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GENERAL

1-METHYLCYCLOPROPENE

Jiang, Li, et.al. 2015. Differential protein profiles of postharvest Gynura bicolor D.C. leaf treated by **1-methylcyclopropene** and ethephon. Food Chem. 176: 27–39.

Abstract

Proteins were extracted from G. bicolor that had been treated with 1-methylcyclopropene and ethephon and then stored at room temperature for 1, 3 and 7 days. More than 300 protein spots were detected by 2-DE and 38 differentially abundant spots ($P < 0.05$) were excised and analysed by using MALDI-TOF/TOF. Thirty-three proteins were finally confidently identified. According to the Clusters of Orthologous Groups of proteins, the proteins identified were classified into those responsible for metabolism (75.8%), information storage and processing (9.1%) and cellular processes and signaling (12.1%). Compared with ethephon and control treatments, 1-methylcyclopropene specifically increased the abundances of superoxide dismutase, peroxidase, carbonic anhydrase, nucleoside diphosphate kinases, glyceraldehyde 3-phosphate dehydrogenase, RuBisCO and ribulose bisphosphate carboxylase/oxygenase activase. 1-Methylcyclopropene protected leaf chloroplast and cells by enhancing stress response and defense, and delayed senescence by inhibiting substance and energy metabolisms. Therefore, 1-methylcyclopropene allowed better self-defense and delayed senescence of G. bicolor leaf.

Keywords: /1-Methylcyclopropene/ /Senescence/ /Ethephon/

AGRICULTURAL PRODUCE

Hussein, Mohamud, Andres Silva, Iain Fraser. 2015. Linking intrinsic quality attributes of **agricultural produce** to revealed consumer preferences. Food Qual. & Prefer. 41: 180 – 188.

Abstract

The quality of agricultural produce, such as fruit and vegetables, is defined by grading criteria based on the assessment of primary product attributes determined at harvest. These quality measures, which characterize important end-product intrinsic attributes such as flavor and texture, are used by processors and retailers to differentiate retail products; hence they determine farm-gate and retail prices for each crop variety. Despite their importance, limited published research has systematically linked these attributes at harvest to consumer preference at retail level. In this article, we adopt a demand system, the Almost Ideal Demand Systems, to assess the effects of the intrinsic quality attributes on consumers' purchase choices across six different quality grades that relate to 41 vegetable products sold by a leading United Kingdom (UK) retailer over a two year period. Findings suggest that consumers are both able to differentiate products based on the attributes determined at harvest and

willing to pay a premium for these attributes. These findings are relevant to both industry and public health practitioners intending to maintain or expand demand for vegetables in the UK.

Keywords: /Agricultural Produce/ /Quality/ /Attributes/

FRESH PRODUCE

Azlin-Hasim, Shafrina, et.al. 2015. Application of silver nanodots for potential use in antimicrobial packaging applications. Innov. Food Sci. & Emerg. Technol. 27: 136 – 143.

Abstract

A simple method to fabricate well-defined silver nanodots of different sizes using self-assembled polystyrene-bpoly(ethylene oxide) (PS-b-PEO) block copolymer was developed. The most well-defined nanodot patterns were observed using optimal concentrations of silver precursor (0.4, 0.6, and 1.2%) with average sizes of 10, 18, and 28 nm by different molecular weights of PS-b-PEO. Silver nanodot patterns were not observed at higher Ag precursor concentrations. In addition, after repeated depositions, the antimicrobial activity (AA) towards bacteria increased compared to well-defined nanodot arrangements. The AA of the silver nanodots was significantly affected by the concentration used independent of the particle size of the silver nanodots. Potentially, silver nanodots can be used as antimicrobial packaging application to preserve the quality of food products due to the data generated here demonstrated that these materials significantly delayed the growth of Pseudomonas fluorescens and Staphylococcus aureus. Industrial relevance: Food wastage is a significant cost to industry and society as a whole and impacts all stages of the food distribution cycle from transport and storage to shelf life and end-consumer use. Antimicrobial packaging could significantly decrease product decomposition and add value for producers by preserving product shelf life. Metal-based nano particles (NPs) (especially Ag) have previously been identified as potential antimicrobials but their performance is dependent on factors such as size and shape, concentration, morphology, composition and crystallinity. Their use in packaging has been limited partly by issues such as size control, powder handling, surface attachment and application to polymer films which can be challenging. We developed a novel method for generating antimicrobial surfaces based around the self-assembly of a polystyrene-b-polyethylene (PS-b-PEO) block copolymer that is a simple, effective and efficient method for generating highly uniformsize and shape defined NPs (as nanodots) on a surface in a well-defined arrangement without the need of expensive lithographic techniques. The developed silver nanodot surfaces exhibited good antimicrobial activity against Gram-positive and Gram-negative bacteria and potentially can be used in antimicrobial packaging applications.

Keywords: /Fresh Produce/ /Antimicrobial Packaging/

Kirezieva, Klementina, et.al. 2015. Exploring the influence of context on food safety management: Case studies of leafy greens production in Europe. Food Policy. 51: 158 – 170.

Abstract

Fresh produce companies operate their food safety management systems (FSMS) in a complex context. On the one hand, during setting and operating their FSMS activities, companies need to consider the riskiness of the 'FSMS context' of the company, including the risk of product and production, and the limitations and opportunities of the organisational and chain characteristics. On the

other hand, companies with their narrow 'FSMS context' and actual FSMS, can be influenced by the 'broad context' in a country and sector. This paper presents an analytical framework with operational tools that enable assessment of the status of FSMS in view of the context riskiness at company level, and exploration of the influence of the 'broad context' in a country and sector. The latter was defined to include: food safety governance, agro-climatic, market, and public policy environment. Empirical data from three case studies of leafy greens production, intentionally chosen to represent three European regions with their specific contexts, was used to validate the analytical framework. As a conclusion, we postulate that the FSMS output is a function of the broad context in a country and sector, the 'FSMS context' in a company, and implemented food safety management system. The model is a first step towards conceptualisation of the complex systems influencing FSMS implementation and operation in companies.

Keywords: /Fresh Produce/ /Leafy Greens/ /Food Safety Management/

FRUITS

Hu, Mingfeng, et.al. 2015. Determination of ametoctradin residue in **fruits** and vegetables by modified quick, easy, cheap, effective, rugged, and safe method using ultra-performance liquid chromatography/tandem mass spectrometry. Food Chem. 175: 395 – 400.

Abstract

A rapid, effective and sensitive method to quantitatively determine ametoctradin residue in apple, cucumber, cabbage, tomato and grape was developed and validated using ultra-performance liquid chromatography coupled with tandem mass spectrometry (UPLC–MS/MS). The target compound was determined in less than 5.0 min using an electrospray ionisation source in positive mode (ESI+). The limit of detection was below 0.043 μg kg^{-1}, whereas the limits of quantification did not exceed 0.135 μg kg^{-1} in all five matrices. The method showed excellent linearity (R^2 > 0.9969) for the target compound. Recovery studies were performed in all matrices at three spiked levels (1, 10 and 100 μg L^{-1}). The mean recoveries from five matrices ranged from 81.81% to 100.1%, with intra-day relative standard deviations (RSDr) in the range of 0.65–7.88% for the test compound. This method will be useful for the quick and routine detection of ametoctradin residues in potato, grape, cucumber, apple and tomato.

Keywords: /Fruits/ /Residue/ /Vegetables/

Pu, Yuan-Yuan, Yao-Ze Feng, Da-Wen Sun. 2015. Recent progress of hyperspectral imaging on quality and safety inspection of fruits and vegetables: a review. Comprehensive Rev. Food Sci. & food Safety. 176 – 188.

