wheat bread and fruit, while providing more healthful food alternatives to less nutrient-dense foods.

S. Casal, E. Mendes, M. B. P. P. Oliveira, M. A. Ferreira, Roast effects on coffee amino acid enantiomers, Food Chemistry, Volume 89, Issue 3, February 2005, Pages 333-340, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.02.039.
(http://www.sciencedirect.com/science/article/B6T6R-4C4BM0D-C/2/defe291c8b030dc417157874e7456ef1)
Abstract:
The effects of roast on the amino acid enantiomers (- and -) of two green coffee samples (arabica and robusta) were determined, by gas chromatography, on a Chirasil -Val column. The free amino acids were present in low amounts in both green samples and destroyed to a very high degree with roast. After hydrolysis, the amino acids behaved according to their thermal stabilities: some amino acids remained unchanged whilst the more thermally sensitive were slightly reduced. Generally, the mean free amino acid racemisation value was higher than that calculated after hydrolysis, and was also higher for the robusta sample. In both cases, an increase in the

racemisation value with temperature was observed, with aspartic acid being the most sensitive amino acid. The results suggested that the robusta coffee matrix is more affected by roast than the arabica. The amount of -amino acids ingested per coffee cup does not seem to constitute a serious food safety problem.
Keywords: Coffee; - and -Amino acids; Racemisation value; Roasting; Food safety

Michele De Monte, Elio Padoano, Dario Pozzetto, Alternative coffee packaging: an analysis from a life cycle point of view, Journal of Food Engineering, Volume 66, Issue 4, February 2005, Pages 405-411, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.04.006.
(http://www.sciencedirect.com/science/article/B6T8J-4CF5D8D-8/2/0b0f786111c93e534d121f37c2001ec0)
Abstract:
The amount of municipal waste related to food packaging systems, with respect to the whole mass of municipal waste, is ever increasing. For this reason, a selection of different packaging systems has to be made from the start of production not only to favour food conservation, but also to reduce packaging mass and increase the use of recyclables.
This paper presents a comparison between impacts associated with alternative packaging systems on the supply of coffee, with the aim of showing how their values change depending on the materials and processes commonly in use. To compare impacts, Life Cycle Assessment methodology was considered. This approach, which is widespread use in many different production sectors, is defined in detail in the ISO 1404x norm.
Keywords: Environmental impact; LCA; Food packing

Ranganathan Rajeshwari, Su-Jau Yang, Theresa A. Nicklas, Gerald S. Berenson, Secular trends in children's sweetened-beverage consumption (1973 to 1994): The Bogalusa Heart Study, Journal of the American Dietetic Association, Volume 105, Issue 2, February 2005, Pages 208-214, ISSN 0002-8223, DOI: 10.1016/j.jada.2004.11.026.
(http://www.sciencedirect.com/science/article/B758G-4F9ST3V-H/2/015124b04b6e50f652079bf06f8f61cd)
Abstract: Objective
To determine whether children's sweetened-beverage consumption has changed over a 21-year period (1973 to 1994) in Bogalusa, LA, and whether trends in energy intake, milk consumption, and body mass index (BMI) varied among the sweetened-beverage consumption groups.Design
Information on food and nutrient intake was derived from a single 24-hour dietary recall collected from children who participated in one of seven cross-sectional surveys.Subjects/setting
A total of 1,548 10-year-old children (65% white, 35% African American; 51% female, 49% male) were randomly selected to participate in the study.Statistical analyses
The Cochran-Armitage Trend test was applied to examine the trends in sweetened-beverage consumption by 10-year-old children over a 21-year period. A general linear model was used to examine the trend in milk consumption, energy intake, and BMI among the sweetened-beverage consumption groups.Results
The percentage of children consuming sweetened beverages significantly decreased from 83% (1973) to 81% (1994) (P<.05), particularly consumption of soft drinks (P<.01) and coffee with sugar (P<.0001). However, the mean gram amount of tea with sugar consumed significantly increased (P<.0001), with no changes in the mean gram amount of fruit drinks, soft drinks, and coffee with sugar consumed. When comparing tertiles of sweetened-beverage consumption over time, the mean gram consumption significantly increased from 1973 to 1994 for those children who were in the medium (P<.001) to high (P<.0001) tertiles. The mean BMI significantly increased (P<.001) from 1973 to 1994 in children within all of the sweetened-beverage consumption groups; however, there were no significant differences in total BMI across the sweetened-beverage consumption groups. The total gram amount of milk consumption was significantly lower in the

medium to high sweetened-beverage consumption groups compared with the lower to no sweetened-beverage consumption groups. Total energy intake remained unchanged from 1973 to 1994 within all four sweetened-beverage consumption groups. Total energy intake was significantly higher in the high sweetened-beverage consumption group compared with the other three sweetened-beverage consumption groups.Conclusions
Children's sweetened-beverage consumption has changed over a 21-year period. The percentage of children consuming sweetened beverages decreased from 1973 to 1994, particularly consumption of soft drinks and coffee with sugar. Data suggest that there was no linear relationship between sweetened-beverage consumption and BMI and total energy intake. However, total milk consumption was lower in the medium to high sweetened-beverage consumption groups compared with the low to no consumption groups. More studies are needed to confirm these regional findings, which may not be reflective of national trends.

Sylvain G. Razafimandimbison, Joachim Moog, Henrik Lantz, Ulrich Maschwitz, Birgitta Bremer, Re-assessment of monophyly, evolution of myrmecophytism, and rapid radiation in Neonauclea s.s. (Rubiaceae), Molecular Phylogenetics and Evolution, Volume 34, Issue 2, February 2005, Pages 334-354, ISSN 1055-7903, DOI: 10.1016/j.ympev.2004.10.005.
(http://www.sciencedirect.com/science/article/B6WNH-4F08DVX-1/2/6adb6bde2e0c31f60c581b9a92fab949)
Abstract:
The biologically interesting ant-plant association, myrmecophytism, occurs in ca. 140 of the 11,000 species and 22 of the 630 genera of the coffee family (Rubiaceae). These myrmecophytic Rubiaceae species are predominantly distributed in Southeast Asia, especially the Malesian region, with comparatively few species in mainland Africa and the Neotropics. The mostly Southeast Asian genus Neonauclea s.s is one of the three Rubiaceae genera with extensive radiation of myrmecophytes and also the most speciose genus of the tribe Naucleeae s.l. We perform parsimony phylogenetic analyses of Neonauclea s.s., previously resolved as paraphyletic, and its allied genera using both ETS and ITS sequencing data to test: (1) the paraphyly of Neonauclea s.s.; (2) the phylogenetic relationships within the Ludekia-Myrmeconauclea-Neonauclea complex; and (3) the evolution of myrmecophytism within the complex. The earlier proposed paraphyly of Neonauclea s.s. appears to be the result of the combined effects of parallel substitutions in Metadina trichotoma and the sampled ITS putative pseudogenes of Neonauclea longipedunculata and losses of some synapomorphies of Neonauclea s.s. in the latter. The analyses present strong support for the monophyly of Myrmeconauclea and Neonauclea s.s. and their sister-group relationships. Our findings additionally favor the hypothesis of multiple origins of myrmecophytism in the Bornean Neonauclea, which have independently been exploited by at least three Cladomyrma ant species. Furthermore, we interpret the low levels of variation in both the ETS and ITS sequences as indication of a recent and rapid radiation for Neonauclea s.s. (with 65 species) and a recent and slow radiation for Myrmeconauclea (with three species). We argue that the rapid diversification of Neonauclea s.s. is partly associated with the nature of its fruits and its ability to colonize a wide range of habitats. We postulate that both ecological and geographical events may have been responsible for the radiation of the non-myrmecophytic Neonauclea species. Finally, we argue that the acquisition of the pseudo-multiple fruits and long-tailed seeds has allowed Myrmeconauclea to specialize on rheophytic habitats but its narrow ecological tolerance may have hindered its speciation.
Keywords: ETS; ITS; Myrmeconauclea; Myrmecophytism; Naucleeae s.l.; Neonauclea s.s.; Putative pseudogenes; Rapid diversification; Recent hybridization

