

SELECTIVE DISSEMINATION OF INFORMATION (SDI)
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GENERAL

PACKAGING

Dari, L., N. Nenguwo and V. AfariSefa. 2015. **Packaging** of indigenous vegetables in the Northern Region, Ghana. Acta Hort. 1102. 179 - 182

Abstract

Vegetables are edible seeds, roots, stems, leaves, bulbs, tubers or non-sweet fruits of any of numerous herbaceous plants. Indigenous vegetables play a highly significant role in food security and income generation of the underprivileged in both urban and rural settings. Amaranth (*Amaranthuscruentus*) is a priority indigenous vegetable in the Northern Region of Ghana. Tomato (*Solanumlycopersicum*) is a popular vegetable commodity in Ghana, as it is consumed daily in many households. The objective of the study was to determine the kinds of packaging material used for tomato and amaranth at the farm-gate and during retail. A primary survey of 107 farmers and 53 traders was used for the analysis following data collection with the aid of structured questionnaires. The results showed that vegetables were mainly packaged with materials ranging from wooden boxes to polyethylene bags in the proportions of 71% (basins and baskets), 22% (wooden boxes), 5.1% (polypropylene sacks) and 1.9% (polyethylene bags) for tomato, and 50.7% (basins and baskets), 2.7% (wooden boxes), 43.8% (polypropylene sacks) and 2.8% (polyethylene bags) for amaranth. The use of the packaging materials came with their associated advantages and disadvantages. The use of wooden boxes, basins and baskets influenced positively on produce shelf life, as these containers permitted aeration of produce. The use of the sacks and bags promoted only easy transportation with reduced protection for produce.

Keywords: /Packaging/ /Tomato//Amaranth//Wooden Boxes//Polyethylene Bags/

Nenguwo, N., et.al. 2015. Assessment of postharvest practices and loss of vegetables marketed in selected regions of Ghana. Acta Hort. 1103. 219 - 224.

Abstract

This paper reports on a survey conducted to compare postharvest handling methods for vegetable crops in the semi-deciduous and Guinea savanna agroclimatic zones in the Ashanti and Northern geographical regions of Ghana, respectively. Information on postharvest losses was obtained through a

socioeconomic field survey of various actors in vegetable supply chains with the aid of a semi-structured questionnaire complemented by physical measurement of produce samples for damage, disease incidence and severity. An analysis of marketing systems highlighted the influence of key market traders and brokers on handling practices -particularly in the preparation of produce for and during transportation - and in setting prices for vegetable crops. Variation in the size and style of packaging was due to efforts to Minimize costs, but this affects the level and type of damage observed in the marketing chain. Information on produce quality along the vegetable value chain was obtained and the attitudes of the various actors toward produce quality assessed. While it is generally understood that losses do occur during harvesting, handling and marketing, the extent of these problems is only now being realized. The information obtained from the quantitative survey will provide a useful guide in the development of an adaptive research program to improve the quality of vegetables produced by smallholder farmers and reduce the losses they currently experience.

Keywords: /Postharvest/ /Packaging/ /Value Chains/ /Harvesting/

SHELFLIFE

Sultanbawa, Y. et.al. 2015. Evaluation of packaging films to extend storage life of indigenous Australian vegetables and herbs. *Acta Hort.* 1102. 183 - 190.

Abstract

A study undertaken in Hervey Bay, Queensland, investigated the potential of creating an indigenous agribusiness opportunity based on the cultivation of indigenous Australian vegetables and herbs. Included were warrigal greens (WG) (*Tetragonia tetragonioides*), a green leafy vegetable and the herb sea celery (SC) (*Apium prostratum*); both traditional foods of the indigenous population and highly desirable to chefs wishing to add a unique, indigenous flavour to modern dishes. Packaging is important for shelf life extension and minimization of postharvest losses in horticultural products. The ability of two packaging films to extend WG and SC shelf life was investigated. These were Antimisted Biaxial Oriented Polypropylene packaging film (BOPP) without perforations and Antifog BOPP Film with micro perforations. Weight loss, packaging headspace composition, colour changes, sensory differences and microbial loads of packed WG and SC leaves were monitored to determine the impact of film oxygen transmission rate (OTR) and film water vapour transmission (WVT) on stored product quality. WG and SC were harvested, sanitised, packed and stored at 4°C for 16 days. Results indicated that the OTR and WVT rates of the package film significantly ($P < 0.05$) influenced the package headspace and weight loss, but did not affect product colour, total bacteria, yeast and mould populations during storage. There was no significant difference ($P > 0.05$) in aroma, appearance, texture and flavour for WG and SC during storage. It was therefore concluded that a shelf life of 16 days at 4°C, where acceptable sensory properties were retained, was achievable for WG and SC in both packaging films.

