Komoditas : Alpukat
Tahun 2004-2008 (74 judul)

C.R. Rodriguez Pleguezuelo, V.H. Duran Zuazo, J.L. Muriel Fernandez, F.J. Martin Peinado, D. Franco Tarifa, Litter decomposition and nitrogen release in a sloping Mediterranean subtropical agroecosystem on the coast of Granada (SE, Spain): Effects of floristic and topographic alteration on the slope, Agriculture, Ecosystems & Environment, Volume 134, Issues 1-2, November 2009, Pages 79-88, ISSN 0167-8809, DOI: 10.1016/j.agee.2009.05.019.
(http://www.sciencedirect.com/science/article/B6T3Y-4WR0CRG-1/2/0610c04590e14cb2cbacdd9c875e4101)
Abstract:
On the coast of Granada (SE, Spain), an economically important area for subtropical fruit cultivation, the crops are grown on orchard terraces. Also, high amounts of fertilizers, often excessive, are used in this type of intensive agriculture. However, each year significant fractions of nutrients taken up by the trees return to the soil by fallen leaves. Using a litter-bag technique, we assessed the decomposition rates and N-release in various types of litter. Our main purpose was to compare two different agroecosystem scenarios: (1) an unaltered slope consisting mainly of a mixture of herbaceous plants (Papaver rhoeas, Convolvulus sp., Malva sylvestris, Reseda phyteuma, Anacyclus sp., Sinapis arvensis, Medicago sp.) among spontaneous perennial woody shrubs (Genista umbellata, Olea europaea, Lavandula officinalis, Phlomis purpurea, Retama sphaerocarpa), and (2) an altered slope cultivated with subtropical trees on terraces: loquat (Eriobotrya japonica), mango (Mangifera indica), avocado (Persea americana), and cherimoya (Annona cherimola), with groundcover plantings of aromatic, medicinal, and melliferous plants (AMMPs) on the taluses of the terraces, which are usually used for erosion control: Lavandula dentata, Thymus mastichina, Satureja obovata, Rosmarinus officinalis, Anthyllis cytisoides. In the leaves from the subtropical crops, we found the highest decomposition rates in cherimoya and the lowest in mango (1.30 and 0.64 years-1, respectively). Leaves from mango and loquat registered initial peaks of N immobilization and later N-release, which was highest in cherimoya and avocado leaves (71.2 and 56.8% of the initial remaining N). In the spontaneous woody shrubs, O. europaea and G. umbellata were the slowest in decomposing (1.18 and 1.01 years-1, respectively) contrary to L. officinalis, which decomposed fastest (2.22 years-1). Only L. officinalis and P. purpurea registered a net N-release at the end of the study. The AMMPs showed different decomposition patterns: L. dentata registered the highest decomposition rates and Rosmarinus the lowest (1.9 and 1.1 years-1, respectively). T. mastichina, L. dentata, and S. obovata had the highest N-release, whereas R. officinalis and A. cytisoides showed N immobilization (183 and 122% of the initial N). Knowledge of the dynamics of nutrient release and litter decomposition will be useful for predicting nutrient availability and nutrient cycles in these types of agroecosystems where subtropical orchards are grown on terraces.
Keywords: Nitrogen cycling; Terrace agriculture; Subtropical crops; Litter decomposition

D. Ruano Rosa, C.J. Lopez Herrera, Evaluation of Trichoderma spp. as biocontrol agents against avocado white root rot, Biological Control, Volume 51, Issue 1, October 2009, Pages 66-71, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.05.005.
(http://www.sciencedirect.com/science/article/B6WBP-4WCTWRB-1/2/22019220a05097c896056b293ddcf7fd)
Abstract:
Five isolates of Trichoderma atroviride and one isolate each of T. virens, T. harzianum and T. cerinum were tested for in vivo biological control of white root rot of avocado (Rosellinia necatrix). Five of these Trichoderma isolates were previously selected as possible biological control agents

on the basis of their capacity to control the disease and high levels of colonization of the avocado rhizoplane. Combinations of the five selected isolates were evaluated on cellophane for compatibility with each other and T. virens CH 303 was eliminated because of a high incompatibility with other Trichoderma isolates. The four remaining isolates, all T. atroviride, were tested singly and in combination for their capacity to control avocado white root rot. Isolate CH 304.1 provided the highest levels of control when tested singly or in combination with isolate CH 101.
Keywords: Incompatibility in vitro, Control in vivo, Persea americana, Rosellinia necatrix, Avocado white rot, Trichoderma spp.

B. Marquez-Martin, E. Guzman-Garcia, A. Barcelo-Munoz, F. Pliego-Alfaro, C. Sanchez-Romero, Effects of an in vitro maturation treatment on plant recovery from avocado zygotic embryos, Scientia Horticulturae, In Press, Corrected Proof, Available online 10 July 2009, ISSN 0304-4238, DOI: 10.1016/j.scienta.2009.06.018.
(http://www.sciencedirect.com/science/article/B6TC3-4WR5NTM-2/2/11287556aa5b3a253b03c9f3a632b689)
Abstract:
An efficient protocol for in vitro maturation of very immature, <10 mm, avocado embryos has been developed. The efficiency of plant recovery as well as the quality of the resulting plants was greatly improved by including a maturation phase prior to induction of germination. The influence of different factors, such as the gelling agent, organic supplements or abscisic acid, on embryo maturation and subsequent germination was tested. Optimum conditions were met when maturation was carried out in B5m medium supplemented with the Jensen's amino acids, an extra 88 mM sucrose and 6 g l-1 agar as gelling agent. At these conditions, embryos which had been collected 68 days after pollination germinated at a 65% rate in solid medium, giving rise to healthy and vigorous plantlets. Anatomical differentiation and storage product accumulation occurring during the in vitro maturation phase were studied by means of histological techniques. Results obtained revealed that, at the end of the in vitro maturation period, embryos resembled the pattern previously established for avocado embryos matured under in vivo conditions: histodifferentiation had been accomplished and starch granules and protein bodies were abundant.
Keywords: Avocado; Embryo rescue; In vitro maturation; Persea americana Mill.; Protein bodies; Starch grains

Vera Hershkovitz, Haya Friedman, Eliezer E. Goldschmidt, Oleg Feygenberg, Edna Pesis, Induction of ethylene in avocado fruit in response to chilling stress on tree, Journal of Plant Physiology, In Press, Corrected Proof, Available online 9 July 2009, ISSN 0176-1617, DOI: 10.1016/j.jplph.2009.05.012.
(http://www.sciencedirect.com/science/article/B7GJ7-4WR0CR5-1/2/40d2e7a3736f4cae56864b2bde3ebff6)
Abstract: Summary
Chilling of avocado fruit (Persea americana cv. Arad) in the orchard caused a dramatic induction of fruit ripening and a parallel increase in ethylene biosynthesis and receptor genes' expression during shelf life. In-orchard chilling stress stimulated ethylene and CO2 production already in fruit attached to the tree, and these reduced thereafter during 20 [degree sign]C storage. In non-chilled control fruit, ethylene and CO2 production started after 3 d at 20 [degree sign]C and exhibited a climacteric peak. In-orchard chilling stress also led to membrane destruction expressed as higher electrical conductivity (EC) in chilling stressed (CS) fruit and accelerated softening compared with control fruit. The increase in ethylene production on the day of harvest in CS fruit was accompanied by high expression of two 1-aminocyclopropane-1-carboxylic aCSd (ACC) synthase genes: PaACS1 and PaACS2, and ACC oxidase PaACO. The initial gene expressions of PaACS1, PaACS2, and PaACO in the CS fruit at the day of harvest was similar to the levels reached by the

control fruit after 4 d at 20 [degree sign]C. The expression levels of both PaETR and PaERS1 in CS fruit on tree were 25 times higher than the control. In control fruit, expression of ethylene receptor genes was very low at harvest and increased in parallel to the onset of the climacteric ethylene peak. PaCTR1 transcript levels were less affected by chilling stress, and small changes (less than 3-fold) were observed in CS fruit on the day of harvest. Together, our results suggest that ethylene biosynthesis and ethylene response-pathway genes are involved in regulation of ethylene responsiveness in response to in-orchard chilling stress and during ripening.
Keywords: Ethylene production; Ethylene receptors; Fruit ripening; Gene expression; Persea americana

M.L. Alcaraz, J.I. Hormaza, Selection of potential pollinizers for `Hass' avocado based on flowering time and male-female overlapping, Scientia Horticulturae, Volume 121, Issue 3, 2 July 2009, Pages 267-271, ISSN 0304-4238, DOI: 10.1016/j.scienta.2009.02.001.
(http://www.sciencedirect.com/science/article/B6TC3-4VRWNRN-3/2/a208401134af9240623600118f4ff084)
Abstract:
Avocado production is dependent on the singular synchronous protogynous dichogamy of the species that promotes outcrossing. With the objective of selecting potential pollinizer avocado genotypes for `Hass', the most important avocado cultivar worldwide, we have monitored during two consecutive years the flowering phenology of 27 avocado genotypes in South-eastern Spain. The average length of the flowering season was 45 days ranging from 18 days for `Harvest' to 50 days for `Fuerte'. The earliest genotypes to flower were `Fuerte' and `Shepard' that started blooming during the third week of March. The latest genotypes to flower were `Colin V-33', `Adi', `OA184' and `Harvest', which started blooming in the second week of April. `Hass' blooming lasted 30 days, from the first week of April until the second week of May. Since a good pollinizer must present not only an overlapping in the flowering season but also an overlapping in sexual stages with the pollinated cultivar, a group of 12 genotypes (`Hass', `Fuerte' and 10 genotypes producing `Hass-like' fruit with good overlapping in the flowering season with `Hass') was studied with more detail determining daily the stages of male and female overlapping every 2 h. Results herein indicate that `Marvel' and `Nobel' showed a high sexual overlapping with `Hass'. Taking into account the flowering phenology, the overlapping in sexual stages and the fruit set obtained with hand-pollinated flowers in the field, those two genotypes could be an interesting alternative to the current use of `Fuerte' as pollinizer for `Hass' in South-eastern Spain.
Keywords: Bloom; Dioecy; Lauraceae; Persea americana; Pollination

Robert J. Blakey, John P. Bower, Isa Bertling, Influence of water and ABA supply on the ripening pattern of avocado (Persea americana Mill.) fruit and the prediction of water content using Near Infrared Spectroscopy, Postharvest Biology and Technology, Volume 53, Issues 1-2, July-August 2009, Pages 72-76, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2009.03.004.
(http://www.sciencedirect.com/science/article/B6TBJ-4WD10X7-1/2/d79e52bece1d89517857ed755e707a47)
Abstract:
Avocado fruit are highly variable, and even those graded for similar size and appearance do not behave in the same manner after harvest. This is particularly problematical for those involved in sales to the 'ready-ripe' market. These operations are faced with a high variation in the rate of ripening within a consignment, causing logistical difficulties. Fruit water content (or its complement dry matter) has a major impact on-line ripening and has hence been used as the maturity marker in the South African avocado industry. Presently, fruit water content is destructively measured using a representative sample as an indicator of when to post-harvest. In order to investigate if fruit water content and/or abscisic acid triggers fruit ripening, water or ABA was infused into commercially mature, but non-ripe avocado fruit. The fruit ripening, mass, CO2 and ethylene

production patterns were determined over the ripening period. By infusing water through the pedicle, the variation in days to ripening was decreased without any effect on the number of days to ripening. ABA infusion hastened ripening but did not affect the variation in days to ripening. It is therefore suggested that the fruit water content at harvest forms the baseline condition from which the trigger for ripening is determined, while post-harvest water loss and ABA modulate and stimulate ripening, respectively. Furthermore, an equation was developed using Near Infrared Spectroscopy (NIRS) to measure mesocarp water content (R2 = 0.92, SE = 1.8% MC). It is postulated that on line sorting of fruit using NIRS, based on time to ripen, would result in consignments of fruit with less ripening variation, thereby solving the industry's logistical problem of fruit which have a wide spread of ripening being packed into one carton.
Keywords: Avocado; ABA; Water; Infusion; NIR; Non-destructive measurement

David J. Biddinger, Donald C. Weber, Larry A. Hull, Coccinellidae as predators of mites: Stethorini in biological control, Biological Control, In Press, Corrected Proof, Available online 2 June 2009, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.05.014.
(http://www.sciencedirect.com/science/article/B6WBP-4WF4J3K-3/2/078992c727c63d994b13609f5db7273c)
Abstract:
The Stethorini are unique among the Coccinellidae in specializing on mites (principally Tetranychidae) as prey. Consisting of 90 species in two genera, Stethorus and Parasthethorus, the tribe is practically cosmopolitan. The Stethorini are found in a diverse range of habitats, including many agricultural systems such as pome and stone fruits, brambles, tree nuts, citrus, avocadoes, bananas, papaya, palms, tea, cassava, maize, strawberries, vegetables, and cotton, as well as ornamental plantings, grasslands, forests, and heathlands. Tetranychid mite outbreaks became common in many agricultural systems only after World War II, when widespread use of broad-spectrum insecticides increased. Stethorini were initially appreciated only for their ability to suppress severe outbreaks of tetranychid populations. However, research on their prey searching behaviors reveals that Stethorini use visual and olfactory stimuli to locate small mite colonies in patchy distributions, and can be very effective in regulating their prey at low densities. Moreover, acariphagous coccinellids colonize mite outbreaks earlier, and consume more pest mites, than many other mite predators. Key to the use of coccinellids in conservation biological control programs is the provision of overwintering habitats and refuges from pesticides in and near cropland. When these conditions are fulfilled, Stethorini often play important roles in maintaining suppression of tetranychid populations. Examples of successful biological mite control with Stethorini include apple orchards in Pennsylvania, USA, and citrus in Asia, and the unintended disruption of a tetranychid-based biological control program for the invasive woody weed, gorse, in Australia and New Zealand. The systematics and taxonomy of this group is challenging with many cryptic species, and molecular diagnostic tools are sorely needed. How best to utilize their mite-suppressive potential in diverse settings requires better knowledge of their requirements including utilization of alternative foods, refuges for dormancy and from nonselective pesticides, and host-finding mechanisms.
Keywords: Coccinellidae; Stethorus; Acari; Acariphagous; Tetranychid; Spider mites

A. Neuhaus, D.W. Turner, T.D. Colmer, A. Blight, Drying half of the root-zone from mid fruit growth to maturity in `Hass' avocado (Persea americana Mill.) trees for one season reduced fruit production in two years, Scientia Horticulturae, Volume 120, Issue 4, 19 May 2009, Pages 437-442, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.12.010.
(http://www.sciencedirect.com/science/article/B6TC3-4VFBYF0-2/2/0efee52db560bdd621c76e0d3f55d715)
Abstract:

We tested the effect of extended drying of half the root system on fruit yield and fruit Ca concentration, an indirect measure of fruit quality, in avocado (Persea americana Mill. cv Hass). In a field experiment on a sandy soil, withholding irrigation and plastic sheeting was used to dry the root-zone beneath the whole canopy (DD) or half the canopy (WD), compared with well-watered trees (WW). The irrigation water contained added nutrients and was slightly saline. Yield, shoot growth, leaf conductance, leaf and fruit water status and mineral concentrations of leaves and fruit were studied. The responses of treated trees were assessed in the following season during which normal irrigation practices were restored. With respect to yield, the WD treatment behaved the same as the DD treatment. It reduced yield by more than half and proportionately more than the reduction in water supply thus reducing irrigation efficiency. Re-watering did not restore yield of WD or DD-trees in the next season. The WD and DD treatments had no effect on the concentration of Ca in the fruit mesocarp and so are unlikely to affect fruit quality. The main impact of reduced water supply on the trees was fruit abscission and this was linked to dry soil around the roots rather than the water status of the leaves or fruits. We conclude that extended drying of half of the root-zone in one season reduced irrigation efficiency for two seasons by promoting the abscission of developing fruit to the same extent as occurred when the whole root system was exposed to extended drying.
Keywords: Fruit trees; Irrigation management; Split-root design; Mineral distribution; Fruit quality; Water deficit