E. Pardo, A. J. Ramos, V. Sanchis, S. Marin, Modelling of effects of water activity and temperature on germination and growth of ochratoxigenic isolates of Aspergillus ochraceus on a green coffee-

based medium, International Journal of Food Microbiology, Volume 98, Issue 1, 15 January 2005, Pages 1-9, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2004.05.003.
(http://www.sciencedirect.com/science/article/B6T7K-4CSP4Y8-3/2/a248805a29643aadcebf69008973d463)
Abstract:
Influence of water activity (0.75-0.99 aw) and temperature (10, 20 and 30 [degree sign]C) on germination and mycelial growth on green coffee extract agar medium of three ochratoxigenic isolates of Aspergillus ochraceus was studied. Optimal conditions for germination and growth were observed at 0.95-0.99 aw and 20-30 [degree sign]C for the three isolates. Minimum aw level for germination was 0.80, and 0.85 for mycelial growth. At marginal aw and temperature levels assayed, the lag phases prior to germination increased and the growth rates showed a significant decrease in comparison with the optimal conditions. Data were modelled by a multiple linear regression (MLR) and response surface models were obtained. Germination and growth of A. ochraceus in green coffee beans could be prevented or at least inhibited to some extent by minimising the time that coffee beans are exposed to temperature and humidity conditions near to the optimum during processing and storage.
This could be an empirical approach to predict the effects of water activity and temperature conditions on the development of ochratoxigenic isolates of A. ochraceus during handling and storage of green coffee.
Keywords: Aspergillus ochraceus; Green coffee beans; Temperature; Water activity; Predictive modelling

D. D'haeze, J. Deckers, D. Raes, T. A. Phong, H. V. Loi, Environmental and socio-economic impacts of institutional reforms on the agricultural sector of Vietnam: Land suitability assessment for Robusta coffee in the Dak Gan region, Agriculture, Ecosystems & Environment, Volume 105, Issues 1-2, January 2005, Pages 59-76, ISSN 0167-8809, DOI: 10.1016/j.agee.2004.05.009.
(http://www.sciencedirect.com/science/article/B6T3Y-4D4908C-4/2/de7b0fd0f845e358ff4554791ac8185a)
Abstract:
After the reunion of North and South Vietnam in 1975, the area under small-holder, irrigated cultivation of Robusta coffee increased by a factor of 10 in the Central Highlands. The actual coffee acreage in Dak Lak province is estimated to be over 260,000 ha, representing 60% of the national production, with 405,000 t year-1 for the world market. Vietnam is presently the second largest exporter worldwide and expansion is still going on. In cooperation with the National Institute for Agricultural Planning and Projection (NIAPP), a 5-year development project 'Land Evaluation for Land Use Planning and Development of Sustainable Agriculture in the Central Highlands of South Vietnam' was set up, with a goal of diagnosing the sustainability of the rapidly expanding Robusta coffee sector in Central Vietnam. This paper describes the reasons for this quick expansion and investigates the consequences in ecological and social terms. This is done based on a large-scale natural resources inventory, land suitability analysis for Robusta coffee and participatory rural appraisal combined with secondary statistical records from Dak Gan commune. It is representative of the Central Highlands in terms of geomorphological and pedological variability, ethnic identity and with regard to trade-offs between forest conservation and coffee expansion at the cost of available water stocks. Local institutional reforms in the eighties have accelerated coffee expansion in three ways: demographic resettlement, socio-economic liberalization and legislation towards land ownership. Interaction between these three factors has induced a second spontaneous migration flow towards the Highlands in the nineties. Forest area declined by 19% and was converted to coffee plantations, encouraged by the high economic return of this cash crop. The results indicate that this has happened in an haphazard manner and led to a mismatch between the present land use pattern and the natural resource base. Unsustainable land use manifests itself at four levels. (i) The areal limits for sustainable coffee

production have been exceeded. (ii) As a consequence over 74% of the present coffee stand is situated on sub-optimal land units. (iii) An excessive coffee area in combination with over-irrigation is likely to deplete groundwater resources. (iv) And paradoxically 24.3% of suitable soils for coffee production is still under forest in Dak Gan. In turn this leads to large-scale environmental and socio-economic decline: soil erosion, water scarcity and social inequity resulting in conflicts between migrants and the indigenous tribes. Besides local reforms, world trade liberalization changed the global coffee market in the late nineties from a regulated system to a free trade market. This fostered global oversupply, which in combination with a stagnant coffee demand suppressed the world market price. Since Vietnam became the second world producer of Robusta, prices have declined by a factor of 3, not only affecting the local sector but households worldwide.
Keywords: Robusta coffee; Irrigation; Institutional reforms; Agro-ecological decline; Vietnam

Carol D. Frary, Rachel K. Johnson, Min Qi Wang, Food sources and intakes of caffeine in the diets of persons in the United States, Journal of the American Dietetic Association, Volume 105, Issue 1, January 2005, Pages 110-113, ISSN 0002-8223, DOI: 10.1016/j.jada.2004.10.027.
(http://www.sciencedirect.com/science/article/B758G-4F53HK4-Y/2/f2224c12321cbefddc4ba133425b2c14)
Abstract:
This study provides information on the caffeine intakes of a representative sample of the US population using the US Department of Agriculture 1994 to 1996 and 1998 Continuing Survey of Food Intakes by Individuals. The percentage of caffeine consumers of the total sample (N=18,081) and by age and sex groups and for pregnant women were determined. Among caffeine consumers (n=15,716), the following were determined: mean intakes of caffeine (milligrams per day and milligrams per kilogram per day) for all caffeine consumers, as well as for each age and sex group and pregnant women; mean intakes (milligrams per day) of caffeine by food and beverage sources; and the percent contribution of each food and beverage category to total caffeine intake for all caffeine consumers, as well as each age and sex group and pregnant women. Eight-seven percent of the sample consumed food and beverages containing caffeine. On average, caffeine consumers' intakes were 193 mg caffeine per day and 1.2 mg caffeine per kilogram of body weight per day. As age increased, caffeine consumption increased among people aged 2 to 54 years. Men and women aged 35 to 64 years were among the highest consumers of caffeine. Major sources of caffeine were coffee (71%), soft drinks (16%), and tea (12%). Coffee was the major source of caffeine in the diets of adults, whereas soft drinks were the primary source for children and teens.

Alexandre Campos, Maria J. Rijo-Johansen, Maria F. Carneiro, Pedro Fevereiro, Purification and characterisation of adenosine nucleosidase from Coffea arabica young leaves, Phytochemistry, Volume 66, Issue 2, January 2005, Pages 147-151, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2004.11.018.
(http://www.sciencedirect.com/science/article/B6TH7-4F2V51N-3/2/b37517968e8481f576e0d803e6178aac)
Abstract:
An adenosine nucleosidase (ANase) (EC 3.2.2.7) was purified from young leaves of Coffea arabica L. cv. Catimor. A sequence of fractionating steps was used starting with ammonium sulphate salting-out, followed by anion exchange, hydrophobic interaction and gel filtration chromatography. The enzyme was purified 5804-fold and a specific activity of 8333 nkat mg-1 protein was measured. The native enzyme is a homodimer with an apparent molecular weight of 72 kDa estimated by gel filtration and each monomer has a molecular weight of 34.6 kDa, estimated by SDS-PAGE. The enzyme showed maximum activity at pH 6.0 in citrate-phosphate buffer (50 mM). The calculated Km is 6.3 [mu]M and Vmax 9.8 nKat.