Keywords: /Shelf Life/ /Packaging Films/ /Storage/

SUPPLYCHAIN

Jacob John J. and N.K. Weerapa. 2015. A conceptual model of socially responsible business practices on **supply chain** relationships in organic fresh produce supply chains. Acta Hort.110: 3:159 - 166.

Abstract

The influence of ethics in business has been widely researched for decades, albeit from an end-consumer perspective. This research employs a systematic review of literature and a case study methodology to analyse the influence of ethical business on supply chain relationships within the fresh organic produce industry in the state of Victoria, Australia. By exploring the different ethical antecedents of inter organizational trust within supply chain relationships, such as purchase characteristics, reputation, ethos and fairness, the paper demonstrates the impact of responsibility in supply chain relationships. The conceptual framework was validated by examining four case studies of small retail organizations in the organic fresh produce supply chain in Australia. This research contributes to existing literature by elucidating the influence of ethics in all facets of supply chain relationship management.

Keywords: /Supply Chain/ /Fresh Produce/

Obeth, E., P.J.Batt and B. Butter. 2015. Non attractiveness of modern **supply chains**. Acta Hort. 1103: 225 - 232.

Abstract

In comparison to traditional supply chains, modern supply chains potentially allow supply chain actors, including smallholder producers and traders, to improve their productivity and overall performance. While one would expect smallholder producers and traders to join modern supply chains at every opportunity, there is growing evidence to show that not all participants are willing to engage. Through open-ended interviews with banana traders, the unwillingness to participate in modern supply chains is based on perceived risk, additional workloads and a current state of comfort. Apart from that, as supermarkets still source bananas from the traditional market, there is no need for traditional retailers to switch as they can still participate in modern supply chains.

Keywords: /Supply Chains/ /Banana/

TROPICAL FRUITS

Ma, Chen, Li Jianguo, Qun Zhang. 2015. Behavior of Salmonella spp. on fresh cut **tropical fruits**. Food Microbial. 54: 133 - 141.

Abstract

The behavior of *Salmonella* spp. on fresh-cut dragon fruit, banana, starfruit, mango, pineapple, guava and wax apple at 28°C and 4°C was studied. Growth of *Salmonella* on the fresh-cut starfruit was studied at 7, 10, 15, 20, 25 or 30°C. Tropical fruits were cut into cubes and spot inoculated with three-strain cocktail of *Salmonella* spp. at four inoculum levels (0.1, 1.0, 2.0 and 3.0 log CFU/g). Results indicated that *Salmonella* grew well at 28°C on all tested fruits at different inoculum levels [growth potential (d) $\frac{1}{4}$ 2.57e4.95] except for mango and pineapple, with the maximum populations ranging from 2.67 to 6.95 log CFU/g. Starfruit was the most suitable matrix for *Salmonella* growth. *Salmonella* exhibited a poor growth on mango and no growth on pineapple. At 4°C for 6 days, no obvious *Salmonella* growth was observed on all the tested fruits. In addition, *Salmonella* growth was inhibited by different ratios of mango or pineapple ethanol extracts to Luria Bertani (LB) broth. The inhibition percent of pure mango or pineapple ethanol extracts on *Salmonella* growth was 96.3% or 108.9%, respectively. Predicted growth parameters fitted by the Baranyi and Robert model indicated that on fresh-cut starfruit, *Salmonella* spp. grew immediately at 25 and 30°C with no lag time and grew slowly at 7e20°C with lag times of 74.74, 34.19, 9.32, 2.61 h. The predicted growth rate (mmax, log CFU/g/h) for *Salmonella* on starfruit was 0.0048 ± 0.00022 , 0.011 ± 0.00067 , 0.039 ± 0.0027 , 0.088 ± 0.0022 , 0.19 ± 0.0061 , 0.29 ± 0.023 at 7, 10, 15, 20, 25 and 30°C, respectively. At higher storage temperatures, the growth rate and maximum population of *Salmonella* were higher. This study suggests that *Salmonella* may grow and reach high populations on fresh-cut tropical fruits depending on storage conditions except for mango and pineapple and should be stored at low temperatures (<4°C) to ensure the safety and extend the shelf life of fresh-cut tropical fruits