Abstract

Objective quality assessment and efficacious safety surveillance for agricultural and food products are inseparable from innovative techniques. Hyperspectral imaging (HSI), a rapid, nondestructive, and chemical-free method, is now emerging as a powerful analytical tool for product inspection by simultaneously offering spatial information and spectral signals from one object. This paper focuses on recent advances and applications of HSI in detecting, classifying, and visualizing quality and safety attributes of fruits and vegetables. First, the basic principles and major instrumental components of HSI are presented. Commonly used methods for image processing, spectral

pretreatment, and modelling are summarized. More importantly, morphological calibrations that are essential for nonflat objects as well as feature wavebands extraction for model simplification are provided. Second, in spite of the physical and visual attributes (size, shape, weight, color, and surface defects), applications from the last decade are reviewed specifically categorized into textural characteristics inspection, biochemical components detection, and safety features assessment. Finally, technical challenges and future trends of HSI are discussed.

Keywords: /Fruits/ /Vegetables/ /Quality Assessment/

FRUITS

CITRUS

Erasmus, Arno, et.al. 2015. Curative control of **citrus** green mould by imazalil as influenced by infection age, wound size, fruit exposure time, solution pH and fruit brushing after treatment. Postharvest Biol. & Technol. 101: 26 – 36.

Abstract

Green mould (Penicillium digitatum) is a major cause of postharvest losses in citrus. Wounds and infection can be inflicted during the harvest process and should be controlled during postharvest stages to prevent decay. Imazalil (IMZ) in the sulphate formulation is currently applied by the majority of South African packhouses through an aqueous dip treatment. In this study the effects of incubation time (infection age), exposure time, solution pH, wounds size and fruit brushing after dip treatments on residue loading and curative green mould control were investigated. Exposure time did not have a significant effect on residue loading on fruit dipped in pH 3 solutions of IMZ (<2.00 μg g^{-1}). Increasing the pH to 6 resulted in significantly increased residue loading, which increased with longer exposure time, but mostly to levels below the maximum residue level of 5 μg g^{-1} after 180 s. Post-dip treatment brushing reduced residue levels obtained in IMZ pH 3 solutions by up to 90% to levels <0.5 μg g^{-1}; however, curative control of the IMZ sensitive (S) isolate was mostly unaffected, but with poor sporulation inhibition. At pH 6, post-dip brushing reduced residues to ≈60%; again curative control of the sensitive isolate was unaffected, but with better sporulation inhibition than the pH 3 treatments. Wounded rind sections loaded higher residue levels compared with intact rind sections, and large wounds loaded higher levels than small wounds (≈10.19, ≈9.06 and ≈7.91 μg g^{-1} for large, small and no wound, respectively). Curative control of infections originating from large wounds was significantly better than those from small wounds. The ability of IMZ to control sensitive green mould infections declined from 6 and 12 h after inoculation on Clementine mandarin fruit of infections inflicted by small and large wounds, respectively; on navel orange fruit, curative control declined 18 and 36 h after inoculation for the respective wound size treatments. This work shows the importance of timely fungicide treatment after harvest especially on more susceptible citrus types. Results also indicate that excess residues can be stripped from the fruit, retaining residues necessary for curative control in the wound sites. However, reduced residue loading compromised the sporulation inhibition activity of IMZ.

Keywords: /Citrus/ / Green Mould/

KIWIFRUIT

S. Benítez, et. al. 2015. Aloe vera as an alternative to traditional edible coatings used in fresh cut fruits: a case of study with **kiwifruit** slices.LWT – Food Sci. & Technol. 61: 184 – 193.

Abstract

In this work, a comparative study between Aloe vera, chitosan (formulated with acetic (-AC) or citric acid (-C)) and sodium alginate edible coatings was conducted to evaluate the effects on the quality and shelf life of minimally processed kiwifruit. The pH, soluble solids content, titratable acidity, ascorbic acid, color, texture properties, gas concentrations, pectin content, microbial load and sensory quality of the fruit were analyzed during 12 days at 4 ± 1 _C. Chitosan-AC and alginate based coatings act as a gas barrier, although after eight days of storage, a sharp rise in CO2 production was detected for the alginate and chitosan-C coatings. Aloe vera coating maintained the firmness of the fruit, prevented the ascorbic acid losses and yellowing due to ripening. Aloe vera and chitosan-AC reduced microbial proliferation; however chitosan-AC coated slices were not accepted by the sensory panelists. In contrast, fruit treated with an alginate based coating had higher microorganism counts than the control samples. The sensory panel preferred the kiwifruit slices treated with Aloe vera or chitosan-C coatings compared to the other coatings. Our study indicates that Aloe vera was the best coating to both extend the postharvest shelf life and maintain the sensory properties of the product trough the storage period.

Keywords: /Kiwifruit/ /Edible Coatings/ /Fresh Cut/

LITCHI

Liu, Ting, et.al. 2015. Short-term anaerobic, pure oxygen and refrigerated storage conditions affect the energy status and selective gene expression in **litchi** fruit. Food Sci. Technol.-Leb 60: 1254 - 1261.

Abstract

Harvested litchi fruit were stored under cold temperature, short-term anaerobic and pure oxygen conditions to explore the energy characteristics and the genes that are related to pericarp browning. Fruits in short-term anaerobic and pure oxygen environments were stored at 25 °C. Additionally, fruits were stored at 1 °C for 1, 2 or 3 weeks and were then subjected to a post cold storage at 25 °C for up to 48 h. Short-term anaerobic and pure oxygen storage decreased the browning index and relative abundance of the ATP synthase b subunit (LcAtpB) and increased respiration intensity, ATP content, the contribution of an alternate oxidation pathway to the total respiration ($\rho V_{AP}/Vt$) and the transcription of plant uncoupling mitochondria protein 1 (LcUCP1), with short-term anaerobic treatment being more significant than pure oxygen. Cold storage decreased the ATP levels but increased the browning index, respiration intensity, $\rho V_{AP}/Vt$ and the transcription of alternative oxidase 1 (LcAOX1), LcUCP1, ADP/ATP carrier 1 (LcAAC1) and sucrose non-fermenting-1-related kinase 2 (LcSnRK2) during the post storage shelf-life at 25 °C. The data suggest that the energy level is closely related to the respiratory activity and is involved in the browning control of harvested litchi fruit. Transcripts of the 5 genes were found to be involved in the energy regulation and quality control of postharvest litchi fruit.

Keywords: /Litchi/ /Shelf Life/

LONGAN

Li, Li, et.al. 2015. Effects of 2-butanol on quality and physiological characteristics of **longan** fruit stored at ambient temperature. Postharvest Biol. & Technol. 101: 96 – 102.

Abstract

Longan (Dimocarpus longan Lour.) is a fruit with a limited postharvest life. In the present study, 2-butanol (a phospholipase D inhibitor) at different concentrations (0.05%, 0.10% and 0.15%) were applied postharvest to longan fruit stored at ambient temperature (25 °C), and their effects on fruit quality and physiological characteristics were investigated. The results showed that the 0.05% 2-butanol treatment had the most positive effects on fruit quality, with treated fruit showing a significant delay in changes in weight, titratable acidity content and total soluble solids content by day 8. The 0.05% 2-butanol treated fruit had the lowest rate of pericarp moisture loss on day 8 and a significantly lower browning index than the control on day 6. It also maintained higher ascorbic acid contents than in the control from day 2. This treatment maintained high contents of phenolics and flavonoids during 8 days storage, and inhibited browning, pulp breakdown and respiration. These results indicate that the phospholipase D inhibitor 2- butanol could be helpful in postharvest quality maintenance of longan fruit.

Keywords: /Longan/ /Postharvest Quality/ /Physiological Characteristics/

Lin Yifen,et.al. 2015. Inhibitory effects of propyl gallate on browning and its relationship to active oxygen metabolism in pericarp of harvested **longan** fruit. Food Sci. Technol.-Leb 60 : 1122 - 1128.