Keywords: Coffea arabica L.; Rubiaceae; Coffee; Enzyme purification; Adenosine nucleosidase; Adenosine; Purine metabolism

Gabriela A. Arroyo-Serralta, Angela Ku-Gonzalez, S.M. Teresa Hernandez-Sotomayor, Jose J. Zuniga Aguilar, Exposure to toxic concentrations of aluminum activates a MAPK-like protein in cell suspension cultures of Coffea arabica, Plant Physiology and Biochemistry, Volume 43, Issue 1, January 2005, Pages 27-35, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2004.12.003.
(http://www.sciencedirect.com/science/article/B6VRD-4F661X9-1/2/ebc7a600f3462d42aa22a257e28e4ffc)
Abstract:
Addition of a toxic concentration of aluminum (Al) to cell suspension cultures of Coffea arabica L. induced the rapid and transient activation of a protein kinase that phosphorylates myelin basic protein (MBP), as revealed by in-gel kinase assays. This enzyme with an apparent molecular mass of 58 kDa was activated shortly after cells were exposed to 50 [mu]M AlCl3, a concentration previously shown to produce toxicity in plant cells in vitro. The activity of this kinase dropped to basal levels after 20 min of Al addition; this activity is specific for MBP as it could not be detected when casein or histone H1 were used as substrates. Analysis of the same cell extracts with antibodies that specifically recognize bis-phosphorylated (active) mitogen-activated protein kinases (MAP kinases), revealed the presence of a phosphoprotein with an apparent molecular mass of 58 kDa, which showed the same response to Al as the protein kinase revealed by the in-gel kinase assays. Furthermore, immunoprecipitation with an antibody directed against mammalian MAP kinases depleted both the enzymatic activity and the phosphoprotein from the cell extracts, suggesting that the 58 kDa kinase and the 58 kDa phosphoprotein from C. arabica cells are the same protein, and that it can be actually a member of the MAP kinase family of protein kinases. Since its activity is enhanced dramatically after addition of AlCl3 to the medium, we can speculate that Al toxicity in plants could be perceived through the MAP kinase signal transduction pathway.
Keywords: Aluminum toxicity; Coffee cell suspension cultures; MAP kinase-like activity

A. Oosterveld, G.J. Coenen, N.C.B. Vermeulen, A.G.J. Voragen, H.A. Schols, Structural features of acetylated galactomannans from green Coffea arabica beans, Carbohydrate Polymers, Volume 58, Issue 4, 7 December 2004, Pages 427-434, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2004.08.009.
(http://www.sciencedirect.com/science/article/B6TFD-4D98XFM-4/2/98ad042f1ffb74b460326d5cc6551098)
Abstract:
Polysaccharides were extracted from green Coffea arabica beans with water (90 [degree sign]C, 1 h). Galactomannans were isolated from the water extract using preparative anion-exchange chromatography. Almost all of the galactomannans eluted in two neutral populations, while almost all of the arabinogalactans bound to the column, indicating that these arabinogalactans contain charged groups. Analysis of the molecular weight distribution of the two neutral populations showed that they differ in their molecular weight. Further characterization of these neutral populations by NMR and by MALDI-TOF MS after enzymatic degradation with an endo-mannanase, showed the presence of acetyl groups linked to the galactomannans, a feature not previously described for this type of polysaccharides from coffee beans. It was found that the high molecular weight (ca. 2000 kDa) neutral fraction was highly substituted both with galactose residues and acetyl groups, while the low molecular weight (ca. 20 kDa) population was much less substituted. Based on these results it can be concluded that at least two distinctly different populations of galactomannans are present in green coffee beans. It was also shown that the degradation of the galactomannans from green coffee beans with an endo-mannanase from A. niger is hindered by the presence of acetyl groups.

Keywords: Arabica; Green coffee beans; Galactomannans; Acetyl; Branching

Mirna L. Suarez-Quiroz, Oscar Gonzalez-Rios, Michel Barel, Bernard Guyot, Sabine Schorr-Galindo, Joseph P. Guiraud, Effect of chemical and environmental factors on Aspergillus ochraceus growth and toxigenesis in green coffee, Food Microbiology, Volume 21, Issue 6, December 2004, Pages 629-634, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.03.005.
(http://www.sciencedirect.com/science/article/B6WFP-4D3W9F4-1/2/3ed327cd24f95ace0877a72578c267ce)
Abstract:
Post-harvest processing (traditional or ecological wet method, and dry method) and coffee pH did not play a significant role in Aspergillus ochraceus growth and OTA production. However, Aw did play a key role: the optimum for growth and toxigenesis was 0.95; below 0.80, coffee was protected. Temperature affected the rate of toxin production, when Aw was compatible: toxigenesis occurred from 10[degree sign]C with an optimum at 35[degree sign]C. The critical stage in the process was drying, where conditions propitious to A. ochraceus (Aw of 0.99-0.80) could be found for 2 days or more. Caffeine and chlorogenic acids had an inhibiting effect on OTA production.
Keywords: Aspergillus ochraceus; Ochratoxin A; Water activity; Coffee processing

C. A. Knight, I. Knight, D. C. Mitchell, J. E. Zepp, Beverage caffeine intake in US consumers and subpopulations of interest: estimates from the Share of Intake Panel survey, Food and Chemical Toxicology, Volume 42, Issue 12, December 2004, Pages 1923-1930, ISSN 0278-6915, DOI: 10.1016/j.fct.2004.05.002.
(http://www.sciencedirect.com/science/article/B6T6P-4DFBPTS-1/2/512ec43f833b6bc20e61adc6eaa9b6cc)
Abstract:
Concerns exist about the potential adverse health effects of high consumption of dietary caffeine, especially in children and pregnant women. Recommended caffeine intakes corresponding to no adverse health effects have been suggested recently for healthy adults (400-450 mg/day), for women contemplating pregnancy (300 mg/day), and for young children age 4-6 years (45 mg/day). To determine whether current caffeine intake approaches these levels, intake from major dietary sources (coffee, tea and carbonated soft drinks) were measured in 10,712 caffeinated beverage consumers in the 1999 US Share of Intake Panel, a targeted beverage survey. Mean caffeine intakes in adult caffeinated beverage consumers ranged from 106 to 170 mg/day (90th percentile intake was 227-382 mg/day). In children 1-5 and 6-9 years, mean caffeine intakes were 14 and 22 mg/day, respectively; corresponding 90th percentile intakes were 37 and 45 mg/day. Pregnant women consumed an average of 58 mg/day (157 mg/day at the 90th percentile), and women of reproductive age ingested 91-109 mg/day (229-247 mg/day at the 90th percentile). These data show that while mean caffeine intakes are within recommended safe levels, heavy consumers of certain subpopulations, including young children and women contemplating pregnancy, might benefit from dietary advice.
Keywords: Caffeine; Consumption; Beverages; Survey; US population; Children; Women

Susana Andueza, Concepcion Cid, Maria Cristina Nicoli, Comparison of antioxidant and pro-oxidant activity in coffee beverages prepared with conventional and 'Torrefacto' coffee, Lebensmittel-Wissenschaft und-Technologie, Volume 37, Issue 8, December 2004, Pages 893-897, ISSN 0023-6438, DOI: 10.1016/j.lwt.2004.04.004.
(http://www.sciencedirect.com/science/article/B6WMV-4CHRFDD-1/2/3c1bf312861b7d347ebff6dcedb68f41)
Abstract:

Antioxidant and pro-oxidant properties of coffee can be affected by several factors such as coffee variety, roasting process, storage, etc. The aim of this study was to compare the antioxidant and pro-oxidant properties of coffee beverages obtained with conventional and torrefacto roasted coffee.
Coffee variety influences on the antioxidant capacity of ground coffee. A100 roasted samples presented lower antioxidant capacity than Robusta varieties. This could be due to the higher percentage of chlorogenic acids in Robusta ground coffee than in Arabica. Beside, A100 samples presented the highest value of pro-oxidant activity because these samples presented less efficient antioxidants.
In Torrefacto roast, the antioxidant capacity increased and redox potential decreased due to the formation of MRPs, which have reducing properties.
Keywords: Roasted coffee; Torrefacto roast; Antioxidant properties; Pro-oxidant properties