Keywords: /Tropical fruits/ /Starfruit/ /Storage/

FRUITS

KIWIFRUIT

Antunes, M.D.C., M.G. Mguel and T. Panagopoulos. 2015. The effect of 1 MCP applied at different harvest times on storage ability of Hayward **kiwifruit**. *Acta Hort.* 1096: 287 - 294.

Abstract

The minimization of flesh softening is an important issue for long-term 'Hayward' kiwifruit storage mainly because it is highly sensitive to ethylene. The 1-Methylcyclopropene (1-MCP) is an effective inhibitor of ethylene action. The objective of this work was to find the effect of 1-MCP applied pre-storage at two harvest times on storage and shelf-life extension of kiwifruit. The fruit were harvested with 6.5 and 9 °Brix, treated with 0.5 µl/L 1-MCP for 24 h and stored at 0°C. Kiwifruit were removed from 4, 10 and 20 weeks cold storage and then put in shelf-life at 20°C for 14 days. Samples were analysed during shelf-life at 0, 4, 8 and 14 days. Taste panels were performed at seven days shelf life. The 1-MCP treatment did not influence colour (Lightness and a*), soluble solids content (°Brix) and ascorbic acid content. It was effective in reducing softening in kiwifruit harvested with 6.5 °Brix for short term storage, but better in 9 °Brix harvested kiwifruit for

long term storage. Fruit harvested with 9 °Brix showed higher ascorbic acid content and, when treated with 1-MCP, better taste panel evaluation. Being the 9 °Brix harvested kiwifruit of better quality, the use of 1-MCP may be important for increasing their storage life.

Keywords: /Kiwifruit/ /Quality/ /Shelf Life/ /Firmness/

Burdon, J. M. Punter, D. Billing, P. Pidakalaand K. Kerr. 2015. Shrivel in kiwifruit. Acta Hort. 1096: 309-316.

Abstract

Shrivel is a commercial risk to kiwifruit that may be stored for several months. The recently released 'Zesy003' (commonly called Gold9, marketed as Zespri Charm Kiwifruit) appears more susceptible to shrivel than other cultivars. While Gold9 fruit have a high skin permeance to water, early observations suggested that skin permeance did not account for the fruit's propensity to shrivel, which was associated with the fruit softening. The relationships between firmness, water loss and shrivel expression were investigated using either storage time or ethylene treatment to alter the relationships. Using storage to obtain soft fruit with relatively little water loss, it was shown that firm fruit take longer to shrivel and have a concomitant higher water loss when shrivel expresses than soft fruit. Alternatively, increasing the softening rate by ethylene treatment, whilst having little effect on the rate of water loss, resulted in the softer, ethylene-treated fruit shrivelling before the slower-softening control fruit. In a comparison between Gold9 and other kiwifruit, soft Gold9 fruit outer pericarp (OP) was found to have a higher water-binding capacity than the OP of 'Hort16A' or 'Zesy002' (commonly called Gold3, marketed as Zespri® SunGold Kiwifruit). The water status was quantified by magnetic resonance imaging T2 weighted data and by the swelling capacity of a crude ripe fruit OP cell wall preparation. Thus it is concluded that the high propensity for shrivel in Gold9 kiwifruit is associated with a ripe fruit OP that has a high water binding capacity which prevents mass water flow and re-equilibration of water within the fruit as water is lost.