Alicia Sciocco, Dennis K. Bideshi, Jeffrey J. Johnson, Brian A. Federici, Nucleopolyhedrovirus from the Western Avocado Leafroller, Amorbia cuneana: Isolation and characterization of a potential viral control agent, Biological Control, Volume 49, Issue 2, May 2009, Pages 154-159, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2009.01.008.
(http://www.sciencedirect.com/science/article/B6WBP-4VFC7YF-1/2/0c3b2f1c1fd64ae15f7c78f9fe545ea6)
Abstract:
The western avocado leafroller, Amorbia cuneana (Lepidoptera; Tortricidae), is an increasingly important pest of avocados in the San Joaquin Valley of California and is also known to attack citrus periodically. Present control programs rely heavily on biological control agents, mostly hymenopteran parasitoids, but chemical insecticides are also used. To develop more selective alternative control agents, we isolated a multinucleocapsid nucleopolyhedrovirus from A. cuneana (AmcuMNPV) and report here the characterization of this virus in terms of its identity, general genome characteristics, and efficacy as determined in laboratory bioassays. The AmcuMNPV had a genome of 125 kbp and produced virions approximately 220 nm in length occluded in occlusion bodies (OBs) averaging 1.2 [mu]m in diameter. Virions contained an average of four nucleocapsids per envelope. Phylogenetic analyses based on the polh, lef-8, and lef-9 genes showed that this virus was different from, but related to, the NPVs of other tortricid species, specifically, the CfDefNPV of Choristoneura fumiferana and the EppoNPV of Epiphyas postvittana. Histological studies showed its pathology was typical of lepidopteran NPVs, with the virus attacking most tissues, especially the fat body and epidermis. With respect to activity, the virus was highly efficacious, with 70% of neonate larvae dying within a few days of being exposed to a single polyhedron, with an average LC50 of 184 OBs for third instars. These results indicate that this virus has good potential for use in biological and integrated control programs that target A. cuneana.
Keywords: Amorbia cuneana; Multinucleocapsid nucleopolyhedrovirus (MNPV); Baculovirus; Viral insecticide; Avocado

Saul Saucedo-Pompa, Romeo Rojas-Molina, Antonio F. Aguilera-Carbo, Aide Saenz-Galindo, Heliodoro de La Garza, Diana Jasso-Cantu, Cristobal N. Aguilar, Edible film based on candelilla wax to improve the shelf life and quality of avocado, Food Research International, Volume 42,

Issue 4, Bioprocesses in Food Industries, May 2009, Pages 511-515, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.02.017.
(http://www.sciencedirect.com/science/article/B6T6V-4VPD6KJ-1/2/39ef01b840a244deba380cfd53340eb9)
Abstract:
In this study the effect of addition of ellagic acid (at three different concentrations) into candelilla wax matrix on shelf life and quality of whole avocados was studied. Control treatments were avocados coated with candelilla wax without ellagic acid and avocados without coating. The fruits were chosen for their maturity, size, free from infection and physical defects. All those samples were inoculated with a concentrated suspension of spores of Colletotrichum gloeosporioides, the main phytopathogenic fungus for avocados. Experiments were carried out completely divided into randomized groups. Changes in appearance, solids content, pH, aw, lightness (L* value) and weight loss were monitored during 6 weeks every 8 days. A sensory evaluation of avocados coated with the best edible film was also performed. Edibel films were able to reduce significantly the damage caused by C. gloeosporioides, reducing also significantly the change in appearance and weight loss in the fruits. Use of ellagic acid as part of the edible film has an important effect to improve the quality and shelf life of avocado. With this work we found that using this new protection system the negative effects of C. gloeosporioides can be successfully reduced.
Keywords: Candelilla wax; Colletotrichum gloeosporioides; Avocado; Ellagic acid

H.A. Violi, J.S. Brown, C.L. Tondo, J.W. Borrone, R.J. Schnell, Microsatellite markers reveal low breeding system efficacy and pollen contamination can limit production of full-sib avocado progeny, Scientia Horticulturae, Volume 120, Issue 3, 1 May 2009, Pages 360-366, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.11.011.
(http://www.sciencedirect.com/science/article/B6TC3-4V64YT1-2/2/e92868a7db6296541a0f515c5b97be16)
Abstract:
Phytophthora cinnamomi causes a severe root rot in avocado, Persea americana. Breeding tolerant rootstocks is thought to be the most promising method for phytophthora root rot disease control but breeding avocado is challenging. The avocado flowering syndrome (synchronous protogynous dichogamy), combined with high flowering and low fruit set, render controlled pollination exceedingly difficult. Juxtaposing complementary flowering types of elite parent cultivars (cultivars that produce progeny with tolerance to phytophthora root rot) was performed in an effort to increase the number of full-sib progeny for elite maternal parents and, hypothetically, the number of phytophthora root rot tolerant progeny. Although high outcrossing rates were achieved (estimated ~93%), the majority of progeny had a non-elite paternal parent (56% of progeny were offtypes) implying maternal trees were pollinated by non-elite distant trees. Among progeny that could be confidently genotyped, a high number of cross types were detected (33). Contrary to our hypothesis, a significant portion of the progeny were the result of crosses between like, and not complementary, flowering types. The spatial distribution of productive trees and grafts helped to explain these data, as productive grafts were directly adjacent to grafts of the same flowering type more often than that of the complementary flowering type. Selfed progeny were significantly less tolerant to phytophthora root rot than outcrossed progeny. Progeny resulting from crosses between an elite maternal parent and non-elite pollen donor (offtypes) were less tolerant than full-sib progeny resulting from crosses between elite parents. Maternal effects may interfere with identifying truly disease tolerant selections. Thus, to reduce maternal effects and non-elite pollen donor contamination, removal of seedling cotyledons before screening for disease tolerance and better isolation of elite parent trees and windbreaks may improve breeding efficacy. This study also demonstrates the usefulness of microsatellite markers in parentage analysis where a high proportion of the putative parents are closely related.

Keywords: Phytophthora cinnamomi; Root rot; Avocado; Persea americana; Dichogamy; Outcrossing; Breeding; Microsatellite markers

Sun Tay Choi, Donald J. Huber, Differential sorption of 1-methylcyclopropene to fruit and vegetable tissues, storage and cell wall polysaccharides, oils, and lignins, Postharvest Biology and Technology, Volume 52, Issue 1, April 2009, Pages 62-70, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2008.11.002.
(http://www.sciencedirect.com/science/article/B6TBJ-4V87DKR-1/2/3fd6d6569707a53a89891909ca506e34)
Abstract:
This study was designed to determine the nature and multiplicity of non-specific 1-methylcyclopropene (1-MCP) sorption sites in fruit and vegetable tissues. 1-MCP sorption rates and capacities were measured for plant tissues, cell wall polysaccharides, starch, oils, and lignins sealed in 130 mL jars and provided with 18.6 [mu]L L-1 gaseous 1-MCP (SmartFresh(TM) Technology). Significant variation was noted in the sorption properties of the different plant tissues, with both sorption rates and capacities being notably higher for external/exocarp tissues compared with internal tissues. Among the tissues examined, avocado exocarp, mesocarp and seed coat, plantain exocarp, and asparagus stem tissues exhibited the highest sorption rates and capacities. Sorption was markedly reduced in response to tissue drying but recovered to different extents in response to rehydration. Avocado mesocarp treated to deplete oil content showed reduced 1-MCP sorption rate and capacity whereas the exocarp was negligibly affected, indicating that multiple cellular components contribute to non-specific sorption. Starch and the cell wall polysaccharides cellulose, polygalacturonic acid and xyloglucan showed low sorption properties and were unaffected by polymer hydration. In contrast, high methoxy pectic polymers and lignins were strong molecular sinks for 1-MCP sorption. Sorption to pectin was dependent on the esterified methyl moiety, as de-esterification reduced sorption rate and capacity to levels comparable with polygalacturonic acid. Plantain-exocarp and spruce lignins, and avocado and safflower oils exhibited the highest initial sorption rates. For oils, rapid initial sorption was followed by establishment of stable equilibrium between gaseous and partitioned 1-MCP. Compared with oils, the binding capacity of lignins was markedly higher and irreversible. The data collectively demonstrate that 1-MCP sorbs to several cellular targets and that hydrophobic components are preferred sorption sinks. The highly disparate 1-MCP sorption rates and capacities of the different fruit and vegetable tissues examined are consistent with compositional differences in lignin, methylated pectin, and oil levels.
Keywords: 1-Methylcyclopropene; Sorption; Binding; Avocado; Plantain; Asparagus; Lignin; Pectin; Esterification; Oil

Claudia Fassio, Robert Heath, Mary Lu Arpaia, Monica Castro, Sap flow in `Hass' avocado trees on two clonal rootstocks in relation to xylem anatomy, Scientia Horticulturae, Volume 120, Issue 1, 3 March 2009, Pages 8-13, ISSN 0304-4238, DOI: 10.1016/j.scienta.2008.09.012.
(http://www.sciencedirect.com/science/article/B6TC3-4TTF00B-1/2/62476f74da52d2fcec4e942fe48905f6)
Abstract:
The rates of sap flow and xylem vessel features were studied in two-year-old nongrafted and grafted avocado (Persea americana Mill.) trees. Daily sap flow rates were measured with heat and balance stem gauges in clonal Duke 7 (D7) and Toro Canyon (TC) trees and `Hass' clonal scions grafted onto clonal D7 (H/D7) and TC (H/TC) rootstocks. Vessel features as size, number and total vessel area were determined histologically in the stem of the scion and rootstock and the roots of the grafted trees. Significant differences in the sap flow rate were found among the rootstocks, where D7 had a 29% higher sap flow rate than did TC (grafted and nongrafted trees). There were no differences among xylem vessel features in the stems of any of the varieties. However in the

roots, D7 had wider and fewer vessels then TC do. Also, D7 had a 19% higher total vessel area than TC. These results suggest that the differences in water consumption of `Hass' on different rootstocks may be associated with differences in the efficiency of the roots to absorb water across conductive tissue which may be linked to differences in the area of xylem vessels in the root.
Keywords: Xylem vessel; Persea americana; Clonal rootstock; Root anatomy; Sap flow

Stephane Couturier, Jean-Philippe Gastellu-Etchegorry, Pavka Patino, Emmanuel Martin, A model-based performance test for forest classifiers on remote-sensing imagery, Forest Ecology and Management, Volume 257, Issue 1, 20 January 2009, Pages 23-37, ISSN 0378-1127, DOI: 10.1016/j.foreco.2008.08.017.
(http://www.sciencedirect.com/science/article/B6T6X-4TJTTK4-1/2/2403385e703083a0276b78dfb331193c)
Abstract:
Ambiguity between forest types on remote-sensing imagery is a major cause of errors found in accuracy assessments of forest inventory maps. This paper presents a methodology, based on forest plot inventory, ground measurements and simulated imagery, for systematically quantifying these ambiguities in the sense of the minimum distance (MD), maximum likelihood (ML), and frequency-based (FB) classifiers. The method is tested with multi-spectral IKONOS images acquired on areas containing six major communities (oak, pine, fir, primary and secondary high tropical forests, and avocado plantation) of the National Forest Inventory (NFI) map in Mexico. A structural record of the canopy and optical measurements (leaf area index and soil reflectance) were performed on one plot of each class. Intra-class signal variation was modelled using the Discrete Anisotropic Radiative Transfer (DART) simulator of remote-sensing images. Atmospheric conditions were inferred from ground measurements on reference surfaces and leaf optical properties of each forest type were derived from the IKONOS forest signal. Next, all forest types were simulated, using a common environmental configuration, in order to quantify similarity among all forest types, according to MD, ML and FB classifiers. Classes were considered ambiguous when their dissimilarity was smaller than intra-class signal variation.
DART proved useful in approximating the pixel value distribution and the ambiguity pattern measured on real forest imagery. In the case study, the oak forest and the secondary tropical forest were both distinguishable from all other classes using an MD classifier in a 25 m window size, whereas pine and primary tropical forests were ambiguous with three other classes using MD. By contrast, only two pairs of classes were found ambiguous for the ML classifier and only one for the FB classifier in that same window size. The avocado plantation was confounded with the primary tropical forest for all classifiers, presumably because the reflectance of both types of forest is governed by a deep canopy and a similar shadow area. We confronted the results of this study with the confusion matrix from the accuracy assessment of the NFI map. An asset of this model-based method is its applicability to a variety of sensor types, eco-zones and class definitions.
Keywords: 3D model; DART; Contextual classification; Density function; IKONOS; Very high resolution image; Mexico

Shamil Z. Validov, Faina Kamilova, Ben J.J. Lugtenberg, Pseudomonas putida strain PCL1760 controls tomato foot and root rot in stonewool under industrial conditions in a certified greenhouse, Biological Control, Volume 48, Issue 1, January 2009, Pages 6-11, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.09.010.
(http://www.sciencedirect.com/science/article/B6WBP-4TK47BH-2/2/8c1c53c628d5180cf7c016991b08b031)
Abstract:
Pseudomonas putida strain PCL1760 was isolated previously from the avocado rhizosphere, using an enrichment method for competitive tomato root tip colonizers that selects for biological control

strains which act through the biological control mechanism 'competition for nutrients and niches' (CNN). Here we demonstrate that strain PCL1760 showed significant biological control of tomato foot and root rot (TFRR), a disease caused by Fusarium oxysporum f. sp. radicis-lycopersici (Forl), in eight independent laboratory experiments in stonewool substrate. Furthermore, its activity in stonewool was also tested in an industrial setup. The presence of Forl appeared to decrease seed germination. The additional presence of the biological control strain partly restored the germination level. Introduction of P. putida PCL1760 resulted in significant biological control of TFRR. PCR quantification revealed that the biological control strain decreased the amount of Forl DNA in tomato plant tissue significantly. We conclude that the results of this trial show that P. putida strain PCL1760, which acts through the new mechanism CNN, controls TFRR also under industrial stonewool conditions.
Keywords: Biological control; Tomato foot and root rot; Fusarium oxysporum f. sp. radicis-lycopersici; Pseudomonas putida; Stonewool; Competition for nutrients and niches

Salvador Ochoa-Ascencio, Maarten L.A.T.M. Hertog, Bart M. Nicolai, Modelling the transient effect of 1-MCP on `Hass' avocado softening: A Mexican comparative study, Postharvest Biology and Technology, Volume 51, Issue 1, January 2009, Pages 62-72, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2008.06.002.
(http://www.sciencedirect.com/science/article/B6TBJ-4TDJG87-1/2/b45c143ce05e13660ca2573d506ffb3b)
Abstract:
In this study the effect of 1-methylcyclopropene (1-MCP) on the softening of avocado fruit (Persea americana Mill.) cv. Hass was modelled. Data were collected throughout the 2006 season by sampling 40 batches of fruit from 8 different commercial orchards in the region of Michoacan (Mexico). A simplified mechanistic model was developed to analyse the experimental data. Most of the model parameters were treated as being generic for all fruit while only two of the model parameters were identified as being unique to each individual fruit. The two fruit specific parameters characterised the maturity at harvest of an individual fruit and the sensitivity of an individual fruit to 1-MCP. Monte Carlo simulations were performed. The model was able to describe the individual fruit behaviour very well explaining more than 95% of the observed variation for most of the fruit. The model successfully quantified the effect of 1-MCP on avocado softening taking into account the stochastic nature of batch behaviour. The developed model can be utilised to predict the behaviour of a specific batch of `Hass' avocado fruit given the distribution of the two fruit specific model parameters.
Keywords: Avocado; Biological variation; Firmness; 1-MCP; Modelling; Ripening

D.M. De Costa, A.R.F. Zahra, M.D. Kalpage, E.M.G. Rajapakse, Effectiveness and molecular characterization of Burkholderia spinosa, a prospective biocontrol agent for controlling postharvest diseases of banana, Biological Control, Volume 47, Issue 3, December 2008, Pages 257-267, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2008.08.010.
(http://www.sciencedirect.com/science/article/B6WBP-4T8HHF5-2/2/72acb01e027f4e3966268026761677e5)
Abstract:
Prospective antagonists for controlling Colletotrichum musae were isolated from the fructosphere of a range of dessert and cooking type banana varieties grown in Sri Lanka. Out of the isolated microorganisms, 44 bacterial and 31 fungal isolates showed more than 50% C. musae colony growth inhibition in vitro. Among 32 bacterial isolates which showed inhibition zones against C. musae under in vitro conditions, four isolates were highly effective in controlling banana anthracnose, crown rot and blossom end rot in vivo when artificially infected banana (variety Kolikuttu) were dipped in an antagonist suspension (108 cfu/ml) containing Tween 20 (0.02% v/v) for 5 min. Of these four, Burkholderia spinosa was used for further studies as a prospective

biocontrol agent/biopesiticide. A suspension of B. spinosa (105 cfu/ml) containing Tween 20 (0.02% v/v) was effective in controlling anthracnose and blossom end rot of a range of dessert banana varieties (87-95% and 81-82% disease reductions, respectively), while a concentration of 104 cfu/ml with Tween 20 (0.02% v/v) was sufficient to have a 86-98% control of crown rot. B. spinosa showed 45-73% colony growth inhibition of C. gloeosporioides, Botryodiplodia theobromae and Thielaviopsis paradoxa isolates causing anthracnose and stem end rot of avocado, mango and pineapple in vitro. Significant in vivo control of these diseases in avocado, mango and pineapple was also achieved with antagonist concentrations ranging from 104 to 106 cfu/ml (28% reduction of mango anthracnose by 105 cfu/ml, 38% reduction of avocado anthracnose by 104 cfu/ml, 17.5% reduction of mango stem end rot by 105 cfu/ml, 14% reduction of avocado stem end rot by 106 cfu/ml and 34% reduction of pineapple stem end rot by 105 cfu/ml). Molecular analysis of recA gene by PCR-RFLP revealed a unique genomic identity for B. spinosa which discriminated it from human pathogenic isolates of Burkholderia. No antagonists were present in edible parts of banana treated with the most effective postharvest treatment as determined by the present study. Based on these findings, it is concluded that B. spinosa which is an indigenous antagonist is a promising candidate to be used in biological control of postharvest diseases of banana.
Keywords: Banana anthracnose; Crown rot; Blossom end rot; Burkholderia spinosa; Musa spp.; Colletotrichum musae