Hugo A. Pinheiro, Fabio M. DaMatta, Agnaldo R.M. Chaves, Elizabeth P.B. Fontes, Marcelo E. Loureiro, Drought tolerance in relation to protection against oxidative stress in clones of Coffea canephora subjected to long-term drought, Plant Science, Volume 167, Issue 6, December 2004, Pages 1307-1314, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2004.06.027.
(http://www.sciencedirect.com/science/article/B6TBH-4CX10MV-1/2/dbc4f359a9ae4f0a4f369ea6ce7a901c)
Abstract:
Four clones of Coffea canephora (Robusta coffee) representing drought-tolerant (14 and 120) and drought-sensitive (46 and 109A) genotypes were submitted to slowly imposed water deficit, until predawn leaf water potential approximately -3.0 MPa was reached. Drought-tolerant clones were better able to maintain their leaf water status than drought-sensitive clones after withholding irrigation. Regardless of the clones investigated, the net carbon assimilation rate decreased under drought stress, but little or no effect of drought on the quantum yield of electron transport was observed. The photosynthetic apparatus of clone 120 was more tolerant to both drought and paraquat-mediated oxidative stress, with no clear distinction amongst the other clones in this regard. Drought triggered increases in superoxide dismutase (clones 109A and 120), ascorbate peroxidase (clones 14, 46 and 109A), catalase and guaiacol peroxidase (clones 46 and 109A), and also in glutathione reductase (clone 46) and dehydroascorbate reductase (clone 109A). Activity of monodehydroascorbate reductase was not induced in drought-stressed plants. Maximal catalytic activities of the two last enzymes were much lower than that of ascorbate peroxidase, irrespective of the clone investigated. No drought-induced decrease in enzyme activity was found, except for glutathione reductase in clone 120. In any case, oxidative damage appeared to be evident only in clone 109A. A general link between protection against oxidative stress with differences in clonal tolerance to drought was not observed.
Keywords: Acclimation; Antioxidant enzymes; Coffee; Gas exchange; Paraquat; Water deficit

C. Campa, J. F. Ballester, S. Doulbeau, S. Dussert, S. Hamon, M. Noirot, Trigonelline and sucrose diversity in wild Coffea species, Food Chemistry, Volume 88, Issue 1, November 2004, Pages 39-43, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.01.020.
(http://www.sciencedirect.com/science/article/B6T6R-4C1FCX6-1/2/2355a5123a9219fa2f241349aa904b9c)
Abstract:
Trigonelline and sucrose are two coffee aroma precursors. Contents of these compounds are higher in Coffea arabica than in Coffea canephora green beans and this could be the main explanation for consumers' preference for C. arabica coffee. This is the first evaluation of sucrose and trigonelline contents involving 14 species and six new taxa not yet botanically characterised. Trigonelline and sucrose contents varied between species from 0.39% to 1.77% dry matter basis

(dmb) and from 3.8% to 10.7% dmb, respectively. C. canephora could be improved through both compounds by crosses with Coffea eugenioides.
Keywords: Coffea; Biochemical diversity; Sucrose; Trigonelline; HPLC

Lise R. Nissen, Derek V. Byrne, Grete Bertelsen, Leif H. Skibsted, The antioxidative activity of plant extracts in cooked pork patties as evaluated by descriptive sensory profiling and chemical analysis, Meat Science, Volume 68, Issue 3, November 2004, Pages 485-495, ISSN 0309-1740, DOI: 10.1016/j.meatsci.2004.05.004.
(http://www.sciencedirect.com/science/article/B6T9G-4CMYMV9-1/2/a463ade7479bd27f16138e2f7f93333d)
Abstract:
Antioxidative efficiency of extracts of rosemary, green tea, coffee and grape skin in precooked pork patties was investigated during storage under retail conditions (10 days, 4 [degree sign]C, atmospheric air), using descriptive sensory profiling following reheating and quantitative measurements of hexanal, thiobarbituric acid reactive substances (TBARS) and vitamin E as indicators of lipid oxidation. The initial oxidative status of pork patties (evaluated by ANOVA) showed a significant lower level of secondary oxidation products and higher levels of vitamin E in patties with extracts incorporated, indicating that the extracts retarded lipid oxidation during processing of the meat. Data analysis for the storage study was based on qualitative overview of sensory/chemical variation by principal component analysis (PCA) and quantitative ANOVA-PLSR for determination of the relationship between design variables (days of chill-storage, extract treatment) versus sensory-chemical variables and PLSR for elucidating the predictive ability of the chemical methods for sensory terms. Lipid oxidation was seen to involve a decrease in perception of meat flavour/odour and a concomitant increase in the off-flavour/odours linseed, rancid. TBARS, hexanal and vitamin E were all significant predictive indices ($P<0.05$) for the majority of the sensory terms, while vitamin E through negative correlation with TBARS and hexanal displayed its antioxidative effect and thus, its ability to preserve sensory fresh meat flavour/odour. The effect of the various extracts incorporated in the product was clearly related to the degree of lipid oxidation and an overall ranking of the antioxidative efficiency of extracts in declining order became apparent: Rosemary > Grape skin > Tea > Coffee > Reference. Furthermore, the relation between extracts and vitamin E indicated that the extracts, to some extent, interacted with the vitamin and prevented it from degrading. In conclusion, the rosemary extract displayed potential for maintaining sensory eating quality in processed pork products.
Keywords: Processed pork; Natural antioxidants; Storage study; Descriptive sensory profiling; TBARS; Hexanal; Vitamin E; Multivariate data analysis

Boris Bellanger, Sylvain Huon, Fernando Velasquez, Vincent Valles, Cyril Girardin, Andre Mariotti, Monitoring soil organic carbon erosion with [delta]13C and [delta]15N on experimental field plots in the Venezuelan Andes, CATENA, Volume 58, Issue 2, 28 October 2004, Pages 125-150, ISSN 0341-8162, DOI: 10.1016/j.catena.2004.03.002.
(http://www.sciencedirect.com/science/article/B6VCG-4D16Y16-1/2/66d4a5f86e19c2ba7eac2507c9470d0b)
Abstract:
The question of discriminating sources of organic matter in suspended sediment transported by streams can be addressed by using total organic carbon concentration and stable isotope ([delta]13C, [delta]15N) measurements when constant fluxes of organic matter supply can be assumed. However, little is known about the dynamics of organic matter release during soil erosion and the temporal stability of its isotopic composition. In this study, we have monitored soil organic carbon loss and water runoff using natural rainfall events during the 1998 rainy season on three experimental field plots with different vegetation covers (bare, maize and coffee plots), set up on slopes of a tropical mountainous watershed in NW Venezuela (Bocono watershed, 08[degree

sign]57'-09[degree sign]31'N, 70[degree sign]02'-70[degree sign]34'W). Runoff and soil organic carbon losses were considerably higher for the bare field plot than for the cultivated field plots (270 and 2.2-21.0 kg C ha-1, respectively), and these findings are consistent with other soil erosion experiments. Total organic carbon concentrations, total nitrogen concentrations and the [delta]13C and [delta]15N composition of fine (<50 [mu]m) size suspended sediments remain constant for high runoff periods (>30 ml s-1) and 'high' suspended matter concentrations (>0.5 g l-1), closely reflecting the composition of soil organic matter from which they originate and integrating the high variability of organic carbon in top soil horizons. Because runoff and soil organic carbon loss are closely linked during most of the water flow (at the time scales covered by this study), the contribution of soil organic matter, originating from soils with different compositions, to suspended sediments in runoff can be derived using soil organic carbon erosion rates and stable ([delta]13C and [delta]15N) isotope measurements.
Keywords: Soil erosion; Experimental field plots; Organic matter; Stable isotopes; Venezuela

