

**SELECTIVE DESSIMINATION OF INFORMATION (SDI)  
PDF REPRINTS as of March 2013**

**GENERAL**

**EVAPORATIVE COOLING**

Abbouda, Sirelkhathim and Emad A. Almuhanha. 2012. Improvement of **evaporative cooling** efficiency in greenhouses. Int'l. J. Latest Trend Agr. Food Sci. 2(2): 83 – 89.

**Abstract**

An assisted evaporative cooling system is proposed and analyzed to get higher cooling efficiency in hot and arid environments such as Saudi Arabia. For this purpose, a two-stage evaporative cooling experimental setup consisting of a direct evaporative cooling and indirect evaporative cooling was designed, constructed, and tested. The obtained data showed that, the hourly average solar radiation flux incident outside and transmitted into the greenhouse was 555.7 and 298.7 W/m<sup>2</sup>, respectively, consequently, the effective transmittance of the covering material was on the average 53.75%. The temperature and relative humidity of outdoor air, respectively, were 37.3°C and 21.8%, dry and wet-bulb temperatures just leaving the cooling coil were 29.4°C and 18.8°C, respectively, and dry-bulb temperatures of air just leaving the direct evaporative cooling were 22.8°C. The obtained results also revealed that, the overall effectiveness of the combining cooling system was more than 100%. Thus, this system environmentally clean and energy efficient system, which considered as an alternative to the mechanical, vapour compression systems. It can also conclude that, this combining cooling system can use in various climatic conditions as an environmentally clean and energy efficient system.

**Keywords:** /Evaporative Cooling/

**FOOD SAFETY**

Bülent Ergönül. 2013. Consumer awareness and perception to **food safety**: a consumer analysis Food Control. 461 – 471.

**Abstract**

Relationships among the main food safety concerns and food consumption habits of 600 consumers living in Manisa City center, Turkey were evaluated. Respondents were interviewed face-to-face by a structured questionnaire. Sixty six questions under different groups (demographics of respondents, food safety perceptions, and awareness of food-borne illnesses, contaminants of foods and hazards, sources of food safety information, confidence in food safety authorities, food handling and safety practices at homes) were asked in the interview. Data obtained from the study indicated the need for much more consumer education regarding safe food handling practices in the domestic environment. Food handling practices and food safety are of public concern, and action is required to prevent the food borne

illnesses. It was seen that, TV and radio programmes are important media for sharing the knowledge of food safety with consumers.

**Keywords:** /Food Safety/ /Consumer Behavior/

## **FOOD TEXTURE**

Chen, Lan, Umezuruike Linus Opara. 2013. Texture measurement approaches in fresh and processed foods — a review. *Food Res. Int'l.* 51: 823 – 835.

### **Abstract**

Knowledge of textural properties is important for stakeholders in the food value chain including producers, postharvest handlers, processors, marketers and consumers. For fresh foods such as fruit and vegetable, textural properties such as firmness are widely used as indices of readiness to harvest (maturity) to meet requirements for long term handling, storage and acceptability by the consumer. For processed foods, understanding texture properties is important for the control of processing operations such as heating, frying and drying to attain desired quality attributes of the end product. Texture measurement is therefore one of the most common techniques and procedures in food and postharvest research and industrial practice. Various approaches have been used to evaluate the sensory attributes of texture in foods. However, the high cost and time consumption of organizing panelists and preparing food limit their use, and often, sensory texture evaluation is applied in combination with instrumental measurement. Objective tests using a wide range of instruments are the most widely adopted approaches to texture measurement. Texture measurement instruments range from simple hand-held devices to the Instron machine and texture analyzer which provide time-series data of product deformation thereby allowing a wide range of texture attributes to be calculated from force–time or force–displacement data. In recent times, the application of novel and emerging non-invasive technologies such as near-infrared spectroscopy and hyper-spectral imaging to measure texture attributes has increased in both fresh and processed foods. Increasing demand for rapid, cost-effective and non-invasive measurement of texture remains a challenge in the food industry. The relationships between sensory evaluation and instrumental measurement of food texture are also discussed, which shows the importance of multidisciplinary collaboration in this field.

**Keywords:** /Food texture/ /Food Quality/ /Sensory Evaluation/ /Sensory Evaluation/

## **FRESH CUT**

Waghmare, R. b. P.V. Mahanjan, U.S., Annapurea. 2013. Modelling the effect of time and temperature on respiration rate of selected **fresh-cut** produce. *Postharvest Biol. & Technol.* 80: 25 – 30.

### **Abstract**

For the design of modified atmosphere packaging (MAP) it is necessary to know the influence of time and temperature on the respiration rate (RR) of fresh-cut produce. Mathematical modelling is used for prediction of RR as a function of both time and temperature. In this work, RR of three fresh-cut products viz. coriander, cluster beans and beetroot, were quantified and a mathematical model was developed for prediction of RR as a function of both time and temperature. RR (RO<sub>2</sub> and RCO<sub>2</sub>) of each

fresh-cut produce was measured at 10, 20 and 30 °C for storage times of 1–5 d under aerobic conditions using a closed system. RO<sub>2</sub> of coriander, cluster beans and beetroot ranged from 54.0 to 228.6, 40.5 to 143.9 and 11.5 to 130.5 mg kg<sup>-1</sup> h<sup>-1</sup> respectively and RCO<sub>2</sub> ranged from 81.2 to 301.7, 52.7 to 199.7 and 33.5 to 195.2 mg kg<sup>-1</sup> h<sup>-1</sup> respectively over the three storage temperatures tested. Temperature and the interaction of time and temperature had significant effects on RR. The dependence of respiration rate of fresh-cut produce on temperature and time was well described by Arrhenius and first order decay models.

**Keywords:** /Fresh Cut/ /Respiration rate/ /Fresh-Cut Produce/ /Temperature/ /Packaging

## FRESH PRODUCE

Goodburn, Caroline, Carol A. Wallace. 2013. The microbiological efficacy of decontamination methodologies for **fresh produce**: a review. Food Control. 418 – 427.