Abstract

The inhibitory effects of propyl gallate, an active oxygen scavenger, on browning and active oxygen metabolism in the pericarp of harvested 'Fuyan' longan fruit were investigated. The results indicated a lower browning index in the pericarp of propyl gallate-treated fruit when compared with the control fruit. The fruit treated with propyl gallate displayed a decreased rate of superoxide anion ($O_2^{\cdot-}$) production, maintained higher activities of superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidise (APX), had higher contents of ascorbic acid (AsA), glutathione (GSH) and carotenoid, and had lower malondialdehyde (MDA) content. These results give convincing evidence that the retardation of pericarp browning of harvested longan fruit is due to an increased capacity to scavenge active oxygen species and decrease the accumulation of$O_2^{\cdot-}$. Controlling the level of active oxygen species will reduce membrane lipid peroxidation, maintain cellular membrane structure and the integrity of compartmentalization. Preventing polyphenol oxidase (PPO) and peroxidase (POD) from contacting their respective phenolic substrate will reduce the occurrence of enzymatic browning in the pericarp of harvested longan fruit. It is possible that propyl gallate treatment could be a feasible technique for controlling pericarp browning and extend the storage life of harvested longan fruit.

Keywords: /Longan / /Browning/

LOQUAT

Xu, Qian, et.al. 2015. A NAC transcription factor, EjNAC1, affects lignifications of **loquat** fruit by regulating lignin. Postharvest Biol. & Technol. 102: 25 – 31.

Abstract

Lignin is an important component of secondary cell walls, and its content influences the utilization of plant products for food and fiber. Loquat is a typical fruit accumulating lignin during postharvest low temperature storage. In this research, two EjNAC genes were isolated and designated as EjNAC1 and EjNAC2. Both EjNAC1 and EjNAC2 had transcriptional activity in yeast cells. The expression of EjNAC1 and EjNAC2 in lignin-rich stems was higher than in pulp. However, only EjNAC1 was induced in fruit by low temperature and inhibited by heat treatment (HT), which can alleviate lignification, while EjNAC2 expression was not correlated with fruit lignification. Further analysis indicated that EjNAC1 could trans- activate the gene promoters in loquat and Arabidopsis for genes in the lignin biosynthesis pathway. Transient over-expression of EjNAC1 in tobacco leaves resulted in accumulation of lignin and induction of expression of endogenous lignin biosynthesis genes. In conclusion, EjNAC1 was associated with fruit lignification by activating genes involved in lignin biosynthesis.

Keywords: /Loquat/ /Storage/

MANGO

Cissé, Mohamed, et.al. 2015. Preservation of **mango** quality by using functional chitosan-lactoperoxidase systems coatings. Postharvest Biol. & Technol. 101: 10 – 14.

Abstract

Influence of chitosan coating with or without the active antimicrobial lactoperoxidase system was studied on postharvest mangoes. Mangoes were treated with three concentrations of chitosan (0.5; 1; 1.5%) containing or not lactoperoxidase with or without iodine as a second electron donor. Coatings containing 1 and 1.5% chitosan incorporated with lactoperoxidase system efficiently inhibited fungal proliferation and delayed mango ripening. Iodine did not influence antifungal activity. Ripening parameters (firmness, respiration, weight loss and color) were not influenced by the lactoperoxidase system, but were more influenced by chitosan concentration. Chitosan coating alone reduced weight loss, and delayed the decline in firmness and respiration rate. It exhibited a beneficial effect on the contents of total soluble solids (TSS), ascorbic acid, total acidity (TA) and pH.

Keywords: /Manago/ /Chitosan/ Edible Coatings/

Jyotshna, Pooja Srivastava, Bharti Killadi, Karuna Shanker. 2015. Uni-dimensional double development HPTLC-densitometry method for simultaneous analysis of mangiferin and lupeol content in **mango** (Mangifera indica) pulp and peel during storage. Food Chem. 176: 91 – 98.

Abstract

Mango (Mangifera indica) fruit is one of the important commercial fruit crops of India. Similar to other tropical fruits it is also highly perishable in nature. During storage/ripening, changes in its physicochemical quality parameters viz. firmness, titrable acidity, total soluble solid content (TSSC), carotenoids content, and other biochemicals are inevitable. A uni-dimensional double-development high-performance thin-layer chromatography (UDDD-HPTLC) method was developed for the real-time monitoring of mangiferin and lupeol in mango pulp and peel during storage. The quantitative determination of both compounds of different classes was achieved by densitometric HPTLC method. Silica gel $60F_{254}$ HPTLC plates and two solvent systems viz. toluene/EtOAC/MeOH and EtOAC/MeOH, respectively were used for optimum separation and selective evaluation. Densitometric quantitation of mangiferin was performed at 390 nm, while lupeol at 610 nm after post chromatographic derivatization. Validated method was used to real-time monitoring of mangiferin and lupeol content during storage in four Indian cultivars, e.g. Bombay green (Bgreen), Dashehari, Langra, and Chausa. Significant correlations ($p < 0.05$) between of acidity and TSSC with mangiferin and lupeol in pulp and peel during storage were also observed.

Keywords: /Mango/ /Mangifera Indica/ /Storage/

Zerbini, Paola Eccher, et. al. 2015. Optical properties, ethylene production and softening in **mango** fruit. Postharvest Biol. & Technol. 101: 58 – 65.

Abstract

Firmness decay, chlorophyll breakdown and carotenoid accumulation, controlled by ethylene, are major ripening events in mango fruit. Pigment content and tissue structure affect the optical properties of the mesocarp, which can be measured nondestructively in the intact fruit by time-resolved reflectance spectroscopy (TRS). This work is aimed at improving the maturity assessment in mango (Mangifera indica L. cv Haden) from Brazil, using TRS absorption in both the carotenoid and chlorophyll regions in order to develop a model for fruit ripening. Scattering and absorption in the 540–900 nm spectral range by TRS, ethylene production and respiration rate, and firmness, were measured in one day on each individual fruit of a sample covering the range of maturity. The fruit displayed a variability which was attributed to the different biological age. Absorption spectra showed two peaks at 540 and 670 nm, corresponding respectively to the tail of carotenoid absorption and to chlorophyll-a absorption. Carotenoids increased substantially only in fruit where chlorophyll had almost disappeared. The absorptions at 540 and 670 nm, which described the maturity state of each fruit relative to the range of each wave length, were combined in one index of biological age (biological shift factor) for each fruit and used in logistic models of ethylene increase and firmness decay respectively. The model explained about 80% of the variability in ethylene production rate. A similar result was obtained for firmness when scattering was added in the model. The combination of absorption at 540 and 670 nm measured by TRS in the intact fruit can be used to classify mango fruit according to maturity and to predict the ripening of individual fruit.

Keywords: /Mango/ /Maturity/ /Ethylene/

PEACH

Fernandes, Joana Diniz Rosa, et.al. 2015. Influence of different concentrations of CO_2 in the postharvest conservation of **peaches** 'Aurora-1'. J. Stored Prod & Postharvest Re. 6(2): 13 – 20.

Abstract

The objective of this study was to evaluate the influence of different concentrations of carbon dioxide associated with a fixed concentration of oxygen in the postharvest conservation of peaches 'Aurora-1'. Experiment was based on a complete random split plot design, five atmosphere conditions, five analysis dates with three replications, each consisting of five fruits. The treatments were based on five atmospheres of CO_2, that is, 1, 3, 6, and 12% and a fixed concentration of 20% O_2, while control fruits were placed in an atmosphere of 21% O_2 and 0.03% CO_2. Fruits were stored at 12°C for 28 days and analyzed every 7 days for the following variables: external appearance, incidence of disease, accumulated loss of fresh mass, firmness and color of the pulp, soluble solid content, and titratable acidity. The effects of the gas over time were analyzed by analysis of variance and mean comparison of the data by Duncan test at 5% probability. The atmosphere of 12% CO_2 + 20% O_2 allowed the peaches 'Aurora-1' keep the physiochemical characteristics for up to 21 days of storage at 12°C. The controlled atmosphere condition with 1%, CO_2 + 20% O_2 was adequate to allow the absence of disease during the 28 days of storage without compromising the physical-chemical characteristics of fruits.

