

**SELECTIVE DISSEMINATION OF INFORMATION (SDI)  
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**GENERAL**

**FRESH CUT**

Vicente M. Gómez-López, Vicente M., et. al. 2014. Disinfection capacity of high-power ultrasound against *E. coli* O157:H7 in process water of the fresh-cut I industry. *Food Bioprocess Technol.* 73: 3390 – 3397.

**Abstract**

The fresh-cut industry must treat process water to guarantee its microbial quality before reuse or recirculation back into the processing line. In the present study, the suitability of high-power ultrasound (HPU) for disinfecting and recycling process water was evaluated. An ultrasonic horn (20 kHz) was used to inactivate *Escherichia coli* O157:H7 inoculated in five types of process water which showed different physical and chemical characteristics. Differences in the inactivation level of *E. coli* O157:H7 at different HPU densities (0.14, 0.28, 0.56, and 1.12 kW/L) with controlled (20– 25 °C) and uncontrolled (15–72 °C, 3.6 °C/min) temperature increase were studied. Results showed that the higher the power density and temperature, the higher the efficiency, reaching up to 6 log reductions of *E. coli* O157:H7. Alkalinity (between 0 and 253 mg HCO<sub>3</sub><sup>-</sup>/L) and organic matter concentration (between 9 and 3,525 mg O<sub>2</sub>/L) in water did not reduce ultrasonic efficacy against *E. coli* O157:H7. Agglomerates >90 µm, which represented 34% of those present in the process water, were reduced to only 11 % by HPU. Results indicate that HPU can be successfully applied to treat process water of the fresh produce industry because the antimicrobial efficacy was not affected by the continuous variation of the process water quality. HPU can be a suitable technology for the fresh produce industry to be able to reduce consumption of water and decrease wastewater and the generation of disinfection by-products.

**Keywords :** /Food safety/ / Disinfection/

**FRUITS**

Hailu, M., T. Seyoum Workneh & D. Belew. 2014. Effect of packaging materials on shelf life and quality of **banana** cultivars (*Musa* spp.). *J. Food Sci. & Technol.* 51 (11): 2947 – 2963.

**Abstract**

This study was carried out to evaluate the effect of packaging materials on the shelf life of three banana cultivars. Four packaging materials, namely, perforated low density polyethylene bag, perforated high density polyethylene bag, dried banana leaf, teff straw and no packaging materials (control) were used with three banana cultivars, locally known as, Poyo, Giant Cavendish and Williams I. The experiment was carried out in Randomized Complete Block Design in a factorial combination with three replications. Physical parameters including weight loss, peel colour, peel thickness, pulp thickness, pulp to peel ratio, pulp firmness, pulp dry matter, decay, loss percent of marketability were assessed every 3 days. Banana remained marketable for 36 days in the high density polyethylene and low density

polyethylene bags, and for 18 days in banana leaf and teff straw packaging treatments. Unpackaged fruits remained marketable for 15 days only. Fruits that were not packaged lost their weight by 24.0 % whereas fruits packaged in banana leaf and teff straw became unmarketable with final weight loss of 19.8 % and 20.9 %, respectively. Packaged fruits remained well until 36th days of storage with final weight loss of only 8.2 % and 9.20 %, respectively. Starting from green mature stage, the colour of the banana peel changed to yellow and this process was found to be fast for unpackaged fruits. Packaging maintained the peel and the pulp thickness, firmness, dry matter and pulp to peel ratio was kept lower. Decay loss for unpackaged banana fruits was 16 % at the end of date 15, whereas the decay loss of fruits packaged using high density and low density polyethylene bags were 43.0 % and 41.2 %, respectively at the end of the 36th day of the experiment. It can, thus, be concluded that packaging of banana fruits in high density and low density polyethylene bags resulted in longer shelf life and improved quality of the produce followed by packaging in dried banana leaf and teff straw.

**Keywords:** /Banana/ /Packaging/ /Quality/

## **GUAVA**

Mangaraj, S. et.al. 2014. Design and development of modified atmosphere packaging system for guava (cv. Baruipur). J. Food Sci. Technol. 51(11): 2925 – 2946.

