

SELECTIVE DISSEMINATION OF INFORMATION
As of August 2019

Alpinia (Ornamental Plant)

De Franca, R.P.A., Botini, A.F., Silva, C.A., Almeida, H.M., Krause, W. (2019). Morphological and postharvest treatments in Alpinia cultivars. Ornamental Horticulture, 25(3), 255-262 <https://doi.org/10.1590/2447-536X.v25i3.1537>

Abstract

The characterization and morphological evaluation of plants are essential steps towards the germplasm classification and use in breeding. The objective of this study was to improve the morphological characterization of four *Alpinia purpurata* cultivars by means of qualitative evaluations to identify genotypes with promising traits for the ornamental plant market. Four cultivars of *A. purpurata* ('Jungle King', 'Kimi', 'Red Ginger' and 'Pink Ginger') were assessed in a partially shaded cultivation system. Quantitative morphological descriptors such as stem length and diameter, number of leaves on floral stem, leaf width and length, inflorescence width and length, fresh weight of floral stem and the number of produced and marketable stems were evaluated. The qualitative descriptors were evaluated on inflorescence, floral stem, petiole, leaf and bracts. Postharvest longevity was tested in a cold chamber (at 16 and 19°C) and at ambient temperature (26°C). The most outstanding quantitative traits of the cultivars 'Jungle King', 'Kimi' and 'Pink Ginger' were stem length and diameter, fresh weight, floral stem durability, inflorescence length and width and productivity. Cultivar 'Red Ginger' was less outstanding in the quantitative traits mentioned for the other cultivars. Variation among the cultivars was observed for inflorescence shape and color. The cultivars 'Kimi' and 'Pink Ginger' produced a stem yield of 6,654.32 and 7,580.24 ha⁻¹ year⁻¹, respectively, and cultivars 'Red Ginger' and 'Jungle King' 6,012.34 and 4,037.03 ha⁻¹ year⁻¹, respectively. The postharvest durability of the four cultivars evaluated under refrigeration exceeded 15 days and that of the control was less than 8 days. The qualitative and quantitative traits of the cultivars 'Jungle King', 'Kimi' and 'Pink Ginger' were promising for the tropical ornamental plant market.

Keywords: /Postharvest Durability/ /Ornamental Potential/ /Productivity/ /Tropical Ornamental Plants/

APPLE

Tomic, N., Djekic, I., Zambon, A., Spilimbergo, S., Bourdoux, S., Holtze, E., Hofland, G., Sut, S., Dall'acqua, S., Smigic, N., Udovicki, B., Rajkovic, A. (2019). Challenging chemical and quality changes of supercritical CO₂ dried apple during long-term storage. LWT - Food Science and Technology, 110, 132-141 doi: 10.1016/j.lwt.2019.04.083

Abstract

The aim of this study was to analyze the stability of sensory properties and secondary metabolites in supercritical-CO₂ (scCO₂) dried 'Elstar' apple cuts/snacks during twelve months of storage at 'room' temperature. Air-drying and freeze-drying were used as reference methods. ScCO₂-dried apple packed in aluminum-polyethylene bags under nitrogen gas retained a high sensory and nutritional quality, and acceptance level until the end of the observed period. The overall acceptance scores of these apples after 6 and 12 months of storage remained in the range of neutral consumer attitude "neither like nor dislike". Packaging under nitrogen gas preserved the content of flavonols (≥0.14 g/kg), dihydrochalcones (≥0.10 g/kg), hydroxycinnamic acids (≥0.18 g/kg), triterpenes (≥5.72 g/kg), and proanthocyanidins (≥0.08 g/kg) in dried apple irrespective of the drying method applied. The comparison with the conventional drying processes demonstrated that scCO₂-drying represents a promising alternative

technology for the production of dried apple snacks. The study was assisted by the evaluation of consumer attitudes towards dried fruit and drying technologies. Freeze-drying, air-drying and scCO₂-drying were recognized by the tested consumers as trustful drying-processes, with expressed interests in buying scCO₂-dried products if the technology was scientifically proven as excellent in preserving nutrients, color and taste of food products.

Keywords: /Supercritical CO₂ Drying/ /Consumer Survey/ /Sensory Analysis/ /Secondary Metabolites/ /Shelf Life/

Chen, Y., Ge, Y., Zhao, J., Wei, M., Li, C., Hou, J., Cheng, Y., Chen, J. (2019). Postharvest sodium nitroprusside treatment maintains storage quality of apple fruit by regulating sucrose metabolism. *Postharvest Biology and Technology*, 154, 115-120 doi: 10.1016/j.postharvbio.2019.04.024

Abstract

Quality loss of apples during storage is a worldwide problem. In this study, 'Fuji' apples were treated with 1.0 mmol L⁻¹ sodium nitroprusside (SNP) to investigate its effects on storage quality and sucrose metabolism. The results showed that SNP treatment delayed the timing of the maximum respiratory rate, delayed softening and losses of ascorbic acid (AsA), titratable acid (TA) and soluble solids content (SSC) of the fruit. SNP treatment increased the activities of sucrose phosphate synthase (SPS) and sucrose synthase synthesis (SS-s), and suppressed the activities of sucrose synthase-cleavage (SS-c), neutral invertase (NI) and acid invertase (AI). MdSPS, MdSS, MdNI, hexokinase (HK) and fructokinase (FK) genes were up-regulated by SNP. The results suggest that SNP might modulate sucrose metabolism and delay loss of fruit quality.

Keywords: /Malus domestica/ /Sodium nitroprusside/ /Fruit Quality/ /Sucrose Metabolism/

Brassicoraphanus

Han, N., Ku, K. M., & Kim, J. (2019). Postharvest variation of major glucosinolate and their hydrolytic products in *Brassicoraphanus* 'BB1.' *Postharvest Biology and Technology*, 154, 70–78. doi: 10.1016/j.postharvbio.2019.04.011