S.L. Birla, S. Wang, J. Tang, G. Tiwari, Characterization of radio frequency heating of fresh fruits influenced by dielectric properties, Journal of Food Engineering, Volume 89, Issue 4, December 2008, Pages 390-398, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2008.05.021.
(http://www.sciencedirect.com/science/article/B6T8J-4SKB376-1/2/dd35a221a9bcff3651ae5b3a2d003edc)
Abstract:
Because of its fast and volumetric nature, radio frequency (RF) heating has been looked upon as a way to overcome the problems associated with conventional heating methods used for disinfestation of fruits. But non-uniform heating within fruits is a major obstacle in adaptation of this technology. In this study, RF heating patterns influenced by dielectric properties (DPs) of fruits were investigated both experimentally and mathematically. A computer simulation model was developed using FEMLAB 3.4, a commercial software for solving Maxwell's electromagnetic and Fourier's heat transfer equations. Orange, apple, grapefruit, peach, and avocado fruits, selected for these studies were subjected to RF heating in a water filled container equipped with a mechanism to keep fruits rotating and moving during RF heating in a 27.12 MHz, 12 kW parallel plate RF unit. DPs of constitutional parts of the selected fruits were measured by open-ended coaxial probe method. The study showed that dissimilarity in peel and pulp DPs greatly influenced the RF heating behavior of the fruits. Core heating was prominent in apple, peeled orange and grapefruit; whereas subsurface/peripheral heating in whole oranges and grapefruit, and avocado. The computer model was an effective tool in characterizing and explaining the heating patterns in the fruits based on DPs. The study helped in better understanding the complex RF heating characteristics of fruits, which may be useful in assessing the design feasibility of product specific RF energy based treatment protocol.
Keywords: Dielectric properties; Radio frequency; Electromagnetic field; Heating uniformity; Heat treatment; Quarantine

Rosa I. Guzman-Geronimo, Mercedes G. Lopez, Lidia Dorantes-Alvarez, Microwave processing of avocado: Volatile flavor profiling and olfactometry, Innovative Food Science & Emerging Technologies, Volume 9, Issue 4, October 2008, Pages 501-506, ISSN 1466-8564, DOI: 10.1016/j.ifset.2008.05.003.

(http://www.sciencedirect.com/science/article/B6W6D-4SNGM6T-1/2/1bd6c4a9a70ab92faec8949fb89d7a28)

Abstract:
The aim of this research was to evaluate the effect of microwave time, pH and avocado leaves on the volatile profile of avocado using response surface methodology, and aroma extract dilution analysis (AEDA) was employed to evaluate changes in the odorant composition. Response surface analyses showed maximum values for volatiles derived from lipid oxidation at high levels of microwave time and low values of pH. The presence of terpenoids, estragole, hexanal and 2-hexenal [E] was enhanced with the addition of avocado leaves. The optimum condition to prepare avocado puree was 30 s heating time, pH 5.5 and 1% of leaves. Comparative AEDA analysis for microwaved avocado puree added with and without avocado leaves showed changes in the FD of compounds derived from lipids. In addition, AEDA suggests that the addition of avocado leaves to microwaved avocado is related to the presence of important odorants such [alpha]-pinene, estragole and 2-hexenal [E].Industrial relevance
Several attempts have been made to process avocados as puree or 'guacamole'. Microwave treatment offers an alternative for the blanching of fruits and vegetables, since the application of high temperatures for short times often results in minimum damage. Furthermore, previous studies have shown that better retention of color and lightness is obtained when avocado puree is processed in a microwave oven. However, a great loss of flavor takes place when this commodity is treated by heat. The application of a combined treatment consisting of microwaves, pH and the addition of avocado leaves to the puree minimizes flavor loss and results in a product with the characteristic flavor of avocado.
Keywords: Avocado; Microwave treatment; Response surface; Volatiles; Olfactometry

Pilar M. Gil, Luis Gurovich, Bruce Schaffer, Julio Alcayaga, Sergio Rey, Rodrigo Iturriaga, Root to leaf electrical signaling in avocado in response to light and soil water content, Journal of Plant Physiology, Volume 165, Issue 10, 7 July 2008, Pages 1070-1078, ISSN 0176-1617, DOI: 10.1016/j.jplph.2007.07.014.
(http://www.sciencedirect.com/science/article/B7GJ7-4PYRK6S-2/2/cace76a886107d7f5e156c82960daf88)

Abstract: Summary
Phytomonitoring techniques for irrigation of avocado orchards indicate that plants respond very rapidly to fluctuations in soil water content. Root to leaf abscicic acid transport cannot fully explain the almost immediate response of stomata to either irrigation and/or sudden changes in climatic conditions. Therefore, we studied the existence of a fast conducting signal between roots and leaves, and the possible involvement of such a signal in the regulation of stomatal behavior. Two-year-old avocado trees were subjected to drying and re-watering cycles or changes in incident radiation (light or darkness). The difference in extracellular electrical potential between the leaf petiole and the base of stem ([Delta]VL-S) was continuously recorded. Stomatal conductance (gs) was also recorded for the same leaves that were used for voltage difference measurements. A sudden change in soil water content induced by root drying and re-watering was accompanied by a slow, significant change in the recorded [Delta]VL-S signal, which was fully developed at 52 and 32 min for root drying and re-watering, respectively. We found an inverse correlation (r=-0.56) between the change of [Delta]VL-S and the gs difference measured before and after each soil-drying treatment. Plants that were girdled to disrupt the phloem and then irrigated tended to have lower [Delta]VL-S differences over time than non-girdled irrigated plants, suggesting that the electrical signal was transmitted in the phloem. The existence of a fast signal transmitted from the root to the leaf that can be measured and correlated with stomatal control opens the possibility of developing a new phytomonitoring technique and/or artificially modifying plant responses by imposing agronomic management strategies aimed at rapid stomatal adaptation to changes in soil water content.

Keywords: Electrical surface potential; Stress signal; Variation potential; Water stress

E. Salgado, R. Cautin, Avocado root distribution in fine and coarse-textured soils under drip and microsprinkler irrigation, Agricultural Water Management, Volume 95, Issue 7, July 2008, Pages 817-824, ISSN 0378-3774, DOI: 10.1016/j.agwat.2008.02.005.
(http://www.sciencedirect.com/science/article/B6T3X-4S7S2P4-1/2/e67f246eac999b9553e4d330e9246d00)
Abstract:
A common irrigation-scheduling problem in orchards is the proper location of instruments for monitoring soil water content within the active root zone. Given the high spatial variability of soils in the field, and seasonal changes in root distribution and frequency, both within the orchard and around the trees, the accuracy and representativeness of soil water measurements can be strongly affected. Adequate soil water monitoring in orchards thus requires assessment of the variability and location of the active roots in a given location over an extended period of time. We examined the root systems of 12-year-old `Hass' avocado (Persea americana Mill.) trees grafted on `Mexicola' seedling rootstocks, growing in fine or coarse-textured soils, under either drip or microsprinkler irrigation systems in Central Chile. We dug 3 m long and 0.75 m deep trenches within the tree rows in spring, summer and autumn, and counted the active roots (white, diameter <=2 mm) found on the walls. Over the three growing seasons of our study, season had the most significant effect on root distribution, as autumn root frequencies accounted for about half of the cumulative average. Also, the location of the highest concentration of roots under microsprinklers in autumn clearly differed between the fine soils, at about 200 cm from the trunk and 50-60 cm deep, and coarse soils, where they were found within 30 cm from the trunk, and within the first 25 cm of soil. Trees in fine soil had 25% more roots than those in coarse soil, and drip irrigation produced about 30% more roots than microsprinkler, although both of these figures are mainly due to the high number of roots found in the fine soil-drip irrigation combination. Overall, we found the highest root frequency within the first meter from the tree trunk, for all combinations, with some differences between irrigation types. Throughout the growing season in semi-arid regions, some changes in both the quantity of tree roots and the location of the zones of the greatest root activity should be expected, which will vary according to the seasonal soil temperatures, soil texture, and type of irrigation used.
Keywords: Persea americana Mill.; Seasonal root frequency; Soil water monitoring; Instrument placement; Irrigation-scheduling; Root-location

Beatriz Cara, James J. Giovannoni, Molecular biology of ethylene during tomato fruit development and maturation, Plant Science, Volume 175, Issues 1-2, Ethylene Biology, July-August 2008, Pages 106-113, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2008.03.021.
(http://www.sciencedirect.com/science/article/B6TBH-4S98TRX-1/2/df09f63e9c8e3cd924cfeba14a1ae7f7)
Abstract:
Important traits for complete ripening and consumer fruit quality preferences include development of aroma, flavor, color, texture, and nutritional quality. These attributes are influenced by the endogenously produced hormone ethylene in many fleshy fruits such as apple, avocado, banana, mango, pear and tomato. Even in species where endogenous ethylene seems to play little if any role as an endogenous regulator, exogenous ethylene will often promote ripening characteristics and can be the target of post-harvest strategies designed to accelerate, synchronize or delay ripening. In recent decades the YANG cycle for ethylene biosynthesis has been revealed and characterized at the molecular level with much of this important work done via the analysis of fruit systems. However, the genetic regulation that controls ethylene production at different developmental stages of fruits has only recently begun to be studied. Tomato has emerged as the primary model plant to further understand the molecular biology that controls ethylene synthesis

and additional ripening regulators during fruit development. Here we summarize data pertaining to ethylene biology specifically as related to fruit maturation and including recent insights into genetic control of the ripening process prior to and controlling ethylene.
Keywords: Ethylene; Fruit; Ripening; Signal transduction; Tomato; Transcriptional regulation

J. Burdon, N. Lallu, G. Haynes, K. McDermott, D. Billing, The effect of delays in establishment of a static or dynamic controlled atmosphere on the quality of `Hass' avocado fruit, Postharvest Biology and Technology, Volume 49, Issue 1, July 2008, Pages 61-68, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2008.01.002.
(http://www.sciencedirect.com/science/article/B6TBJ-4S094YD-1/2/1654364608971f73e0cdc1ac1561389d)
Abstract:
The effect of delays of 1, 5, 10 or 15 d after harvest in establishing a static controlled atmosphere (SCA) or dynamic controlled atmosphere (DCA) on the quality of `Hass' avocados (Persea americana Mill.) was investigated. Fruit were stored at 5 [degree sign]C in SCA (5% O2/5% CO2) or DCA (<3% O2/0.5% CO2) for 6 weeks and compared with fruit stored in air. In addition, to determine whether increasing the CO2 in the DCA would affect the fruit quality, DCA-stored fruit were compared with fruit held in a DCA with 5% CO2 (DCA + CO2) established 1 d after harvest. The quality of fruit was assessed at the end of storage and after ripening at 20 [degree sign]C. DCA-stored fruit ripened in 4.6 d compared with 7.2 d for SCA-stored fruit, or 4.8 d for air-stored fruit. In addition, the incidences of stem end rot (SER), body rot (BR) and vascular browning (VB) were lower in DCA-stored fruit (35%, 29% and 29%, respectively) than in SCA-stored fruit (57%, 52% and 49%, respectively), or air-stored fruit (76%, 88% and 95%, respectively). Delaying the establishment of both SCA and DCA for 15 d resulted in significantly more advanced skin colour at the end of storage (average rating score 11.9) compared with other delay periods (4.6-5.1). There was no significant effect of delay on the time to ripen, skin colour when ripe or any ripe fruit disorder incidence. The incidence of diffuse flesh discolouration (DFD) was not only <1% when averaged over all delays but only occurred at >0.5% incidence in the 15 d delay treatment in DCA (4.8%) and not in SCA. The incidence of diffuse flesh discolouration was 62% in air-stored fruit. Inclusion of 5% CO2 in DCA retarded fruit ripening from 4.7 to 6.9 d and increased the incidence of rots at the end of storage from 5% to 14%, and increased the incidence in ripe fruit of SER from 30% to 56% and of BR from 27% to 55%. It is concluded that fruit quality was better after CA storage than after air storage, and that DCA storage was better than SCA. The effect of DCA is to independently reduce the time to ripen after storage and the incidence of rots when ripe. Delaying the application of SCA or DCA did not affect the expression of rots, but may increase the incidence of DFD. Inclusion of CO2 at 5% in CA retarded fruit ripening but stimulated rot expression and should not be used for CA storage of New Zealand grown `Hass' avocados.
Keywords: Storage; Rot; Physiological disorder; Chilling injury; Oxygen; Carbon dioxide

Kerry R. Everett, Ian C. Hallett, Jonathan Rees-George, Robert W. Chynoweth, Henry A. Pak, Avocado lenticel damage: The cause and the effect on fruit quality, Postharvest Biology and Technology, Volume 48, Issue 3, June 2008, Pages 383-390, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.09.008.
(http://www.sciencedirect.com/science/article/B6TBJ-4PXNHG8-4/2/f7e7898c777bf3cab25049d05f180328)
Abstract:
Avocado fruit can develop small, 1-5 mm diameter brown spots immediately after harvest. These symptoms are typically more severe among fruit harvested following rain. The incidence of the brown spots increased significantly when fruit were artificially imbibed with water, but not when immersed in water. Morphological examination with the light and electron microscope showed there was a change in lenticels that was caused by water uptake. In unaffected fruit, large

intercellular spaces were observed in cells below the lenticels, but when the fruit had taken up water, these cells became turgid and filled these spaces. Swollen cells associated with lenticels were more distended than other cells in the mesocarp, because the expansion of mesocarp cells was limited by adjacent cells. Swollen cells in the lenticels became brown more rapidly than other cells, probably because their turgidity made them more susceptible than other cells. Cells close to the surface were also more susceptible to discoloration than internal fruit cells. They were not prone to compression from adjacent cells towards the surface and were consequently more distended than internal cells. At harvest, prior to coolstorage, no fungal mycelium or spores were observed associated with lenticel damage symptoms. Surface-sterilised samples of lenticel damaged tissue failed to yield a fungal pathogen. In coolstorage, however, these fruit developed slightly sunken dark brown patches with irregular margins, referred to as measles, about 10-50 mm diameter The fungi Colletotrichum acutatum and Phomopsis sp. were isolated from such tissue in greater quantities than adjacent green tissue. Imbibation had no effect on measles development, but fruit jostled in a plastic crate to simulate damage that occurs at harvest developed more severe measles than fruit that were not damaged. There was no evidence that lenticel damage lead to measles but both symptoms were worsened by jostling.
Keywords: Avocado; Lenticel damage; Measles; Colletotrichum acutatum; Phomopsis

Sun Tay Choi, Pavlos Tsouvaltzis, Chai Il Lim, Donald J. Huber, Suppression of ripening and induction of asynchronous ripening in tomato and avocado fruits subjected to complete or partial exposure to aqueous solutions of 1-methylcyclopropene, Postharvest Biology and Technology, Volume 48, Issue 2, May 2008, Pages 206-214, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.10.008.
(http://www.sciencedirect.com/science/article/B6TBJ-4R718GW-1/2/05d41b2b07c7a60f828a041fea012187)
Abstract:
This study was designed to determine the effects of aqueous 1-methylcyclopropene (1-MCP) formulation applied as a brief, topical dip on the ripening of early ripening-stage tomato (Solanum lycopersicum L. `Florida 47') and avocado (Persea americana Mill. `Hass') fruits. Tomato and avocado fruits were subjected to either total or partial (approximately half of fruit surface) immersion in aqueous 625 [mu]g L-1 1-MCP for 1 min and stored at 20 [degree sign]C. Liquid-formulated 1-MCP strongly delayed ripening in both tomato and avocado fruit, and in tomato fruit exhibited efficacy comparable to that of gaseous 1-MCP (SmartFreshSM Quality System) applied at 500 nL L-1 for 9 h. Tomato fruit treated with liquid 1-MCP exhibited a strongly delayed ethylene climacteric, suppressed respiration, a reduction in the rate of softening, delayed and reduced accumulation of polygalacturonase activity and lycopene, and delayed changes in surface hue angle. Tomato fruit exposed to partial immersion for 1 min exhibited strong ripening asynchrony, with immersed and control fruit portions diverging significantly in all measured ripening parameters. The asynchronous ripening of partially immersed tomato fruit was observed independently of direct exposure of the stem-scar. Avocado fruit ripening was also delayed following a 1 min immersion in 625 [mu]g L-1 1-MCP though less striking ripening asynchrony was observed in response to partial immersion. The results demonstrate the efficacy of relatively brief exposures to liquid-formulated 1-MCP on fruit ripening and illustrate that these formulations, designed to facilitate field or preharvest exposure to 1-MCP, may have postharvest applications as well.
Keywords: Avocado; Ethylene; Firmness; Lycopene; 1-Methylcyclopropene; Polygalacturonase; Tomato