### Abstract

Fresh fruits and vegetables are an essential part of the world populations' diet, contributing essential vitamins and minerals, and they are often eaten raw or minimally processed. Fruits and vegetables grown using conventional agricultural methods are at risk from microbiological contamination and foodborne illness relating to the consumption of produce is widely reported throughout the world, as illustrated by recent figures from the USA (at least 713 produce related outbreaks between 1990 and 2005) and UK (88 outbreaks between 1996 and 2006). Better understanding of produce decontamination is essential to support industry in assuring the safety of fruit and vegetable products, thus contributing to consumer health protection. The purpose of this study was to establish the current state of knowledge on industrial produce decontamination techniques and to identify and prioritise research gaps regarding practical and effective mechanisms to reduce microbial loading of produce with particular reference to industrially cut, washed and prepared fresh produce. Using suitable keywords, a literature review was executed using academic databases and industry sources to identify current literature on different decontamination technologies. Efficacy of approaches was compared to that of chlorine washing, the most common decontamination method used by the fresh produce industry. Findings indicate that the identified technologies had varying efficacy of microbiological reduction when compared to chlorine, and the reductions achievable across a range of methods are limited, giving rise to food safety concerns. In addition, the results demonstrate that there has been limited consideration given to several key factors, namely industrial application of the technology approaches, organoleptic acceptability of the product, whether the microbiological reduction could be sustained throughout the life of the product and consumer acceptability of the technology. This preliminary study has highlighted concerns about the efficacy of existing produce decontamination techniques and identified research gaps regarding efficacy and industrial application of new decontamination technologies.

**Keywords:** /Fresh produce/ /Microbiological Decontamination/ /Fresh Produce Safety/

## **FRUIT**

Chan, Zhulong. 2013. Proteomic responses of **fruits** to environmental stresses. *Plant Sci.* 311 (3): 1 – 10.

### **Abstract**

Fruits and vegetables are extremely susceptible to decay and easily lose commercial value after harvest. Different strategies have been developed to control postharvest decay and prevent quality deterioration during postharvest storage, including cold storage, controlled atmosphere (CA), and application of biotic and abiotic stimulus. In this review, mechanisms related to protein level responses of host side and pathogen side were characterized. Protein extraction protocols have been successfully developed for recalcitrant, low protein content fruit tissues. Comparative proteome profiling and functional analysis revealed that defense related proteins, energy metabolism, and antioxidant pathway played important roles in fruits in response to storage conditions and exogenous elicitor treatments. Secretome of pathogenic fungi has been well investigated and the results indicated that hydrolytic enzymes were the key virulent factors for the pathogen infection. These protein level changes shed new light on interaction among fruits, pathogens, and environmental conditions. Potential postharvest strategies to reduce risks of fruit decay were further proposed based on currently available proteomic data.

**Keywords:** /Fruits/ /Postharvest/ /Pathogen/

## **SUPPLY CHAIN**

Bosona, Techane, Ginna Gebresenbet. 2013. Food traceability as an integral part of logistics management in food and agricultural **supply chain**. *Food Control.* 33: 32 – 48.

### **Abstract**

The contemporary food supply chain (FSC) should adequately provide information that consumers and other concerned bodies need to know such as variety of the food attributes, country of origin, animal welfare, and genetic engineering related issues. For this, effective food traceability system (FTS) is important. The objective of this study was to conduct a comprehensive literature review on food traceability issues. About 74 studies, mainly focusing on food traceability issues and published during 2000 - 2013, were reviewed. Based on the review results, the definition, driving forces, barriers in developing and implementing FTSs, benefits, traceability technologies, improvements, and performances of FTSs have been identified and discussed. Considering FTS as an integral part of logistics management, new conceptual definition of FTS has been provided. This review has pointed out that the issue of developing effective and full chain FTS is quite complex in nature as it requires a deeper understanding of real processes from different perspectives such as economic, legal, technological, and social issues. Therefore, future researches (recommended here) on traceability should focus on: integration of traceability activities with food logistics activities; technological aspects of FTSs; the linkage between traceability system and food production units; standardization of data capturing and information exchange; awareness creation strategies; continuity of information flow and effective communication of traceability information to consumers and other stakeholders; the linkage between different drivers of FTS; improvement strategies of FTS; and development of performance evaluation frameworks for FTSs.

**Keywords:** /Supply Chain/ /Food Traceability/

Ma, Ying and Yuanyuan Zhang. 2013. Research on protection of the agricultural products quality safety based on evolution game from the perspective of the supply chain. *Advance J. Food Sci. & Technol.* 5(2): 153 – 159.

**Abstract:**

This study firstly introduces the research status quo to protect the agricultural products quality safety. Secondly, the game model is established to ensure the agricultural products quality safety, respectively, analyzed from the horizontal relations and the vertical relationships in the supply chain of agricultural products. Finally, on the basis of the analysis model, measures to protect the agricultural products quality safety are proposed, the study shows that increasing government regulations of enterprises in the supply chain of agricultural products and giving full play to the supervision and guidance role of the media and consumers will help to ensure the agricultural products quality safety.

**Keywords:** /Supply Chain/ /Quality Safety/

**FRUITS**

**AVOCADO**

Pereira, Marcio Eduardo Canto, et.al. 2013. Volatile profiles of ripening West Indian and Guatemalan -West Indian avocado cultivars as affected by aqueous 1-methylcyclopropene. *Postharvest Biol. & Technol.* 80: 37 – 46.

**Abstract**

Separate experiments were conducted with three major commercial avocado (*Persea americana* Mill.) cultivars grown in Florida: 'Simmonds' (early-season, West Indian race); 'Booth 7' (mid-season, Guatemalan-West Indian hybrid); and 'Monroe' (late-season, Guatemalan-West Indian hybrid). Fruit were harvested at preclimacteric stage and left untreated (Control) or treated 24 h after harvest with aqueous 1-methylcyclopropene (1-MCP) at 1.39 (treatment M1) or 2.77  $\mu\text{mol L}^{-1}$  a.i. (treatment M2) (75 or 150  $\mu\text{g L}^{-1}$ ) for 1 min at 20 °C. Whole fruit ripening was monitored at 20 °C/92%  $\pm$  3% R.H. and based on whole fruit firmness, respiration and ethylene evolution. Fruit volatiles were assessed at preclimacteric (24 h after harvest), mid-ripe (half of initial fruit firmness) and ripe maturity stages, from 100 g of chopped pulp using a purge and trap system. Untreated, firmer fruit 'Monroe' (268 N at harvest) ripened within 12 d of harvest while softer fruit 'Simmonds' (118 N) ripened within only 6 d. 1-MCP treatment extended ripening time from 33% (M1) to 83% (M2). All fruit softened normally, indicating the potential benefits of aqueous 1-MCP as a postharvest treatment for avocado when applied at these concentrations. Volatile profiles differed among the three cultivars with several compounds detected in only one cultivar, results that may contribute to a potential identification of the origin of the cultivar based on fruit volatile composition. The West Indian cultivar 'Simmonds' had much higher emission of hexanal (preclimacteric fruit) and cis-3-hexenal and cis-3-hexen-1-ol (ripe fruit) than the Guatemalan-West Indian hybrids 'Booth 7' and 'Monroe'. On the other hand, these latter hybrids had much higher levels of alkanes than 'Simmonds'. Treatment with 1-MCP increased emissions of alkanes during ripening of 'Booth 7' and 'Monroe'. Total volatiles of avocado decreased during ripening