Keywords: /Controlled Atmosphere/ /Oxygen/ /*Monilinia* sp./ /*Prunus Persica*/

Wang, Jinhua, et.al. 2015. Optimal hypobaric treatment delays ripening of honey **peach** fruit via increasing endogenous energy status and enhancing antioxidant defence systems during storage. Postharvest Biol. & Technol. 101: 1 – 9.

Abstract

Honey peach (Prunus persica) fruit is highly perishable and rapidly loses quality after harvest. Postharvest hypobaric treatment is a potential new technique to delay fruit ripening and quality deterioration in fruit. Honey peach fruit were stored under four different pressure conditions (101, 10–20, 40–50 and 70–80 kPa) for 30 days at 0 °C at 85–90% RH. The fruit were then observed for 4 days at 25 °C and 80–85% RH. Decay index, content of total soluble solids (TSS), ascorbic acid, malondialdehyde (MDA), membrane permeability, H2O2 content, superoxide anion ($O_2^{\bullet-}$) production rate, activities of lipoxygenase (LOX), superoxide dismutase (SOD) and catalase (CAT) and contents of adenosine triphosphate (ATP), adenosine diphosphate (ADP) and adenosine monophosphate (AMP) were measured. Results indicated that hypobaric treatment at 10–20 kPa delayed decay rates and maintained overall quality, and extended the shelf-life of honey peach fruit. Furthermore, the application of 10–20 kPa treatment effectively delayed increases in both $O_2^{\bullet-}$ production rate and H_2O_2 content, enhanced activities of CAT and SOD and increased contents of ATP and ADP while reducing LOX activity and AMP content during low temperature storage and the following shelf-life at roomtemperature. These data indicated that the shelf-life extension of honey peach by hypobaric treatment could be due to increased energy status, enhanced antioxidant ability and less membrane damage. The relationships of ATP content with membrane damage, radical oxygen species (ROS) production and antioxidant enzyme activities is discussed.

Keywords: /Peach/ /Hypobaric Treatment/ /Ripening/

PEAR

Cefola, Maria, Massimiliano Renna, Bernardo Pace. 2015. Marketability of ready-to-eat cactus **pear** as affected by temperature and modified atmosphere. J. Food Sci. Technol. 51(1): 25 – 33.

Abstract

In order to increase the diffusion of cactus pear fruits, in this study, the proper maturity index for peeling and processing them as ready-to-eat product was evaluated and characterized. Thereafter, the effects of different storage temperatures and modified atmosphere conditions on the marketability of ready-to-eat cactus pear were studied. The storage of ready-to-eat fruits at 4 °C in both passive (air) and semi-active (10 kPa O_2 and 10 kPa CO_2) modified atmosphere improved the marketability by 30%, whereas the storage at 8 °C caused a dangerous reduction in O_2 partial pressure inside modified atmosphere packages, due to fruits' increased metabolic activity. Avery low level of initial microbial growth was detected, while a severe increase in mesophilic and psychrophilic bacteria was shown in control samples at both temperatures during storage; an inhibitory effect of modified atmosphere on microbial growth was also observed. In conclusion, modified atmosphere improved only the marketability of fruits stored at 4 °C; whereas the storage at 8 °C resulted in deleterious effects on the ready-to-eat fruits, whether stored in air or in modified atmosphere.

Keywords: /Pear/ /Cold Storage/ /Maturity/ /Fresh-Cut/

Cheng, Yudou, et.al. 2015. The effects of modified atmosphere packaging on core browning and the expression patterns of PPO and PAL genes in 'Yali' **pears** during cold storage. Food Sci. Technol.-Leb 60: 1243 - 1248.

Abstract

Pear fruits often experience core browning when exposed to excessive CO2 during storage. Therefore, it is critical to understand the mechanism of this process to optimize atmospheric conditions during postharvest pear storage. In the present study, the browning process, phenolic content, polyphenol oxidase (PPO) activity and expression profiles of phenylalanine ammonia-lyase (PAL) and PPO genes in the core tissue of 'Yali' pears (Pyrus bretschneideri Rehd cv. Yali) were investigated under modified atmosphere packaging (MAP). The results showed that MAP1 (with a thickness of 10 mm) reduced core browning, retarded the peak appearance of PPO activity and phenolic content, and inhibited the expression of PbPAL1, PbPAL2, and PbPPO1 genes in core tissue relative to the control (which had no packaging), but MAP2 (with a thickness of 30 mm) exerted the opposite effects during cold storage (0 _C). There was no significant relation between PbPPO4, PbPPO5 and PbPPO6 expression in core tissue and core browning. These results suggested that MAP1 was suitable for cold storage and that the PbPAL1, PbPAL2 and PbPPO1 genes might be involved in core browning under modified atmosphere storage in 'Yali' pears.

Keywords: /Pear/ /Modified Atmosphere Packaging/ /Browning/

PERSIMMON

Besada, Cristina, et.al. 2015. Short-term high CO2 treatment alleviates chilling injury of **persimmon** cv. Fuyu by preserving the parenchyma structure. Food Control. 51: 163 - 170.

Abstract

Persimmon cv. Fuyu is chilling-sensitive and manifests chilling injury symptoms, flesh gelling and fruit darkening, during cold storage and subsequent shelf life. The objective of this study was to evaluate the effect of short-term high CO_2 treatments on chilling injury manifestation of 'Fuyu'. Short-term high CO_2 treatments consisted in maintaining fruit in a 95% CO_2 atmosphere for 0, 12, 24 or 36 h before storage at 1 °C. After 35 d and 50 d of low-temperature storage and after subsequent shelf-life periods of 5 d at 20 °C, fruit quality and microstructural changes of flesh were evaluated. Our results showed that short-term high CO_2 treatments alleviate the main chilling injury symptoms, flesh gelling and fruit darkening. The longer the treatment, the greater chilling injury alleviation becomes. The microstructural study revealed that flesh gelling is associated with a complete disruption of cell walls and membranes, which led to the total loss of the initial parenchyma structure. Short-term high CO_2 treatment alleviated flesh gelling by preserving the integrity of cells walls and plasmalemma.

Keywords: /Persimmon/ /Chilling Injury/

RASPBERRY

Fu, Yu, et.al. 2015. Chemical composition and antioxidant activity of Chinese wild **raspberry** (Rubus hirsutus Thunb.). Food Sci. Technol. 60: 1262 - 1268.

Abstract

Wild berries are effective in nutrition, health and medical care. Berries of Rubus hirsutus Thunb. In different sizes, native to China, were analysed for nutrients including sugars, total acids and proteins and phytochemicals including ascorbic acid and polyphenols (total phenolics, total flavonoids and anthocyanins) as well as antioxidant activity. The contents of reducing sugar, total sugar, total solids, pH, total acids and proteins of R. Hirsutus Thunb. fruit were 6.23-9.79 g/100 g FW, 6.82-10.15 g/100 g FW, 11.75-13.25%, 3.67-3.86, 0.30-0.60 g/100 g FW and 0.016-0.030 g/100 g FW. The contents of ascorbic acids, total flavonoids, total phenolics and total anthocyanins were 16.33-23.28 mg/100 g, 68.23-192.11 mg/ 100 g, 108.23-269.90 mg/100 g and 12.43-16.71 mg/100 g. The anthocyanin composition was determined by HPLC-DAD and HPLC-UV-ESI-MS coupled with a chromogenic reagent (5% $AlCl_3$ in ethanol). The anthocyanin composition of this fruit was identified as delphinidin-3-pentoside, which might be useful in authentication procedures. The contributions of total phenolics and total flavonoids to antioxidant activity were much greater than those of vitamin C and anthocyanins. Overall, the results verified that Chinese wild raspberry had high antioxidant activity and might be a new source of phytochemicals in the nutraceutical and functional food market.

Keywords: /Raspberry/ /Antioxidant/

STRAWBERRY

Tokarskyy, Oleksandr, et.al. 2015. Sanitizer applicability in a laboratory model **strawberry** hydrocooling sytem. Postharvest Biol. & Technol. 101: 103 – 106.