Keywords: /Kiwifruit/ /Magnetic Resonance Imaging/

Burdon, J. 2015. Soluble solids revisited a maturity or harvest index for kiwifruit. Acta Hort. 1096: 257 - 266.

Abstract

Postharvest performance of fruit is dependent on the physiological state of the fruit at harvest in conjunction with the management of the postharvest environment. Soluble solids content (SSC) has been used as a measure of maturity and as a harvest index for 'Hayward' kiwifruit in New Zealand since 1980. At that time, a SSC of 6.2 °Brix was set as a minimum threshold for fruit to be harvested for long-term storage and export. Since then, 6.2 Brix, or other SSC thresholds, have been adopted as criteria for harvest/handling/export elsewhere in the world. In New Zealand, the 6.2 Brix harvest index was based on fruit having an increased rate of soluble solids accumulation at that stage, associated with lower night temperatures

resulting in starch conversion to soluble sugars. More recently, with increasing yields and changes in management practices, as well as increasing numbers of new cultivars being commercialised, maturation in kiwifruit is being re-evaluated. This includes a closer look at soluble solids accumulation as well as consideration of other fruit attributes, including flesh colour for yellow-fleshed cultivars. In this paper, the topic of SSC has been reviewed in the context of understanding kiwifruit maturation and harvest indices.

Keywords: /Kiwifruit/ /Postharvest/ /Storage//Quality/

Wang, R.c., et.al. 2015. Effects of postharvest treatments on storability of *Actinidiaargutav* **kiwifruit**. *Acta Hort.* 1096: 461 - 466.

Abstract

Actinidiaargutais a typical respiratory climactic fruit and has low storabilityand transport-ability under normal conditions. In order to prolong the storage period of *A. arguta*and reduce the loss, the effects of different postharvest treatments (CaCl_2 , ClO_2 , 1-MCP) on the fruit decay rate, flesh firmness, respiration and storage quality of *A. arguta*were investigated. The results showed that different postharvest treatments have different effects. Comparative study on the effect of different postharvest treatments on the fruit storability and quality of *A. arguta*, 1 mmol/L salicylic acid and 1 $\mu\text{L/L}$ 1-MCP could prolong the fruit storage period, the best treatment was 1 $\mu\text{L/L}$ 1-MCP application. 1-MCP treatment could reduce the fruit decay rate, restrain the decline of flesh firmness, and decrease the respiratory peak value, it also could restrain the increase of sugar and soluble solids content, and the decline of Vitamin C content, but had no significant effect on the decline of titratable acidity.

Keywords: /Kiwifruit/ /Sstorability/ /1-methylcyclopropene

Xu, W.P., et.al. 2015. Effect of calcium and boron on the quality of **kiwifruit**. *Acta Hort.* 1096

Abstract

To clarify the effect of calcium and boron on the quality of *Actinidia*fruit.0.2% borax, 0.5% CaCl_2 and 0.2% borax + 0.5% CaCl_2 were utilized on fruit of 'Miliang-1' (*Actinidiadeliciosa*) before harvest; fruits treated with water were set as the control. The results showed that all treatments had no obvious influence on fruit size, total content of soluble solids and vitamin C in fruit at harvest time; treatments containing calcium at full bloom and commercial maturity stage improved fruit calcium content and restricted the accumulation of boron at harvest time; while only CaCl_2 treatments at commercial maturity stage had positive effect on flesh firmness change at cold storage. Comparing with calcium, boron had no obvious effect on *Actinidia*fruit at cold storage. This study suggested that application of calcium might improve the calcium nutrition and storage life of kiwifruit.

Keywords: /Kiwifruit/ /Quality/ /Cold Storage/

Yommi, A. et.al. 2015. Pre storage treatment of Hayward **kiwifruit** with 1 MCP the effect of harvest maturity. Acta Hort. 1096: 321 - 316.