Abstract

Brassicoraphanus 'BB1' is an inter-generic hybrid vegetable between Chinese cabbage (*Brassica rapa* L. 'Bulam 3') and radish (*Raphanus sativus* L. 'Taebaek'), maintaining high glucosinolates during their development. Postharvest changes in glucosinolate content and their corresponding hydrolytic products were determined between root and leaf tissues of *Brassicoraphanus* 'BB1' during storage at 2 °C. Among the glucosinolates, glucoraphasatin was the major glucosinolate (34–45% and 49–59% of total glucosinolates content in leaves and roots, respectively). Total glucosinolates content was higher in root (13,439 to 16,233 μmol kg⁻¹ dry matter) than in leaf (3,506 to 6,146 μmol kg⁻¹ dry matter) tissues during storage. Total glucosinolates content in leaves of *Brassicoraphanus* 'BB1' decreased approximately 40% in 3 d of storage; however, it regained up to 85% of the initial value after storage for 28 d. Glucosinolates content in root tissue decreased steadily during the eight weeks of storage. Sulforaphane and raphasatin were the most abundant isothiocyanates in leaves, whereas the main isothiocyanates in roots were raphasatin and 2-phenethyl isothiocyanate. Total isothiocyanates content in the leaves increased, but little change was exhibited in the roots during storage. Total isothiocyanates content was highly correlated with total glucosinolates content ($r = 0.976$, $n = 10$, $P < 0.01$) in leaf and root tissues combined, but not in those tissues separately. Nitriles and epithionitriles were not detected from glucosinolate hydrolysis in *Brassicoraphanus* 'BB1'. These results indicated that glucosinolates in *Brassicoraphanus* 'BB1' are exclusively converted to isothiocyanates with little activity of epithiospecifier

protein. This study is the first to provide basic information on glucosinolates and their hydrolytic products in *Brassicoraphanus* 'BB1'.

Keywords: /Brassicaceae/ /Cold Storage/ /Inter-generic Hybrid Plant/ /Isothiocyanate/ /Myrosinase/

BROCCOLI

Cai, J.-H., Luo, F., Zhao, Y.-B., Zhou, Q., Wei, B.-D., Zhou, X., & Ji, S.-J. (2019). 24-Epibrassinolide treatment regulates broccoli yellowing during shelf life. *Postharvest Biology and Technology*, 154, 87–95. doi: 10.1016/j.postharvbio.2019.04.019

Abstract

To explore the effect of 24-epibrassinolide (EBR) on the postharvest yellowing of broccoli (*Brassica oleracea* var. *italica*) florets, these were treated with 0–20 μM EBR and kept at 4 °C for 24 days (shelf life). Changes in color, chlorophyll fluorescence, chloroplast ultrastructure, and in the activities of enzymes and expression of genes related to ethylene synthesis and chlorophyll degradation were determined. Low EBR concentrations (2–5 μM) effectively inhibited the yellowing of broccoli, while high EBR concentrations (15–20 μM) accelerated it. On the 24th day, the grana thylakoids of the chloroplasts of 2 μM EBR-treated florets were neatly arranged and clearly visible, while the chloroplast membrane and grana thylakoids of the chloroplast of 20 μM EBR-treated florets were dissolved. Chlorophyll fluorescence was significantly higher in broccoli florets treated with low EBR concentrations than in control broccoli; the opposite was found for broccoli treated with high EBR concentrations. In 20 μM EBR-treated broccoli, the expressions of the genes coding for 1-aminocyclopropane-1-carboxylic acid (ACC) synthase 4 (BoACS4), ACC oxidase 3 (BoACO3), pheophytinase (PPH), and polyamine oxidase (PaO) were increased, accelerating the degradation of chlorophyll, while in 2 μM EBR-treated broccoli the expressions of BoACS4 and BoACO3 were lower than in control broccoli, thereby reducing the production of endogenous ethylene and delaying yellowing. Thus, treatment with 2 μM EBR extends the shelf life of broccoli.

Keywords: /Broccoli/ /Yellowing/ /24-Epibrassinolide/ /Ethylene/ /Chlorophyll Degradation/

CABBAGE

Kang, J.-H., Woo, H.-J., Park, J.-B., Chun, H. H., Park, C. W., & Song, K. B. (2019). Effect of storage in pallet-unit controlled atmosphere on the quality of Chinese cabbage (*Brassica rapa* L. spp. *pekinensis*) used in kimchi manufacturing. *Lwt*, 111, 436–442. doi: 10.1016/j.lwt.2019.05.069

Abstract

In this study, the effects of storage in pallet-unit controlled atmosphere (CA) at different gas compositions (control: atmospheric air, CA1: 0.5% O₂ and 2% CO₂, CA2: 2% O₂ and 2% CO₂) on the quality of Chinese cabbages during 100 days of storage at 2 °C were examined. Rapid weight loss up to 30% was observed in the Chinese cabbages during storage for the control group, and there was severe color change, such as browning inside the cabbages for the CA1 storage group. In contrast, CA2 storage effectively maintained the marketable quality of the cabbages during long-term storage. The levels of vitamin C, total phenolics, and total glucosinolates were the highest in the CA2 storage group among the samples. In addition, the growth of total aerobic bacteria on the Chinese cabbages during 100 days of storage was more inhibited for the CA2 storage group, compared to other storage conditions. Therefore, these results indicated that CA2 storage condition (2% O₂, 2% CO₂) applied in this study might be suitable for maintaining the quality and extending the shelf life of Chinese cabbages used in kimchi manufacturing.

Keywords: /Chinese Cabbage/ /Kimchi Manufacturing/ /Marketable Quality/ /Pallet-unit Controlled Atmosphere Storage/ /Shelf Life/

CUCUMBER

Patel, C., & Panigrahi, J. (2019). Starch glucose coating-induced postharvest shelf-life extension of cucumber. Food Chemistry, 288, 208–214. doi: 10.1016/j.foodchem.2019.02.123

Abstract

Cucumber (*Cucumis sativus L.*) is a rich source of vitamins, minerals, and antioxidants. Its post-harvest deterioration leads to a limited shelf-life up to 5–7 days. To avoid such loss, the present study investigates the potential effect of starch glucose (SG) coating on the extension of its shelf-life after harvest. 1.0, 1.5 and 2.0 μM of starch with 2.5 μM D-glucose solutions were coated over freshly harvested cucumbers and stored at refrigerated temperature ($\pm 4^\circ\text{C}$) for 30 days. 1.5 μM starch plus 2.5 μM D-glucose displayed significantly better results as per the skin colour and sensory evaluation test. This level of SG coating extended the shelf-life of cucumbers up to 30 days with least reduction in weight loss, total soluble sugar, protein, catalase activity, peroxidase activity and increased in proline content, 2, 2-diphenyl-1-picrylhydrazyl antioxidant activities and ferrous ion chelating activities.