Abstract

After harvest, strawberries are cooled to 2–5 °C, typically by forced-air cooling. Hydrocooling is an alternative method that ensures faster cooling and with the addition of various sanitizers can reduce the risk of microbial cross contamination. In this study, the effect of forced-air cooling and hydrocooling

on the survival of Lactobacillus plantarum, a non-pathogenic, potential surrogate bacterium, was evaluated. Further, the efficacy of three antimicrobial compounds, sodium hypochlorite (HOCl, 100 µL/L), aqueous chlorine dioxide (ClO2, 5 µL/L) and peroxyacetic acid (PAA, 80 µL/L) in reducing Lactobacillus levels during strawberry hydrocooling was also investigated. The results indicated that the Lactobacillus population on forced-air cooled strawberries was not significantly different from untreated strawberries. Compared to forced-air cooling, hydrocooling significantly reduced Lactobacillus survival on inoculated intact strawberries, even in the absence of a sanitizer. The addition of ClO_2 resulted in the least reduction in initial Lactobacillus levels (~1 log CFU/mL), similar to those on strawberries hydrocooled without antimicrobials. The addition of HOCl or PAA to the hydrocooling water resulted in respective reductions of 2.5 log CFU/mL and 4.0 CFU/mL in the initial Lactobacillus levels, which continued to decrease throughout the sampling period. The results from this study indicate that antimicrobials HOCl and PAA are both effective in reducing surface contamination on strawberries during hydrocooling.

Keywords: /Strawberry/ /Hydrocooling/

SWEET CHERRY

Hayta, Eda, Mehmet Seckin Aday. 2015. The effect of different electrolyzed water treatments on the quality and sensory attributes of **sweet cherry** during passive atmosphere packing storage. Postharvest Biol. & Technol. 102: 32 – 41.

Abstract

The present study was designed to determine the effectiveness of electrolyzed water (EW) prepared at six levels of free available chlorine concentrations (25, 50, 100, 200, 300, 400 mg/L), on postharvest quality attributes of sweet cherry. Cherries were analyzed for various quality parameters, such as gas concentration inside packages, pH, total soluble solid, water activity, weight loss, firmness, color, anthocyanin profile, sensory attributes, and decay rate during 30 d of storage at 4 _C. The oxygen (O2) level reduced sharply during the first five days of storage inside the package of sweet cherries treated with 300 and 400 mg/L EW. However, steady-state gas concentration was formed in the packages of 25 and 50 mg/L EW between 10 and 20 d of storage. Weight losses were about 0.25% in 25, 50 and 100 mg/L EW treated samples while losses were in the range of 0.30–0.37% for other samples after 30 d of storage. The cherries treated with 25 and 50 mg/L EW had lower pH values, total soluble solid contents, and decay rate than control and other treated samples at each storage time. Color values of L* increased with the increment of EW concentration at each sampling time. Cherries treated with 25, 50, and 100 mg/L EW showed higher a* values than other treated and control samples. Cherries treated with 300 and 400 mg/L EW had the lowest cyanidin 3-rutinoside, cyanidin 3-glucoside, and pelargonidin 3-rutinoside content, whereas the highest amount belonged to the cherries treated with 25, 50, and 100 mg/L EW. Mold growth was the main factor in shortening the shelf life of sweet cherries. Electrolyzed water concentrations above 200 mg/L had a negative impact on sensory quality. The overall results indicated that electrolyzed water concentration below 200 mg/L combined with passive atmosphere packaging can be used to extend the shelf life of sweet cherry.

Keywords: /Sweet Cherry/ /Storage/ /Quality/

Wang, Lei, et.al. 2015. Effect of ß-aminobutyric acid on cell wall modification and senescence in **sweet cherry** during storage at 20 °C. Food Chem. 175: 471 – 477.

Abstract

The effects of postharvest ß-aminobutyric acid (BABA) treatment on fruit firmness, pectin degrading enzymes, cell wall constituents and microstructural alterations of pericarp in sweet cherry fruit were investigated. BABA significantly delayed the decline of fruit firmness and inhibited the increase of membrane permeability and the accumulation of malondialdehyde in cherries. The BABA-treated fruit exhibited significantly higher contents of water-soluble pectin, CDTA-soluble pectin, Na_2CO_3-soluble pectin, total pectin, cellulose and hemicellulose than the control during storage. Activities of pectin degrading enzymes including polygalacturonase and pectinmethylesterase were markedly reduced by BABA treatment. Observations by scanning electron microscopy showed BABA maintained smooth cuticle and integrated structure of subepidermal cell in sweet cherry. These results suggest that the delay in fruit senescence by BABA may be due to depressed membrane permeability and malondialdehyde content, reduced activities of polygalacturonase and pectinmethylesterase, enhanced cell wall polysaccharides content, and integrated subepidermal cell structure in sweet cherry.

Keywords: /Sweet Cherry/ /Softening/

Wang, Lei, et.al. 2015. In vitro inhibition and in vivo induction of defense response against Penicillium expansum in **sweet cherry** fruit by postharvest applications of Bacillus cereus AR156. Postharvest Biol. & Technol. 101 : 15 – 17.

Abstract

The biocontrol effect of Bacillus cereus AR156 on blue mold decay caused by Penicillium expansum in harvested sweet cherry fruit and the possible mechanisms were investigated. The results indicated that B. cereus AR156 treatment significantly reduced disease incidence and development. The treatment significantly enhanced activities of chitinase and ß-1, 3-glucanase in the fruit. B. cereus AR156 damaged the plasma membrane integrity of P. expansum spores and caused the leakage of protein and sugar of the pathogen mycelia in vitro. The results indicated that the efficacy of B. cereus AR156 on controlling blue mold decay in cherry fruit may be related to the direct fungitoxic property against the pathogen, and the induction of defense-related enzymes in the fruit.

Keywords: /Sweet Cherry/ /Blue Mold/

VEGETABLES

ASPARAGUS

Li, Tiehua, Min Zhang. 2015. Effects of modified atmosphere package (MAP) with a silicon gum film window on the quality of stored green **asparagus** (Asparagus officinalis L) spears. LWT - Food Sci. & Technol. 60: 1046 - 1053.

Abstract

Packages of green asparagus (Asparagus officinalis L.) spears with or without silicon gum film windows were flushed in two different modified systems (50 mL L^{-1} O_2 with 100 mL L^{-1} CO_2 and 100 mL L^{-1} O_2 with 100 mL L^{-1} CO_2, with N_2 as a balance gas) and stored at 2 ± 1 °C for 30 days. The changes in gas

headspace, sensory, respiration rate, ascorbic acid content, soluble solid content and chlorophyll content were investigated. The results showed that green asparagus spears stored in MAP with silicon gum film windows, the gas exchange between packages and surrounding atmosphere through the silicon gum film windows induced an in-package optimum atmosphere for green asparagus spears stored at O_2 above 21 mL L^{-1}, CO_2 below 157 mL L^{-1} and ethylene below 15.84 µL L^{-1}. These packages prevented anaerobic respiration to get good odour score, and were able to keep a relatively low respiration rate and reduce loss of ascorbic acid. A low concentration of ethylene atmosphere was effective for inhibiting chlorophyll degradation, which resulted in a high appearance score. The initial atmosphere in packs also affect the quality attributes, where 50 mL L^{-1} O_2 and 100 mL L^{-1} CO_2 initial atmosphere was preferred.

Keywords: /Asparagus/ /Modified Atmosphere Packaging/ /Storage/ /Ethylene/

BABY SPINACH

Garrido, Yolanda, Juan A. Tudela, María I. Gil. 2015. Comparison of industrial precooling systems for minimally processed **baby spinach**. Postharvest Biol. & Technol. 102: 1 – 8.