J.A.B. Ordonez, B.H.J. de Jong, F. Garcia-Oliva, F.L. Avina, J.V. Perez, G. Guerrero, R. Martinez, O. Masera, Carbon content in vegetation, litter, and soil under 10 different land-use and land-cover classes in the Central Highlands of Michoacan, Mexico, Forest Ecology and Management, Volume

255, Issue 7, Large-scale experimentation and oak regeneration, 20 April 2008, Pages 2074-2084, ISSN 0378-1127, DOI: 10.1016/j.foreco.2007.12.024.
(http://www.sciencedirect.com/science/article/B6T6X-4RTCPPS-1/2/e47593a0384c71cbff55c061f200b099)
Abstract:
In this study we estimated the carbon content in vegetation, litter, and soil, under 10 different classes of land-use and land-cover classes (LU/LC) in the Purepecha Region, located in the Central Highlands of Mexico. Forests in this area are representative of the montane forests of Central and Southern Mexico and are subject to rapid degradation and deforestation by human pressure.
Carbon data for each of the LU/LC classes and the main pools (vegetation, soil and litter) were collected at 92 sites in 276 field plots of 0.1 ha each, based on a 'nested' design which allows the collection of samples and their replicates. The following LU/LC classes were identified: pine forest, oak forest, pine-oak forest, fir forest, Plantation, Agricultural fields, Grasslands, Scrublands, Avocado plantation and Degraded forests.
The following results were obtained: (a) carbon content in vegetation ranged from 0.2 (grasslands) to 169.7 (fir forest) Mg C ha-1; (b) carbon content in litter ranged from 0.6 (agriculture) to 4.1 (fir forest) Mg C ha-1, and (c) carbon content in soil from the 0-30 cm depth, ranged from 72.8 (degraded forest) to 116.4 (oak forest) Mg C ha-1.
Forest classes (pine, oak, fir and pine-oak forest) presented the highest total carbon stocks with values ranging between 220.7 and 266.9 Mg C ha-1; degraded forest contained 169.2 Mg C ha-1; plantation 142 Mg C ha-1 and avocado orchards reported 156.1 Mg C ha-1; scrublands 121 Mg C ha-1; grasslands 90.8 Mg C ha-1 and agriculture 82.7 Mg C ha-1. The total carbon stock in the last three classes was mainly found in the soil. The results of the present study are relevant for national inventories of carbon stocks and can be used to derive greenhouse gas emissions (GHG), once the land-cover change dynamics are known.
Keywords: Carbon stocks; Above-ground biomass; Litter; Soil; Highlands; Central Mexico; Montane forest

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

Ohad Afik, Arnon Dag, Sharoni Shafir, Honeybee, Apis mellifera, round dance is influenced by trace components of floral nectar, Animal Behaviour, Volume 75, Issue 2, February 2008, Pages 371-377, ISSN 0003-3472, DOI: 10.1016/j.anbehav.2007.04.012.
(http://www.sciencedirect.com/science/article/B6W9W-4RGVWHC-1/2/a0bcd8a7413b72e1ce97f936f71b405a)
Abstract:
The round dance and mutual feeding (trophallaxis) enable honeybees to transfer information concerning a food source, including its profitability. For nectar, which consists mainly of sugars, profitability is usually defined by its energetic value. Nectars, however, also contain a wide range of trace components, some of which affect their attractiveness. Honeybees produce honey from nectar. We compared the round dance and trophallaxis behaviours of bees foraging on avocado and citrus honey solutions, as a substitute for nectars. These sources differ in their trace-elements composition, with avocado nectar and honey containing higher concentrations of minerals than citrus nectar and honey. In a second experiment, we compared the behaviour of bees foraging on sucrose solution and sucrose solution enriched with four major mineral components of avocado nectar. Subjects foraging on avocado honey had a significantly lower probability of dancing than those foraging on citrus honey, a rate of direction reversals that was almost one half, a lower total number of reversals, shorter dance duration and longer trophallaxis time. When avocado honey was supplied to bees that previously fed on citrus honey, most of them avoided it, indicating a strong context effect. When foraging on mineral-enriched sugar solution, dance variables tended to be lower compared with sucrose solution without minerals, but differences were smaller than the differences between the honey solutions. These results show that nectar trace components affect the estimation of nectar profitability by bees and consequently recruitment of new foragers to nectar sources.
Keywords: Apis mellifera; avocado; citrus; context-dependent evaluations; honey; honeybee; minerals; Persea americana

T.V. Logaraj, Suvendu Bhattacharya, K. Udaya Sankar, G. Venkateswaran, Rheological behaviour of emulsions of avocado and watermelon oils during storage, Food Chemistry, Volume 106, Issue 3, 1 February 2008, Pages 937-943, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.07.004.
(http://www.sciencedirect.com/science/article/B6T6R-4P5NX89-5/2/dfa9af19d16a25b7b4e58cb9d6114c7c)
Abstract:
Rheological properties of emulsions made out of avocado pulp and watermelon seed oils with whey protein concentrate were determined during different storage periods. The oils, as well as the emulsions behaved like non-Newtonian liquids, having shear-thinning characteristics. Both oils showed moderate shear-thinning characteristics as the flow behaviour indices were between 0.86 and 0.88. The shear-rate/shear-stress data could be adequately fitted (r = 0.997-0.999) to a common rheological equation, e.g. the power-law model. Avocado pulp oil was markedly more viscous than was watermelon seed oil which was also evident from the higher apparent viscosity and consistency index values.
The rheological parameters during storage did not significantly change flow parameters, e.g. flow behaviour and consistency indices and apparent viscosity. The values of different droplet sizes and their distribution patterns, as evident from phase contrast microscopy, were considered almost unimodal (i.e., between 2 and 10 [mu]m). Such a narrow range of variations in the particle diameters may not markedly influence particle behaviour. Cream and serum separation of emulsions were not noticed during storage, indicating that the stability of these two emulsions was not affected during storage for up to 2 months at room temperature.
Keywords: Rheology; Emulsions; Avocado and watermelon; Apparent viscosity; Flow behaviour index

Duong Tan Nhut, Nguyen Ngoc Thi, Bui Le Thanh Khiet, Vu Quoc Luan, Peptone stimulates in vitro shoot and root regeneration of avocado (Persea americana Mill.), Scientia Horticulturae, Volume 115, Issue 2, 7 January 2008, Pages 124-128, ISSN 0304-4238, DOI: 10.1016/j.scienta.2007.08.011.
(http://www.sciencedirect.com/science/article/B6TC3-4PRRHGS-2/2/d5a03bd60e4e62e74f865af9c9675bb4)
Abstract:
The effect of peptone on in vitro regeneration of avocado's shoots and roots from juvenile or mature stem sections was studied. In this study, both mature and juvenile explants were used to study the effect of peptone on shoot regeneration. Explants were necrotized on Murashige and Skoog (MS) medium without or with plant growth regulators. On the MS medium supplemented with both peptone and benzyladenine or dichlorophenoxyacetic acid, explants survived but significantly delayed in shoot regeneration. Addition of peptone alone into the medium with an optimal amount of 2.0% (w/v) induced shoot formation. Shoot formation also occurred in nodal sections from mature plant but the regeneration rate remained low. All juvenile explant-derived shoots formed root on the medium supplemented with peptone and naphthaleneacetic acid.
Keywords: In vitro; Peptone; Persea americana Mill.; Rooting; Shoot regeneration

C.J. Clark, A. White, R.B. Jordan, A.B. Woolf, Challenges associated with segregation of avocados of differing maturity using density sorting at harvest, Postharvest Biology and Technology, Volume 46, Issue 2, November 2007, Pages 119-127, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.05.010.
(http://www.sciencedirect.com/science/article/B6TBJ-4P5RKTB-4/2/701a27a6a1e2b8807ecf3b384c301823)
Abstract:
The dry matter (DM) content in the flesh of harvested avocado is quite variable, ranging from low DM (<20%), poor-tasting fruit that should be removed from commercial sale, to high DM (>35%) fruit that are potentially suitable for processing. Currently, no suitable method exists for segregating these categories in harvested lines. Compositional analysis of the skin, seed and flesh of 1000 mature `Hass' avocado (Persea americana Mill.) fruit was undertaken to determine the feasibility of employing a density technique to identify such fruit on the basis of their flesh DM. Measurements included whole-fruit density, and the mass, density and DM of both core plugs of individual tissues from unripe fruit, and the separated tissues of each fruit upon ripening. The proposition was evaluated by extending basic density theory to develop a generic multi-term expression for a whole-fruit system where the density of each component (the skin, seed and flesh) was characterized with regard to its water, DM and air content. At harvest whole-fruit densities ranged between 970 and 1018 kg m-3, and flesh DMs between 23 and 43%, with a correlation of $r = -0.29$; $P < 0.0001$. From theoretical considerations, the factors having the biggest impact on the variability in these data were: the magnitude of the internal airspace fraction within the flesh; the composition and density of the individual lipids in the lipid fraction; and, the seed/flesh volume ratio. Thus without any additional information on these factors, we conclude that whole-fruit density is a poor predictor of fruit DM, and grading fruit into even coarse categories would be unlikely to be successful. Density grading might be feasible however, if one wished to discriminate roughly between fruit on the basis of their seed/flesh volume ratio.
Keywords: Fruit; Non-destructive analysis; Ripening; Air content; Flesh; Seed; Skin

C.J. Lopez-Herrera, T. Zea-Bonilla, Effects of benomyl, carbendazim, fluazinam and thiophanate methyl on white root rot of avocado, Crop Protection, Volume 26, Issue 8, August 2007, Pages 1186-1192, ISSN 0261-2194, DOI: 10.1016/j.cropro.2006.10.015.
(http://www.sciencedirect.com/science/article/B6T5T-4MK60RV-1/2/87cda2eeef69d31cd0980f72ea5c1d8c)

Abstract:
Benomyl, carbendazim, thiophanate methyl and fluazinam were tested in vitro and in vivo for their effects on Rosellinia necatrix. Benomyl, carbendazim and thiophanate methyl at [greater-or-equal, slanted]0.5 [mu]g ml-1 totally inhibited R. necatrix mycelial growth on PDA medium. At 0.1 [mu]g ml-1, carbendazim and fluazinam inhibited growth by 97% and 84%, respectively, in comparison with fungicide-free medium. Benomyl and thiophanate methyl had less effect (53% and 22%, respectively) at this dose. Mycelia treated with fungicide were tested for their capacity to grow when transferred to fungicide-free medium one month after treatment, demonstrating the fungistatic effect of fluazinam in comparison with the other systemic fungicides assayed.
The in vivo effects of fungicides on white root rot (WRR) control in avocado plants was studied in two greenhouse experiments with eight sequential applications of fungicides at doses of 0.1% (w/v) and 1% (w/v). Plants were inoculated once with R. necatrix or inoculated twice when plants received an additional dose of inoculum 30 days after the last application of fungicide.
Fluazinam was highly effective in the control of WRR as measured by aerial symptoms, plant height increase, dry weight of secondary roots, percentage isolation of R. necatrix from secondary roots and R. necatrix populations in soil. Carbendazim, benomyl and thiophanate methyl were less effective.
Keywords: Chemical control; Persea americana; Rosellinia necatrix

Leon A. Terry, Thomas Ilkenhans, Stephen Poulston, Liz Rowsell, Andrew W.J. Smith, Development of new palladium-promoted ethylene scavenger, Postharvest Biology and Technology, Volume 45, Issue 2, August 2007, Pages 214-220, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2006.11.020.
(http://www.sciencedirect.com/science/article/B6TBJ-4NF2H9S-1/2/286d97afca11bb158ef7b3b255b1496d)
Abstract:
The control of ethylene in stored environments plays a key role in prolonging the postharvest life of many fresh produce types. However, there has been a paucity of research in recent years on developing novel and more effective ethylene scavenging materials. In this study a palladium (Pd)-promoted powdered material that has significant ethylene adsorption capacity (4162 [mu]L g-1 material) at 20 [degree sign]C and approximately 100% RH was identified and was shown to be far superior to KMnO4-based scavengers when used in low amounts and in conditions of high relative humidity (RH).
Initial screening was carried out in a plug flow reactor with 200 [mu]L L-1 ethylene, 10% (v/v) O2 balanced with He at approximately 100% RH. Further work demonstrated that the Pd-promoted material at either 0.01 or 0.03 g L-1 effectively scavenged both exogenously administered (100 [mu]L L-1) and/or endogenously produced ethylene by banana or avocado, respectively, to sub-[mu]L L-1 concentrations within a 24 h period. Optimum ethylene adsorption capacity was calculated as approximately 10,000 [mu]L g-1. Accordingly, corresponding inhibition of ethylene-induced ripening was observed. When removed, Pd-material did not disrupt subsequent ripening. The results from this study demonstrate that Pd-promoted material has commercial potential.
Keywords: Avocado; Banana; Ethylene adsorption capacity; Strawberry

Akira Tateishi, Hajime Shiba, Jun Ogihara, Katsunori Isobe, Kazunari Nomura, Keiichi Watanabe, Hiroaki Inoue, Differential expression and ethylene regulation of [beta]-galactosidase genes and isozymes isolated from avocado (Persea americana Mill.) fruit, Postharvest Biology and Technology, Volume 45, Issue 1, July 2007, Pages 56-65, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2007.01.009.
(http://www.sciencedirect.com/science/article/B6TBJ-4NB2SH7-2/2/12c7d927892705b2875c79fb83acbd07)
Abstract:

[beta]-Galactosidases (EC 3.2.1.23; [beta]-Gals) consist of several isoforms which have different activity levels against native and synthetic substrates and play an important role in cell wall metabolism during fruit growth and ripening. In this study, we isolated three new [beta]-Gal cDNA clones, PaGAL2, PaGAL3 and PaGAL4, from the fruit of ripening avocado in addition to the AV-GAL1 clone previously obtained. The expression patterns of these genes during fruit ripening were quite different. The AV-GAL1 transcript, which was solely found in the fruit, accumulated with fruit ripening. PaGAL2 transcript, which was detected in leaves, shoots, roots and fruit, showed a constant level throughout fruit ripening. The level of PaGAL3 transcript in control fruit, which was not detected in root but only in other tissues, increased markedly at 2 days after treatment (DAT) (air treatment) and dropped quickly at 4 DAT in fruit. The transcript was not detectable at 6 DAT and thereafter. The PaGAL4 transcript was detected in all tissues except for the fruit. In order to investigate the role of ethylene, on the regulation of [beta]-Gal expression, pre-ripe fruit were treated with either ethylene or its inhibitor 1-methylcyclopropene (1-MCP). Exogenous ethylene promoted AV-GAL1 expression but severely suppressed PaGAL3 expression. Ethylene also affected the activities of fractionated [beta]-Gal isozymes in a differential manner. Among the three isozymes, the increase in AV-GAL III activity with fruit softening were promoted by exogenous ethylene and delayed by 1-MCP. However, no apparent changes in the activities were observed in the other two isozymes. Based on the results obtained, it seems that AV-GAL1, which may encode AV-GAL III, is important for postharvest fruit softening while PaGAL2, PaGAL3 and PaGAL4 may be involved in galactose metabolism of cells or cell walls during development and ripening.
Keywords: Cell wall; Ethylene; Fruit softening; Galactose; 1-MCP

E. Patazca, T. Koutchma, V.M. Balasubramaniam, Quasi-adiabatic temperature increase during high pressure processing of selected foods, Journal of Food Engineering, Volume 80, Issue 1, May 2007, Pages 199-205, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.05.014.
(http://www.sciencedirect.com/science/article/B6T8J-4KB10VV-1/2/2d8445d77a2e0e77120ba7f2a19e94be)
Abstract:
The effect of food composition on the quasi-adiabatic temperature increase during high pressure processing (HPP) was studied using specially designed experimental equipment. [delta]S was evaluated as the ratio of the temperature increase with respect to final pressure. Selected foods (mayonnaise dressing, egg yolk raw fresh, egg white raw fresh, Hass avocado, beef ground 90% lean meat, chicken breast fat free raw, whole and skim milk, gravy beef canned) were evaluated at an initial temperature of 25 [degree sign]C and pressure treatments ranging from 150 to 600 MPa. The effect of initial temperature (1-70 [degree sign]C) on the [delta]S over a range of pressures treatments from 150 to 600 MPa was evaluated using vegetable oil, honey and cream cheese. Results showed that vegetable oil had the highest [delta]S (upto 9.7 [degree sign]C/100 MPa) of the samples examined. This [delta]S value decreased with increasing pressure and was slightly affected by initial temperature of the sample. For foods with high water content, [delta]S increased with increasing initial temperature. An empirical equation was developed to calculate the final temperature during HPP at different initial temperatures for vegetable oil, honey and cream cheese. The observed thermal effects of compression must be taken into account when HPP sterilization or pasteurization processes are developed.
Keywords: Heat of compression; High pressure of foods; Pressure and thermal effects; Pressure and food composition

N. Maftoonazad, H.S. Ramaswamy, M. Moalemiyan, A.C. Kushalappa, Effect of pectin-based edible emulsion coating on changes in quality of avocado exposed to Lasiodiplodia theobromae infection, Carbohydrate Polymers, Volume 68, Issue 2, 21 March 2007, Pages 341-349, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2006.11.020.