mainly due to the significant reduction of sesquiterpenes, the main group of volatiles in all cultivars at harvest ('Simmonds', 53%; 'Booth 7', 78%; 'Monroe', 66%).  $\alpha$ -Caryophyllene was the major compound at harvest, but decreased to less than 2% in ripe fruit, at which point most sesquiterpenes were not detected. Among the 10 sesquiterpenes commonly found in the avo-cado cultivars in this study, only  $\alpha$ -Copaene had significantly higher emissions in mid-ripe fruit treated with the higher concentration of 1-MCP ( $2.77 \mu\text{mol L}^{-1}$  a.i.), suggesting that ethylene participates in the regulation of this sesquiterpene.

**Keywords:** /Avocado/ /1-methylcyclopropene/

## BLUEBERRIES

Pangloli, Philipus, Yen-Con Hung. 2013. Reducing microbiological safety risk on blueberries through innovative washing technologies. *Food Control*. 32: 621 – 625.

### Abstract

The objective of this study was to determine the efficacy of novel home-use sanitizers (ozonated water, FIT solution, and EO water) in killing *Escherichia coli* O157:H7 on blueberries compared to common bleach solution and tap water. Blueberries samples (6 berries; ca. 10 ± 1 g) were spot-inoculated with 60 ml (10ml/berry) of a mixture of 5 strains *E. coli* O157:H7 (ca.  $8 \times 10^9$  log CFU/ml) and treated in sanitizers for 1 to 5 min. The greatest reductions of the pathogen ( $4.4 \times 10^8$  log CFU/g) were achieved by treating blueberries in bleach solutions (100 mg/l free chlorine), followed by EOwater (30 mg/l free chlorine;  $3.9 \times 10^4$  log CFU/g), FIT solution ( $3.3 \times 10^6$  log CFU/g), ozonated water (1.5 mg/l ozone;  $2.3 \times 10^5$  log CFU/g), and tap water (1.9 - 2.7 log CFU/g). In general, increasing treatment time from 1 to 5 min significantly increased the reduction of the pathogen, except for the bleach solution. In most cases, FIT solution, EOwater, and bleach solution inactivated *E. coli* O157:H7 in treatment solutions after use. Application of novel sanitizers to wash blueberries at home and food services could reduce the risk of *E. coli* O157:H7 that may attach to the berries and minimize cross-contamination during preparation of foods.

**Keywords:** /Blueberries/ /Microbial Safety/ /Washing/

## CANTALOUPE

Fang, ting, Liu Yanhong, Lihan Huang. 2013. Growth kinetics of *Listeria monocytogenes* and spoilage microorganisms in fresh-cut cantaloupe. *Food Microbiol*. 34: 174 -181.

### Abstract

The main objective of this study was to investigate the growth kinetics of *Listeria monocytogenes* and background microorganisms in fresh-cut cantaloupe. Fresh-cut cantaloupe samples, inoculated with three main serotypes (1/2a, 1/2b, and 4b) of *L. monocytogenes*, were incubated at different temperatures, ranging from 4 to 43 °C, to develop kinetic growth models. During storage studies, the population of both background microorganisms and *L. monocytogenes* began to increase almost immediately, with little or no lag phase for most growth curves. All growth curves, except for two growth curves of *L. monocytogenes* 1/2a at 4 °C, developed to full curves (containing exponential and stationary phases), and can be described by a 3-parameter logistic model. There was no significant difference ( $P > 0.28$ ) in the growth behaviors and the specific growth rates of three different serotypes

of *L. monocytogenes* inoculated to fresh-cut cantaloupe. The effect of temperature on the growth of *L. monocytogenes* and spoilage microorganisms was evaluated using three secondary models. For *L. monocytogenes*, the minimum and maximum growth temperatures were estimated by both the Ratkowsky square-root and Cardinal parameter models, and the optimum temperature and the optimum specific growth rate by the Cardinal parameter model. An Arrhenius-type model provided more accurate estimation of the specific growth rate of *L. monocytogenes* at temperatures <4 °C. The kinetic models developed in this study can be used by regulatory agencies and food processors for conducting risk assessment of *L. monocytogenes* in fresh-cut cantaloupe, and for estimating the shelf-life of fresh-cut products.

**Keywords:** /Cantaloupe/ /Fresh-Cut/

## **CHERRY**

Dokhaniels, Afsaneh Yousefpour, et.al. 2013. Postharvest salicylic acid treatment enhances antioxidant potential of cornelian **cherry** fruit. *Scientia Hort.* 154: 31 – 36.

### **Abstract**

In order to enhance postharvest antioxidant potential of cornelian cherry fruits, the effects of treatment with 0 (control), 1 and 2 mM salicylic acid (SA) on total phenols (TP), flavonoids (TF), anthocyanins (TA), ascorbic acid (AA) contents, DPPH scavenging activity (TAA) and phenylalanine ammonia-lyase (PAL) enzyme activity were investigated in fruits stored at 4 °C for 21 days. The DPPH scavenging activity of the cornelian cherry fruits was significantly increased by SA treatment. In addition, fruits treated with SA exhibited significantly higher total phenols, flavonoids, anthocyanins and ascorbic acid contents, and higher PAL enzyme activity. These results suggested that SA treatment might be a powerful strategy to enhance antioxidant potential of cornelian cherry fruits. In addition, these results suggested that enhanced antioxidant potential of cornelian cherry fruits treated with SA might be due to the stimulation of PAL enzyme activity and thus triggering the phenylpropanoid–flavonoids pathways.