Keywords: /Coating/ /Cucumber/ /Postharvest/ /Shelf-life/ /Starch-glucose/

DATES

Mohammed, M. E., El-Shafie, H. A., & Sallam, A. A. (2019). A solar-powered heat system for management of almond moth, *Cadra cautella* (Lepidoptera: Pyralidae) in stored dates. Postharvest Biology and Technology, 154, 121–128. doi: 10.1016/j.postharvbio.2019.04.025

Abstract

The almond moth, *Cadra cautella* is a worldwide pest that inflicts serious economic damage on dates while on the bunch and during storage. After phasing out of the potent fumigant methyl bromide, extreme temperatures remain an alternative option for the management of this insect pest. A solar-powered heat system was tested for the control of eggs and larvae of *C. cautella* on fruit of four cultivars, namely Khalas, Shishi, Shibibi, and Khashram. The heating system consisted of an insect treatment chamber, two similar solar collectors, horizontal and vertical air ducts, precision integrated-circuit temperature sensors (Im 35), axial suction fans, and automatic temperature control unit. The delay time required for heating to attain the target temperature of 55°C in fruit of all cultivars was 120 min. The average lethal time (LT95) at 55°C which 95% of the eggs and larvae of *C. cautella* has died was 52.1 and 52.3 min, respectively. Exposing dates to 55°C for 60 min resulted in total mortality for both eggs and larvae without significant effect on total soluble solids, color, and sugars of all cultivars. Heat treatment of 55°C for 60 min could be applied to dates immediately after harvest as a safeguard against *C. cautella* infestation.

Keywords: /Solar Energy/ /*Cadra cautella*/ /Heat Treatment/ /Date Quality/ /Insect Mortality/

GRAPEFRUIT

Aispuro-Hernández, E., Vera-Guzmán, A. M., Vargas-Arispuro, I., & Martínez-Téllez, M. Á. (2019). Low-temperature storage regulates the expression of genes related to peel pigments of grapefruit. *Scientia Horticulturae*, 254, 208–214. doi: 10.1016/j.scienta.2019.04.085

Abstract

Grapefruit fruit (*Citrus paradisi* Macfad) are sensitive to postharvest temperature variations. In red grapefruit cultivars, peel color is a characteristic and important quality parameter that may undergo changes during storage due to alterations in the content of pigments. So far, it is not clear if the postharvest peel color variations in grapefruit are regulated at the transcriptional level due to storage conditions. The objective of this work was to investigate the effect of postharvest storage temperature (2 and 13 °C) on the relationships between peel color, chlorophyll (Chl) and carotenoid contents and the expression of genes related to the synthesis and degradation of these pigments in the flavedo of 'Rio Red' grapefruit grown in Northern Mexico. Fruit were harvested at breaker stage with a maturity index of 4.8 and stored for 42 days at 2 and 13 °C. Pigments, transcript levels, color index (CI) and ethylene production were periodically evaluated through storage. Pearson's correlations between CI and Chl, lycopene, and β -carotene contents were evaluated. Storage at 13 °C increased lycopene content and CI and decreased Chl content. In fruit stored at 2 °C, the CI and content of β -carotenes remained almost unchanged. In contrast, the lycopene content increased at this temperature, but to a lesser extent than at 13 °C. The ANOVA showed the expression of ζ -carotene desaturase(ZDS), two types of lycopene cyclases (carotenoid biosynthesis pathway genes) and the pheophorbide a oxygenase gene (involved in Chl breakdown), was significantly influenced by the storage time-temperature interaction. The expression of the ZDSgene was significantly higher in fruit stored at 13 °C than in fruit stored at 2 °C, suggesting that lycopene biosynthesis is transcriptionally regulated by storage temperature. The lycopene levels showed a positive relation with the ZDS transcript levels and CI, indicating this pigment is implicated in the red coloration of the 'Rio Red' grapefruit flavedo during postharvest.

Keywords: / β -Carotene/ /Carotenoid Biosynthetic Pathway/ /Chlorophyll/ /*Citrus paradisi*/ /Cold Storage/ /Lycopene/

GUAVA

Formiga, A. S., Pinsetta, J. S., Pereira, E. M., Cordeiro, I. N., & Mattiuz, B.-H. (2019). Use of edible coatings based on hydroxypropyl methylcellulose and beeswax in the conservation of red guava 'Pedro Sato.' *Food Chemistry*, 290, 144–151. doi: 10.1016/j.foodchem.2019.03.142

Abstract

Guavas are tropical climacteric fruit with a short postharvest shelf life at room temperature. This study aims to extend the shelf life of red guavas 'Pedro Sato' using edible coatings of hydroxypropyl methylcellulose (HPMC) and beeswax (BW) at concentrations of 10%, 20%, and 40% (dry basis). Coated and uncoated guavas were stored for 8 days at 21 °C and assessed every 2 days. The HPMC + BW produced a modified atmosphere around the fruit, delaying ripening process. The coatings reduced loss of mass, maintained green color, and increased firmness compared to the control fruit. The uncoated fruit had 6 days of shelf life. The treatment with HPMC + 20% BW provided the best maintenance of fruit quality. On the eighth day, fruit with this coating showed the same physicochemical characteristics of control fruit in the second day of storage, which represents a gain of 6 days in the shelf life of guavas 'Pedro Sato'.

Keywords: /Psidium guajava L./ /Edible Coating/ /HPMC/ /Postharvest/

JUJUBE FRUIT (*Zizyphus jujube* Miller)

Zhang, L., Wang, P., Chen, F., Lai, S., Yu, H., & Yang, H. (2019). Effects of calcium and pectin methylesterase on quality attributes and pectin morphology of jujube fruit under vacuum impregnation during storage. Food Chemistry, 289, 40–48. doi: 10.1016/j.foodchem.2019.03.008

Abstract

Calcium chloride (1% w/w, CaCl₂) and pectin methylesterase (PME) (15 U/mL) were vacuum impregnated (VI) into jujubes to preserve their quality. The nanostructure of jujube pectin was investigated using atomic force microscopy (AFM) to determine the degradation mechanism of pectin. CaCl₂ with PME under VI treatment (VI + Ca + PME) maintained jujubes' quality. Weight loss in VI + Ca + PME group at day 56 was only 60.36% of that in control group (CK). Firmness, soluble solids content, and ascorbic acid content of jujubes in VI + Ca + PME group were higher than those in CK. Firmness was highly positively correlated with sodium carbonate-soluble pectin (SSP) content. According to AFM results, frequencies of molecules with a width ≥ 60 nm of water-soluble pectin (WSP), chelate-soluble pectin (CSP), and SSP were the highest in VI + Ca + PME group at the end of storage. WSP, CSP, and SSP degradation was delayed by VI + Ca + PME treatment. The quality of jujubes was effectively maintained by VI + Ca + PME treatment.