(http://www.sciencedirect.com/science/article/B6TFD-4MWPV6Y-1/2/0e034999552698415de1cdc847d87550)
Abstract:
This study was carried out to evaluate the effect of pectin-based edible emulsion coating on activity and disease severity of Lasiodiplodia theobromae in avocados, and their subsequent influence on the fruit quality. In order to assess the influence of coating and disease, avocados were sorted and devided into four equal lots and all were incubated at 20 [degree sign]C for up to 4 days. The first and second lots constituted samples which were stored as coated and uncoated, respectively, without fungal inoculation. The third and fourth lots were coated and un-coated fruits inoculated with the fungal disease. For coating, a previously standardized pectin-based emulsion was used. The incubated fruits were examined for the spread of disease, respiration rate and quality parameters, color and texture. As the incubation time increased, the volume of disease (VDS) increased, which in turn influenced the respiration rate (RR) in both coated and uncoated fruits. However, the coated fruits sustained a significantly slower rate of disease spread and RR. Similarly, the associated quality changes (texture and color) were much lower in coated fruits as compared with the control. Thus, the pectin based coating was effective in controlling the spread and severity of stem end rot in avocados. Changes in physical and physiological parameters of coated and uncoated fruits were well described by some form of semi-logarithmic models and were related to the VDS as well as case dependent incubation time.
Keywords: Avocado; Storage; Edible film; Pectin; Coating; Lasiodiplodia theobromae; Texture; Color; Respiration rate

C. Sanchez-Romero, R. Peran-Quesada, B. Marquez-Martin, A. Barcelo-Munoz, F. Pliego-Alfaro, In vitro rescue of immature avocado (Persea americana Mill.) embryos, Scientia Horticulturae, Volume 111, Issue 4, 16 February 2007, Pages 365-370, ISSN 0304-4238, DOI: 10.1016/j.scienta.2006.11.009.
(http://www.sciencedirect.com/science/article/B6TC3-4MJS09G-1/2/c945a4da5f9adb866ab87a80eee6bb2a)
Abstract:
An in vitro culture protocol was developed as a means of avocado embryo rescue. Different factors including presence of cotyledons, medium texture and cold or gibberellic acid pretreatments, were studied. To better understand the germination process in this recalcitrant species, immature zygotic embryos at different stages were used in these experiments. Optimum results were dependant on the embryo developmental stage. Whereas smaller embryos (5 mm long) germinated better in M1 liquid medium, 15 mm long embryos responded better when precultured in B5m medium supplemented with 1 mg l-1 GA3, and fully mature embryos were capable of germinating directly in solid M1 medium. Our results suggest the existence of two types of dormancy in avocado embryos: an embryo-dormancy caused by cotyledons, and another type of dormancy, mainly occurring in 35 mm long embryos and revealed by the formation of dwarfing rosette seedlings, that can be released by a GA3 pretreatment.
Keywords: Avocado; Embryo rescue; Germination; Gibberellic acid; Persea americana Mill.

J. Burdon, N. Lallu, C. Yearsley, D. Burmeister, D. Billing, The kinetics of acetaldehyde and ethanol accumulation in `Hass' avocado fruit during induction and recovery from low oxygen and high carbon dioxide conditions, Postharvest Biology and Technology, Volume 43, Issue 2, February 2007, Pages 207-214, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2006.08.014.
(http://www.sciencedirect.com/science/article/B6TBJ-4M0J4GS-2/2/d8bd0abf81ec0111ca78238a648a4003)
Abstract:
The kinetics of acetaldehyde (AA) and ethanol (EtOH) accumulation and pyruvate decarboxylase (PDC) and alcohol dehydrogenase (ADH) activities were studied in pre-climacteric `Hass' avocado

fruit flesh during induction and recovery from hypoxic conditions at 6 [degree sign]C. Oxygen levels <0.5% resulted in a rapid accumulation of AA and EtOH. The pattern of AA and EtOH accumulation could be described by a hyperbolic model, although the initial 96 h of EtOH accumulation was linear. The accumulation of EtOH and AA was coincident with a doubling of the extractable ADH and PDC activities after 120 h exposure. Exposure of the fruit to up to 20% CO2 concentrations resulted in an increase in tissue levels of AA, but not EtOH. The pattern of AA accumulation under high CO2 was similar to that under low O2, with the level of AA being higher at higher CO2 concentrations.
The AA and EtOH induced by low O2 declined to basal levels in an exponential manner when O2 was increased from <=0.5 to >=2%. The longer the duration of hypoxic induction, the longer the time required for AA and EtOH to decline to basal levels. When low O2 induction was 48 h or less, the time required for AA and EtOH to decline to basal levels was not affected by O2 concentrations >2%. However, after 96 h induction, the initial rate of decline in AA or EtOH was slower at lower O2 concentrations. Including 20% CO2 in the recovery atmosphere decreased the initial rapid rate of AA and EtOH decline, affecting EtOH levels more than AA, although both compounds reached pre-induction levels at approximately the same time. The rate of decline of ADH and PDC activity following low O2 induction was accelerated by the presence of CO2 in the atmosphere.
Based on the rapid induction of AA and EtOH in response to low O2 stress, and the comparable rapid recovery to basal levels after removal of the stress atmosphere, together with a seemingly high tolerance to O2 atmospheres <2% and the similar but relatively smaller effect of CO2 compared with O2, it is concluded that preclimacteric `Hass' avocados are physiologically well suited to dynamic CA storage.
Keywords: Avocado; Persea americana Mill.; Fruit; Oxygen; Carbon dioxide; Acetaldehyde; Ethanol; Anaerobic; Kinetics

E. de la Fuente, M.L. Sanz, I. Martinez-Castro, J. Sanz, A.I. Ruiz-Matute, Volatile and carbohydrate composition of rare unifloral honeys from Spain, Food Chemistry, Volume 105, Issue 1, 2007, Pages 84-93, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.03.039.
(http://www.sciencedirect.com/science/article/B6T6R-4NB99MJ-D/2/59a268185a976453433ac55242e5602c)
Abstract:
Volatile composition and carbohydrate content of Spanish honey samples from uncommon botanical origins have been studied by gas chromatography coupled to mass spectrometry. About 100 volatile compounds were identified; some of them appeared to be characteristic of particular honey types, such as methyl salycilate in willow (Salix spp.), 2,6,6-trimethyl-2,4-cycloheptadien-1-one (eucarvone) in almond tree (Prunus dulcis) and isophorone in strawberry-tree (Arbutus unedo). Concentration ranges for major carbohydrates were similar to those previously reported in other honeys with different botanical origins, although concentrations of maltulose in avocado honeys (Persea americana) and of melezitose in Quercus ilex honeys were higher. Some carbohydrate alcohols could also be considered as markers of honey botanical origin, such as quercitol for Q. ilex and perseitol for avocado.
Keywords: Honey; Carbohydrates; Volatile compounds; Polyalcohols; GC-MS

Zhong Haiyan, Danny R. Bedgood Jr., Andrea G. Bishop, Paul D. Prenzler, Kevin Robards, Endogenous biophenol, fatty acid and volatile profiles of selected oils, Food Chemistry, Volume 100, Issue 4, 2007, Pages 1544-1551, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.12.039.
(http://www.sciencedirect.com/science/article/B6T6R-4JD0YJ0-1/2/de5629d6f35b00bf01aa40895bb3b77b)
Abstract:

Fatty acid composition, total phenols, phenolic and volatile profile data are presented for cold-pressed and refined camellia oil, in comparison to other commercially available oils - avocado, pumpkin, sesame and soybean - representing a cross-section of bulk, 'bland' oils (e.g., soybean) through to more boutique oils consumed primarily for taste (e.g., pumpkin). Camellia oil has a high oleic acid content, low polyunsaturated acid content, and levels of endogenous phenols comparable, in quantity and diversity, to cold-pressed oils. Volatile profiles of camellia oil are also comparable to cold-pressed oils, in that alkanals are the dominant headspace compounds, as measured by solid-phase microextraction gas chromatography. These factors suggest that camellia oil may find much wider commercial acceptance outside its current market range, southern China.
Keywords: Biophenol; Fatty acid; Volatiles; Edible oil; Camellia oil

Yukitomo Arao, Namiko Kanamori, Eri Kikkawa, Hiroko Otsuka, Yasushi Arimoto, Kazuhiro Ikeda, Takahiro Inakuma, Fujio Kayama, A two-step screening method, using estrogen receptor-mediated transactivation, to measure estrogenicity in edible plants, Food Chemistry, Volume 104, Issue 3, 2007, Pages 1288-1294, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.01.076.
(http://www.sciencedirect.com/science/article/B6T6R-4NNPCPY-1/2/a595831bce4c6b5b05fd1be8ad0c042b)
Abstract:
Estrogenic activity in 88 edible plants was screened using a human ovarian carcinoma cell line stably transformed with estrogen-responsive elements (ERE) fused to a luciferase (luc) reporter gene (BG1Luc4E(2)). We found 18 plants (ashitaba, avocados, chinese mustard, chinese chive (yellow), chrysanthemum, dokudami, shantung greens, green soybeans, soybean seeds, soybean sprouts, hop, japanese pepper, kidney beans, kuromame, perilla, peas (immature), plantain, and pomegranate juice) expressing estrogenic activity in BG1Luc4E(2) cells. To confirm that the phytoestrogenic activity occurred via estrogen receptors (ER), the reporter vector (ERE-tk-luc) and an expression vector, containing either ER[alpha] or ER[beta], were used to transiently transfect 293T cells. Extracts from avocados, plantain and dokudami did not activate ER[alpha]- and ER[beta]-mediated transcription. In conclusion, we report a simple and quick screening method for phytoestrogenic activity in plant extracts using BG1Luc4E(2) cells and confirmation of the results by ER[alpha]- or ER[beta]-transfected 293T cells. This two-step screening method has a practical application in screening estrogenic substances in edible plants.
Keywords: Phytoestrogen; Estrogen receptor; Transcription; Screening

David B. Lobell, Christopher B. Field, Kimberly Nicholas Cahill, Celine Bonfils, Impacts of future climate change on California perennial crop yields: Model projections with climate and crop uncertainties, Agricultural and Forest Meteorology, Volume 141, Issues 2-4, 20 December 2006, Pages 208-218, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2006.10.006.
(http://www.sciencedirect.com/science/article/B6V8W-4MBT1J2-3/2/ac502c4d94f976dcf45bcc6da31b5294)
Abstract:
Most research on the agricultural impacts of climate change has focused on the major annual crops, yet perennial cropping systems are less adaptable and thus potentially more susceptible to damage. In regions where perennial crops are economically and culturally important, improved assessments of yield responses to future climate are needed to prioritize adaptation strategies. These impact assessments, in turn, must rely on climate and crop models that contain often poorly defined uncertainties. We evaluated the impact of climate change on six major perennial crops in California: wine grapes, almonds, table grapes, oranges, walnuts, and avocados. Outputs from multiple climate models were used to evaluate climate uncertainty, while multiple statistical crop models, derived by resampling historical databases, were used to address crop response uncertainties. We find that, despite these uncertainties, climate change in California is very likely to

put downward pressure on yields of almonds, walnuts, avocados, and table grapes by 2050. Without CO2 fertilization or adaptation measures, projected losses range from 0 to >40% depending on the crop and the trajectory of climate change. Climate change uncertainty generally had a larger impact on projections than crop model uncertainty, although the latter was substantial for several crops. Opportunities for expansion into cooler regions were identified, but this adaptation would require substantial investments and may be limited by non-climatic constraints. Given the long time scales for growth and production of orchards and vineyards (~30 years), climate change should be an important factor in selecting perennial varieties and deciding whether and where perennials should be planted.
Keywords: Climate change; Perennial agriculture; Almonds; Grapes; California

Cuauhtemoc Saenz-Romero, R. Ricardo Guzman-Reyna, Gerald E. Rehfeldt, Altitudinal genetic variation among Pinus oocarpa populations in Michoacan, Mexico: Implications for seed zoning, conservation, tree breeding and global warming, Forest Ecology and Management, Volume 229, Issues 1-3, 1 July 2006, Pages 340-350, ISSN 0378-1127, DOI: 10.1016/j.foreco.2006.04.014.
(http://www.sciencedirect.com/science/article/B6T6X-4JYKKSB-2/2/0c281a03035ccbaea3946500119be161)
Abstract:
Pinus oocarpa has a large natural distribution in the sub-tropical forests of Mexico. Populations, however, are rapidly disappearing particularly in the Michoacan State as native forests are converted to avocado (Persea sp.) orchards. We investigated the patterning of genetic variation among P. oocarpa populations for quantitative traits along an altitudinal gradient by establishing a provenance/progeny test from wind-pollinated seeds collected along an altitudinal transect (1100-1500 m) near Uruapan, Michoacan, Mexico. Genetic variation was analyzed in relation to normalized climate records (temperature, precipitation, degree days >5 [degree sign]C and annual moisture index) for the provenances and the test site for the contemporary climate and for climates projected for the decades beginning in 2030, 2060, and 2090. Estimates of future climates used output from the Canadian and Hadley General Circulation Models.
Results of a field test suggested an altitudinal pattern of genetic differentiation in juvenile height among P. oocarpa populations. Seedlings from populations originating from lower altitudes tended to grow more than seedlings originating from populations at the higher altitudes. However, this trend abates at the lowest altitudinal limit of the species distribution, a probable conservative growth strategy for avoiding drought stress. Thus, the cline appeared to arise from selection along a climatic gradient reflecting in a moisture index (ratio of degree days to precipitation) and is dependent, therefore, on a balance between temperature and moisture. For guiding seed and seedling transfer in ecological restoration, conservation of genetic resources, tree breeding and mitigating the effects of global warming, we suggest guidelines based on delimitation of three altitudinal seed zones of about 200 m in breadth. Alternatively, one can limit transfer to three climatic zones of about 0.75 units of annual moisture index.
Predictions of future climates indicate an average annual temperature increase of 3.8 [degree sign]C by year 2090, and, judging from an increase of an annual moisture index of 26%, an increase in aridity by the end of the century. However, the more difficult period for adaptation of P. oocarpa populations to the new climate should be between 2030 and 2060, when the increase in aridity is expected to be most pronounced. Changes of this magnitude should alter the natural distribution of the species and would create an adaptational lag, as the adaptedness of extant populations deteriorates. Mitigating these effects will require seeds to be transferred upwards in altitude, perhaps as much as 150 m initially.
Keywords: Pinus oocarpa; Provenances; Altitudinal genetic variation; Seed zoning; Tree breeding; Conservation; Global warming; Mexico

Besrat Tesfagiorgis Demoz, Lise Korsten, Bacillus subtilis attachment, colonization, and survival on avocado flowers and its mode of action on stem-end rot pathogens, Biological Control, Volume 37, Issue 1, April 2006, Pages 68-74, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2005.11.010.
(http://www.sciencedirect.com/science/article/B6WBP-4J021RJ-2/2/43bc31c3a880e46efe4c95d83be84a4b)
Abstract:
Stem-end rot (SER) is an economically important postharvest disease of avocado. It is caused by several fungi, which infect fruit through inflorescences. Targeting the flowering stage in the disease cycle for dispersal of antagonists is believed to be an alternative application strategy for controlling SER. The aim of this study was therefore to determine the ability of Bacillus subtilis B246, commercially registered as Avogreen and used as a biocontrol agent against avocado pre- and postharvest diseases, to attach, colonize, and survive on avocado flowers and to study the interaction of the SER pathogens and the antagonist on avocado flowers. Avocado flowers inoculated with a liquid commercial formulation of the antagonist were observed at different time intervals under the scanning electron microscope (SEM). Population dynamics of the antagonist on the flowers were determined by means of total viable counts using reference cultures and background counts from the control. Flowers were also inoculated with antagonist-pathogen (Dothiorella aromatica and Phomopsis perseae) combinations to determine in vivo interactions. The SEM observations and population dynamics study confirmed that the antagonist could effectively attach, colonize, and survive on avocado flowers. It could also attach to conidia and hyphae of the pathogens and cause cell degradation. These modes of action can give new insights into the control of pathogens by B. subtilis.
Keywords: Bacillus subtilis; Mode of action; Stem-end rot; Avocado