Abstract

The objective of the present work was to study the effect of the harvestmaturity on the response to the application of 1-methylcyclopropene (1-MCP) in prestorage of kiwifruit 'Hayward' produced in the Mar del Plata area (38°0'S, 57°30'W), Buenos Aires, Argentina. The kiwifruits were harvested at 142, 177 and 190 days after bloom (MS1, MS2 and MS3, respectively); half of the fruits were treated with 1 µl L-1 1-MCP for 24 h and the others were untreated (controls). Fruits were stored for six months at 0°C and 95% RH. Firmness (N), color (CIELab*), soluble solids content (SSC) and titratable acidity (TA) were analyzed at the end of the cold storage (ECS) and shelf-life (seven days at 20°C). Maturity stage at harvestaffected the color, SSC and TA at ECS and shelf-life without significant effects of 1- MCP treatment. The 1-MCP application increased fruit firmness in both at ECS and shelf-life, especially at MS1. The MS1 presented the lowest values of SSC and TA, being the SSC content less than the adequate to satisfy the consumers. The fruits treated with 1-MCP matured normally, without physiological disorders, or external symptoms of toxicity. In conclusion, the 1-MCP treatment delayed softening of kiwifruit in the three maturity stages. This effect was greater in MS1, but this maturity stage showed a sub-optimal SSC values for consumption.

Keywords: /Kiwifruit/ /Storage/ /Shelf-life/ /Firmness/ /Fruit Quality/

PEAR

Xu, Mudan, et.al. 2015. Effects of high pressure nitrogen treatments on the quantity of fresh cut **pears** at cold storage. Innov.Food Sci. &Emerg. 32: 56 - 63.

When fresh-cut fruit and vegetables are subjected to HP nitrogen treatments, the nitrogen gas dissolves into water and forms clathrate hydrates to restricted water mobility and enzymatic reactions. In this study, effects of HP (120 MPa) nitrogen treatments on preserving fresh-cut pears were studied at 4 °C for 14 days. Watermobilityin fresh-cut pears was significantly reduced by the HP (120 MPa) nitrogen treatment. The activities of catalase (CAT) and peroxidase (POD)were restricted by the HP (120MPa) nitrogen treatment. Respiration rate and ethylene production of fresh-cut pears treated by the HP (120MPa) nitrogen for 10minwere lower significantly in comparison with control and treated by flushing with nitrogen and the HP air for 10 min. The treatment also delayed proliferation of spoilage microorganisms of fresh-cut pears, because the populations of both mesophiles and psychrotrophs did not exceed 6.0 log cfu/g, and those for molds and yeasts did not exceed 3.0 log cfu/g after 14 day storage. HP nitrogen treatment did barely affect

the content of titrated acidity and soluble solids, and significantly reduced the total phenolics decrease in fresh-cut pears ($p < 0.05$). Dipping into chemical solution, such as 0.3% ascorbic acid, and 0.5% calcium chloride for 3min, could decrease the changes in the color and firmness of pear samples during HP (120MPa) operation, and the combined HP nitrogen with dipping treatment maintained good sensory quality of fresh-cut pears during storage. These results suggested the fresh-cut pears treated by HP nitrogen at 120 MPa for 10 min could be kept in a fresh-like condition for 14 days at 4 °C. Industrial relevance: Through this study, HP nitrogen (120MPa) methods reduced the water mobility, antioxidative enzyme (CAT, POD) activities, respiration rate, and ethylene production of fresh-cut fruit and vegetables, and restrained the growth of microorganisms within 14 days at cold storage. This could be a promising approach to preserve fresh-cut pears. It was demonstrated that pressurized nitrogen is a suitable means of preserving fresh cut pears. However, HP operation has a negative effect on the color and firmness to some degree. The combination treatment between HP nitrogen and dipping in solutions (0.3% AA, 0.5% CC) showed a better means of extending the shelf-life of fresh-cut fruit and vegetables.

Keywords: /Pears/ /Fresh Cut/ /Cold Storage/

PRESIMMON

Akbudak, B., et.al. 2015. Effect of postharvest treatments on storage period and quality in **persimmon** (*Diospyros kaki* L). Acta Hort. 1099: 241 - 248.