Emerson A. Silva, Fabio M. DaMatta, Carlos Ducatti, Adair J. Regazzi, Raimundo S. Barros, Seasonal changes in vegetative growth and photosynthesis of Arabica coffee trees, Field Crops Research, Volume 89, Issues 2-3, 8 October 2004, Pages 349-357, ISSN 0378-4290, DOI: 10.1016/j.fcr.2004.02.010.
(http://www.sciencedirect.com/science/article/B6T6M-4C2NMHB-5/2/1b9eae98317fd20455e13f3dfc51df20)
Abstract:
Seasonal changes in vegetative growth, leaf gas exchanges, carbon isotope discrimination ([Delta]) and carbohydrate status were monitored in de-fruited coffee trees (Coffea arabica L.) grown in the field, from October 1998 through September 1999, in Vicosa (20[degree sign]45'S, 42[degree sign]15'W, 650 m a.s.l.), southeastern Brazil. Of the total growth over the 12-month study period, 78% occurred in the warm, rainy season (October-March), and 22% during the cool, dry season (April-September). Throughout the active growth period, the rate of net carbon assimilation (A) averaged 8.6 [mu]mol m-2 s-1, against 3.4 [mu]mol m-2 s-1 during the period of reduced growth. In the active period, growth, unlike A or [Delta], was strongly negatively correlated with air temperature. In contrast, growth and A were both correlated positively, and [Delta] correlated negatively, with air temperature during the reduced growth period. However, the depressions of A and growth might have simply run in parallel, without any causal relationship. Changes in A appeared to be largely due to stomatal limitations in the active growing season, with non-stomatal ones prevailing in the slow growth period. Foliar carbohydrates seemed not to have contributed appreciably to changes in growth rates and photosynthesis.
Keywords: Carbohydrate; Carbon isotope discrimination; Coffea arabica; Gas exchange; Temperature

Jane Southworth, Harini Nagendra, Laura A. Carlson, Catherine Tucker, Assessing the impact of Celaque National Park on forest fragmentation in western Honduras, Applied Geography, Volume 24, Issue 4, October 2004, Pages 303-322, ISSN 0143-6228, DOI: 10.1016/j.apgeog.2004.07.003.
(http://www.sciencedirect.com/science/article/B6V7K-4D98JD7-1/2/46813e64aed95d08a7e73b08b76bce76)
Abstract:
The effectiveness of parks as management regimes is much in debate. This study examines the effect of establishment of the Celaque National Park, Honduras, in 1987, on limiting deforestation through a comparison with the surrounding landscape using remote sensing, GIS and landscape pattern analysis. Pressure on the park region is found to relate spatially to the locations of towns and roads, with increasing deforestation in the landscape surrounding the park. In contrast, the park has been largely successful in maintaining forest cover. Although the extent of change within the park is not pronounced, the pattern of change is. Expansion of agriculture and coffee

production have led to increasing pressure on the park boundaries, with as much as 25% of the landscape surrounding the park experiencing land cover change between 1996 and 2000. This has significant implications for the future of the park.
Keywords: National Parks; Remote sensing; GIS; Landscape Metrics; Agricultural intensification; Coffee

Hector Palacios-Cabrera, Marta H. Taniwaki, Hilary C. Menezes, Beatriz T. Iamanaka, The production of ochratoxin A by Aspergillus ochraceus in raw coffee at different equilibrium relative humidity and under alternating temperatures, Food Control, Volume 15, Issue 7, October 2004, Pages 531-535, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2003.08.006.
(http://www.sciencedirect.com/science/article/B6T6S-49NVGRF-3/2/6d726e96414d47aa0646105e94e20017)
Abstract:
The effect of alternating temperatures in the storage of coffee was studied. From the day and night values, two average temperatures (25 and 14 [degree sign]C) were chosen. Such changes may occur, mainly during storage in farm barns and transport. The study was carried out under different conditions of equilibrium relative humidity (ERH): 80%, 87% and 95% for the production of ochratoxin A (OTA) by Aspergillus ochraceus in raw coffee. Temperatures were cycled at 12 h intervals. Coffee was also maintained at 25 [degree sign]C under similar conditions, but without temperature cycling, at the same three values of relative humidity. Ochratoxin production was analysed after periods of 39 and 60 days after the coffee had reached the equilibrium relative humidity. The water activity and moisture content of coffee were checked and OTA production was quantified.
There was little or no OTA production at 80% ERH; at 87% and 95% OTA production was high after different days of incubation. Under alternating temperatures OTA production was higher than at constant temperature, and alternating temperatures indirectly favoured OTA production due to condensation and a subsequent rapid increase in moisture content and water activity of the coffee beans.
Keywords: Coffee; Ochratoxin A; Aspergillus ochraceus; Alternating temperatures; Water activity

Michael N. Clifford, Susan Knight, The cinnamoyl-amino acid conjugates of green robusta coffee beans, Food Chemistry, Volume 87, Issue 3, September 2004, Pages 457-463, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2003.12.020.
(http://www.sciencedirect.com/science/article/B6T6R-4BT8GJ7-4/2/1b3402269651560a410fbee94c9fe607)
Abstract:
Methanolic extracts of green robusta coffee beans have been analysed for cinnamoyl amides by electrospray LC-MSn. Evidence is presented for the presence of p-coumaroyl-N-tyrosine, feruloyl-N-tyrosine, feruloyl-N-tryptophan and caffeoyl-N-phenylalanine, in addition to the previously reported p-coumaroyl-N-tryptophan, caffeoyl-N-tryptophan and caffeoyl-N-tyrosine. These compounds are found at higher levels in Angolan coffees compared with coffees of other origins. Caffeoyl-N-phenylalanine has previously been reported in Lady Fern (Athyrium filix-femina) but p-coumaroyl-N-tyrosine, feruloyl-N-tyrosine and feruloyl-N-tryptophan seem not to have been reported elsewhere. A combination of negative ion and positive ion LC-MS2 is a convenient procedure for characterising cinnamoyl amides as the former gives an MS2 base peak defining the amino acid and the latter an MS2 base peak defining the cinnamic acid in the conjugate.
Keywords: Caffeoyl-N-phenylalanine; Caffeoyl-N-tryptophan; Caffeoyl-N-tyrosine; Cinnamoyl-amides; Coffee; p-Coumaroyl-N-tryptophan; p-Coumaroyl-N-tyrosine; Feruloyl-N-tryptophan; Feruloyl-N-tyrosine; LC-MSn

Ji Young Kim, Kyung Sik Jung, Hye Gwang Jeong, Suppressive effects of the kahweol and cafestol on cyclooxygenase-2 expression in macrophages, FEBS Letters, Volume 569, Issues 1-3, 2 July 2004, Pages 321-326, ISSN 0014-5793, DOI: 10.1016/j.febslet.2004.05.070.
(http://www.sciencedirect.com/science/article/B6T36-4CMHMMN-1/2/00b789ee33f3ce217668e665c98d2cd0)
Abstract:
Inducible cyclooxygenase-2 (COX-2) has been suggested to play a role in the processes of inflammation and carcinogenesis. Recent studies have shown the chemoprotective effects of kahweol and cafestol, which are coffee-specific diterpenes. This study investigated the effects of kahweol and cafestol on the expression of COX-2 in lipopolysaccharide (LPS)-activated RAW 264.7 macrophages. Kahweol and cafestol significantly suppressed the LPS-induced production of prostaglandin E2, COX-2 protein and mRNA expression, and COX-2 promoter activity in a dose-dependent manner. Furthermore, kahweol blocked the LPS-induced activation of NF-[kappa]B by preventing I[kappa]B degradation and inhibiting I[kappa]B kinase activity. These results will provide new insights into the anti-inflammatory and anti-carcinogenic properties of kahweol and cafestol.
Keywords: Kahweol; Cafestol; Cyclooxygenase-2; NF-[kappa]B; Macrophage