B. Mosquera, C. Carvalho, R. Veiga, L. Mangia, R.M. Anjos, 137Cs distribution in tropical fruit trees after soil contamination, Environmental and Experimental Botany, Volume 55, Issue 3, March 2006, Pages 273-281, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2004.11.007.
(http://www.sciencedirect.com/science/article/B6T66-4F83PFD-1/2/eba94ce905460f974eef8522708071c2)
Abstract:
Gamma-ray spectra from guava (Psidium guajava), mango (Mangifera indica) and avocado (Persea americana) trees were measured. These tropical fruit trees were planted at one site that was contaminated by 137Cs due to a radiological accident occurred in the city of Goiania, Brazil, in 1987. The 137Cs concentrations in fruit, leaves, twigs, stems, and roots were measured in order to determine its distribution in tropical fruit trees. Binary diagrams of the 137Cs radial distribution in the main trunk are presented. Comparisons with longitudinal and radial distributions of 40K for these trees are also shown. The 137Cs concentration is higher in fruit, leaves and bark than in the inner parts of the plant (main trunk and stems) and neither symmetrical nor homogeneous behavior of the 137Cs radial distribution is observed.
Keywords: Guava, mango and avocado trees; 137Cs and 40K distributions; Goiania accident

Kuek Tze Lee, Mohammed Farid, Sing Kiong Nguang, The mathematical modelling of the rehydration characteristics of fruits, Journal of Food Engineering, Volume 72, Issue 1, January 2006, Pages 16-23, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2004.11.014.
(http://www.sciencedirect.com/science/article/B6T8J-4F31PSN-8/2/3680dd6e29b1760bd1c18e290541af93)
Abstract:
Freeze-dried fruits (avocado, kiwi fruit, apple, banana and potato) were rehydrated by dipping them in water at room temperature and their rehydration characteristics examined. The samples were found to restore up to 90% of their original moisture content, depending on the type of fruit and various other factors like ripeness and the freezing condition. The water uptake happened

rapidly during the first 30 s and then slowed down with time until it finally stopped altogether. A mathematical model based on one-dimensional, steady state, fully developed capillary flow of water with negligible inertia effects within the fruits was developed. The mathematical model was found to suitably describe the rehydration behavior and the model with the parameters generated can be used satisfactorily to predict the rehydration pattern of fruits.
Keywords: Freeze-drying; Porosity; Dehydration; Rehydration; Moisture content; Water uptake; Capillary flow

Constantinos A. Loulakakis, Mahmoud Hassan, Dimitrios Gerasopoulos, Angelos K. Kanellis, Effects of low oxygen on in vitro translation products of poly(A)+ RNA, cellulase and alcohol dehydrogenase expression in preclimacteric and ripening-initiated avocado fruit, Postharvest Biology and Technology, Volume 39, Issue 1, January 2006, Pages 29-37, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2005.09.005.
(http://www.sciencedirect.com/science/article/B6TBJ-4HTCTJ2-3/2/3d28891be6806c9225119960c2db5fa3)
Abstract:
In order to distinguish the interactions between low oxygen and fruit developmental stages, preclimacteric and ripening-initiated with propylene avocado fruit were exposed to different low oxygen levels and the steady-state levels of protein and mRNA accumulation of selected hypoxic and ripening genes were investigated. In addition, the patterns of translatable mRNA were studied by 2D IEF/SDS-PAGE analysis in preclimacteric fruit. Analysis of mRNA populations in preclimacteric avocado fruit revealed that low oxygen levels induced new mRNA species possibly implicated in the adaptive mechanism under low oxygen, suppressed de novo synthesized ones, or left unaffected house-keeping and/or pre-existing mRNAs, indicating that the low oxygen response is complex and involves more than a simple adaptation in energy metabolism. The accumulation of cellulase protein and mRNA was irrespective of low oxygen concentrations in preclimacteric fruit and oxygen dependent in ripening-initiated fruit. That is, preclimacteric avocado fruit contained cellulase protein and mRNA which were not suppressed by low oxygen treatment. Low oxygen tensions prevented the accumulation of cellulase protein and mRNA in ripening-initiated with propylene avocado tissues. New ADH isoenzymes were present in preclimacteric and ripening-initiated avocado fruit held in low oxygen atmospheres and correlated with elevated ADH mRNA levels. Low oxygen treatment (0-5%) did not result in increased ADH activity in avocado fruit. Neither the duration of exposure nor the developmental stage of the fruit altered this pattern, suggesting that unknown factor(s) might accumulate which possibly interfere with ADH activity under such conditions.
Keywords: Hypoxia; Anoxia; Low oxygen atmospheres; Avocado ripening; Alcohol dehydrogenase (ADH); Cellulase; Gene expression; 2D IEF/SDS-PAGE

Salvador Valle-Guadarrama, Teodoro Espinosa-Solares, Crescenciano Saucedo-Veloz, Cecilia B. Pena-Valdivia, Oxygen Diffusivity in Avocado Fruit Tissue, Biosystems Engineering, Volume 92, Issue 2, October 2005, Pages 197-206, ISSN 1537-5110, DOI: 10.1016/j.biosystemseng.2005.06.001.
(http://www.sciencedirect.com/science/article/B6WXV-4GWBF0X-1/2/834a2859a2c47f5b4461d06a84af2b69)
Abstract:
The oxygen mass diffusion coefficient in pre-climacteric `Hass' avocado fruits tissue at 20 [degree sign]C was evaluated. A respiration-diffusion model was developed by using a non-steady-state mass balance routine, in combination with the second law of Fick and the Michaelis-Menten enzymatic kinetic theory. Diffusivity was determined by simulation trials where a set of quantities for this parameter was proposed during the model solution, until a predicted O2 partial pressure below the skin agreed with experimental information; the resulting value was 2[middle dot]2x10-9

m2 s-1. The effect of the diffusion on the respiration parameters is discussed. Oxygen internal concentration profiles were used to suggest a minimal permissible coating permeance for an adequate fruit modified atmosphere storage.

Anass Terrab, Angeles F. Recamales, M. Lourdes Gonzalez-Miret, Francisco J. Heredia, Contribution to the study of avocado honeys by their mineral contents using inductively coupled plasma optical emission spectrometry, Food Chemistry, Volume 92, Issue 2, September 2005, Pages 305-309, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.07.033.
(http://www.sciencedirect.com/science/article/B6T6R-4DM2BYK-G/2/ee6c900e9ccf5745e0ea04d9a7af7a33)
Abstract:
Avocado honey samples were analyzed by inductively coupled plasma optical emission spectrometric. First, the botanical origin of the honeys was confirmed by melissopalynological analysis. Twenty-four minerals were quantified for each honey sample. The elements Al, Ba, Ca, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Na, Ni, P, Pb, S, Se, Si and Zn were detected in all samples; seven elements were very abundant (Ca, K, Mg, Na, P, S and Si), six were not abundant (Al, Cu, Fe, Li and Zn) and 11 were trace elements (As, Ba, Cd, Co, Cr, Mo, Ni, Mo, Pb, Se, Sr and V).
Keywords: ICP-OES; Minerals; Honey; Avocado

N. Maftoonazad, H.S. Ramaswamy, Postharvest shelf-life extension of avocados using methyl cellulose-based coating, LWT - Food Science and Technology, Volume 38, Issue 6, September 2005, Pages 617-624, ISSN 0023-6438, DOI: 10.1016/j.lwt.2004.08.007.
(http://www.sciencedirect.com/science/article/B6WMV-4DTKH9W-1/2/0cff9d6cef754bd8092166044e1a69d5)
Abstract:
Edible coatings regulate water vapor, oxygen and carbon dioxide transfer in or out of the produce thereby influencing the ongoing respiratory activity and produce quality. The objective of this study was to evaluate the effect of a methyl cellulose-based coating on the respiration rate, color and texture of avocados stored at room temperature. Avocados were initially surface disinfected, washed and air-dried. They were then immersed in the coating solution for 1 min at 20 [degree sign]C, air-dried for 10 min and stored at 20 [degree sign]C in an open box. At 2-day intervals, fruits were removed and evaluated for respiration rate, color and texture. Respiration rate was evaluated by measuring the rate of CO2 produced from a given quantity of fruits per unit time. Color and texture of avocados were measured using instrumental techniques. Coated avocados demonstrated lower respiration rates, greener color and higher firmness as compared with the uncoated control during the entire storage. The appearance of brown spots and mesocarp discoloration normally associated with fruit ripening were delayed in the coated fruits.
Keywords: Avocado; Storage; Methyl cellulose; Coating; Quality; Texture; Color

X. Wang, I. Kobiler, A. Lichter, A. Leikin-Frenkel, E. Pesis, D. Prusky, 1-MCP prevents ethylene-induced accumulation of antifungal diene in avocado fruit, Physiological and Molecular Plant Pathology, Volume 67, Issues 3-5, September 2005-October 2006, Pages 261-267, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2006.03.002.
(http://www.sciencedirect.com/science/article/B6WPC-4JS1MVK-1/2/a8a73325161cf5f9d9a443eb75113358)
Abstract:
The preformed (Z,Z)-1-acetoxy-2-hydroxy-4-oxo-heneicosa-12,15-diene (AFD) is the most active antifungal compound in avocado; it affects the quiescence of Colletotrichum gloeosporioides in unripe fruit. Ethylene treatment (40 [mu]g l-1) of freshly harvested avocado fruits cv. Fuerte enhanced the expression patterns of genes encoding [Delta]12 fatty acid desaturase (avfad12-3), fatty acid elongase (AVFAE, avfae1), their respective enzymatic activities, and the level of the

AFD. Application of the ethylene-action inhibitor 1-methylcyclopropene (1-MCP) after harvest and prior to ethylene treatment resulted in inhibition of: avfad12-3 and avfae1 transcription, enzymatic activities and AFD accumulation. 1-MCP treatment of fruit harvested 280 and 360 days after fruit set delayed fruit softening and reduced their AFD content compared with that in untreated fruits. However, decay symptoms caused by C. gloeosporioides were differentially affected by 1-MCP treatment after harvest. In the early-harvested fruits, the initial level of the AFD was 1820 [mu]g g-1 fresh wt and the inhibition of the AFD synthesis by 1-MCP did not reduce it below its threshold for inhibiting C. gloeosporioides. In contrast, in the late-harvested fruits, the initial level of the AFD was only 950 [mu]g g-1 fresh wt, and the 1-MCP treatment reduced the level of the AFD below its inhibition threshold, enabling fungal development in unripe fruits. These results demonstrate temporal relationships among fruit firmness, the synthesis of the precursor of AFD, the AFD content, and quiescence of C. gloeosporioides, and suggest that in avocado fruits, the processes of fruit ripening and AFD induction are independent processes that are differentially affected by ethylene action during fruit ripening.
Keywords: Preformed antifungal compound; Quiescent infection; Preformed resistance; Ethylene; 1-MCP

Vera Hershkovitz, Sam I. Saguy, Edna Pesis, Postharvest application of 1-MCP to improve the quality of various avocado cultivars, Postharvest Biology and Technology, Volume 37, Issue 3, September 2005, Pages 252-264, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2005.05.003.
(http://www.sciencedirect.com/science/article/B6TBJ-4GSBGPR-2/2/bb3eaed63939d02707eda06f684ea52f)
Abstract:
1-Methylcyclopropene (1-MCP), an ethylene action inhibitor, significantly delayed the ripening of the avocado cultivars `Ettinger', `Hass' and `Pinkerton'. Application of 1-MCP at low concentration (300 nl l-1), prior to the climacteric increase, was effective and delayed the onset of the climacteric peaks of CO2 and ethylene production. The delay was associated with reductions in fruit softening and in electrical conductivity (EC), the latter being an indicator of membrane permeability. The 1-MCP-treated `Ettinger' and `Pinkerton' avocado fruit maintained a greener peel color because of their lower levels of chlorophyllase activity and less chlorophyll breakdown. Treatment with 1-MCP at 300 nl l-1 prior to cold storage reduced chilling injury (CI) symptoms that are expressed as mesocarp discoloration and reduced polyphenol oxidase (PPO) and peroxidase (POD) activities in avocadoes stored at 5 [degree sign]C for 3.5 weeks. PPO and POD activities were low in harvested fruit and increased significantly during cold storage and shelf life at 20 [degree sign]C. 1-MCP was effective in reducing pulp browning in all the tested avocado cultivars. Mesocarp discoloration in avocado was found to be correlated with increases in EC values and PPO and POD activities.
Keywords: Avocado; 1-Methylcyclopropene; Chilling injury; Mesocarp discoloration; Electrical conductivity; Membrane permeability; Polyphenol oxidase; Peroxidase; Chlorophyllase

Timothy H. Robinson, Al Leydecker, Arturo A. Keller, John M. Melack, Steps towards modeling nutrient export in coastal Californian streams with a Mediterranean climate, Agricultural Water Management, Volume 77, Issues 1-3, Special Issue on Land and Water Use: Environmental Management Tools and Practices, 22 August 2005, Pages 144-158, ISSN 0378-3774, DOI: 10.1016/j.agwat.2004.09.024.
(http://www.sciencedirect.com/science/article/B6T3X-4FSCV8W-2/2/c8e334b2a0e03688f968dfc65c38a448)
Abstract:
Along the southern California coast, near Santa Barbara, California, we are measuring nutrient export from specific land uses and developing relationships to predict nutrient export at a watershed scale. The area is characterized by a Mediterranean-like climate and short steep

catchments producing flashy runoff. Land uses include chaparral, avocado orchards, greenhouse agriculture, open-field nurseries, and residential and commercial development. Sampling sites are located on defined drainages or storm drains that collect runoff from relatively homogeneous areas representing each land use. Stream water samples are taken once a week during the rainy season, every two weeks during the dry season and every 1-4 h during storms; samples are analyzed for nitrate, ammonium, and phosphate. We determine discharge from measurements of stage derived from pressure transducers at all sampling sites. This information is then converted to flux at a high temporal resolution.
Several parameters are presented in an initial effort to build relationships for simulating nutrient export based on land use, precipitation and antecedent soil moisture conditions. The objective is to create robust relationships, using parameters in a simple and cost efficient manner, which can be extended to other coastal watersheds with similar land uses and climate. The effort focuses on nitrate and soluble reactive phosphorus (SRP). The relationship of volume-weighted mean nutrient concentration and runoff/rainfall ratios shows promise as a means of predicting nutrient export in flashy streams experiencing a Mediterranean climate.
Keywords: Nutrient export; Stream loading; Coastal watersheds; Mediterranean climate

B. Wekwete, K.P. Navder, Effect of Avocado Puree as a Fat Replacer on the Physical, Textural and Sensory Properties of Oatmeal Cookies, Journal of the American Dietetic Association, Volume 105, Issue 8, Supplement 1, August 2005, Page 47, ISSN 0002-8223, DOI: 10.1016/j.jada.2005.05.158.
(http://www.sciencedirect.com/science/article/B758G-4GPTPW0-4X/2/0b63b88b42b8df1c79cbd3a7d435c670)

Yves Henrotin, Christelle Sanchez, Marc Balligand, Pharmaceutical and nutraceutical management of canine osteoarthritis: Present and future perspectives, The Veterinary Journal, Volume 170, Issue 1, July 2005, Pages 113-123, ISSN 1090-0233, DOI: 10.1016/j.tvjl.2004.08.014.
(http://www.sciencedirect.com/science/article/B6WXN-4DFK7F4-5/2/535dface15ad4ccf6ac49b846af2c037)
Abstract:
Osteoarthritis (OA) is one of the most common chronic musculoskeletal diseases and causes of lameness in the dogs. The osteoarthritic disease process involves the entire synovial joint, encompassing the synovium, cartilage and underlying bone. Joint failure results from an abnormal mechanical strain causing damage to normal tissue or failure of pathologically impaired articular cartilage and bone under the influence of normal physiological strain or a combination of both. In both cases, the end point is cartilage loss and joint impairment. Osteoarthritic chondrocytes show an altered phenotype characterised by an excess production of catabolic factors, including metalloproteinases and reactive oxygen species. These factors constitute potential therapeutic targets and some new drugs and nutraceuticals have been proposed to promote the return to homeostasis.
Until now, the therapeutic management of OA in dogs has been dominated by nonsteroidal anti-inflammatory drugs, but some new compounds, including diacerhein, with potential structure-modifying effects, are already used to treat OA in humans and could be helpful to manage OA in the dog. In addition, novel nutraceuticals, such as avocado/soybean unsaponifiable substances, have shown symptomatic effects in knee OA in humans, and could offer an alternative to prevent OA progression. This paper provides an overview of recent discoveries in the pathophysiology and in the therapeutic management of osteoarthritis in dogs.
Keywords: Arthritis; Cartilage; Bone; Glucosamine sulphate