Abstract

In this study, the effect of hot water (HW), low oxygen (O₂), 1-methylcyclopropene (1-MCP) and modified atmosphere packaging (MAP) at storage period and quality were investigated in persimmon (*Diospyros kaki* L. 'Fuyu') which shows an increasing trend in production year after year in our country and the world. For this purpose, the fruits after harvest were treated with 48°C water for 10 min, low O₂ (1.5%) for 48 h and 1-MCP for 12 h. The fruits were stored in normal (NA) and modified atmosphere packaging (MAP) conditions. Treated and untreated fruits were stored at 0±1°C with 90±5% relative humidity (RH) conditions for 90 days. According to the results obtained from the study, low O₂ and 50 µ PE gave more successful results in terms of the quality characteristics.

Keywords: /Persimmon/ /Hot Water Treatment/ /1-MCP/ /Storage/

PLUM

Ayub, R.A., et.al. 2015. **Plum** ripening evaluation by H NMR spectroscopy. Acta Hort. 1099: 277 - 282.

Abstract

The increasing demand for fruit and juices, associated to the need of longer storage times as well as the short period for production, has occasioned the use of ripening inducers in order to complete the physiological maturation of fruits. Therefore, this work aimed to evaluate the effect of ripening inducers on the chemical composition of 'Reubennel' plum postharvest by ¹H NMR spectroscopy. For this, plum fruits were harvested in different maturation stages and submitted to artificial ripening by application of 2-chloroethyl phosphonic acid. After ripening period the juices were extracted and submitted to NMR analysis. Any changes in the chemical composition were observed as consequence of application of maturation inducer, when compared with those untreated. On the other hand, in those fruit that remained on the tree the ripening process still occurred and these fruits showed high and low contents of sucrose and organic acids, respectively. Therefore, those fruits that have matured in tree have better quality. Moreover, it was shown that ¹H NMR spectroscopy can be employed to follow the chemical composition of fruits during ripening stages.

Keywords: /Plum/ /Ripening/

POMEGRANATE

Saei Ahagh, H., et.al. 2015. How fruit traits influence cracking of **pomegranate** (*Punicagranatum* L). Acta Hort. 1099: 815 - 818.

Abstract

The present study investigated the effect of different factors on cracking of pomegranate. These factors included fruit skin thickness, fruit volume, fruit shape, total arils weight and Ca ion and depolymerized pectin. 'Malas-e-Saveh' and 'Yusef-Khani' as two sensitive and resistant pomegranate cultivars, respectively, were selected for this study. Data were analyzed in a frame of CRBD using a SAS software program. Logistic regression was applied to determine the effect of each factor on cracking. Results showed that fruit skin thickness was significantly different between the two cultivars. However, the recent factor had no effect on fruit resistance to cracking. With increasing trends of fruit volume fruit cracking rate was increased. Fruit shape in 'Malas-e-Saveh' pomegranate was oblate while 'Yosef-Khani' was more spheroidal. This deviation from a perfect spheroid increased pressure to skin and caused a higher cracking rate. Total arils weight was different among cracked and non-cracked fruits and the recent factor had positive effect on fruit cracking. The recent result indicated that arils were the principal sources of pressure to the fruit skin. In this respect with increasing trend of arils weight in number or volume pressure to skin had increased impressively and subsequently fruit cracking emerged. Physiological characters of fruit skin such as higher Ca ion and lower pectin content in sensitive cultivars increased skin inflexibility and decreased elasticity, resulting in a higher cracking rate.