### **Abstract**

Modified atmosphere packaging (MAP) is a dynamic system during which respiration and permeation occur simultaneously. Hence factors affecting both respiration and permeation were considered for designing a package. In the design of MA packages for guava (cv. Baruipur) a total of 13 variables were considered. The independent variables includes: weight of fruits, surface area of packaging film, free volume of the package, thickness of the film and permeabilities of film to O<sub>2</sub> and CO<sub>2</sub> gas. The fixed variables considered were: the surrounding gas composition and temperature, the respiration rates for O<sub>2</sub> consumption and CO<sub>2</sub> evolution, and the equilibrium gas compositions to be attained in the package so that the fruit's shelf-life is extended. Two types of MA packages, having package size of 19 cm× 19 cm for a fill weight of 1,000±100 g were developed. Packages were designed to accommodate a fill weight range of 0.90–1.10 kg. Various package parameters were optimized to facilitate establishment of dynamic equilibrium at target levels of O<sub>2</sub> and CO<sub>2</sub> concentration in the package. The storage study of MA packages was performed at 10, 15, 20 and 25 °C temperatures. The performance of film packages was evaluated for their ability to establish equilibrium at target levels and to extend the shelf life of the packaged fruit. The MA packaging system increased the shelf life of guava by 128–200 % compared to the unpacked fruits at various storage temperatures with a quality comparable with the freshly harvested commodity.

**Keywords:** /Guava/ /Modified Atmosphere Packaging//Quality/ /Storage/

## **MANGO**

Basem Abu Izneid, Basem Abu, et.al. . 2014. Design and develop a nondestructive infrared spectroscopy instrument for assessment of mango (*Mangifera indica*) quality. J. Food Sci. Technol. 51 (11): 3244 – 3252.

## Abstract

A portable infrared spectroscopy system has been designed and developed for assessment of quality of mango fruit. This paper describes the design and development of a fruit quality grading device using reflectance mode optical sensor. The experiment was conducted to obtain the best results from the system and the device was correlated according to the measured output. In the experiment, several samples of mango fruits have been monitored for six days to study the relation how fruit quality increases with time as fruit ripens. Between the unripe mango fruit and the ripest one, a range of 3.5 V to 4.2 V was measured by the developed system. The rate of quality increase was calculated as an average of 6.7 mV per day. These results were used to correlate the final hardware and software development of the device. The results demonstrate that, portable near infrared spectroscopy is feasible for evaluating mango quality non-destructively.

**Keywords:** /Mango/ /Sorting/ /Quality/ /Post harvest/

## PAPAYA

Jayathunge, K. G. L. R., et.al. 2014. Physico-chemical and sensory quality of fresh cut **papaya** (*Carica papaya*) packaged in micro-perforated polyvinyl chloride containers. *J. Food Sci. Technol.* 51 (12): 3918 – 3925.

## Abstract

Papaya cubes at maturity stages, 5–45 % yellow (more green than yellow) and 55–80 % yellow (more yellow than green) were washed with 5 % H<sub>2</sub>O<sub>2</sub>, drained and packaged in PVC trays having five, seven and ten microperforations and stored for 19 days. PVC trays with 3 mm diameter punch holes were used as the control. Based on physico-chemical properties, optimum maturity for papaya and micro-perforation level of PVC trays were determined. Effectiveness of citric acid in prevention of browning was also tested. Firmness and TSS changed significantly, on day 19. O<sub>2</sub>, CO<sub>2</sub> and C<sub>2</sub>H<sub>4</sub> concentration changed 2.4 to 4.2 %, 23.4 to 5.9 %, and 0 to 0.13 % respectively, from day 3 to 19. pH and titratable acidity did not change significantly throughout the storage. Pretreated papaya cubes, packaged in PVC trays with ten micro-perforations, kept under 4 °C had storage lives of 19 days.

**Keywords:** /Papaya/ /Maturity/ /Minimally Processed/

Yao, Benjamin N. et.al. 2014. The role of hydrolases in the loss of firmness and of the changes in sugar content during the post-harvest maturation of *Carica papaya* L. var solo 8. *J. Food Sci. Technol.* 51(11): 3309 – 3316.