Keywords: /Nanostructure/ /Calcium/ /Hardness/ /Quality/ /Polysaccharide/ /Atomic Force Microscopy/ /Jujube/ /Pectin methylesterase/

KIWI

Xu, F., Liu, S., Liu, Y., Xu, J., Liu, T., & Dong, S. (2019). Effectiveness of lysozyme coatings and 1-MCP treatments on storage and preservation of kiwifruit. Food Chemistry, 288, 201–207. doi: 10.1016/j.foodchem.2019.03.024

Abstract

The objective of the present study was to investigate the effectiveness of lysozyme coatings and 1-MCP on storage and preservation of kiwifruit stored at 4 ± 1 °C and 90–95% RH for 20 d. Ethylene production, respiratory rate, decay incidence, weight loss, firmness, chlorophyll, soluble solid, titratable acid, ascorbic acid, total bacterial count, ascorbate peroxidase (APX), superoxide dismutase (SOD) and catalase (CAT) activity of treated kiwifruit were examined. The results showed that lysozyme coatings or 1-MCP treatment inhibited ethylene production and respiratory rate, delayed the increase of decay incidence, weight loss, soluble solid and total bacterial count, improved firmness, chlorophyll, titratable acid, ascorbic acid content, APX, SOD and CAT activity during the storage compared with the untreated kiwifruit in different degree. Moreover, the combined effect of lysozyme coatings and 1-MCP was more excellent than that of lysozyme coatings or 1-MCP alone. In conclusion, our present results indicated that the combined treatment of lysozyme coatings and 1-MCP may be an efficient way to improve the postharvest quality and prolong the shelf life of kiwifruit.

Keywords: /Lysozyme/ /1-MCP/ /Storage/ /Preservation/ /Kiwifruit/

LEMON

Ramallo, A. C., Cerioni, L., Olmedo, G. M., Volentini, S. I., Ramallo, J., & Rapisarda, V. A. (2019). Control of Phytophthora brown rot of lemons by pre- and postharvest applications of potassium phosphite. *European Journal of Plant Pathology*, 154(4), 975–982. doi: 10.1007/s10658-019-01717-y

Abstract

Citrus Brown Rot (BR), caused by *Phytophthora* spp., provokes important economical losses mainly in periods of high rainfall. The management of this disease in Florida and Brazilian citrus areas, main orange growers worldwide, includes chemical control using phosphite salts. In Argentina, the world leader in lemon production, these compounds are registered only as fertilizers. In this work, the effect of potassium phosphite on different *Phytophthora* sp. cellular structures and the conditions to control lemon BR by its application at pre and post-harvest stages were evaluated. Phosphite inhibited in vitro the mycelial growth, the sporangia production, and the motility and germination of zoospores of a local isolate of *Phytophthora citrophthora*. In postharvest applications on artificially inoculated lemons, the phosphites exerted a moderate curative activity, reducing BR incidences ~25% in respect to controls. When this salt was applied a week before inoculation, BR incidences were 50–60% lower than those of controls, denoting a significant preventive activity. The application of phosphite with fungicides in commercial packingline prevented BR disease in fruit inoculated at 96 h post-treatment. In pre-harvest, two phosphite applications reduced incidences ~40–60% in lemons harvested and inoculated up to 75 d after treatment. Our data confer valuable technical information towards the use of phosphite salts against lemon BR, contributing to the pre- and postharvest management strategies of this disease.

Keywords: /Citrus Brown Rot/ /*Phytophthora citrophthora*/ /Potassium phosphite/

LITCHI FRUIT

Ali, S., Khan, A. S., Malik, A. U., Anjum, M. A., Nawaz, A., & Shah, H. M. S. (2019). Modified atmosphere packaging delays enzymatic browning and maintains quality of harvested litchi fruit during low temperature storage. *Scientia Horticulturae*, 254, 14–20. doi: 10.1016/j.scienta.2019.04.065

Abstract

Postharvest skin browning of litchi is the major issue which substantially affects its visual quality and market potential. Effect of modified atmosphere packaging (MAP) was studied to manage its surface browning and various quality attributes during storage at 5 ± 1 °C. It was noted that fruits kept under MAP exhibited reduced decay, browning index and loss of fresh weight. MAP storage of fruits markedly suppressed polyphenol oxidase (PPO) activity and delayed production of superoxide anion ($O_2^{\cdot-}$), malondialdehyde (MDA), hydrogen peroxide (H_2O_2) and relative electrolyte leakage with higher anthocyanin concentrations. Likewise, MAP stored fruits had higher total soluble solids (TSS), ascorbic acid content and titratable acidity (TA) with lower peroxidase (POD) activity. In addition, sensory quality, total phenolic content (TPC), radical scavenging activity, superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidase (APX) activities were also markedly higher in MAP kept fruits. So, litchi fruits storage under MAP packaging was suitable to delay its postharvest browning and to conserve biochemical attributes and antioxidative enzymes during 28 days cold storage.

Keywords: /Antioxidant Activity/ /Enzymatic Browning/ /*Litchi chinensis*/ /Oxidative Stress/ /Sensory Quality/

Li, M.-F., Feng, S., Li, S.-P., Wu, F., Wang, F., Li, C.-L., ... Wang, L.-J. (2019). Preharvest promotion or inhibition of colouration: Which is the more conducive to improving litchi postharvest quality? Scientia Horticulturae, 254, 124–132. doi: 10.1016/j.scienta.2019.04.083

Abstract

Litchi (*Litchi chinensis* Sonn. cv. 'Feizixiao') has a high market value. However, its value declines during postharvest storage because its quality deteriorates, and its pericarp turns brown. Therefore, safe and effective ways of improving litchi quality and inhibiting postharvest browning are required. In this study, 5-aminolaevulinic acid (5-ALA) and thidiazuron (TDZ) were applied to litchi fruit before harvest to determine their relative effects on litchi colour and postharvest storage characteristics. The results showed that preharvest 5-ALA application significantly increased postharvest fruit weight, anthocyanins, total phenol, vitamin C and antioxidant activity relative to those in the untreated fruits. Compared with the control, TDZ significantly increased fruit weight but inhibited anthocyanin accumulation and did not significantly alter antioxidant activity. Both pre-harvest treatments significantly reduced the browning index, the relative leakage rate and polyphenol oxidase activity after 6 d of storage. A membership function analysis indicated that preharvest 5-ALA application was the most beneficial for postharvest storage whereas TDZ treatment was relatively less effective. Preharvest colour promotion was preferable for improving litchi quality and inhibiting postharvest browning.