S. R. Herwitz, L. F. Johnson, S. E. Dunagan, R. G. Higgins, D. V. Sullivan, J. Zheng, B. M. Lobitz, J. G. Leung, B. A. Gallmeyer, M. Aoyagi, R. E. Slye, J. A. Brass, Imaging from an unmanned aerial vehicle: agricultural surveillance and decision support, Computers and Electronics in Agriculture, Volume 44, Issue 1, July 2004, Pages 49-61, ISSN 0168-1699, DOI: 10.1016/j.compag.2004.02.006.
(http://www.sciencedirect.com/science/article/B6T5M-4CKFKSP-5/2/5e80448ad108973a6f0a7e76996123f3)
Abstract:
In September 2002, NASA's solar-powered Pathfinder-Plus unmanned aerial vehicle (UAV) was used to conduct a proof-of-concept mission in US national airspace above the 1500 ha plantation of the Kauai Coffee Company in Hawaii. While in national airspace, the transponder-equipped UAV was supervised by regional air traffic controllers and treated like a conventionally piloted aircraft. High resolution color and multispectral imaging payloads, both drawing from the aircraft's solar power system, were housed in exterior-mounted environmental pressure pods. A local area network (LAN) using unlicensed radio frequency was used for camera control and downlink of image data at rates exceeding 5 Mbit s-1. A wide area network (WAN) allowed a project investigator stationed on the US mainland to uplink control commands during part of the mission. Images were available for enhancing, printing, and interpretation within minutes of collection. The color images were useful for mapping invasive weed outbreaks and for revealing irrigation and fertilization anomalies. Multispectral imagery was related to mature fruit harvest from certain fields with significant fruit display on the tree canopy exterior. During 4 h 'loitering' above the plantation, ground-based pilots were able to precisely navigate the UAV along pre-planned flightlines, and also perform spontaneous maneuvers under the direction of the project scientist for image collection in cloud-free zones. Despite the presence of ground-obscuring cumulus cloud cover of ca. 70% during the image collection period, the UAV's maneuvering capability ultimately enabled collection of cloud-free imagery throughout most of the plantation. The mission demonstrated the capability of a slow-flying UAV, equipped with downsized imaging systems and line-of-sight telemetry, to monitor a localized agricultural region for an extended time period. The authors suggest that evolving long-duration (weeks to months) UAVs stand to make a valuable future contribution to regional agricultural resource monitoring.
Keywords: Unmanned aerial vehicle; Pathfinder-Plus UAV; Multispectral imaging; Local area network; Ripeness monitoring; Weed mapping; Fertigation; Coffee

Eduardo Pineda, Gonzalo Halffter, Species diversity and habitat fragmentation: frogs in a tropical montane landscape in Mexico, Biological Conservation, Volume 117, Issue 5, June 2004, Pages 499-508, ISSN 0006-3207, DOI: 10.1016/j.biocon.2003.08.009.
(http://www.sciencedirect.com/science/article/B6V5X-49SWC5Y-5/2/7ff02f5c2a32f9df0aaa9162a9f5813c)
Abstract:
We evaluate the alpha (within patch species richness), beta (spatial turnover among patches) and gamma (landscape) diversity of frogs in a tropical montane cloud forest (TMCF) in central Veracruz, Mexico in order to assess (1) the influence of forest fragmentation on frog assemblages, (2) the importance to diversity of the various elements of the landscape matrix, including the shaded coffee plantations and cattle pastures that surround TMCF and (3) to identify the frog guilds most affected by habitat transformation. We sampled ten sites between May 1998 and November 2000: five TMCF fragments and five anthropogenic habitats. For the entire landscape, we registered 21 species belonging to six families. 100% of these were found in the TMCF fragments and 62% in the surrounding mosaic of anthropogenic habitats. Gamma diversity ([gamma]) is determined to a greater extent by species exchange ([beta]) than by local species richness ([alpha]). Elevational variation, the degree of conservation of the vegetation canopy and fragment size appear to determine the species diversity of this landscape. Large species, terrestrial species, those whose eggs develop outside water, and those whose larvae develop in the water seemed to be most affected by habitat transformation. On its own, even the largest and most species-rich cloud forest fragment is not capable of preserving the current anuran diversity. Neither are the shaded coffee plantations that are interspersed among and link the patches of TMCF. However together they form a diverse system of habitats crucial to species conservation in this landscape.
Keywords: Alpha, beta and gamma diversity; Cloud forest; Shaded coffee plantation; Frog community; Mexico

Gabriela Perez-Lachaud, Tim P. Batchelor, Ian C. W. Hardy, Wasp eat wasp: facultative hyperparasitism and intra-guild predation by bethylid wasps, Biological Control, Volume 30, Issue 2, June 2004, Pages 149-155, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2004.03.003.
(http://www.sciencedirect.com/science/article/B6WBP-4C47KF5-2/2/8132989001661d76dc5ee620834f157d)
Abstract:
Bethylid wasps are primary parasitoids of coleopteran and lepidopteran pests of economic importance and have thus been deployed as biological control agents. We show that Cephalonomia hyalinipennis (Hym.: Bethylidae) is also a facultative hyperparasitoid of four other bethylid species: Cephalonomia stephanoderis and Prorops nasuta, natural enemies of the coffee berry borer, Hypothenemus hampei (Col.: Scolytidae), and of Goniozus nephantidis and Goniozus legneri, which have been released against lepidopteran pests of coconuts and almonds, respectively. Conspecific and allospecific ovicide and larvicide are also observed, constituting intra-guild predation. Such trophic interactions have the potential to disrupt biological control in coffee, coconut, and almond agroecosystems.
Keywords: Hyperparasitism; Intra-guild predation; Bethylidae; Cephalonomia hyalinipennis; Cephalonomia stephanoderis; Prorops nasuta; Goniozus; Coffee berry borer

D. Labbe, A. Rytz, A. Hugi, Training is a critical step to obtain reliable product profiles in a real food industry context, Food Quality and Preference, Volume 15, Issue 4, June 2004, Pages 341-348, ISSN 0950-3293, DOI: 10.1016/S0950-3293(03)00081-8.
(http://www.sciencedirect.com/science/article/B6T6T-496FRM3-1/2/116e0867184953f77ba3947c4dbfc7be)
Abstract:

In the recent past, many authors have evaluated the benefit of training in the case of descriptive profiling. Conflicting results were presented, sometimes even concluding that untrained panels performed as well as trained ones. In this study, a panel of ten assessors evaluated eight soluble coffees from a benchmarking with repetition before and after a training of 21 h using a pre-defined glossary of 17 attributes. The benefits of training are multiple in this typical example from the food industry, where complex products are described within a relatively narrow sensory range. Two other means are proposed to shorten the duration of the study without altering the relevance of the data. First, monitoring panel performance during training helps to keep the training duration as short as possible. Second, a single evaluation of products is enough to provide reliable data for products as homogeneous as soluble coffee. In other more heterogeneous products, such as meat, cheese, etc., replicates are essential in order to determine the variability within products with the same treatment or even with the same product.
Keywords: Descriptive sensory analysis; Training procedure; Panel performance

Carlos Navarro, Florencia Montagnini, Gustavo Hernandez, Genetic variability of Cedrela odorata Linnaeus: results of early performance of provenances and families from Mesoamerica grown in association with coffee, Forest Ecology and Management, Volume 192, Issues 2-3, 6 May 2004, Pages 217-227, ISSN 0378-1127, DOI: 10.1016/j.foreco.2004.01.037.
(http://www.sciencedirect.com/science/article/B6T6X-4BWYRSD-3/2/36b7de2643d283fafd8228dd5fbea634)
Abstract:
Cedrela odorata Linnaeus is a highly valued forest species, chiefly because of its high quality wood. It has been severely extracted in natural forest and is considered endangered in Mesoamerica. Plantations of the species are difficult to establish because of the severe attack of the shootborer Hypsipyla grandella (Zeller) Lep., Pyralidae. Due to the wide range of distribution of the species and its high morphological variability, there are possibilities of obtaining provenances/families of good growth, which are more resistant to the attack of the shootborer. We studied the early performance of 115 families of 21 Mesoamerican provenances of the endangered species C. odorata when grown in association with coffee. The results present a new way to conserve genetic resources and their efficient use.
All the variables studied, provenance, family and coffee growing conditions, were highly significant for the performance of C. odorata. The provenances that tended to produce fewer shoots (re-sprouting of the terminal bud after attack) which is desirable to maintain a good form of the tree were Gualaca, Pacifico Sur and Tulum. The families that presented the best performance in diameter were 6240 (PZ), 6207(PS), 6121(Tal), 78 (Almirante), and 745 (Gualaca). The growth of these families was in a range of 35-37 mm per year in diameter. The best families had a very good growth in height, of up to 4 m per year.
The coffee conditions that provided the best environment for the growth of C. odorata were adult coffee bushes, with the trees planted between the coffee rows. The attack of the shoot borer insect H. grandella was also lower in the adult coffee conditions than in recently planted or pruned coffee. The number of shoots that re-sprouted following the attack of the shoot borer was significantly lower in the blocks where C. odorata was planted within the coffee rows, because of the strong lateral competition between the C. odorata trees and the coffee branches.
Agroforestry systems using C. odorata, as shade for coffee can be a good economical option for conservation of endangered populations of this important species.
Keywords: Agroforestry; Cedrela odorata; Coffee; Hypsipyla grandella; Progeny trials