**Keywords:** /Cherry/ /Postharvest/ /Salicylic Acid/

## **CITRUS**

Marcet-Houben, Marina, et.al. 2012. Genome sequence of the necrotrophic fungus *Penicillium digitum*, the main postharvest pathogen of **citrus**. *BmC Genomics.* 13: 1 – 17.

### **Abstract**

**Background:** *Penicillium digitum* is a fungal necrotroph causing a common citrus postharvest disease known as green mold. In order to gain insight into the genetic bases of its virulence mechanisms and its high degree of host-specificity, the genomes of two *P. digitum* strains that differ in their antifungal resistance traits have been sequenced and compared with those of 28 other Pezizomycotina. **Results:** The two sequenced genomes are highly similar, but important differences between them include the presence of a unique gene cluster in the resistant strain, and mutations previously shown to confer fungicide resistance. The two strains, which were isolated in Spain, and another isolated in China have identical mitochondrial genome sequences suggesting a recent worldwide expansion of the

species. Comparison with the closely-related but non-phytopathogenic *P. chrysogenum* reveals a much smaller gene content in *P. digitatum*, consistent with a more specialized lifestyle. We show that large regions of the *P. chrysogenum* genome, including entire supercontigs, are absent from *P. digitatum*, and that this is the result of large gene family expansions rather than acquisition through horizontal gene transfer. Our analysis of the *P. digitatum* genome is indicative of heterothallic sexual reproduction and reveals the molecular basis for the inability of this species to assimilate nitrate or produce the metabolites patulin and penicillin. Finally, we identify the predicted secretome, which provides a first approximation to the protein repertoire used during invasive growth. **Conclusions:** The complete genome of *P. digitatum*, the first of a phytopathogenic *Penicillium* species, is a valuable tool for understanding the virulence mechanisms and host-specificity of this economically important pest.

**Keywords:** /Citrus/ /Postharvest/ /Pathogens/

Reyes-Campos, Rosario, et.al. 2013. Irradiation effects on the chemical quality of **guavas**. *Advance J. Food Sci. & Technol.* 5(2): 90 – 98.

### **Abstract**

The aim of this research is to evaluate the effect of radiation treatment on the chemical changes of main components of guavas (*Psidium guajava*, var. *media china*). The quality of guavas irradiated by Co-60 gamma rays at 150, 200, and 300 Gray as Gy/min were evaluated during storage at room and low temperature. Results indicated that the differences observed are principally associated with maturity stages, temperature, and changes attributed to physiological and metabolic processes. Radiation treatment produced reductions in ascorbic acid and  $\beta$ -carotene. The results suggest that fruit in storage can recover from stress produced by treatment. No other significant changes were observed in any other parameters including sugars, pectin, and citric acid.

**Keywords:** /Guava/ /Irradiation/ /Quality

### **KIWIFRUIT**

Benítez, S.. I. Achaerandio, F. Sepulcre, M. Pujolà. 2013. Aloe vera based edible coatings improve the quality of minimally processed 'Hayward' **kiwifruit**. *Postharves Biol. & Technol.* 81: 20 – 35.

### **Abstract**

This article studies the efficacy of an edible coating based on Aloe vera gel at four different concentrations (0, 1, 5, 15% (v/v)) in maintaining the quality of fresh-cut kiwifruit. The kiwifruit slices were packaged under passive atmosphere and stored at  $4 \pm 1$  °C. Quality attributes such as colour and texture (firmness and texture profile analysis), titratable acidity, total soluble solids, pectin content, microbial load and sensory parameters were evaluated during storage. In general, Aloe vera coating reduced respiration rates and microbial spoilage in sliced kiwifruit. After seven days of storage, the mesophilic load dropped by approximately one logarithmic unit for slices coated with 15% and 5% Aloe vera. Total pectin depoly-merization was also lower in the treated samples and the texture of the uncoated samples deteriorated more rapidly than the treated slices during storage. Furthermore, due to the atmospheric composition and the microbial load, the quality of the control samples declined after six days of storage. Our results show that an Aloe vera coating improved the quality of stored kiwifruit slices. The best results obtained in the instrumental texture profile and in the preference panel test

were with the 5% coating, indicating that this may be a healthy alternative coating for fresh-cut kiwifruit.

**Keywords:** /Kiwifruit/ /Minimally Processed/ /Edible Coating/

## LITCHI

Jing, Guoxing, et.al. 2013. Effect of pyrogallol on the physiology and biochemistry of **litchi** fruit during storage. Chem. Central J. 1 – 11.

### Abstract

**Background:** Litchi (*Litchi chinensis* Sonn.) fruit are highly perishable and have a very short shelf life, easily turning brown and decaying. This study investigated the efficiency of pyrogallol, a catechin on the physiology and biochemistry in relation to storage life of litchi fruit. **Results:** Fruit were treated with pyrogallol at 1 mM and then stored at ambient temperature (25°C) or low temperature (4°C). Compared with control, pyrogallol significantly reduced pericarp browning and delayed the rotting of fruit day 4 at 25°C, and on day 30 at 4°C. The chemical treatment reduced respiration rate and the activities of peroxidase (POD) and polyphenol oxidase (PPO), and delayed the loss of membrane permeability. Pyrogallol increased the activity of phenylalanine ammonia-lyase (PAL), delayed the loss of anthocyanin and phenolics, and maintained high 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging activity and reducing power. High performance liquid chromatograph (HPLC) analysis clearly indicated that treated fruit contained higher concentration of the four phenolic compounds procyanidin B1, (+)-catechin, (-)-epicatechin and (-)-epicatechin-3-gallate. **Conclusions:** The application of pyrogallol partially reducing pericarp browning and changed quality-related physiological activities and, thus, pyrogallol could have beneficial effects on pericarp browning and fruit decay control, and could be helpful for litchi fruit postharvest storage.

**Keywords:** /Litchi/ /Physiology/ /Postharvest/ /Quality/ /Storage/

## MUSKMELON

Simona, Vallone et.al. 2013. An integrated approach for flavour quality evaluation in **muskmelon** (*Cucumis melo* L. *reticulatus* group) during ripening. Food Chem. 139: 171 – 183.