Erika Matuschek, Ulf Svanberg, The effect of fruit extracts with polyphenol oxidase (PPO) activity on the in vitro accessibility of iron in high-tannin sorghum, Food Chemistry, Volume 90, Issue 4, May 2005, Pages 765-771, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.06.002.
(http://www.sciencedirect.com/science/article/B6T6R-4CYNNJG-2/2/f2b6b6496e848667057ce3881a761052)
Abstract:
Dephytinized high-tannin sorghum flour was incubated with crude extracts from pear, banana or avocado, respectively, followed by investigation of the effects on the phenolic content and on in vitro accessible iron. All fruits contained polyphenol oxidase (PPO) activity and incubation resulted in significant reduction of phenolic compounds. Incubation with avocado extract resulted in the lowest levels of phenolic compounds, as well as the highest amount of in vitro accessible iron. Peroxidase activity and some organic acids in the fruit extracts might also have contributed to the positive effect on iron accessibility. Nevertheless, incubation of the sorghum flour with the fruit extracts under conditions enabling the PPO to oxidize phenolic compounds, resulted in the highest accessibility of iron. The results from this study suggest that the PPO activity in simple fruit extracts can be utilized to increase the accessibility of iron in dephytinized polyphenol-containing cereal foods.
Keywords: Oxidation; Polyphenol oxidase; PPO; Fruits; Sorghum; Tannin; Polyphenol; Iron accessibility; Bioavailability; Peroxidase; Organic acids

Blondy B. Canto-Canche, Annemarie H. Meijer, Graziella Collu, Robert Verpoorte, Victor M. Loyola-Vargas, Characterization of a polyclonal antiserum against the monoterpene monooxygenase, geraniol 10-hydroxylase from Catharanthus roseus, Journal of Plant Physiology, Volume 162, Issue 4, 22 April 2005, Pages 393-402, ISSN 0176-1617, DOI: 10.1016/j.jplph.2004.06.006.
(http://www.sciencedirect.com/science/article/B7GJ7-4DXT7VW-1/2/d9d858d3a057a6ae4d1d98c5c037e0df)
Abstract: Summary
Geraniol 10-hydroxylase (G10H) is a P450 containing enzyme which is the first committed step in the biosynthesis of monoterpene indole alkaloids (MIAs), including the Catharanthus roseus-anticancer drugs vinblastine and vincristine. It is thought that G10H has a regulatory role in MIA production. In the present paper, we report the characterization of a polyclonal serum raised against the purified G10H polypeptide. Anti-G10H IgG was able to inhibit the G10H activity and also recognized the G10H polypeptide from C. roseus and other plants producing MIAs. These results establish the usefulness of this antiserum as a biochemical tool for the study of G10H regulation.
Keywords: Catharanthus roseus; Cytochrome P450; Geraniol 10-hydroxylase; Hairy roots; Monooxygenase; P450 reductase

Matthew F. Adkins, Peter J. Hofman, Barbara A. Stubbings, Andrew J. Macnish, Manipulating avocado fruit ripening with 1-methylcyclopropene, Postharvest Biology and Technology, Volume 35, Issue 1, January 2005, Pages 33-42, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2004.05.021.
(http://www.sciencedirect.com/science/article/B6TBJ-4DN9YGJ-1/2/3a80dab0a64ab9722a6e92353a3dc694)
Abstract:
Previous investigations with 1-methylcyclopropene (1-MCP) on avocado (Persea americana Mill.) fruit have focussed mainly on improving storage life by reducing the severity of disorders causing discolouration of the flesh. Development of 1-MCP and ethylene treatments, which also help control the time to reach the eating ripe stage, may confer additional practical benefits. In this context, the current study investigated the potential of 1-MCP to accurately manipulate ripening of

non-stored `Hass' avocado fruit by treatment before or after ethylene and at different times during ripening. To investigate this, 500 nL L-1 1-MCP was applied within 1 day after harvest, followed by ethylene 0-14 days after 1-MCP. In addition, fruit were treated with ethylene, then 1-MCP 0-8 days after ethylene. Treatment of fruit with 500 nL L-1 1-MCP for 18 h at 20 [degree sign]C provided the maximum effect by increasing the days from harvest to ripe (DTR) from 8 (with no 1-MCP) to 20. Fruit treated with 500 nL L-1 1-MCP for 18 h at 20 [degree sign]C remained insensitive to 100 [mu]L L-1 ethylene applied between 0 and 14 days after 1-MCP for 24 h at 20 [degree sign]C. Ripening of fruit exposed to 100 [mu]L L-1 ethylene for 24 h at 20 [degree sign]C could be delayed by up to 3.3 days by applying 500 nL L-1 1-MCP for 18 h at 20 [degree sign]C up to 2 days after ethylene treatment. However, once the fruit started to soften (sprung) there was little effect of 1-MCP on DTR, compared with no 1-MCP. 1-MCP treatment was associated with increased severity of body rots (caused mainly by Colletotrichum spp.) and stem-end rots (caused mainly by Dothiorella spp.), which was likely due to the increased DTR in these treatments. Significant differences in disease severity were found between orchards (replications), with replicates with low disease severity being less affected by 1-MCP treatment. These results indicate that 1-MCP can delay ripening, but careful sourcing of fruit is required to reduce the risk of diseases in ripe fruit. There is some capacity to delay ripening using 1-MCP after ethylene. There is little potential to control ripening using ethylene after treatment with 500 nL L-1 1-1-MCP, but lower concentrations may be more effective.
Keywords: Avocado; Disease; Ethylene; 1-MCP; Quality; Ripening

Allan. B. Woolf, Cecilia Requejo-Tapia, Katy A. Cox, Richard C. Jackman, Anne Gunson, Mary Lu Arpaia, Anne White, 1-MCP reduces physiological storage disorders of `Hass' avocados, Postharvest Biology and Technology, Volume 35, Issue 1, January 2005, Pages 43-60, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2004.07.009.
(http://www.sciencedirect.com/science/article/B6TBJ-4DN9YGJ-B/2/ed0790aeb63c05ac950d1b078e1bf641)
Abstract:
Physiological disorders occur when `Hass' avocados are stored for more than approximately 4-6 weeks. The major disorder is diffuse flesh discolouration ('flesh greying', or 'internal chilling injury'), but others include vascular browning, vascular leaching (browning of flesh around the vascular bundles), stringy vascular tissue (thickening and separation of the vascular strands), and outer flesh blackening (blackening of the outmost layer of the mesocarp). We have examined 1-MCP effects on `Hass' avocados stored for 4 or 7 weeks at 5.5 [degree sign]C following treatment with 50-1000 nl l-1 1-MCP for 6-24 h, at 6 or 15 [degree sign]C. The effect of harvest date (fruit maturity) on responsiveness to 100 and 500 nl l-11-MCP was examined. 1-MCP treated fruit were firmer following storage, had reduced skin colouration (purpling) at removal from storage (4 or 7 weeks), increased time to softening, and reduced physiological disorders associated with long-term storage. Relatively little difference was observed between fruit treated at 15 and 6 [degree sign]C, and thus a treatment temperature of 6 [degree sign]C was used in the remaining experiments. For lower 1-MCP concentrations, short treatment durations influenced time to ripen, but not fruit quality. Treatment times of 12 and 24 h produced similar results. Harvest date (fruit maturity) influenced the levels of disorders in non-1-MCP treated fruit, but had little overall effect on 1-MCP efficacy. 1-MCP treatment was of little benefit for fruit stored for 4 weeks but, particularly if the 1-MCP concentration was high (250 nl l-1), excessively delayed the time to ripen. After 7 weeks storage 100 nl l-1 1-MCP almost completely eliminated some long-term storage disorders. A small trial showed that 500 nl l-1 1-MCP did not reduce external chilling injury (skin blackening) of `Hass' avocados induced by 0 [degree sign]C storage. Overall, 1-MCP shows promise as a tool for reducing internal physiological disorders due to long-term storage of `Hass' avocados.

Keywords: Persea americana (Mill.); 1-Methylcyclopropene; Quality; Maturity; Softening; Chilling injury; Fruit firmness

Yean-Yean Soong, Philip J. Barlow, Antioxidant activity and phenolic content of selected fruit seeds, Food Chemistry, Volume 88, Issue 3, December 2004, Pages 411-417, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.02.003.
(http://www.sciencedirect.com/science/article/B6T6R-4BYNPMF-H/2/408791c97d29df2763ba33ee5005c267)
Abstract:
The total antioxidant capacity and phenolic content of edible portions and seeds of avocado, jackfruit, longan, mango and tamarind were studied. In addition, the relationship between antioxidant activity, phenolic content and the different degrees of heating of mango seed kernel was investigated. The seeds showed a much higher antioxidant activity and phenolic content than the edible portions. The contribution of all the fruit seed fractions to the total antioxidant activity and phenolic content was always >70%. ABTS cation radical-scavenging and FRAP assays were employed for the determination of antioxidant activity; FCR assay was used to measure the total phenolic content. The AEAC and FRAP of ethanolic extracts of MSKP products increased to a maximum after heating to 160 [degree sign]C. The total phenolic content in extracts of MSKP products increased from 50.3 to 160 mg/g GAE with an increase in heating temperature to 160 [degree sign]C.
Keywords: Antioxidant capacity; Avocado; Jackfruit; Longan; Mango; Phenolic content; Tamarind

Mark S. Hoddle, Lindsay Robinson, Evaluation of factors influencing augmentative releases of Chrysoperla carnea for control of Scirtothrips perseae in California avocado orchards, Biological Control, Volume 31, Issue 3, November 2004, Pages 268-275, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2004.06.007.
(http://www.sciencedirect.com/science/article/B6WBP-4D2FHWD-1/2/13b63b5dd9aadab4482ee607ab455718)
Abstract:
Weekly releases of Chrysoperla carnea for control of Scirtothrips perseae were evaluated in replicated field plots in two commercial avocado orchards in southern California, USA. Two release techniques and rates commonly employed by commercial pest control advisors who routinely use this generalist predator for S. perseae control were assessed. Release technique one utilized C. carnea eggs glued to paper squares that were stapled to leaves of experimental trees at a rate of 41,000 eggs per ha. Release technique two used a motorized backpack sprayer to apply a dry mixture of lacewing eggs and larvae to trees at a rate of 514,501 per ha. Pest populations were monitored by making bi-weekly population counts of S. perseae larvae and adults on leaves, and adult densities were simultaneously monitored in each experimental plot with yellow sticky cards. In the laboratory, degree-day accumulation until death of immature C. carnea was determined at temperatures representative of field conditions when predators were provisioned with varying amounts of food or different food types. Preference for S. perseae instars by first, second, and third instar C. carnea was assessed in the laboratory, and intraguild predation towards larvae and adult females of a co-occurring generalist predatory thrips, Franklinothrips orizabensis, was investigated along with intraspecific predation rates. Both release strategies failed to significantly reduce S. perseae populations in comparison to non-treated control plots. Approximately 35-96% of C. carnea eggs and larvae applied with the motorized sprayer landed on the ground. C. carnea larvae lived for approximately 1-2 days when provisioned with either no food, an avocado leaf or avocado pollen. Longevity was extended to 14-15 days when prey was provided. C. carnea larvae showed no preference for first or second instar S. perseae, all predator instars attacked first instar F. orizabensis, but only second and third instar C. carnea managed attacks on second instar F. orizabensis larvae. No adult female F. orizabensis were attacked and

no attacks by F. orizabensis on C. carnea were recorded. Second instar C. carnea engaged in the highest levels of intraspecific predation.
Keywords: Degree-days; Franklinothrips orizabensis; Intraspecific predation; Prey preference; Quality control

Allan B. Woolf, Judith H. Bowen, Sarah Ball, Severine Durand, William G. Laidlaw, Ian B. Ferguson, A delay between a 38 [degree sign]C pretreatment and damaging high and low temperature treatments influences pretreatment efficacy in `Hass' avocados, Postharvest Biology and Technology, Volume 34, Issue 2, November 2004, Pages 143-153, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2004.05.013.
(http://www.sciencedirect.com/science/article/B6TBJ-4DC43HB-2/2/e5ad6b775008c407c0411528f8bff6e6)
Abstract:
Pretreatments at moderate temperatures applied immediately prior to the high or low temperature treatments can reduce skin damage to avocados. These temperature tolerance-inducing pretreatments have generally been applied immediately prior to the high or low temperature. We examined whether a delay between the pretreatment and potentially damaging high and low temperatures may cause a loss in the induced tolerance. A hot air pretreatment (38 [degree sign]C for 6 h) applied prior to storage at 0 [degree sign]C for 3 weeks with intervening delays of 1-4 days at 20 [degree sign]C, showed a large reduction in chilling injury as a result of the pretreatment but that this was progressively lost with increasing delay to storage. Hot water pretreatments (38 [degree sign]C for 0, 5, 20 and 60 min) increasingly reduced chilling damage at 0 [degree sign]C, and heat damage from a hot water treatment (HWT) at 50 [degree sign]C/10 min. With delays of up to 3-24 h prior to the HWT, heat damage was reduced for the 5 and 20 min pretreatments. However, delays up to 5 days between pretreatment and HWT, loss of heat tolerance was observed. For delays of between 1 and 5 days there was a clear loss of chilling tolerance which was more rapid than the increase in chilling injury in control treatments for the same delays. However, the effect of delays <24 h was less clear for the 5 and 20 min treatments. Heat shock protein (hsp) 17 and 70 homologous RNA levels were induced by heat pretreatments and delays lead to first an increase in RNA levels (maximum induction at 6 h), which paralleled the induced tolerance, and then a decline which was less closely associated with loss in tolerance. Thus, delayed time between thermotolerance inducing pretreatments and high or low temperatures can lead to a general reduction in tolerance, and should be considered and exploited in the application of temperature treatments. A dose response/decay model for induced tolerance fits the pattern of temperature damage and hsp expression.
Keywords: Persea americana Mill.; Temperature tolerance; Hsps; Disinfestation; Chilling injury

R. Peran-Quesada, C. Sanchez-Romero, A. Barcelo-Munoz, F. Pliego-Alfaro, Factors affecting maturation of avocado somatic embryos, Scientia Horticulturae, Volume 102, Issue 1, 15 October 2004, Pages 61-73, ISSN 0304-4238, DOI: 10.1016/j.scienta.2003.12.003.
(http://www.sciencedirect.com/science/article/B6TC3-4C0071D-5/2/ab989a7625113391ce606eb1db23a470)
Abstract:
The effect of mineral salts, sucrose, gellan gum, abscisic acid and coconut water on maturation of avocado (Persea americana Mill.) somatic embryos was studied. Use of B5 major salts was essential to obtain white-opaque embryos. Sucrose at 175 mM, gellan gum (6.8 g l-1) or coconut water (10-20%) also enhanced the recovery of white-opaque embryos. Abscisic acid slightly enhanced the appearance of white-opaque embryos. White-opaque embryos were further grown on MS, modified B5 medium supplemented with 10% coconut water or Jensen-MS media and they subsequently germinated on M1 medium. Higher germination rates (11.11%) were obtained with embryos that matured on modified B5 medium supplemented with 10% coconut water, although

larger embryos developed on MS medium. Thus, embryo size during maturation does not seem to be correlated with germination capacity. Shoots obtained from germinated embryos could be multiplied in the presence of 4.44 [mu]M benzylaminopurine and successfully rooted (80% rate) after a 3 days treatment with 4.92 [mu]M indole-3-butyric acid. Over 90% of the rooted shoots survived acclimatization.
Keywords: Avocado; Persea americana Mill.; Maturation phase; Somatic embryogenesis