Luciano Navarini, Michele Ferrari, Furio Suggi Liverani, Libero Liggieri, Francesca Ravera, Dynamic tensiometric characterization of espresso coffee beverage, Food Hydrocolloids, Volume 18, Issue 3, May 2004, Pages 387-393, ISSN 0268-005X, DOI: 10.1016/S0268-005X(03)00126-7.

(http://www.sciencedirect.com/science/article/B6VP9-49H0V04-1/2/495f5769c8fb83ce1c6e4d10a384c43c)
Abstract:
Espresso coffee world-wide success, besides being a phenomenon of fashion, seems to be based on the greater sensory satisfaction it gives to the consumer when compared with coffees prepared with other brewing methods. Conditions normally used in the espresso brewing technique enhance several surface tension-related phenomena such as foam and emulsion formation and stabilisation which strongly affects the organoleptic beverage properties. In spite of the relevant role played by surface tension in several quality characteristics of espresso coffee, little attention has been paid in its determination and its time-dependency has not yet been investigated.
In the present work, experimental techniques such as maximum bubble pressure and pendant drop have been used to characterise in a wide time window the dynamic surface tension of air-espresso coffee beverage interface at two different temperatures. The experimental data show a remarkable decrease of the surface tension with time for beverages prepared by using pure arabica as well as pure robusta roasted coffee, with a profile dependent upon the coffee variety. This behaviour is definitely related to the presence of surface active components and is consistent with a system having good wetting properties for oral cavity surfaces. A possible role of some natural surface active chemical components, like lipids, on tensiometric behaviour is discussed.
Keywords: Espresso; Coffee; Emulsions; Foams; Surface tension

Tesfay Teklay, Anders Malmer, Decomposition of leaves from two indigenous trees of contrasting qualities under shaded-coffee and agricultural land-uses during the dry season at Wondo Genet, Ethiopia, Soil Biology and Biochemistry, Volume 36, Issue 5, May 2004, Pages 777-786, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2003.12.013.
(http://www.sciencedirect.com/science/article/B6TC7-4BP9N0N-1/2/2e2b1429deefa2fd87a12ce1b3ab5dd5)
Abstract:
To explore the potential of trees and shrubs on farmlands on traditional systems in southern Ethiopia, mineralization of macronutrients and loss of organics from leaves of Cordia africana and Albizia gummifera were studied under shaded-coffee and agricultural land-uses during the dry season. Leaves in litterbags were incorporated at 15 cm depth in soil under both land uses and residues were recovered after 2, 4, 8, 12 and 16 weeks. Contents of macronutrients and organics in initial and recovered residues were measured. Single- or double-exponential decay or quadratic functions were fitted to describe patterns of decay or release of various leaf constituents. The two species differed significantly ($P<0.05$) with respect to contents of ash, N, P, K, cellulose (CEL), lignin (LG), total soluble polyphenols (PL), and condensed tannins (CT). Cordia had higher content of ash, K, P, CEL, LG and a higher C-to-N ratio while Albizia had higher contents of N, PL, CT and a higher C-to-P ratio. Albizia had significantly greater mass loss, N loss and release of CT than Cordia. N was immobilized for the first 4 weeks in most treatments. Across land uses and species, mass loss rates varied from -0.023 week-1 in Cordia to -0.034 week-1 in Albizia ($R2>0.70$). Higher rate of release of CT seems to have facilitated decomposition in Albizia despite higher initial PL and CT in the leaves of this species. There was no significant land-use effect on any of the variables considered. It was concluded that under drier conditions, tree cover might not affect decomposition, and that organic residues with high content of polyphenols, particularly condensed tannins could decompose faster than those with lower content. This suggests that indigenous tree species with high concentrations of tannins, supposedly considered to be of `poor quality', might still be quite useful as an organic input for improving soil fertility and productivity in the tropics.
Keywords: Decomposition; Cordia africana; Albizia gummifera; Polyphenols; Shaded-coffee; Agroforestry

Isabelle Andriot, Jean-Luc Le Quere, Elisabeth Guichard, Interactions between coffee melanoidins and flavour compounds: impact of freeze-drying (method and time) and roasting degree of coffee on melanoidins retention capacity, Food Chemistry, Volume 85, Issue 2, April 2004, Pages 289-294, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2003.07.007.
(http://www.sciencedirect.com/science/article/B6T6R-49TRMMT-7/2/09a1f40bd894ec63747dbb7152780d26)
Abstract:
The objective of this work was to study the putative interactions between flavour compounds and coffee melanoidins. After extraction, melanoidins were freeze-dried and several flavour compounds from different chemical classes were tested in aqueous solution. The retention of flavour compounds by melanoidins was found to be different in function of the method or time of freeze-drying. Thus, for the same freeze-drying method, the retention capacity of melanoidins increased when the aliphatic chain length of a homologous series of flavour compounds increased. This observation seems to favour the hydrophobic nature of the interactions between melanoidins and flavour molecules. Moreover, for the same aroma compound, the retention capacity of coffee melanoidins was found to vary in function of the freeze-drying method used. Freeze-drying could therefore be involved in the modification of the surface properties of melanoidins or in their denaturation, modifying their retention ability towards volatile flavour compounds. At last, retention by coffee melanoidins decreased with the roasting degree of coffee.
Keywords: Aroma; Melanoidins; Interaction; Headspace; Freeze-drying; Roasting

Deborah H. Shields, Kattia M. Corrales, Elizabeth Metallinos-Katsaras, Gourmet coffee beverage consumption among college women, Journal of the American Dietetic Association, Volume 104, Issue 4, April 2004, Pages 650-653, ISSN 0002-8223, DOI: 10.1016/j.jada.2004.01.015.
(http://www.sciencedirect.com/science/article/B758G-4C1DT7Y-14/2/dc6e5155cb66001ade209cfd3fcab64f)
Abstract:
Gourmet coffee beverages (GCBs) are relatively new products in the foodservice industry that consist of high-energy coffee drinks. A descriptive study was conducted to evaluate the frequency of consumption of GCBs and their energy and fat contribution to overall dietary intake in college women using a beverage questionnaire and a 3-day food diary. A convenience sample of 165 undergraduate and graduate women attending Simmons College completed a beverage questionnaire, and a subsample of 41 women completed a 3-day food diary. Mean reported GCB consumption was 2.5 times/week for the entire sample and 7 times/week for the food diary subsample. A comparison of GCB consumers and nonconsumers indicated that GCB drinkers had a 206 kcal/day higher intake (P=.250) and a 32 g higher sugar intake than nonconsumers (P<.05). A significant percentage of college women consume GCBs, which contributes additional energy and fat to dietary intake. Over time, this could potentially affect weight status.