### Abstract

Numerous and diverse physiological changes occur during fruit ripening and maturity at harvest is one of the key factors influencing the flavour quality of fruits. The effect of ripening on chemical composition, physical parameters and sensory perception of three muskmelon (*Cucumis melo* L. *reticulatus* group) cultivars was evaluated. Significant correlations emerging from this extensive data set are discussed in the context of identifying potential targets for melon sensory quality improvement. A portable ultra-fast gas chromatograph coupled with a surface acoustic wave sensor (UFGC-SAW) was also used to monitor aroma volatile concentrations during fruit ripening and evaluated for its ability to predict the sensory perception of melon flavour. UFGC-SAW analysis allowed the discrimination of melon maturity stage based on six measured peaks, whose abundance was positively correlated to maturity-specific sensory attributes. Our findings suggest that this technology shows promise for future applications in rapid flavour quality evaluation.

**Keywords:** /Melon/ /Maturity/ /Ripening/

## PAPAYA

Fabi, Joao Paulo, et.al. 2013. Analysis of ripening-related gene expression in **papaya** using an BMC Plant Biol. 2 – 19.

### Abstract

**Background:** Papaya (*Carica papaya* L.) is a commercially important crop that produces climacteric fruits with a soft and sweet pulp that contain a wide range of health promoting phytochemicals. Despite its importance, little is known about transcriptional modifications during papaya fruit ripening and their control. In this study we report the analysis of ripe papaya transcriptome by using a cross-species (XSpecies) microarray technique based on the phylogenetic proximity between papaya and *Arabidopsis thaliana*. **Results:** Papaya transcriptome analyses resulted in the identification of 414 ripening-related genes with some having their expression validated by qPCR. The transcription profile was compared with that from ripening tomato and grape. There were many similarities between papaya and tomato especially with respect to the expression of genes encoding proteins involved in primary metabolism, regulation of transcription, biotic and abiotic stress and cell wall metabolism. XSpecies microarray data indicated that transcription factors (TFs) of the MADS-box, NAC and AP2/ERF gene families were involved in the control of papaya ripening and revealed that cell wall-related gene expression in papaya had similarities to the expression profiles seen in *Arabidopsis* during hypocotyl development. **Conclusion:** The cross-species array experiment identified a ripening-related set of genes in papaya allowing the comparison of transcription control between papaya and other fruit bearing taxa during the ripening process.

**Keywords:** /Papaya/ /Ripening/

Iniestra-González, Jesus J. 2013. **Papaya** endoxylanase biochemical characterization and isoforms expressed during fruit ripening. *Postharvest Biol. & Technol.* 81: 13 – 22.

### Abstract

Papaya fruit ripening processes involve the coordinated action of several hydrolases that causes cell wall degradation. Endoxylanase participates in xylan or arabinoxylan modifications and its importance has been related to papaya softening. However, endoxylanase has been not fully characterized biochemically and kinetically. Semipurified endoxylanase from ripe 'Maradol' papaya fruit had an optimal temperature from 45 °C to 50 °C, a pH optimum of 5.5 against Remazol brilliant blue-xylan (RBB-Xylan) and enzymatic activity remained stable during 36 h at 45 °C. The activation energy of the enzyme was 25.5 kJ mol<sup>-1</sup>, and the V<sub>max</sub> at 32, 37 and 42 °C was 788.9, 888.9 and 1085.6 g kg<sup>-1</sup> s<sup>-1</sup>, respectively. The K<sub>m</sub> did not change as a function of temperature and was measured as 1.8 g L<sup>-1</sup> and was within the range reported for other xylanases. Total proteins were extracted from color-break, half-ripe and ripe fruit. A pre-endoxylanase at 63.9 kDa was identified in the color-break fruit and an active endoxylanase at 32.5 kDa that was only found in ripe fruit, when the highest enzymatic activity was obtained. Immunodetection on two-dimensional gel electrophoresis (2DE) protein blots showed three isoforms of the pre-endoxylanase at color-break and ripe stages and, four isoforms in ripe fruit

that were absent in color-break fruit. The biochemical and kinetic characteristics of the endoxylanase are crucial to our understanding papaya fruit softening.

Keywords: /Papaya/ /Softening/ /Ripening/

## PEACH

Insausti, Pedro, Santiago Gorjón. 2013. Floods affect physiological and growth variables of **peach** trees (*Prunus persica* (L.) Batsch), as well as the postharvest behaviour of fruits. *Scientia Hort.* 152: 56 – 60.

### Abstract

Flooding is a case of abiotic stress that can affect plant growth, yield and fruit quality of many fruit trees species. The peach tree is recognized as highly susceptible to this stress factor. The aim of this study was to investigate the effects of flood periods on some physiological variables directly related to the growth and development of different organs of the peach tree and to evaluate the response to flooding by the plant with respect to postharvest fruit ripening. Flood cycles of 12 h per day were applied for two months to 'Red Globe' peach plants, comparing them with other plants with no flooding. Physiological variables, growth and behavior of the fruits after harvesting were evaluated. Flooding affected negatively leaf conductance and water potential and significantly decreased the chlorophyll content of leaves compared to controls. The trees subjected to flooding had branches with lower diameter and length growth, as well as smaller fruits, than control trees. The fruits from flooded trees produced ethylene earlier after harvest and responded with a faster softening. The results of this study proved that stress due to flooding produces responses that not only affect the plant but also the fruits after harvest.

Keywords: /Peach/ /Postharvest/ /Ethylene/ /Fruit Firmness/

## STONEFRUIT

Sisquella, M., et.al. 2013. Immersion of fruit in water to improve radio frequency treatment to control brown rot in **stone fruit**. *Postharvest Biol. & Technol.* 80: 31 – 36.