## Abstract

Fruit ripening is associated with many hydrolase activities involved in the softening of the fruit during the maturation. This study investigates the relationship between the loss of firmness along with the changes of sugar content and the enzymatic activities in *Carica papaya* L. var solo 8 during post-harvest storage. Three maturation stages (green immature: the fruit is entirely green, green mature: the fruit shows 1/32 yellow skin and fully mature: the fruit shows 1/8 yellow skin) have been selected and stored at 15, 22 and 28 °C. The reduction of fruit firmness, total sugar contents, refractive index (% Brix) and enzymatic activities were

measured. Low enzymatic activities (0.035  $\mu\text{mol}/\text{min}/\text{mg}$ ) were recorded in fruit harvested at the green immature stage with no significant ( $p \geq 0.05$ ) effect on the softening while fruit harvested at the green mature and fully mature stages showed enzymatic activities 7 times as high as those of the green immature stage. These high enzymatic activities were responsible for the loss of firmness of the fruit. Accordingly, papayas at the green mature and fully mature stages displayed higher maxima of sugar content (4.8 g/100 g at 28 °C at day 12, and 10.2 g/100 g at 22 °C at day 8, respectively) at higher temperatures. Meanwhile in green immature papayas, the maximum was only 4.3 g/100 g at 22 °C and day 12 of storage. The results show that the loss of firmness of the papaya was highly related to the hydrolytic enzyme activities and the sweet taste to the presence of simple sugars such as galactose liberated from the polysaccharide complexes.

**Keywords:** /Papaya/ /Firmness/ /Maturation/ /Post-harvest/

## PEAR

Oveisi, Z., et. al. 2014. Application of vibration response technique for the firmness evaluation of pear fruit during storage. J. Food Sci. Technol. 51(11): 3261 – 3268.

## Abstract

Storage conditions of pear affect its subsequent softening process and shelf life. Measurements of firmness have traditionally been carried out according to the Magness Taylor (MT) procedure; using a texture analyzer or penetrometer in reference texture tests. In this study, a non-destructive method using Laser Doppler vibrometer (LDV) technology was used to estimate texture firmness of pears. This technique was employed to detect responses to imposed vibration of intact fruit using a shaker. Vibration transmitted through the fruit to the upper surface was measured by LDV. A fast Fourier transform algorithm was used to process response signals and the desired results were extracted. Multiple Linear Regression models using fruit density and four parameters obtained from modal tests showed better correlation ( $R^2=0.803$ ) with maximum force in Magness Taylor test compared to the models that used only modal parameters ( $R^2=0.798$ ). The best polynomial regression models for pear firmness were based on elasticity index (EI) and damping ratio ( $\eta$ ) with  $R^2=0.71$  and  $R^2=0.64$ , respectively. This study shows the capability of the LDV technique and the vibration response data for predicting ripeness and modelling pear firmness and the significant advantage for commercially classifying of pears based on consumer demands.

**Keywords:** /Pear/ /Storage/ /Non-destructive/ /Firmness/

## STRAWBERRIES

Wang, Zhe, et.al. 2014. Improving storability of fresh strawberries with controlled release chlorine dioxides dioxide in perforated clamshell packaging. Food Bioprocess Technol. 7: 3516–3524.

## Abstract

Fresh strawberries have short shelf life because of rapid weight loss, softening, and decay. The objective of this research was to study the response of strawberries to  $\text{ClO}_2$  when applied to the fruit using a controlled release pad. Four experiments were conducted over 2011 to 2013. Strawberries

were packed in perforated commercial clamshells, with or without ClO<sub>2</sub> treatments, and stored at 1 and 6 °C for up to 14 days and at 10 and 20 °C for up to 7 days. The effect of ClO<sub>2</sub> on strawberries was assessed by measuring decay incidence, weight loss, firmness, volatile composition, and stomata activity during storage. Chlorine dioxide treatments induced closing of stomata, markedly slowed weight loss and softening, and reduced decay incidence of strawberry fruit at 10 °C or lower temperatures, but not at 20 °C. Fruit flavour profiles were not affected by ClO<sub>2</sub> treatment.