Keywords: /Antioxidant/ /Membership Function Analysis/ /Postharvest Storage/ /Preharvest Application/ /Quality/ /Redundancy Analysis/

MEDLAR FRUIT (*Mespilus germanica*)

Ozturk, A., Yildiz, K., Ozturk, B., Karakaya, O., Gun, S., Uzun, S., & Gundogdu, M. (2019). Maintaining postharvest quality of medlar (*Mespilus germanica*) fruit using modified atmosphere packaging and methyl jasmonate. Lwt, 111, 117–124. doi: 10.1016/j.lwt.2019.05.033

Abstract

The study was aimed to assess the effect of methyl jasmonate (MeJA) and modified atmosphere packaging (MAP) on postharvest biochemical changes and quality loss in medlar fruit (*Mespilus germanica* cv. 'İstanbul'). Fruit were kept at 0 ± 0.5 °C and $90 \pm 5\%$ RH for 60 d. At the end of storage, as compared with the control, the weight loss, respiration rate and flesh firmness were lower in MAP-treated fruit. The SSC and vitamin C were lower in MAP-treated fruit than the control. The losses of total phenols, total flavonoid and antioxidant activity were significantly delayed by MAP during the storage. At the end of storage, the losses of oxalic acid, ascorbic acid and citric acid were delayed significantly only with the MeJA + MAP as compared with the control; and the losses of malic acid and fumaric acid were also delayed with both MAP and MeJA + MAP. The content of gallic acid, protocatechuic acid, ferulic acid, caffeic acid, quercetin and chlorogenic acid was higher in MeJA + MAP than the control. As a result, MeJA and MAP treatments could be used as an effective tool for delaying quality loss and maintaining of bioactive compounds in medlar fruit during cold storage.

Keywords: /Antioxidant/ /Organic Acids/ /Phenolic Compounds/ /Respiration Rate/ /Weight Loss/

MUSHROOM

Baskar, C., Nesakumar, N., Kesavan, S., Rayappan, J. B. B., & Alwarappan, S. (2019). ATR-FTIR as a versatile analytical tool for the rapid determination of storage life of fresh *Agaricus bisporus* via its moisture content. *Postharvest Biology and Technology*, 154, 159–168. doi: 10.1016/j.postharvbio.2019.05.006

Abstract

Agaricus bisporus, an edible macroscopic fungus, is the most widely cultivated mushroom in the world. *A. bisporus* is highly susceptible to microbial attacks when stored in the refrigerator at 0 °C for more than 5 days. Hence, it is imperative to measure the freshness level of *A. bisporus* during its refrigeration to prevent any wastage of harvest. Herein, we propose a novel analytical technique of using Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) spectroscopy as a non-invasive inspection tool to assess the moisture content of *A. bisporus* samples. The score plot of Principal Component Analysis (PCA) shows that the proposed analytical method can effectively discriminate aged and fresh *A. bisporus*. Finally, the application of ATR-FTIR coupled PCA for determination of storage life of fresh *A. bisporus* is demonstrated. Non-destructive analysis, rapidity, simplicity and high accuracy are the attributes of this inspection tool that may popularize this versatile analytical technique for the rapid determination of storage life of fresh *A. bisporus* during cold storage.

Keywords: /*Agaricus bisporus*/ /Fourier Transform Infrared Spectroscopy/ /Principal Component Analysis/ /Shelf-Life/ /Polynomial Regression/

NECTARINE FRUIT (PEACH)

Zhang, W., Zhao, H., Zhang, J., Sheng, Z., Cao, J., & Jiang, W. (2019). Different molecular weights chitosan coatings delay the senescence of postharvest nectarine fruit in relation to changes of redox state and respiratory pathway metabolism. *Food Chemistry*, 289, 160–168. doi: 10.1016/j.foodchem.2019.03.047

Abstract

The aim of this study is to investigate the impact of different molecular weights of chitosan treatment (LM 30 kDa; HM 120 kDa) on fruit senescence related to redox state and respiratory pathway metabolism in postharvest nectarine fruit stored at 25 °C for 8 days. The treatments of LM and HM chitosan both delayed senescence, which are due to inhibition of respiration rate, and enhanced the antioxidant system, as evidenced by the improvement of ASA-GSH cycle and total phenolics and flavonoids contents and decrease in H₂O₂ and MDA accumulation. Meanwhile, fruit treated with HM chitosan manifested better quality and redox state than LM. It is noteworthy that the results showed that HM chitosan notably suppressed the activity of SDH enzyme and increased the total activity of G-6-PDH and 6-PGDH. Accordingly, changed respiratory pathways by HM chitosan coating contributed to senescence retardation and modification of redox status in postharvest nectarine fruit.

Keywords: /Nectarine Fruit/ /Chitosan/ /Senescence/ /Redox State/ /Respiratory Pathway/

Zhao, H., Jiao, W., Cui, K., Fan, X., Shu, C., Zhang, W., ... Jiang, W. (2019). Near-freezing temperature storage enhances chilling tolerance in nectarine fruit through its regulation of soluble sugars and energy metabolism. Food Chemistry, 289, 426–435. doi: 10.1016/j.foodchem.2019.03.088

Abstract

To avoid chilling injury (CI) of nectarines during storage, the impact of near-freezing temperature (NFT) (-1.4 ± 0.1 °C), 0 ± 0.1 °C and 5 ± 0.1 °C on CI incidence, ion leakage, levels of soluble sugars and enzymatic activities related to soluble sugars and energy metabolism, were investigated over five weeks. NFT-stored fruit showed no CI symptoms and significantly ($P < 0.05$) lower increase of ion leakage than those kept at 0 and 5 °C. NFT significantly ($P < 0.05$) diminished the activities of sucrose metabolism-associated enzymes leading to a higher level of sucrose in fruit, and maintained higher activities of hexokinase and fructokinase. Additionally, NFT-stored fruit exhibited significantly ($P < 0.05$) higher activities of energy metabolism-associated enzymes than fruit stored at 0 and 5 °C, leading to high levels of adenosine triphosphate and energy in fruit. These results indicated that NFT storage can effectively enhance chilling tolerance of nectarine fruit by inducing the metabolism of soluble carbohydrates and energy.

Keywords: /Nectarine/ /Chilling Injury/ /Near-Freezing Temperature/ /Sugar Metabolism/ /Energy Status/

Temizkan, R., Atan, M., Büyükcan, M. B., & Caner, C. (2019). Efficacy evaluation of ultrasound treatment on the postharvest storability of white nectarine by both physicochemical and image processing analyses. Postharvest Biology and Technology, 154, 41–51. doi: 10.1016/j.postharvbio.2019.04.014

Abstract

Ultrasound is a non-thermal method to preserve the postharvest quality of fresh fruit during storage that is also non-toxic and environmentally friendly. In this study, the effects of ultrasound treated at 0, 100, 200, 300, and 500 W on the quality of white nectarine stored at 4 °C for 50 d were investigated. Additionally, image processing techniques were used as a means of qualitative analysis. Weight loss, pH, total soluble solids (TSS), in-package gas concentration, decay rate, instrumental color, texture, and Fourier transform near-infrared (FT-NIR) were measurements were done in this study. Color and morphological characteristics of white nectarines were also identified by image processing techniques. Based on the results of physicochemical analyses, ultrasound treatment at 300 W power best-maintained nectarine quality. The decay rate was found to be 20% in the control fruit (CNT) and 3,3% in the 300 W treatment at the end of the storage. These results were supported by color and morphological characteristics obtained by image processing techniques. Overall, the results indicated that the non-thermal ultrasound technique could be used to increase storage quality of white nectarines, and image processing techniques could be implemented as objective, rapid and non-destructive analysis methods by the food industry.