### Abstract

Brown rot caused by *Monilinia* spp. is the most important postharvest disease of stone fruit. Currently, no chemical fungicides are allowed in the European Union to be applied to stone fruit after harvest, which has increased the need to develop alternative methods. Radio frequency (RF) treatment at 27.12 MHz with fruit immersed in water was studied to control brown rot in peaches and nectarines artificially inoculated with *M. fructicola*. Additionally, RF treatment in air was also investigated to evaluate the benefit of water immersion to reduce the effect of fruit size on treatment efficacy. RF treatment with fruit immersed in water at 20 °C applied for 9 min significantly reduced brown rot incidence in both peaches and nectarines and no significant differences in RF efficacy were observed depending on fruit size. However, when RF treatment was applied in air for 18 min, brown rot reduction was significantly higher in large fruit than in small fruit. Finally, the decrease in exposure time of radio frequency treatment with fruit immersed in water with increasing water temperature was also studied. Reduction of treatment time to 6 and 4.5 min was achieved by increasing water temperature at 35 and

40 °C, respectively, to control brown rot without adverse external and internal damage in both 'Baby Gold 9' peaches and 'Autumn Free' nectarines.

**Keywords:** /Stone fruit/ /Heat Treatment/ /Postharvest Disease Control/

## **WATERMELON**

Abbaszadeh, Rouzbeh, et.al. 2013. Evaluation of watermelon texture using their vibration responses. Biosystems Eng. 115: 102 – 105.

### **Abstract**

Flesh texture quality is an important attribute for watermelons that can be used as a ripeness indicator for sorting fruits. A non-destructive method is employed here, based on vibrations response, to assess the consumer opinion about watermelon (Crimson Sweet) tissue. The responses of samples to vibration excitation were recorded by laser Doppler vibrometry (LDV). The amplitude and phase as two spectrums of frequency response function were extracted over a wide frequency range. Following non-destructive tests, the watermelons were sensory evaluated. The samples were graded in a range of ripeness by panel members in terms of texture acceptability. Stepwise multiple linear regression (SMLR) and partial least squares regression (PLSR) were applied to extracted vibration spectrums to construct prediction models of watermelon flesh quality. The results showed that performance of SMLR models on phase spectrum was better than others. The determination coefficients (R<sup>2</sup>) of the calibration and cross validation models were 0.9998 and 0.9986 respectively. This study demonstrated the feasibility of mentioned method for predicting the quality of watermelons in industrial grading systems.

**Keywords:** /Watermelon/ /Texture/

## **VEGETABLES**

### **BELLPEPPER**

Ignat, Timea, et.al. 2013. Nonlinear methods for estimation of maturity stage, total chlorophyll, and carotenoid content in intact bell peppers. Biosystems Eng. 114: 414 – 425.

### **Abstract**

The objective of the present study was to develop a fast, non-destructive method to measure the bell pepper chlorophyll content, which is one of the major maturity indices for determining harvesting time. The research is based on visiblenear-infrared (VISeNIR) and short-wave infrared (SWIR) spectrometry. Red, green and yellow varieties were examined: 'Celica', 'Ever Green' and 'No.117', respectively. Peppers were marked at the flowering stage, and 20 samples of each variety were collected weekly during nine weeks until full growth. Disc samples of the fruit flesh were analysed destructively, the spectrometry data were analysed chemometrically, and a nonlinear-kernel algorithm was developed for spectral data analysis. Comparisons were made between the linear and nonlinear regression analyses of the raw reflectance spectra (R), on one hand, and the pre-processed spectra such as the first derivative of R (D1R), log(1/R), D1(log(1/R)) and D2(log(1/R)), on the other hand. For further evaluation of the regression models a standardised weighted sum (SWS) index was developed, based on criterion weighting. The developed kernel algorithm, partial least squares (PLSR), and support vector

machine (SVM) regression models were able to predict total chlorophyll and carotenoid contents for all three tested bell pepper cultivars, with average cross-validation errors of 0.007 and 0.01 mg g<sup>-1</sup>, respectively. The kern I nonlinear analysis of the spectral data yielded the most promising regression models for all three cultivars.

**Keywords:** /Bell Peppers/ /Maturity/

## **BROCCOLI**

Garitta, Lorena, Guillermo Hough, Alicia Chaves. 2013. Sensory analysis of **broccoli** over time consumer defined critical attributes and evaluation of digital photographs in comparison to real product appearance. *Food Qual. & Prefer.* 29: 48 – 52.

### **Abstract**

The objectives of the present work were: (a) define the critical attribute of broccoli from a consumers' perspective and (b) for broccoli compare the trained panel sensory evaluation of real products versus the sensory evaluation of the corresponding digital photographs. A panel of broccoli consumers evaluated appearance, aroma and flavor acceptability of broccoli with different storage times. Appearance acceptability was the only attribute where there were significant differences between storage times. Thus appearance was the critical attribute as evaluated by consumers. A panel of assessors measured the appearance of broccoli samples with different storage times using the quality scoring method (QSM). A month after having measured the real product the same assessors measured the appearance of digital photographs of the same samples using the QSM. Analysis of variance showed that there were no significant differences between evaluations of the real broccoli and the corresponding photograph.

**Keywords:** /Broccoli/ / Sensory Analysis/

Sabir, Ferhan K. 2013. Postharvest quality response of **broccoli** florets to combined application of 1-methylcyclopropene and modified atmosphere packaging. *Agric. & Food Sci.* 21: 421 – 429.

### **Abstract**

Broccoli rich in health-promoting compounds such as ascorbic acid and glucosinolates. However, amount of such compounds inevitably decrease along with the storage. This study was Conducted to investigate the effects of 1-methylcyclopropene (1-MCP) and Modified Atmosphere Packaging (MAP) treatments alone or in combination on postharvest life and quality of broccoli heads during cold storage. MAP and 1-MCP+MAP significantly reduced weight loss, delayed surface color changes and chlorophyll breakdown, maintained visual quality, ascorbic acid, total phenol, soluble solid contents and titrable acidity compared with control as well as 1-MCP treatment. In 1-MCP plus MAP treated florets, approximate 47% and more chlorophyll and 14% more total phenol contents were found compared to control florets./ 1 –MCP plus MAP application better performed in maintaining the quality of broccoli florets during 28 day-storage. Overall results revealed that combined treatment can be recommended for commercial broccoli storage at 0 degree C.

**Keywords:** /Broccoli/ /1-MCP/ /Quality/ /Storage/

## CUCUMBER

Renfu Lua, Diwan P. Ariana. 2013. Detection of fruit fly infestation in pickling cucumbers using a hyperspectral reflectance/transmittance imaging system. *Postharvest Biol. & Technol.* 81: 44 – 50.