**Keywords:** /Strawberry/ /Weight Loss/ /Softening/ /Decay/ /Storage/

## **VEGETABLES**

### **CUCUMBER**

Manjunatha, M., & Rahul K. Anurag. 2014. Effect of modified atmosphere packaging and storage conditions on quality characteristics of **cucumber**. J. Food Sci. Technol. 51(11): 3470 – 3475.

#### **Abstract**

Cucumbers (*Cucumis sativus* L.) stored in perforated modified atmosphere packaging (MAP) under cold room (4±1 °C and 90±2 % RH) and ambient condition (23–26 °C and 63–66 % RH) were evaluated for firmness, weight loss (WL), colour, chilling injury and sensory characteristics. The firmness of cucumbers was decreased to 0.333 and 0.326 N on 6th and 12th day of storage, respectively from initial value of 0.38 N. After 12 days of storage, the WL was in the range of 1.62–12.89 % whereas the cucumber stored under MAP having 2 perforations at 4± 1 °C and 90±2 % RH recorded least WL of 1.62 %. The minimum change in colour (Hunter L, a and b values) was observed in the cucumber samples stored at cold room condition. The increase in 'b' values (yellowness) was more in the sample stored at ambient condition with unsealed sample registered highest 'b' values (35.82). On 12th day of storage, sensory quality evaluation revealed that samples stored under perforated MAP at 4±1 °C and 90±2 % RH were acceptable in condition with sensory score of 7.1 and 7.5. Chilling injury was severe in sample unsealed (4.4 chilling injury score) and slight to moderate chilling injury was observed in 2 and 4 perforated package samples stored under cold room condition. The study revealed that cucumber can be stored under MAP with 2 perforations at 4±1 °C and 90±2 % RH and ambient condition (23–26 °C and 63–66 % RH) for 12 and 6 days, respectively.

**Keywords:** /Cucumber/ /Modified Atmosphere Packaging/ /Chilling Injury/ /Quality/

### **LETTUCE**

Wulfkuenler, Sabine, et.al. 2014. Effect of water jet cutting and moderate heat treatment on quality of fresh-cut red oak leaf **lettuce**(*Lactuca sativa* L. var. *crispa*). Food Bioprocess Technol. 7: 3478 – 3492.

#### **Abstract**

Fresh-cut red oak leaf lettuce was produced by six different processing lines in order to assess the effect of water jet cutting (nozzle diameter 0.1 mm, pressure 2,500 bar) versus blade cutting as well as

washing with cold and warm water (4 and 45 °C, 120 s) prior to and after shredding, respectively. throughout refrigerated storage (4 °C, 12 days), O<sub>2</sub> and CO<sub>2</sub> levels in the modified atmosphere of the consumer-sized sample bags were monitored, and fresh-cut products and process water were subjected to microbiological analysis. As further quality parameters, phenylalanine ammonia lyase (PAL) activity as well as levels of chlorophyll a and b, β-carotene and cyanidin 3-O-(6"-O-malonyl)-glucoside were determined by HPLC with diode array detection (HPLC-DAD) and HPLC coupled with diode array detection and tandem mass spectrometry (HPLC-DAD-MSn) throughout storage. Additionally, visual appearance and cut edge browning were assessed by sensorial evaluation and stereo microscopy on storage day 8. Microbiological quality throughout commercial shelf life was best retained by warm water washing of shredded lettuce. Furthermore, moderate heat treatment significantly reduced PAL activity and cut edge browning without affecting pigment contents and vitality of the lettuce tissue. Additionally, warm water treatment significantly lowered the microbial load in the process water. Throughout storage, water jet cutting did not affect the microbial, physiological and sensorial fresh-cut lettuce quality compared to blade cutting using a newly sharpened blade, thus indicating a similar degree of wounding due to the cutting techniques applied. The application of a pre-washing step prior to shredding was found to be suitable to reduce the risk of cross-contamination in subsequent process steps.

**Keywords:** /Lettuce/ /Heat Treatment/ /Quality/