Abstract

Leafy greens including baby spinach are particularly prone to rapid dehydration. After harvest, leafy greens should be refrigerated as soon as possible to remove the heat from the field in order to decrease respiration rate and increase shelf-life. Delays between harvest and cooling should be avoided, especially during warm weather to avoid water loss. There is a wide range of precooling systems available for using in fresh produce. However, the best precooling system for baby leaves as raw material for the fresh-cut industry has not been well established. The aim of this study was to compare four precooling systems including room cooling (RC), forced air cooling (FAC), hydro cooling (HC) and vacuum cooling (VC) for their effects on quality and shelf-life of baby spinach. Two separate trials, one in winter and another in spring were carried out. Leaf water content increased after cooling in HC and VC but more significantly in winter while in spring, differences among treatments were not significant. The colour measured as chroma was more vivid in HC and VC just after processing but after storage, no differences among precooling treatments were observed. In winter, there were no significant differences in the respiration rate among precooling systems. However, in spring, HC and VC decreased respiration rate and modified less the headspace gas composition of the packages. Pseudomonas counts significantly decreased in HC and VC due probably to the washing effect of the leaf surface without promoting the growth of spoilage microorganisms. Surprisingly, visual quality was significantly lower in VC compared with the rest of precooling treatments due to the higher degree and number of damaged leaves. In conclusion, selection of the precooling system is critical during warm weather because of the high temperature at harvest. Hydro cooling is a good precooling system for baby spinach in spring as it decreases rapidly leaf temperature, decreasing respiration rate and extending shelf life. However, in winter, precooling systems are not as critical because the temperature at harvest was similar to the temperature reached after precooling.

Keywords: /Baby Spinach/ /Quality/ /Postharvest Handling/

BAMBOO SHOOTS

Zeng, Fangfang, et.al. Feng. 2015. Gamma radiation control quality and lignifications of **bamboo**

shoots (Phyllostachys praecox f. prevernalis) stored at low temperature. Postharvest Biol. & Technol. 102: 17 – 24.

Abstract

Bamboo shoots are highly nutritious but possess poor shelf life after harvest due to rapid decline of tenderness mostly result from lignification processes. Present investigation was performed to evaluate the potential of gamma radiation as a postharvest technology to preserve bamboo shoots. The effects of 0.5 kGy gamma radiation on quality and lignification of bamboo shoots during storage at 2 _C were investigated. The results showed that gamma radiation reduced the decay rate of bamboo shoots by 71% at the end of storage. It also significantly retarded ethylene production through controlling the activities of ACC synthase (ACS) and ACC oxidase (ACO), which may contribute to inhibition of lignin synthesis. Meanwhile, gamma radiation decreased the activities of phenylalanine ammonia-lyase (PAL), cinnamyl alcohol dehydrogenase (CAD) and peroxidase (POD), which are associated with lignin accumulation, thus reduced lignin content by 12.5% than that of the control after twenty-eight days of storage. These results demonstrated the potential of the gamma radiation as a promising postharvest technique to maintain the quality and inhibit the lignification of bamboo shoots.

Keywords: /Bamboo Shoots/ /Gamma Radiation/ /Ethylene/

BELL PEPPER

Liu, Ling, eet.al. 2015. Intermittent warming improves postharvest quality of **bell peppers** and reduces chilling injury. Postharvest Biol. & Technol. 101: 18 – 25.

Abstract

The long-term low temperature storage of pepper fruit is currently risky because of the likelihood of chilling injury (CI), which reduces shelf-life. Intermittent warming (IW) has been proposed as a potential solution to enhance successful long-term pepper fruit storage. To understand the influence of IW in alleviating CI in peppers, the effects of 3 IW cycles were tested on the organic acid content, firmness, and relative enzyme content of pepper fruit (namely, 1–3 IW cycles to 20 °C for 24 h every 7 days for fruit stored at 4 °C for 27 days). Subsequently, the effects of 2 IW cycles were tested on the organizational structure of pepper fruit cells and potential odor changes. The results showed that IW effectively reduces the CI index and maintains pepper firmness. Following 2 IW cycles after 6 and 13 days storage, pepper integrity was retained, with no shrinkage or decay. Furthermore, partial least squares analysis of odor changes showed that both 1 IW cycle after 20 days storage and 2 IW cycles after 6 and 13 days storage extended storage time to over 10 days. The appropriate IW cycles effectively delay the decline in unsaturated fatty acid content and maintain a higher index of unsaturated fatty acids (IUFA), which helps retain the integrity of the pepper cell membranes.

Keywords: /Bell Pepper/ /Chilling Injury/ /Postharvest Quality/

CABBAGE

Hyun, Jeong-Eun, et.al. 2015. Preservative effectiveness of essential oils in vapor phase combined with modified atmosphere packaging against spoilage bacteria on fresh **cabbage**. Food Control. 51: 307 - 313.

Abstract

This study was conducted to investigate the antibacterial effects of various essential oils (EOs) against pathogens using the disc volatilization method. Also, combined effects of EOs in vapor phase and MAP were evaluated for reducing levels of total mesophilic microorganisms on fresh cabbage. The vapor phase activities of EOs (thyme-1, oregano-1, lemongrass-1, and lemongrass-2 oils) observed strong inhibitory effects. The MAP results showed that 100% CO_2 gas packaging reduced significantly levels of total mesophilic microorganisms on cabbage and radish sprouts, and their reduction level was 1.55 and 2.26 $\log_{10}$ CFU/g compared to control after 21 days of storage ($p \leq 0.05$). Based on previous results, combined effects of EOs in vapor phase and MAP (100% CO_2) showed that lemongrass-2 oil with 20 discs showed complete inactivation by <1.0 $\log_{10}$ CFU/g after 14 days of storage. These results could provide useful information for developing alternative preservation method to improve the freshness and shelf-life of fresh produce using natural antimicrobials.

Keywords: /Cabbage/ /Modified Atmosphere Packaging/ /Fresh Produce/

LETTUCE

O'Beirne, David, et.al. 2015. Effects of oxygen-depleted atmospheres on survival and growth of Listeria monocytogenes on fresh-cut Iceberg **lettuce** stored at mild abuse commercial temperatures. Food Microbiol. 48: 17 - 21.

Abstract

The effects of oxygen-depleted atmospheres, 0.25% O_2+12% CO_2 (balance N_2) and 2% O_2 + 6% CO_2 (balance N_2), on growth of Listeria monocytogenes on fresh-cut Iceberg lettuce were determined. The study was carried out at mild abuse temperatures using controlled atmosphere chambers. During storage at a constant temperature of 7 °C, growth was enhanced at the lower oxygen level of 0.25% O_2 by Day 10. Over 17 days of storage at temperatures designed to mimic mild abuse commercial conditions, there were again significantly higher counts under 0.25% O_2 from Day 10 onwards. These were 0.9 and 0.7 log cycles higher on Days 14 and 17, respectively. When a model lettuce agar medium was used to eliminate possible interactions with competing flora the direct effects of the atmosphere enhancing the growth of L. monocytogenes was also observed. It is concluded that use of very O_2-depleted atmospheres for control of enzymatic browning of fresh-cut Iceberg lettuce may introduce a potential hazard under some commercial conditions. There is a need for greater vigilance and possibly additional measures to ensure consumer safety.

Keywords: /Letuce/ /Food Safety/ /Modified Atmosphere Packaging/ /Minimal Processing/ /Shelf-Life/

PEPPER

Ying, Sun Chun, et.al. 2015. Resistances to anthracnose (Colletotrichum acutatum) of Capsicummature green and ripe fruit are controlled by a major dominantcluster of QTLs on chromosome P5. Scientia Hortic. 181: 81 – 88.

Abstract

Anthracnose (Colletotrichum spp.) is a serious disease worldwide in pepper (Capsicum) production. Inheritance of resistance to Colletotrichum acutatum from a Capsicum chinense accession (PBC932) was studiedin a BC1population derived from a hybrid with Capsicum annuum line 77013 (susceptible) using a QTL analysis method. Resistance test was performed on detached mature green and mature red fruit under laboratory conditions by evaluated in disease incidence, true lesion diameter and overall lesion diameter. Based on a linkage map with 14 linkage groups, 385 markers (SSR, In Del and CAPS), 1310.2 cM in length, inclusive Composite Interval Mapping (ICIM) revealed main effect QTLs located in a close marker interval on P5 chromosome for all fruit stages and resistance criteria, and four minor-effect QTLs only at green mature stage. Identification of recombinant individuals suggested that resistance in green versus red fruit may be controlled by distinct genes within the QTL interval on P5.