### Abstract

Fruit fly infestation can be a serious problem in pickling cucumber production. In the United States and many other countries, there is zero tolerance for fruit flies in pickled cucumber products. Currently, processors rely on manual inspection to detect and remove fruit fly-infested cucumbers, which is labor intensive and also prone to error due to human fatigue and the difficulty of visually detecting infestation that is hidden inside the fruit. In this research, a laboratory hyperspectral imaging system operated in an integrated mode of reflectance and transmittance was used to detect fruit fly-infested pickling cucumbers. Hyperspectral reflectance (450–740 nm) and transmittance (740–1000 nm) images were acquired simultaneously for 329 normal (infestation-free) and fruit fly-infested pickling cucumbers of three size classes with the mean diameters of 16.8, 22.1, and 27.6 mm, respectively. Mean spectra were extracted from the hyperspectral image of each cucumber, and they were then corrected for the fruit size effect using a diameter correction equation. Partial least squares discriminant analyses for the reflectance, transmittance and their combined data were performed for differentiating normal and infested pickling cucumbers. With reflectance mode, the overall classification accuracies for the three size classes and the mixed class were between 82% and 88%, whereas transmittance achieved better classification results with the overall accuracies of 88–93%. Integration of reflectance and transmittance did not result in noticeable improvements, compared to transmittance mode. The hyperspectral imaging system performed better than manual inspection, which had an overall accuracy of 75% and whose performance decreased significantly for smaller size cucumbers. This research demonstrated that hyperspectral imaging is potentially useful for detecting fruit fly-infested pickling cucumbers.

**Keywords:** /Cucumber/ /Postharvest Quality/ /Pest Infestation/ /Fruit Fly/

## ONION

Kato, Masahiro. 2013. Structures and reactions of compounds involved in pink discolouration of onion. *Food Chem.* 139: 885 – 892.

### Abstract

In “pinking” of onion, E-(+)-S-(1-propenyl)-L-cysteine sulfoxide is first cleaved by alliinase to yield colour developers (CDs), which react with amino acids, such as valine, to form pigment precursors (PPs). The PPs react with naturally occurring carbonyls (NOCs) to form pigments. By inducing a PP from previously isolated cepathiolanes and L-valine, it was confirmed that cepathiolanes constitute at least a part of the CDs. From the PP and formaldehyde as a NOC, two colourless and two pink compounds were derived. The structure of one of the colourless compounds was established as 2-(2-(1-(1-carboxy-2-methylpropyl)-3,4-dimethyl-1H-pyrrol-2-yl)methyl-3,4-dimethyl-1H-pyrrol-1-yl)-3-methylbutanoic acid. The structures of the other colourless compound and the pink pigments were predicted based on their molecular formula and the MSn spectral data. A trimeric pigment structure was predicted for one of the pink pigments, which was believed to be the first to be reported in the literature. With these, a new reaction scheme for “pinking” of onion is proposed.

**Keywords:** /Onion/ /Discoloration/

Y. Sun, D. T. Laird, and Y. C. Shieh. 2012. Temperature-dependent survival of hepatitis a virus during storage of contaminated onions. Appl. Environ. Microbiol. 78(14): 4976 – 4983.

### **Abstract**

Pre- or postharvest contamination of green onions by hepatitis A virus (HAV) has been linked to large numbers of food-borne illnesses. Understanding HAV survival in onions would assist in projecting the risk of the disease associated with their consumption. This study defined HAV inactivation rates in contaminated green onions contained in air-permeable, moisture-retaining high-density polyethylene packages that were stored at 3, 10, 14, 20, 21, 22, and 23°C. A protocol was established to recover HAV from whole green onions, with 31% as the average recovery by infectivity assay. Viruses in eluates were primarily analyzed by a 6-well plaque assay on FRhK-4 cells. Eight storage trials, including two trials at 3°C, were conducted, with 3 to 7 onion samples per sampling and 4 to 7 samplings per trial. Linear regression correlation ( $r^2$  0.80 to 0.98) was observed between HAV survival and storage time for each of the 8 trials, held at specific temperatures. Increases in the storage temperature resulted in greater HAV inactivation rates, e.g., a reduction of 0.033 log PFU/day at 3.4\_0.3°C versus 0.185 log PFU/day at 23.4\_0.7°C. Thus, decimal reduction time ( $D$ ) values of 30, 14, 11, and 5 days, respectively, were obtained for HAV in onions stored at 3, 10, 14, and 23°C. Further regression analysis determined that 1 degree Celsius increase would increase inactivation of HAV by 0.007 log PFU/day in onions ( $r^2$  0.97). The data suggest that natural degradation of HAV in contaminated fresh produce is minimal and that a preventive strategy is critical to produce safety. The results are useful in predicting the risks associated with HAV contamination in fresh produce.

**Keywords:** /Onions/ /Storage/

### **SPINACH**

Glowaczka, Marcin, et.al. 2013. Can hot water treatments enhance or maintain postharvest quality of spinach leaves? Postharvest Biol. & Technol. 81: 23 – 28.

### **Abstract**

It has been reported that a short duration hot water treatment, applied as a heat shock, improves subsequent postharvest quality in bagged spinach and rocket leaves. This study has established that the maximum hot water temperature and duration before spinach leaves showed damage, was 45 °C for 60 s. Subsequent detailed studies compared postharvest quality of leaves treated at 45 °C for 60 s immediately after harvest with untreated leaves after 5 and 10 days of storage at 4 °C. Heated leaves were significantly lighter and more yellow suggesting enhanced senescence, but leaf membrane integrity and associated gas composition of the storage atmosphere were not significantly different. Hot water treatment at 45 °C for 60 s applied immediately after harvest had a mixed effect on the biochemical constituents of the leaves; total carotenoid concentration was maintained compared to untreated leaves but the contents of ascorbic acid, dehydroascorbic acid, chlorophyll a and b were not affected. These observations suggest that in contrast to other reports, hot water treatments have limited commercial potential for postharvest quality improvement of spinach leaves.

**Keywords:** / Spinach/ /Hot Water Treatments/ /Postharvest/ /Quality/

## **TOMATO**

Cao, Ying, et.al. 2012. Functional characterization of a **tomato** COBRA-like gene functioning in fruit development and ripening. BMC Plant Biol. 12 (211): 1 – 15.