X. Wang, I. Kobiler, A. Lichter, A. Leikin-Frenkel, D. Prusky, Enhanced expression of avfae1 encoding a long-chain fatty acid elongase during the induction of the antifungal diene in avocado fruits, Physiological and Molecular Plant Pathology, Volume 65, Issue 4, October 2004, Pages 171-180, ISSN 0885-5765, DOI: 10.1016/j.pmpp.2005.01.004.
(http://www.sciencedirect.com/science/article/B6WPC-4FPJ9Y1-1/2/ede85da71ce3f65b422dd70317f676e7)
Abstract:
The preformed (Z,Z)-1-acetoxy-2-hydroxy-4-oxo-heneicosa-12,15-diene (AFD) is the most active antifungal compound in avocado; it affects the quiescence nature of infection of unripe fruit by Colletotrichum gloeosporioides. Fatty acid elongase was hypothesized to participate in the biosynthesis of AFD, therefore the enzymatic activity of avocado fatty acid elongase (AVFAE) and the expression pattern of one of the genes encoding this enzyme were determined. Using avfae1 as a probe, high expression was detected in young fruits and leaves, those being the organs in which the incorporation of the AFD precursor, linoleic acid, and the level of AFD were the highest. In contrast, no expression of avfae1 could be detected in mature leaves and fruits and the content of AFD was lower. The expression of avfae1, the enzymatic activity of fatty acid elongase, and the level of AFD in unripe-resistant fruits increased transiently when the fruits were exposed to ethylene (40 [mu]l/l), low temperature (4 [degree sign]C) or 1 mM H_2O_2, but ripe fruits were not affected. The present results suggest that the elongation of the linoleic acid is an important step in the biosynthesis of AFD, and hence, in the quiescence of C. gloeosporioides in unripe fruits.
Keywords: Preformed antifungal diene; Quiescent infections; Preformed resistance

V. E. T. M. Ashworth, M. C. Kobayashi, M. De La Cruz, M. T. Clegg, Microsatellite markers in avocado (Persea americana Mill.): development of dinucleotide and trinucleotide markers, Scientia Horticulturae, Volume 101, Issue 3, 10 September 2004, Pages 255-267, ISSN 0304-4238, DOI: 10.1016/j.scienta.2003.11.008.
(http://www.sciencedirect.com/science/article/B6TC3-4C0071D-6/2/3074d4835857fedbdb05603e0857b0d4)
Abstract:
This paper compares the development of microsatellite markers from two genomic DNA libraries of avocado cultivar Hass enriched for dinucleotide and trinucleotide repeats. Sequencing showed 86 and 31% of clones from the respective libraries to contain microsatellites. However, banding profiles of trinucleotide loci were easier to interpret than those of dinucleotide loci. Of 376 dinucleotide-containing clones, 81% harbored AG repeats and 19% contained AC repeats. A subset of 104 trinucleotide-containing clones consisted of ATG repeats (44%), AGT repeats (30%), and AAG repeats (16%). Array lengths of up to 34 were attained in the dinucleotide repeat microsatellites, whereas trinucleotide arrays never exceeded 11 elements. Typing 37 genotypes at 25 loci (11 dinucleotide and 14 trinucleotide loci) revealed a total of 204 alleles, of which 60% originated from the dinucleotide loci. Average heterozygosity of the di- and trinucleotide loci was 73.4 and 52.6%, respectively. Many loci, especially dinucleotide loci, exhibited allele size differences that were not multiples of the repeat unit, suggesting nonstepwise mutational mechanisms. Several loci were additionally characterized by large gaps in the allele size distribution.
Keywords: Lauraceae; Microsatellite; Mutation; Persea americana; SSRs

T. C. Dlamini, R. J. Haynes, Influence of agricultural land use on the size and composition of earthworm communities in northern KwaZulu-Natal, South Africa, Applied Soil Ecology, Volume 27, Issue 1, September 2004, Pages 77-88, ISSN 0929-1393, DOI: 10.1016/j.apsoil.2004.02.003.
(http://www.sciencedirect.com/science/article/B6T4B-4C7W1WB-2/2/7d514deef3a67e573f4d9ec8114a43f9)
Abstract:
The effects of land management including undisturbed native forest, native grassland, sugarcane (Saccharum spp.) (preharvest burnt or green cane harvested), exotic forest (gum, Eucalyptus grandis; pine, Pinus elliottii; wattle, Acacia mearnsii), orchard crops (orange, Citrus sinensis; banana, Musa accumunata; avocado, Persea americana) and grazed kikuyu grass (Pennisetum clandestinum) on the size and composition of earthworm communities and on related soil properties (organic C, soluble C, microbial biomass C) were investigated. The study locality was in the tropical, northern part of KwaZulu-Natal. Earthworm numbers followed the order: kikuyu pasture>native forest>banana>orange>wattle=pine=gum=green cane harvested sugarcane>=native grassland=avocado>=burnt sugarcane. Earthworm numbers and biomass were closely positively correlated with soluble C, microbial biomass C and also pH. A total of 11 species of earthworms were collected. Over 80% of individuals collected were accidentally introduced exotic species which originated from India, South America and West Africa. Most land use types supported five to seven species but sugarcane and wattle supported only two or three species. Juveniles dominated the community under all land uses except kikuyu pasture and avocado. Epigeic species dominated under native forest and native grassland, avocado and gum. For the other types of land use, endogeics predominated. The most numerous species present was Pontoscolex corethrurus which was present under all land uses. The most common epigeic species was Amynthus rodericensis which made up a substantial portion of the community under native and gum forests and banana. The third most numerous species was A. minimus which is a polyhumic, endogeic species and was particularly numerous under kikuyu pasture. Dichogaster saliens was an important component of the community under some land uses. It was concluded that land use has major effects on the size, composition and diversity of earthworm communities in the region.
Keywords: Soil organic C; Microbial biomass; Pastures; Orchard crops; Forests; Sugarcane; South Africa

Mark S. Hoddle, Pascal Oevering, Phil A. Phillips, Ben A. Faber, Evaluation of augmentative releases of Franklinothrips orizabensis for control of Scirtothrips perseae in California avocado orchards, Biological Control, Volume 30, Issue 2, June 2004, Pages 456-465, ISSN 1049-9644, DOI: 10.1016/j.biocontrol.2004.01.009.
(http://www.sciencedirect.com/science/article/B6WBP-4BY3VG4-1/2/910a28c5fac657a20d3ca053e79f4050)
Abstract:
The efficacy of augmentative releases of a predatory thrips, Franklinothrips orizabensis, was assessed for control of avocado thrips, Scirtothrips perseae. F. orizabensis were released weekly at a rate of 50 pupae per tree into replicated experimental blocks in two different `Hass' avocado orchards in southern California, USA. Thrips-days calculated from weekly population counts and yellow sticky card monitoring were used to compare S. perseae and F. orizabensis densities in release and non-release (control) blocks. Augmentative releases of this predator failed to demonstrate an ability to control low densities (<5 S. perseae larvae per leaf) on small avocado trees (<3 m in height) and medium sized trees (4-5 m in height). Average field emergence rates of predators from deployed pupae ranged from 67 to 83% and sex ratio of emerged predators was male biased ranging 53-71%. Significant differences in emergence rates and sex ratio of predators were detected between sites and insectaries. Field longevity of predators was significantly affected

by sex and the amount of food available. Male and female predators died quickly (accumulation of 14-23 day-degrees) when food was either absent or present in low quantities. Consequently, pre-emptive releases of mass-reared F. orizabensis to control low densities of S. perseae in avocado orchards in southern California in anticipation of pest outbreaks are not recommended.
Keywords: Augmentative biological control; Avocado; Day-degree; Field longevity; Franklinothrips orizabensis; Insect-days; Mass rearing; Scirtothrips perseae; Thrips-days; Quality control

Feramuz Ozdemir, Ayhan Topuz, Changes in dry matter, oil content and fatty acids composition of avocado during harvesting time and post-harvesting ripening period, Food Chemistry, Volume 86, Issue 1, June 2004, Pages 79-83, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2003.08.012.
(http://www.sciencedirect.com/science/article/B6T6R-4B0X60C-5/2/9fa5fd8cea6e86b92d7ddfe8008b7076)
Abstract:
Dry matter, oil content and fatty acid composition of avocado fruit (Persea americana, cv. Fuerte and Hass) were examined with respect to the harvesting and post-harvest ripening period. Fruits were harvested in November, December, and January at one-month intervals. Samples were kept for 8 days under ambient conditions to ripen. Dry matter and oil content of both cultivars increased significantly ($p<0.05$) according to the length of time that the fruits remained on the tree. However, significant ($p<0.05$) changes in the amount of dry matter and oil content of avocado were determined during the post-harvest ripening period. There were significant ($p<0.05$) differences in the fatty acid compositions of Fuerte and Hass in each sampling time. Although oleic acid significantly ($p<0.05$) increased with late harvest, other fatty acids decreased. In particular, palmitic acid notably underwent a 46.5% decrease from November to January. There were statistically significant ($p<0.05$) differences in the fatty acid compositions during the post-harvest ripening period: however, these were too small numerically to be of significance, either biologically or nutritionally.
Keywords: Avocado (Persea americana Mill.); Fatty acid composition; Ripening period

Diane Barraclough, David Obenland, William Laing, Tanya Carroll, A general method for two-dimensional protein electrophoresis of fruit samples, Postharvest Biology and Technology, Volume 32, Issue 2, May 2004, Pages 175-181, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2003.11.002.
(http://www.sciencedirect.com/science/article/B6TBJ-4C4BMXX-C/2/ed6019abfe15b3811b5bed9c57df8a97)
Abstract:
During experiments characterizing and identifying proteins from controlled atmosphere-stored apple and peach fruit, we optimized methods for the extraction and two-dimensional electrophoresis (2-DE) of fruit proteins, using commercially available immobilized pH gradient strips for the first dimension. The method is relatively rapid with minimal handling of small amounts of sample, and has been reproduced successfully for 2-DE of a variety of fruit and plant tissues in our labs. Critical factors for fruit tissues include using acetone precipitation following incubation in a lysis buffer, and a long iso-electric focussing time. We have observed no interference to focussing from such troublesome fruit components as soluble pectins, polyphenolics, or high-acidity fruit, using this protocol. In addition we have used the method with no modification, for a range of fruit tissues including low protein sources (apple and peach flesh), high lipid material (avocado fruit flesh) and high acidity lemon tissue. As the method in our hands is straightforward and robust, we recommend the method for routine 2-DE separations of fruit samples.
Keywords: 2-DE; Varied plant tissues; Rapid extraction; Mini-prep

Maria del Refugio Ramos, Gerold Jerz, Socorro Villanueva, Fernando Lopez-Dellamary, Reiner Waibel, Peter Winterhalter, Two glucosylated abscisic acid derivates from avocado seeds (Persea

americana Mill. Lauraceae cv. Hass), Phytochemistry, Volume 65, Issue 7, April 2004, Pages 955-962, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2003.12.007.
(http://www.sciencedirect.com/science/article/B6TH7-4BJ1XJK-1/2/37f9606c204e79ec46394ae2418dd52d)
Abstract:
Phytochemical investigation of avocado seed material (Persea americana Mill., Lauraceae) resulted in the isolation of two glucosylated abscisic acid derivates. One of these was not known as a natural product and can be regarded as a potential `missing link' in abscisic acid metabolism in plants. After fractionation by high-speed countercurrent chromatography, and multiple steps of column chromatography, structures were elucidated by 1D-, 2D-NMR, electrospray-MS to be the novel [beta]--glucoside of (1'S,6'R)-8'-hydroxyabscisic acid, and (1'R,3'R,5'R,8'S)-epi-dihydrophaseic acid [beta]--glucoside. Absolute configuration was determined by circulardichroism, optical rotation, and by NOE experiments.
Keywords: Persea americana Mill. (cv. Hass) Lauraceae; Avocado seeds; Abscisic acid [beta]--glucoside; (1'S,6'R)-8'-Hydroxyabscisic acid [beta]--glucoside; (1'R,3'R,5'R,8'S)-epi-Dihydrophaseic acid [beta]--glucoside; High-speed countercurrent chromatography; Stereochemistry; Circulardichroism; Plant metabolism

Katy A. Cox, Tony K. McGhie, Anne White, Allan B. Woolf, Skin colour and pigment changes during ripening of `Hass' avocado fruit, Postharvest Biology and Technology, Volume 31, Issue 3, March 2004, Pages 287-294, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2003.09.008.
(http://www.sciencedirect.com/science/article/B6TBJ-4BRP586-3/2/5d9e0e506eae5f190884e8ccad08aba2)
Abstract:
Skin of `Hass' avocados (Persea americana Mill.) changes colour from green to purple/black as fruit ripen. This colour change is important as an indicator of ripeness for both industry and consumers. We sought to characterise pigment changes during ripening of `Hass' avocados. Skin colour and changes in chlorophyll and anthocyanin concentrations in relation to fruit firmness at three ripening temperatures (15, 20 and 25 [degree sign]C) were studied. As fruit ripened, skin colour changed from green, to purple, to black, which was observed as a decrease in L, chroma and hue. Total anthocyanins in skin tissue increased during ripening, but this increase was due almost entirely to a single anthocyanin; cyanidin 3-O-glucoside. Cyanidin 3-O-glucoside concentration increased after 3-6 days postharvest (depending on ripening temperature), and levels increased earlier, and were higher, with higher ripening temperature. Chlorophyll a and b levels decreased until 4-5 days after harvest, but did not change significantly thereafter. No significant differences in chlorophyll concentration were observed among the three ripening temperatures. Fruit harvested directly from the tree (unripe) with skin darkening showed similar pigments changes to that during ripening (reduced chlorophyll and increased cyanidin 3-O-glucoside). Colour change in `Hass' avocados from green to purple, then black, results from an initial decrease in chlorophyll content, followed by an increase in the levels of the anthocyanin, cyanidin 3-O-glucoside.
Keywords: Persea americana; Anthocyanins; Cyanidin 3-O-glucoside; Chlorophyll; Ripening temperature; Fruit firmness

CLAUDINE D.S. SEIXAS, ROBERT W. BARRETO, ACELINO C. ALFENAS, FRANCISCO A. FERREIRA, Cryphonectria cubensis on an indigenous host in Brazil: a possible origin for eucalyptus canker disease?, Mycologist, Volume 18, Issue 1, February 2004, Pages 39-45, ISSN 0269-915X, DOI: 10.1017/S0269-915X(04)00107-7.
(http://www.sciencedirect.com/science/article/B7XMS-4R10WR6-C/2/259af42d6c9b8465a27ea80ab346a857)
Abstract:

Endothiella sp. was found associated with witches' broom symptoms of Tibouchina granulosa growing in a stretch of Atlantic rain forest in Rio de Janeiro, Brazil. The fungus was the anamorph of Cryphonectria cubensis, the eucalypt canker fungus. Host-range studies were performed involving 40 plant species belonging to 19 families and showed that C. cubensis has a wide potential host-range, concentrated on the Myrtales but including Persea americana (avocado) and Pouteria caimito. These are members respectively of the subclasses Magnoliidae and Dilleniidae, distantly related to plants of the subclass to which both eucalypt and T. granulosa belong (Rosidae). The finding of C. cubensis in balance with a population of a native species at a site isolated and distant from both eucalypt and clove plantations might be regarded as reinforcing the hypothesis of a Neotropical origin for the fungus as opposed to the hypothesis of the fungus being from Oceania and having cloves as its original host. The new alternative hypothesis (of separate origins from endemic hosts in the Neotropics, Africa and Oceania) should nevertheless be also considered.
Keywords: Endothiella; Tibouchina granulosa; Eucalyptus; host-range

Mark G. Sanders, Wouter G. van Doorn, The Avocado: Botany, Production and Uses: A.W. Whiley, B. Schaffer, B.N. Wolstenholme (Eds.), CABI Publishing, Wallingford, Oxon, UK, ISBN 0-85199-357-5, Postharvest Biology and Technology, Volume 31, Issue 2, February 2004, Pages 213-214, ISSN 0925-5214, DOI: 10.1016/j.postharvbio.2003.11.010.
(http://www.sciencedirect.com/science/article/B6TBJ-4BFXTHG-4/2/336cdbadb990a7564ee9118627b53ba1)

Robert C. Soliva-Fortuny, Pedro Elez-Martinez, Merce Sebastian-Caldero, Olga Martin-Belloso, Effect of combined methods of preservation on the naturally occurring microflora of avocado puree, Food Control, Volume 15, Issue 1, January 2004, Pages 11-17, ISSN 0956-7135, DOI: 10.1016/S0956-7135(02)00151-2.
(http://www.sciencedirect.com/science/article/B6T6S-482G9D2-J/2/f7b72ab3655211e3044c60944a2dd419)
Abstract:
The effects of combining techniques such as addition of sorbic acid, modification of water activity (aw), reduction of pH, modification of the packaging atmosphere and control of the storage temperature on the microbiological shelf life of avocado puree were evaluated during four months of storage. Results show that the addition of 300 mg/kg of sorbic acid can extend the stability of the product native microflora for storage periods of up to four months. Vacuum packaging as well as storage at 4 [degree sign]C was also found to have a significant influence over the control of yeast and mould populations and could preserve avocado purees during 112 days without addition of antimicrobial. The addition of maltose to reduce aw to 0.96 resulted in slightly more stable purees but would impart important changes to the product palatability.
Keywords: Avocado; Combined methods; Microbiological stability