Keywords: /Pepper/ /Capsicum/ /Anthracnose/

TOMATO

Severo, Joseana, et.al. 2015. UV-C radiation modifies the ripening and accumulation of ethylene response factor (ERF) transcripts in **tomato** fruit. Postharvest Biol. & Technol. 102: 9 – 16.

Abstract

Ultraviolet-C (UV-C) radiation is used as a postharvest treatment to prolong the shelf life of fruit. However, this stressful process may also affect ethylene production and, consequently, the expression of genes encoding ethylene response factors (ERFs). To test this hypothesis, MicroTom tomatoes harvested at the breaker stage were subjected to: 1 – application of 3.7 kJ m^{-2} UV-C radiation, 2 – application of 2 μL L^{-1} 1-methylcyclopropene (1-MCP) followed by UV-C radiation; and 3 – without 1-MCP or UV-C (control treatment). After treatment all fruit were stored for 12 d at 21 ± 2 °C and 80 ± 5% relative humidity (RH). Although UV-C radiation increased ACC oxidase transcripts and stimulated ethylene production, the ripening evolution was delayed. Fruit treated with UV-C showed lower accumulation of lycopene, ß-carotene, lutein + zeaxanthin and δ-tocopherol; but retained higher levels of chlorogenic acid, ρ-coumaric acid and quercetin after 6 d. Additionally, UV-C treated fruit had higher contents of polyamines (putrescine and spermidine). Among the 14 ERFs studied, 11 (SI-ERF A.1, SI-ERF A.3,SI-ERF B.1, SI-ERF B.2, SI-ERF B.3, SI-ERF C.6, SI-ERF D.1, SI-ERF D.3, SI-ERF E.1, SI-ERF F.5, SI-ERF G.2) exhibited increased transcript accumulation, 2 ERFs (SI-ERF E.2 and SI-ERF E.4) showed decreased transcript accumulation and only 1 ERF (SI-ERF E.3) was not significantly affected by UV-C treatment. As expected, the transcript profiles of 1-MCP and/or UV-C-treated tomatoes demonstrate that ethylene plays an important role in the expression of ERFs. The delay in fruit ripening may be caused by the activation of ERFs that could act as regulators of metabolic pathways during ripening. However, this hypothesis needs to be better tested. In conclusion, a relationship has been established between UV-C treatment and ripening delay, correlated to changes in 13 ERF transcripts evaluated during postharvest treatment.

Keywords: /Tomato/ /Ripening/ /Senescence/ / 1-Methylcyclopropene/

HERBS & SPICES

CHILI PEPPERS

Sánchez-Segura, L., et.al. 2015. Morpho-structural description of epidermal tissues related to pungency of Capsicum species. J. Food Eng. 152 : 95–104.

Abstract

Chili peppers (Capsicum spp.) production is important worldwide due to its capsaicin contents. This work aimed to evaluate morphometrics of chili pepper tissues and in the formation of ampullas (structures related to pungency) by digital image analysis (DIA). Structural changes of epidermis in pungent chilli peppers ''habanero'' and ''jalapeno'' were evident at 15 and 31 dpa (days post-anthesis), respectively, while in ''bell pepper'' (no pungent), only minor changes were observed during 82 dpa. Fractal dimension (Fd) and lacunarity (Λ) values of cropped tissue images were useful to distinguishing between pungent on one side and intermediate and non-pungent varieties on the other. Correlations between fractal areas of evaluated tissues were high for ''jalapeno'' and ''bell pepper'' while for ''habanero'' no correlation was found. Linear regressions and significant correlations between Fd and K indicated that DIA morphology characteristics are related to ripening stages, thus indicating commercialisation and processing possibilities.

Keywords: /Capsicum/ /Ripening/

PEPPERMINT

Riachi, Liza G., Carlos A.B. De Maria. 2015. **Peppermint** antioxidants revisited. Food Chem. 72 – 81.

Abstract

This review discusses the relationship between the chemical composition and antioxidant property of peppermint tisane and essential oil. Phenolic acids (e.g. rosmarinic and caffeic acids), flavones (e.g. luteolin derivatives) and flavanones (e.g. eriocitrin derivatives) are possibly the major infusion antioxidants. Vitamin antioxidants (e.g. ascorbic acid and carotenoids) are minor contributors to the overall antioxidant potential. Unsaturated terpenes having a cyclohexadiene structure (e.g. terpinene) and minor cyclic oxygenated terpenes (e.g. thymol), may contribute to antioxidant potential whilst acyclic unsaturated oxygenated monoterpenes (e.g. linalool) may act as pro-oxidants in essential oil. Findings on the antioxidant potential of major cyclic oxygenated terpenes (menthol and menthone) are conflicting. Antioxidant behaviour of aqueous/organic solvent extracts and essential oil as well as the effect of environmental stresses on essential oil and phenolic composition are briefly discussed.

Keywords: /Peppermint/ /Antioxidant/

TUBERS & ROOTCROPS

LOTUS ROOT

Sun, Ying, et.al. 2015. Hydrogen sulfide inhibits enzymatic browning of fresh-cut **lotus root** slices by regulating phenolic metabolism. Food Chem. 177: 376 – 381.

Abstract

The effect of fumigation with hydrogen sulfide (H_2S) gas on inhibiting enzymatic browning of fresh-cut lotus root slices was investigated. Browning degree, changes in color, total phenol content, superoxide anion production rate ($O_2^{\bullet-}$), H_2O_2 content, antioxidant capacities (DPPH radical scavenging ability, ABTS radical scavenging activity and the reducing power) and activities of the phenol metabolism-associated enzymes including phenylalanine ammonialyase (PAL), catalase (CAT), peroxidase (POD), polyphenol oxidase (PPO) were evaluated. The results showed that treatment with 15 μl L^{-1} H_2S significantly inhibited the browning of fresh-cut lotus root slices ($P < 0.05$), reduced significantly $O_2^{\bullet-}$ production rate and H2O2 content, and enhanced antioxidant capacities ($P < 0.05$). PPO and POD activities in the fresh-cut lotus root slices were also significantly inhibited by treatment with H_2S ($P < 0.05$). This study suggested that treatment with exogenous H_2S could inhibit the browning of fresh-cut lotus root slices by enhancing antioxidant capacities to alleviate the oxidative damage.

Keywords: /Lotus/ /Fresh-Cut/ /Enzymatic Browning/

POTATO

Rocha, Artur B.O., et.al. 2015. Effect of UV-C radiation and fluorescent light to control postharvest soft rot in **potato** seed tubers. Scientia Hortic. 181: 174 – 181.