Fabio M. DaMatta, Ecophysiological constraints on the production of shaded and unshaded coffee: a review, Field Crops Research, Volume 86, Issues 2-3, 10 March 2004, Pages 99-114, ISSN 0378-4290, DOI: 10.1016/j.fcr.2003.09.001.
(http://www.sciencedirect.com/science/article/B6T6M-49SWCMR-1/2/04ce8e1419994c6448e33c0b1fc1842e)
Abstract:
The ecophysiological constraints on the production of the arabica and robusta coffee under shading or full sunlight are reviewed. These two species, which account for almost all the world's production, were originally considered shade-obligatory, although unshaded plantations may out-yield shaded ones. As a rule, the benefits of shading increase as the environment becomes less favorable for coffee cultivation. Biennial production and branch die-back, which are strongly decreased under shading, are discussed. The relationships between gas exchange performance

and key environmental factors are emphasized. Ecophysiological aspects of high density plantings are also examined.
Keywords: Coffea; Environmental factors; Gas exchange; High density planting; Photosynthesis; Shading

Xin-qiang Zheng, Hiroshi Ashihara, Distribution, biosynthesis and function of purine and pyridine alkaloids in Coffea arabica seedlings, Plant Science, Volume 166, Issue 3, March 2004, Pages 807-813, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2003.11.024.
(http://www.sciencedirect.com/science/article/B6TBH-4B7YHF1-2/2/4162f9391bf8b0a6cfbd12e0ea9f10db)
Abstract:
Endogenous levels of purine and pyridine alkaloids were studied in different parts of 6-month-old Coffea arabica seedlings. In seedlings, caffeine was distributed mainly in leaves and cotyledons at concentrations varying from 43 to 104 [mu]mol g-1 dry weight. Essentially no caffeine was detected in roots or in older brown parts of shoots. In contrast, trigonelline was present in all parts of the seedlings. The concentration of trigonelline was highest in the upper part of the stems, including buds, which consist of young cells (180 [mu]mol g-1 dry weight), and was lowest in roots (25 [mu]mol g-1 dry weight). The trigonelline concentration in leaves was 60-80 [mu]mol g-1 dry weight, and the concentration in young leaves was higher than in older leaves. Purine alkaloid biosynthesis was estimated from the incorporation of radioactivity from [8-14C]adenosine into purine alkaloids. Theobromine and caffeine were synthesized only in young leaves and young shoots including buds, but no biosynthetic activity was found in roots or aged cotyledons. Biosynthetic activity of trigonelline was estimated from the conversion of exogenously supplied [carboxyl-14C]nicotinic acid to trigonelline. Trigonelline synthesis was found in all parts of the coffee seedlings. Metabolic fate studies indicated that large fractions of the radioactivity from [carboxyl-14C]nicotinic acid (59% in leaves, 53% in cotyledons, 36% in stems and 29% in roots) were incorporated into trigonelline during a 4 h incubation period. Radioactivity was also found in NAD(P), NMN and nicotinamide. Only trace amounts of 14CO2 from [carboxyl-14C] nicotinic acid were detected. These results suggest that caffeine accumulation is specific to above ground parts (leaves, cotyledons and shoots) of the seedlings and that biosynthesis is performed only in very young tissues, whereas trigonelline is distributed in all parts of coffee seedlings and biosynthetic activity is present even in mature parts. The differing roles of these two alkaloids are discussed.
Keywords: Coffee (Coffea arabica); Caffeine; NAD; Nicotinic acid; Pyridine alkaloid; Trigonelline

Sevgi Kolayli, Mirac Ocak, Murat Kucuk, Riza Abbasoglu, Does caffeine bind to metal ions?, Food Chemistry, Volume 84, Issue 3, February 2004, Pages 383-388, ISSN 0308-8146, DOI: 10.1016/S0308-8146(03)00244-9.
(http://www.sciencedirect.com/science/article/B6T6R-49506PP-7/2/64ca886e9a50bc985d06f200101de34a)
Abstract:
The complex formation capacity of caffeine, a highly-consumed tea and coffee component, was determined for Ca, Mg, Fe, Zn, Pb, Mn, Co and Cr metal ions. The binding constants of metal ion-caffeine complexes for the metals chosen were determined spectrophotometrically. The results were compared with the known stability constants of metal ion-EDTA complexes, EDTA being known for its high metal binding capacity. Furthermore, iron chelating activity of caffeine, using the ferrozine reference method, was studied and compared with that of EDTA. The results showed very little complex formation capacity of caffeine with binding constants of 29.6, 22.4, 59, 396, 55, 9.3, 83 and 592 M-1 for Ca, Mg, Fe, Zn, Pb, Mn, Co and Cr metal ions, respectively, in contrast to that of EDTA. The iron chelating activity of caffeine was also found to be 6%, which was considered to be quite low compared with EDTA.

Keywords: Caffeine; EDTA; Ferrozine; Iron chelating activity; Metal ions; Complex formation; Binding constant

Chanchal Narain, Alistair Paterson, Ewan Reid, Free choice and conventional profiling of commercial black filter coffees to explore consumer perceptions of character, Food Quality and Preference, Volume 15, Issue 1, January 2004, Pages 31-41, ISSN 0950-3293, DOI: 10.1016/S0950-3293(03)00020-X.
(http://www.sciencedirect.com/science/article/B6T6T-48943KC-5/2/77e6ba86622367e00d1761e86e02c684)
Abstract:
Filter coffees from ground bean blends are key drink products in the out-of-home market. To explore how sensory characters were perceived in 12 commercial coffee blends, free choice profiling of black, unsweetened and sweetened coffees was effected. This yielded three generalised Procrustes product spaces that explained limited variance. However a derived vocabulary was used in subsequent conventional profiling of black, unsweetened coffee generating a principal component product space that explained 70% variance. Comparisons showed that roast height was the dominant factor in discrimination, followed by Robusta content. The coffee profiling vocabulary, had terms suited to understanding consumer evaluations of sensory character in retailed coffees, consisted of 26 attributes: six for aroma; 13 for flavour by mouth, or taste; four for after-taste; and three for mouthfeel.
Keywords: Sensory evaluation; Vocabulary development; Coffee quality; Sweetening

Massimo F. Marcone, Composition and properties of Indonesian palm civet coffee (Kopi Luwak) and Ethiopian civet coffee, Food Research International, Volume 37, Issue 9, 2004, Pages 901-912, ISSN 0963-9969, DOI: 10.1016/j.foodres.2004.05.008.
(http://www.sciencedirect.com/science/article/B6T6V-4CVV7RD-1/2/f0bd5555a48e9cea7b50f291f7763c05)
Abstract:
This research paper reports on the findings of the first scientific investigation into the various physicochemical properties of the palm civet (Kopi Luwak coffee bean) from Indonesia and their comparison to the first African civet coffee beans collected in Ethiopia in eastern Africa. Examination of the palm civet (Kopi Luwak) and African civet coffee beans indicate that major physical differences exist between them especially with regards to their overall color. All civet coffee beans appear to possess a higher level of red color hue and being overall darker in color than their control counterparts. Scanning electron microscopy revealed that all civet coffee beans possessed surface micro-pitting (as viewed at 10,000x magnification) caused by the action of gastric juices and digestive enzymes during digestion. Large deformation mechanical rheology testing revealed that civet coffee beans were in fact harder and more brittle in nature than their control counterparts indicating that gestive juices were entering into the beans and modifying the micro-structural properties of these beans. SDS-PAGE also supported this observation by revealing that proteolytic enzymes were penetrating into all the civet beans and causing substantial breakdown of storage proteins. Differences were noted in the types of subunits which were most susceptible to proteolysis between civet types and therefore lead to differences in maillard browning products and therefore flavor and aroma profiles. This was confirmed by electronic nose analysis which revealed differences between the palm civet coffee (Kopi Luwak) and African civet coffee aroma profiles. Analytical techniques for the authentification of palm civet (Kopi Luwak) and African civet coffee are also explored. It would appear that SDS-PAGE may serve as the most reasonable and reliable test to help confirm the authenticity of civet coffee. Electronic nose data was able to distinguish both civet coffees from their control counterparts and further indicated that processing through the civets gastro-intestinal track substantially modified these coffees.

Keywords: Kopi Luwak; African civet; Comparison; Composition