Keywords: /White Nectarine/ /Non-Thermal Preservation/ /Ultrasound Treatment/ /Image Processing/

PEACH

Wang, L., Bokhary, S. U. F., Xie, B., Hu, S., Jin, P., & Zheng, Y. (2019). Biochemical and molecular effects of glycine betaine treatment on membrane fatty acid metabolism in cold stored peaches. *Postharvest Biology and Technology*, 154, 58–69. doi: 10.1016/j.postharvbio.2019.04.007

Abstract

The effect of glycine betaine (GB) treatment on chilling injury (CI), cell membrane integrity and membrane fatty acid metabolism in peach fruit during storage were investigated using biochemical and transcriptomic analysis in this study. The results showed that GB treatment alleviated the CI by suppressing lipoxygenase (LOX), phospholipase D (PLD) and lipase gene expression and enzyme activities, resulting in higher levels of unsaturated fatty acids and degree of unsaturation. In addition, this study suggested that GB treatment could inhibit the release of cytochrome C and caspase-3 activity, thus suppressing cell breakdown and contributing to membrane function. Moreover, transcriptome analysis revealed that genes related to fatty acid biosynthesis and desaturation were enhanced, while genes related to fatty acid degradation and activation of caspases were suppressed by GB treatment. Therefore, GB treatment could maintain normal cell membrane structure and function through upregulating membrane fatty acid biosynthesis and desaturation metabolism and downregulating caspase activation to alleviate CI in peaches.

Keywords: /Peach/ /Glycine betaine/ /Membrane Fatty Acid Metabolism/ /Cytochrome C/ /Caspase-3/ /Chilling Injury/

Jiao, W., Shu, C., Li, X., Cao, J., Fan, X., & Jiang, W. (2019). Preparation of a chitosan-chlorogenic acid conjugate and its application as edible coating in postharvest preservation of peach fruit. *Postharvest Biology and Technology*, 154, 129–136. doi: 10.1016/j.postharvbio.2019.05.003

Abstract

Chitosan (CS) based edible coatings has been widely applied in postharvest preservation in fruit and vegetables. In this work, the incorporation of chlorogenic acid onto chitosan was conducted using free radical mediated grafting procedure. The effects of chitosan grafted with chlorogenic acid (CS-g-CGA) complex on postharvest quality of peach fruit stored at 20 °C for 8 days were investigated. Structural properties of CS-g-CGA were characterized by UV–vis absorption, fourier transform infrared (FTIR), and nuclear magnetic resonance (NMR) spectra. The results showed that CS-g-CGA had a significantly higher antioxidant activity than the native CS. Furthermore, the antioxidant activity increased with the increase of grafting ratios. In vivo test, CS-g-CGA treatment better maintained firmness, soluble solids contents, titratable acidity, and l-ascorbic acid contents, and inhibited the increase of weight loss, decay index, and respiration rate of peach stored at 20 °C for 8 days. Our results suggest that CS-g-CGA holds great potential as preservative agent and edible coating material in peach fruit.

Keywords: /Chitosan/ /Grafted/ /Chlorogenic acid/ /Peach Fruit/ /Edible Coating/

PEAR

Sun, C., Jin, L., Cai, Y., Zheng, X., & Yu, T. (2019). (1→3)-β-D-glucan from yeast cell wall: Characteristic and potential application in controlling postharvest disease of pear. *Postharvest Biology and Technology*, 154, 105–114. doi: 10.1016/j.postharvbio.2019.04.021

Abstract

In this study, the (1→3)-β-D-glucan was isolated from yeast cell wall for investigating its effect on reducing the postharvest decay of pear fruit caused by *Penicillium expansum* and the underlying mechanisms. The results demonstrated that (1→3)-β-D-glucan could significantly induce disease resistance against *P. expansum* in pear wounds. (1→3)-β-D-glucan did not directly affect the growth of *P. expansum* in vitro and in vivo, whereas the spore germination of the pathogen was obviously inhibited in pear wounds when the induction time increased to 24 h by (1→3)-β-D-glucan. Furthermore, a large variety of defense-related genes, including PR1, GLU, endoGLU9, CHI4, endoCHI, PR4, PR5, CHI3 and PAL, were markedly up-regulated by (1→3)-β-D-glucan treatment. To the best of our knowledge, this is the first report that (1→3)-β-D-glucan can induce the disease resistance in the postharvest fruit. These findings suggest that application of (1→3)-β-D-glucan may be an effective strategy to reduce the fungal rot of the postharvest fruit.

Keywords: / (1→3)-β-D-glucan/ /Induced Resistance/ /*Penicillium expansum*/ /Postharvest/ /Pear Fruit/

SAFFRON

Moratalla-López, N., Lorenzo, C., Chaouqi, S., Sánchez, A. M., & Alonso, G. L. (2019). Kinetics of polyphenol content of dry flowers and floral bio-residues of saffron at different temperatures and relative humidity conditions. *Food Chemistry*, 290, 87–94. doi: 10.1016/j.foodchem.2019.03.129

Abstract

The cultivation of *Crocus sativus* L. is valued for its dried stigmas, but the rest of the parts of its flowers are increasingly important. Saffron flowers (SF) are natural sources of antioxidant compounds. Kaempferols and anthocyanins are the main compounds of the high-phenolic content of SF. This work studies the evolution of flavonols and anthocyanins of dry SF and floral bio-residues of saffron (FBR) and their kinetics at different temperatures and relative humidity (RH) conditions. There was a degradation process of anthocyanins that fitted a second-order kinetic model and kaempferols showed better fit in a first-order kinetics model. The best storage conditions for anthocyanins studied in SF and FBR was 25 °C and 23% RH. The main kaempferol (Kaempferol 3-O-sophoroside) was no deteriorated in FBR. These results could contribute to the using SF and FBR as food and active ingredients in cosmetic industry, as well as development of new food products.