Abstract

Wet rot due to Pectobacterium carotovorum subsp. carotovorum is one of the main bacteria diseases that affect all potato cultivars causing significant losses. Potato plants contain glycoalkaloids being α-chaconine and α-solanine the main. The accumulation of these glycoalkaloids can be stimulated by several factors, especially light, having them important antimicrobial properties. The aim of this research was to evaluate how postharvest exposition to ultraviolet C (UV-C) and fluorescent light affects the development of P. carotovorum soft rot as well as the accumulation of α-chaconine and α-solanine, sprouting, weight loss and soluble solids content in potato seed tubers 'Agata' and 'Monalisa'. Susceptibility of P. carotovo-rum to UV-C light was first in vitro tested. For that, bacterial aliquots (107CFU mL−1) were grown in Petridishes (culture medium YDC) and subjected to 0.0, 2.3, 6.9, 11.5 or 34.5 kJ m^{-2} of UV-C (254 nm) and stored at 25◦C in darkness. Number of colonies was counted after 24 h. For in vivo analysis, potato seed tubers were subjected to UV-C (34.5 kJ m^{-2}) with subsequent storage of half of the samples in darkness and the other half under fluorescent light (photon flux of 1.6 μmol $m^{-2}s^{-1}$) at 25◦C and 88% RH during 21 days. Development (incidence) and severity of wet rot, concentration of α-chaconine and α-solanine,sprouting, and quality parameters were analyzed. Non UV-C treated tubers were used as control. UV-Clight at 34.5 kJ m^{-2} completely inhibited the development of P. carotovorum subsp. carotovorum in in vitro studies. For in vivo experiments, the control and the UV-C treated tubers stored under fluorescent light were less affected by soft rot than the UV-C treated stored under darkness since any disease incidence was detected on them. Control and UV-C treated tubers stored under fluorescent light as well as UV-C tubers kept in darkness showed an increased concentration of α-chaconine and α-solanine for both cultivars. The largest amount of these glycoalkaloids had an effective influence on controlling soft rot. These tubers also showed highest sprouts number, increased weight loss and soluble solids content. The use of UV-C, firstly reported here, and fluorescent light are advantageous to control soft rot without adversely affecting sprouting.

Keywords: /Potato/ /Postharvest/ /Soft Rot/

SUGAR BEET

Leiqing Pan , Renfu, et.al. 2015. Measurement of moisture soluble solids, sucrose content and mechanical properties in **sugar beet** using portable visible and near-infrared spectroscopy. Postharvest Biol. & Technol. 102: 42 – 50.

Visible and near-infrared spectroscopy, coupled with partial least squares regression, was used to predict the moisture, soluble solids and sucrose content and mechanical properties of sugar beet. Interactance spectra were acquired from both intact and sliced beets, using two portable spectrometers covering the spectral regions of 400–1100 nm and 900–1600 nm, respectively. Both visible and short-wave near- infrared (400–1100 nm) and near-infrared (900–1600 nm) spectrometers gave excellent predictions for the moisture, soluble solids and sucrose content of beet slices with the correlations (rp) of 0.89–0.95 and the standard errors of prediction (SEP) of 0.60–0.85. Lower prediction accuracies were obtained for intact beets, with the rp values of 0.75–0.85 and the SEPs of 0.88–1.23. However, the two spectrometers showed a poor ability of predicting the compressive mechanical properties (i.e., maximum force, area and the slope for the force/displacement curve) of both beet slices and intact beets. Using simple correlation analysis, we also identified wavelengths that had strong correlation with the measured compositions of sugar beets. The portable visible and near-infrared spectrometry is potentially useful for rapid assessment of the moisture, soluble solids and sucrose content of sugar beet at harvest and during postharvest handling and processing.

Keywords: /Sugar Beet/

YAM

Luo, Zisheng, et.al. 2015. Effect of nano-$CaCO_3$-LDPE packaging on quality and browning of fresh-cut **yam**. LWT - Food Sci. & Technol. 60: 1155 - 1161.

Abstract

In order to evaluate the effects of nano-$CaCO_3$-based low density polyethylene (nano-$CaCO_3$-LDPE) packaging on the quality of fresh-cut Chinese yam, the browning index, overall visual quality (OVQ), total bacterial count (TBC), and yeast and mold count (YMC), titratable acid, ascorbic acid, total phenolic content, ethylene production, malondialdehyde content, phenylalanine ammonia-lyase (PAL), polyphenol oxidase (PPO), and peroxidase (POD) activities were determined during storage at 10 °C. TBC and YMC counts of fresh-cut Chinese yam were significantly reduced by nano-$CaCO_3$-LDPE packaging. Nano-$CaCO_3$-LDPE packaged fresh-cut Chinese yam exhibited significantly lower activities of PAL, PPO, and POD compared to the control yam samples. Meanwhile, nano-$CaCO_3$-LDPE packaging significantly inhibited the increase of browning index, total phenolic and malondialdehyde content, and maintained OVQ, titratable acid, and ascorbic acid. These results indicated that nano-$CaCO_3$-LDPE packaging and stored at 10 °C was a promising approach in inhibiting browning and maintaining quality of fresh-cut Chinese yam.

Keywords: /Yam/ /Fresh-Cut/ /Browning/ /Quality/

ORNAMENTALS

CHRYSANTHEMUM

Fan, Hong-mei, et.al. 2015. Effects of humic acid derived from sediments on the postharvest vase life extension in cut **chrysanthemum** flowers. Postharvest Biol. & Technol. 101: 82 – 87.

Abstract

Previous research has shown that humic acid can extend the vase life of cut flowers. However, the mechanisms responsible for this effect are unclear. In this study, the physiological mechanisms of foliar humic acid fertilizer on cut chrysanthemum flower postharvest vase life were investigated. Seedlings of chrysanthemum were sprayed with the same volume of distilled H_2O, inorganic NPK fertilizer and organic foliar humic acid fertilizer every 15 days (15, 30, 45, 60 days after transplanting). The results showed that foliar application of humic acid improved the chlorophyll content, the net photosynthetic rate (P_n), contents of soluble sugars and soluble protein in the leaves of chrysanthemum, and increased the flower size, fresh weight, vaselife, activities of antioxidant enzymes, and decreased the malondialdehyde (MDA) content in cut chrysanthemum flowers. It was concluded that the responses of the foliar humic acid fertilizer on postharvest vase life extension of cut chrysanthemum flowers could be related with the higher chlorophyll content, P_n, contents of soluble sugars and soluble protein in the leaves, the greater flower size, fresh weight, activities of antioxidant enzymes, and the lower MDA content in cut chrysanthemum flowers.

Keywords: /Chrysanthemum/ / Postharvest / /Vase Life/

PAEONIA

Zhang, Chao, et.al. 2015. Glucose supply improves petal coloration and anthocyanin biosynthesis in **Paeonia** suffruticosa 'Luoyang Hong' cut flowers. Postharvest Biol. & Technol. 101: 73 – 81.

Abstract

Sugars induce the accumulation of anthocyanins, the main pigments for flower coloration, as well as the expression of anthocyanin biosynthetic genes in many plants. However, the effects of exogenous sugar on flower color and anthocyanin biosynthesis have not been elucidated in the cut flowers of Paeonia suffruticosa, a traditional Chinese ornamental plant. Here, we found that 333, 500 and 667mM glucose treatments all improved petal color, with lower lightness, higher redness and chroma, and induced nsoluble sugars contents and anthocyanin accumulation in the petals of P. suffruticosa 'Luoyang Hong' cut flowers. Furthermore, treatment with 3-O-methylglucose, a glucose analog which could not be phosphorylated by hexokinase (HXK), increased anthocyanin accumulation and induced the expression of PsbHLH1,PsbHLH3, PsWD40-1, PsWD40-2, PsMYB2, PsCHS1 and PsCHI1 only for a short time, whereas treatment of mannose, known to be phosphorylated by HXK, constantly up-regulated the expression of several anthocyanin biosynthetic genes, but inhibited the expression of PsF3'H1 and PsANS1 and anthocyanin accumulation in petals. Glucose treatment was found to greatly enhance anthocyanin content and induced the expression of PsWD40-2, PsMYB2, PsCHS1, PsCHI1 and PsF3'H1 through glucose signaling. N-Acetyl-glucosamine, a specific inhibitor of HXK, blocked glucose induction of anthocyanin accumulation and PsF3'H1 expression. In addition, anthocyanin contents of flowers with the sucrose treatment were lower than those with the treatment of equimolar concentrations of glucose. The expression levels of PsCHI1 and PsF30H1 were lower in sucrose-treated flowers than those in glucosetreated flowers, although the expression levels of most geneswere higher in sucrose-treated flowers. Our findings should contribute to a deeper understanding of the regulation

of glucose on petal color and anthocyanin biosynthesis in P. suffruticosa cut flowers, andwould provide theoretical foundation for their postharvest technology development.

Keywords: /Paeonia/ /Cutflowers/