### **Abstract**

**Background:** Extensive studies have demonstrated that the COBRA gene is critical for biosynthesis of cell wall constituents comprising structural tissues of roots, stalks, leaves and other vegetative organs, however, its role in fruit development and ripening remains largely unknown. **Results:** We identified a tomato gene (SICOBRA-like) homologous to Arabidopsis COBRA, and determined its role in fleshy fruit biology. The SICOBRA-like gene is highly expressed in vegetative organs and in early fruit development, but its expression in fruit declines dramatically during ripening stages, implying a primary role in early fruit development. Fruit-specific suppression of SICOBRA-like resulted in impaired cell wall integrity and up-regulation of genes encoding proteins involved in cell wall degradation during early fruit development. In contrast, fruit-specific over expression of SICOBRA-like resulted in increased wall thickness of fruit epidermal cells, more collenchymatous cells beneath the epidermis, elevated levels of cellulose and reduced pectin solubilization in the pericarp cells of red ripe fruits. Moreover, transgenic tomato fruits over expressing SI COBRA-like exhibited desirable early development phenotypes including enhanced firmness and a prolonged shelf life. **Conclusions:** Our results suggest that SICOBRA-like plays an important role in fruit cell wall architecture and provides a potential genetic tool for extending the shelf life of tomato and potentially additional fruits.

**Keywords:** /Tomato/ /Ripening/

Oliveira, dAurelice B., et.al. 2013. The impact of organic farming on quality of **tomatoes** is associated to increased oxidative stress during fruit development. PLoS ONE 8(2): e56354. doi: 10.1371/journal.pone.

### **Abstract**

This study was conducted with the objective of testing the hypothesis that tomato fruits from organic farming accumulate more nutritional compounds, such as phenolics and vitamin C as a consequence of the stressing conditions associated with farming system. Growth was reduced in fruits from organic farming while titratable acidity, the soluble solids content and the concentrations in vitamin C were respectively +29%, +57% and +55% higher at the stage of commercial maturity. At that time, the total phenolic content was +139% higher than in the fruits from conventional farming which seems consistent with the more than two times higher activity of phenylalanine ammonia lyase (PAL) we observed throughout fruit development in fruits from organic farming. Cell membrane lipid peroxidation (LPO) degree was 60% higher in organic tomatoes. SOD activity was also dramatically higher in the fruits from organic farming. Taken together, our observations suggest that tomato fruits from organic farming experienced stressing conditions that resulted in oxidative stress and the accumulation of higher concentrations of soluble solids as sugars and other compounds contributing to fruit nutritional quality such as vitamin C and phenolic compounds.

**Keywords:** /Tomato/ /Quality/ /Organic Farming/

## **ORNAMENTALS**

### **CALLA**

Iftikhar Ahmada, et.al. 2013. Water quality effects on postharvest performance of cut calla, hydrangea, and snapdragon. *Scientia Hort.* 153: 26 – 33.

#### **Abstract**

Effects of water quality on water uptake, change in fresh weight, vase solution pH and electrical conductivity (EC) change, termination symptoms, and longevity of cut 'Nicole Yellow' calla (*Zantedeschia* L.), 'White Extra' hydrangea [*Hydrangea macrophylla* (Thunb.) Ser.], and 'Admiral Pink' snapdragon (*Antirrhinum majus* L.) were studied. Calla was tolerant of high water pH (8.1); vase life varied only from 9.2 d for acidic solutions (pH 3.2) to 10.1 d for solutions with intermediate pH (6.3). Calla had the longest vase life at an EC of 0.75 dS m<sup>-1</sup>, whereas addition of floral preservative (Floralife Professional, Floralife, Walterboro, SC at 10 ml L<sup>-1</sup>) was ineffective. Low solution pH (2.9–3.3), increasing EC (up to 2.5 dS m<sup>-1</sup>), and use of floral preservative increased vase life of hydrangea. Increasing EC increased vase life of hydrangea from a low of 7.3 d to a high of 15.4 d at 2.5 dS m<sup>-1</sup>, when floral preservative was used and from a low of 3.5 d to a high of 5.7 d at 4.0 dS m<sup>-1</sup> in distilled water. Vase solution pH of snapdragon had no significant effect on vase life or water uptake. Increasing EC increased vase life to a maximum of 14.8 d at 2.0 dS m<sup>-1</sup> with preservative and to 9.7 d at 3.0 dS m<sup>-1</sup> without preservative. Each species had differing responses to varying pH and EC levels; however, solution pH should be low, as high pH solutions either had no effect or reduced vase life, such as with hydrangea. EC of vase water for hydrangea and snapdragon should be approximately 2.0–2.5 dS m<sup>-1</sup>, when preservatives are used and 3.0–4.0 dS m<sup>-1</sup> without, which is higher than most recommendations. Addition of preservative to vase solutions extended vase life of hydrangea and snapdragon, but did not affect calla.

**Keywords:** / Calla/ /Snapdragon/ /Cut Flower/ /Flower longevity/

### **DENDROBIUM**

Sirikesorna, Laongsri, et.al. 2013. Low temperature-induced water-soaking of dendrobium inflorescences: Relation with phospholipase D activity, thiobarbituric-acid-staining membrane degradation products, and membrane fatty acid composition. *Postharvest Biol. & Technol.* 80: 47 – 55.

#### **Abstract**

We compared the effects of cold storage (5 °C) on two *Dendrobium* cultivars. After various periods of storage the cut inflorescences were transferred to 25 °C. Water-soaking of the tepals was the main chilling-injury symptom. Cv. Earsakul showed higher CI sensitivity than cv. Khao Sanan. Phospholipase D (PLD) activity increased during 5 °C storage in both cultivars, but generally increased more in cv. Earsakul during the subsequent period at 25 °C. The level of lipid degradation products (including malondialdehyde) that react with thiobarbituric acid was higher in cv. Earsakul than in cv. Khao Sanan. In contrast to expectation, the ratio between unsaturated and saturated fatty acids was higher, and remained higher during cold storage, in cv. Earsakul than in cv. Khao Sanan. The data suggest that water-soaking due to cold storage of *Dendrobium* inflorescences involves membrane damage, likely related to activation of

PLD and accumulation of lipid degradation products. The level of unsaturated fatty acids apparently did not protect against CI. The data seem to question the general view that unsaturated fatty acids protect against CI.

**Keywords:** /Dendrobium/ /Low Temperature/