Keywords: /*Crocus sativus* L./ /Kinetics/ /Kaempferol/ /Anthocyanin/ /Storage/

STRAWBERRY

Li, D., Zhang, X., Xu, Y., Li, L., Aghdam, M. S., & Luo, Z. (2019). Effect of exogenous sucrose on anthocyanin synthesis in postharvest strawberry fruit. *Food Chemistry*, 289, 112–120. doi: 10.1016/j.foodchem.2019.03.042

Abstract

Sucrose acts as a vital signal that modulates fruit ripening. In current study, 50 mM sucrose was applied in strawberry fruit to investigate the regulation of sucrose in anthocyanin synthesis after harvest. The results showed that sucrose treatment increased the contents of glucose, fructose and sucrose, which were 19.76%, 15.83% and 16.50% higher, respectively, compared with control at the end of storage. The increase of glucose and fructose contents resulted from the activation of acid invertase by sucrose treatment. In addition, sucrose treatment specifically increased four pelargonidin derivatives, pelargonidin 3-glucoside, pelargonidin 3-rutinoside, pelargonidin 3-malonylglucoside and pelargonidin 3-methylmalonylglucoside, during the storage. Further, transcriptional profiles and enzyme activities analysis revealed that the accumulation of pelargonidin derivatives was related to the activation of the pentose phosphate pathway, shikimate pathway, phenylpropanoid pathway, and flavonoid pathway. These results provided new insights into the regulation of sucrose on the accumulation of individual anthocyanins.

Keywords: /Strawberry Fruit/ /Sucrose Signal/ /Sucrose Catabolism/ /Anthocyanin Synthesis/

Ktenioudaki, A., O'Donnell, C. P., & Nunes, M. C. D. N. (2019). Modelling the biochemical and sensory changes of strawberries during storage under diverse relative humidity conditions. *Postharvest Biology and Technology*, 154, 148–158. doi: 10.1016/j.postharvbio.2019.04.023

Abstract

Many studies stress the importance of keeping strawberries at high relative humidity conditions during postharvest storage. However, the effect of deviations occurring across the supply chain on the appearance, acceptability and biochemical properties of strawberries has not been adequately explored or quantified to date using kinetic modelling applications. This study investigated the effect of relative humidity (RH) on degradation kinetics of quality and biochemical properties of 'Strawberry Festival', during 7 days of storage at 2 °C, using zero, first-order and Weibull models. The strawberries were stored at 40, 60, 70, 80 or 90% RH and were evaluated using subjective quality evaluation, weight loss monitoring and biochemical analysis. The shelf life was established based on current industry practices using subjective quality evaluation, namely shrivelling and colour scores. The Weibull model was found to better fit the experimental chemical analysis data compared to zero and first order kinetics models. The analysis of the rate constants quantified the significant effect of RH conditions on the weight loss and degradation rate of chemical components. Storage at low RH conditions accelerated the loss of ascorbic acid, and anthocyanins and negatively affect the in vitro antioxidant activity. The overall appearance of strawberries was modelled with zero-order kinetic model and the results revealed that lower RH conditions can limit the remaining shelf life of fresh strawberries by increasing the rate of appearance deterioration. Using RH and time as predictors in a logistic regression model, the waste occurring due to unacceptable strawberry quality, was predicted; highlighting the importance of using RH in predictive modelling when designing supply chains with the view to minimise losses.

Keywords: /Strawberry/ /Shelf Life/ /Kinetics/ /Weibull Model/ /Postharvest Storage/ /Relative Humidity/

TABLE GRAPES

Xu, J., Zhang, Z., Li, X., Wei, J., & Wu, B. (2019). Effect of nitrous oxide against *Botrytis cinerea* and phenylpropanoid pathway metabolism in table grapes. *Scientia Horticulturae*, 254, 99–105. doi: 10.1016/j.scienta.2019.04.061

Abstract

Nitrous oxide (N₂O) was investigated for the potential use on inhibiting the postharvest decay of the grape. In this study, 50 μL L⁻¹ N₂O gas was used for fumigating the 'Munage' grape which was used as the test material at room temperature for 6 h. Results indicated that N₂O had no direct effect on the *Botrytis cinerea* inhibition. But N₂O can promote the accumulation of total phenolic, flavonoids and lignin, as well as increase the activities of phenylalanine ammonia-lyase (PAL), cinnamate-4-hydroxylase (C4H), and 4-coumarate CoA ligase (4CL), which were the key enzymes in the metabolism of phenylpropanol. N₂O also induced PAL family genes expression in a short time at the molecular level. Thereby the N₂O significantly reduced the lesion diameter and incidence of the grape fruit inoculated with *Botrytis cinerea*. These results suggested that N₂O participated in enhancement of disease resistance by improving the phenylpropanoid pathway metabolism of the grape fruit and it could be a promising strategy to suppress postharvest disease.

Keywords: /Nitrous Oxide/ /'Munage' Grapes/ /*Botrytis cinerea*/ /Phenylpropanoid Pathway Metabolism/ /PAL Genes Expression/

TOMATO

Wang, L., Baldwin, E., Luo, W., Zhao, W., Brecht, J., & Bai, J. (2019). Key tomato volatile compounds during postharvest ripening in response to chilling and pre-chilling heat treatments. *Postharvest Biology and Technology*, 154, 11–20. doi: 10.1016/j.postharvbio.2019.04.013

Abstract

Mature green 'FL 47' tomatoes were exposed to heat (52 °C water for 5 min) and/or cold (5 °C for 4 d) before sampling at following ripening stages. Results showed that although did not cause visual injury, chilling substantially suppressed ripening process, ethylene production and respiration rate at early stages, while a slight impact was observed by heating. Most volatiles were detected at low levels before breaker stage with a burst at red stage in all treatments. Chilling and heating induced production of "green" note volatiles, especially hexenal early in fruit development. At the red stage, 11 out of 12 important aromatic volatiles exhibited significant reduction in chilled fruit compared to control, while most volatiles in heated fruit were recovered during ripening. On the other hand, a pre-chilling heat treatment alleviated the chilling-caused reduction of ethylene during ripening, which was associated with higher levels of 6-methyl-5-hepten-2-one, 2-phenylacetaldehyde, and 2-phenylethanol in red fruit.

Keywords: /*Solanum lycopersicum*/ /Aromatic Volatiles/ /Chilling/ /Heating/ /Ethylene Production/ /Ripening Process/

Sharafi, Y., Aghdam, M. S., Luo, Z., Jannatizadeh, A., Razavi, F., Fard, J. R., & Farmani, B. (2019). Melatonin treatment promotes endogenous melatonin accumulation and triggers GABA shunt pathway activity in tomato fruits during cold storage. *Scientia Horticulturae*, 254, 222–227. doi: 10.1016/j.scienta.2019.04.056

Abstract

Higher H₂O₂ accumulation in tomato fruits during storage at 4 °C for 7 days by melatonin treatment at 100 µM may serve as signaling molecule for promoting endogenous melatonin accumulation by triggering melatonin biosynthesis TDC, T5H, SNAT, and ASMT genes expression during storage at 4 °C for 28 days. Also, higher GABA shunt pathway activity demonstrating by higher GAD, GABA-T and SSADH enzymes activity in tomato fruits treated with melatonin may be responsible for promoting phenylpropanoid pathway activity demonstrating by higher PAL gene expression and enzyme activity giving rise to higher phenols accumulation and higher DPPH scavenging capacity during storage at 4 °C for 28 days. Hence, exogenous melatonin treatment may serve as beneficial procedure for response to chilling stress in tomato fruits by signaling H₂O₂ accumulation responsible for promoting endogenous melatonin accumulation accompanying by stimulating GABA shunt pathway activity.

Keywords: /DPPH Scavenging Capacity/ /Low Temperature Storage/ /Phenols Accumulation/ /Phenylpropanoid Pathway Activity/ /ROS Scavenging Capacity/ /Signaling H₂O₂ Accumulation/

***Toona sinensis* (CHINESE TOON)**

Lin, S., Chen, C., Luo, H., Xu, W., Zhang, H., Tian, J., ... Wang, L. (2019). The combined effect of ozone treatment and polyethylene packaging on postharvest quality and biodiversity of *Toona sinensis* (A.Juss.) M.Roem. *Postharvest Biology and Technology*, 154, 1–10. doi: 10.1016/j.postharvbio.2019.04.010

Abstract

The young leaves and sprouts of the *Toona sinensis* (TS) are nutritious and popular in Asia, however they are highly perishable and, thus, have a short shelf life, which impacts negatively on their market performance. This study investigated the effects of ozone (OZ) and polyethylene (PE) treatments on the postharvest quality of TS during near-freezing temperature storage. The results revealed that TS subjected to OZ + PE treatment had higher levels of peroxidase, superoxidase dismutase, catalase, thiophenes, CIS, TRANS, malondialdehyde and hue angle, and lower levels of weight loss, respiration rate, ethylene production rate, total chlorophyll content, vitamin C, total plate count, coliforms, yeast and mold, and polyphenol oxidase compared to the control (CK) and PE treatments. In the next-generation sequencing analysis of TS biodiversity, microbial communities of TS treated with OZ + PE were found to differ significantly from those treated with CK and PE. The combination treatment inhibited most order bacteria, however, the fungal communities present in TS, such as orders of Dothideales, Agaricales, Erysiphales and Filobasidiales, proved resistant to OZ treatments. The results of the principal components analysis and co-occurrence network patterns further confirmed that OZ, used in combination with PE, could improve postharvest quality and extended the shelf life of TS.

Keywords: /*Toona sinensis*/ /Ozone/ /Postharvest Quality/ /Biodiversity/ /Co-occurrence Network Analysis/

WALNUT

Pournik, S., Abbasi-Rostami, M., Sadeghipour, H. R., & Ghaderi-Far, F. (2019). True lipases beside phospholipases contribute to walnut kernel viability loss during controlled deterioration and natural aging. *Environmental and Experimental Botany*, 164, 71–83. doi: 10.1016/j.envexpbot.2019.04.016

Abstract

Little is known on the role of true lipases in aging of orthodox seeds. Walnut (*Juglans regia* L.) kernels rich in triacylglycerol stores lose viability after storage however, data on lipolytic activities and their correlation to kernel viability loss are lacking. Extracts from mature kernels contained acid (pH 5.0) and alkaline (pH 9.0) lipases, phospholipase A2 and fatty acyl-esterase activities. Kernels with moisture contents of 6, 15 and 20% were subsequently incubated for 3 and 6 days at 45 °C for controlled deterioration. Viability loss was greatest in kernels with 20% moisture content after 6 days. Lipase and phospholipase A2 activities increased but total lipid declined as kernels lost viability. Pre-treatments with diphenylmethyl-phosphonate or 1-butanol which specifically inhibited oil body mobilization and phospholipase D, respectively, inhibited viability loss of kernels after controlled deterioration. Diphenylmethyl-phosphonate inhibited *in vitro* lipase activity and kernels treated with this chemical also had reduced lipase activity. Declined kernel viability after one year storage was also associated with the increased lipase activities and the accumulation of free fatty acids in the neutral lipid fraction. Cyanide application increased germination and fatty acyl-esterase activity of non-aged kernels but resulted in viability loss of one-year stored kernels. Thus, the increased activities of lipases beside phospholipase might result in walnut kernel viability loss at higher temperature and moisture content while fatty acyl-esterase activity may be a marker of kernel ongoing metabolic activity.

Keywords: /Fatty-Acyl Esterase/ /*Juglans regia*/ /Kernel Aging/ /Lipase/ /Viability Loss/

WATERMELON

Mendoza-Enano, M., Stanley, R., & Frank, D. (2019). Linking consumer sensory acceptability to volatile composition for improved shelf-life: A case study of fresh-cut watermelon (*Citrullus lanatus*). *Postharvest Biology and Technology*, 154, 137–147. doi: 10.1016/j.postharvbio.2019.03.018

Abstract

Shelf-life improvement of fresh-cut produce such as watermelon can be guided by optimizing flavor and consumer liking, while ensuring microbial quality. In this study, the impacts of postharvest processing and packaging technologies on consumer acceptability and flavor profiles of fresh-cut watermelon were evaluated. The treatments included post-cut sanitation spray (with and without), modification of the headspace gas composition (ambient and modified atmosphere), lidding film permeability (perforated and non-perforated), storage temperature (3 and 7 °C) and storage period (1, 6 and 8 d). Odor-active compounds of both fresh and stored watermelon were identified by olfactometry. Changes in key odor-impact volatile compounds were measured using solid phase microextraction-gas chromatography-mass spectrometry and proton transfer reaction-mass spectrometry. Changes in the volatile composition of samples stored at 3 °C were correlated to the consumer sensory scores for color, fresh appearance, odor, firmness, flavor, and taste. Fresh-cut watermelon packed in ambient air, sealed with non-perforated lidding film, and stored at 3 °C for both 6 and 8 d received the highest flavor and overall liking scores compared to modified atmosphere (5 %O₂ and 10 %CO₂). Further improvement of flavor freshness and overall acceptability was achieved when the post-cut sanitation step was removed. Results indicated that the shelf-life, as judged by overall perceived quality, can be increased from 6 to 8 d

by manipulation of processing and storage conditions without compromising flavor and consumer acceptance. The study confirmed the usefulness of linking consumer acceptability to volatile measurement as a research tool to optimize product improvement.

Keywords: /Consumer/ /Flavor/ /Fresh-Cut Watermelon/ /Modified Atmosphere/ /Sanitation/ /PTR-MS/