STRAWBERRY

Andrianjaka-Camps, Z.N., et.al. 2015. **Strawberry** Clery fruit quality evolution during harvest. Acta. Hort. 1099. 225-232

Abstract

Strawberry fruit composition is important for its taste and health value. Significant variations of the fruit composition such as the content of sugars, acids, phenolic compounds and vitamin C have been already observed and criticized. Several studies have shown that the genotype has a very high impact on these variations. In addition, variations of these parameters can also be monitored within a same genotype and thus also be responsible for the inconsistencies in fruit quality. The aim of this study was to assess the weekly evolution of those quality traits during the whole harvest period and to analyze the duration of the fruit development and its effects on the fruit quality parameters for the strawberry cultivar 'Clery'. Our results confirm the high fluctuation of the strawberry quality within a same genotype throughout the harvest period, especially for soluble solids content and for anthocyanins content in fruits. Another source of variation was the duration of the fruit development from flowering to harvest, especially for the anthocyanin contents. Fruits with slower development and with a longer ripening time appeared to accumulate more anthocyanins.

Keywords: /anthocyanin//*Fragaria × ananassa*// duration of fruit development//fruit Quality//harvest period

HERBS & SPICES

DILL

Tsamaidi and H.C.Passam. 2015. The effect of modified atmosphere on the quality of fresh dill *Anethum graveolens* L. Acta Hort. 1099. 263 - 268.

Abstract

Because of its high perishability, fresh dill (*Anethum graveolens* L.) cannot be stored for more than a few days, even at low temperature. The present study was therefore undertaken to determine whether modified atmospheres based on changes in CO₂ and O₂ concentrations would benefit dill storage. Dill cultivar 'Ducat' was cultivated between October 2009 and January 2010. Plants were harvested at the fresh market stage (before flowering) and randomly selected leaves were weighed, placed in airtight plastic bags and stored for 10 days at 5°C. The atmospheres within the bags (O₂-CO₂-N₂) were initially as follows: (1) Control - 20-0-80 (air), (2) 20-10-70, (3) 10-0-90, and (4) 10-10-80. The changes in O₂-CO₂ concentrations were monitored during storage; fresh weight, chlorophyll, vitamin C and total phenolics concentrations were measured before and after storage. The O₂ concentration within the bags during storage fell to 12.5% (control) and 17.9% (treatment 2) indicating a reduction of respiration due to the inclusion of 10% CO₂ within the initial atmosphere (20% O₂). At an initial concentration of 10% O₂, the O₂ level decreased to 5.5 and 5.8% in the absence or presence of 10% CO₂ (treatments 3 and 4), respectively. In each case, the decrease in O₂ was accompanied by a corresponding increase in CO₂ concentration. Weight loss during storage ranged from 2.6-5.3% and the total phenolics levels decreased in all

treatments except treatment 3 (10-0- 90). Vitamin C and chlorophyll concentrations decreased during storage. Vitamin C loss was similar in all treatments, but chlorophyll loss was significantly higher in the treatments with 10% CO₂. In conclusion, although modified atmospheres containing 10% CO₂ reduce respiratory activity they are of questionable value for dill because the decrease in chlorophyll concentration causes a decrease in quality.

Keywords: //chlorophyll// temperature// total phenolics//vitamin C// oxygen// carbon dioxide

ORNAMENTALS

ALSTROEMERIA

Galati, V.c., et.al. 2015. Use of calcium chloride in postharvest treatment of **Alstroemeria** cut flowers. Acta Hort. 1104. 267 - 272.

Abstract

Cut flowers require the use of technologies to improve postharvest quality and increase floral longevity. The application of calcium in maintenance solutions is used to extend the postharvest preservation. The aim of this study was to investigate the effect of calcium chloride solutions on the postharvest maintenance of *Alstroemeria* inflorescences. *Alstroemeria* stems (70 cm) were placed into one-liter Erlenmeyer flasks containing 500 mL of calcium chloride solutions at concentrations of 0, 10, 25, 50 and 100 mmol of calcium L-1, using 3 replications with 3 stems each. Evaluations were performed every three days (0, 3, 6, 9 and 12 days). The flower stems were stored at room temperature (22±1°C and 85±3% RH). The following parameters were assessed: calcium content, fresh weight loss, relative water content, respiration rate, pigments, soluble and reducing carbohydrates, and polyphenoloxidase and peroxidase activity. It was found that the use of 50 mmol of calcium L-1 in the preservation solution prolonged *Alstroemeria* flower vase life, however, leaf yellowing was not delayed.

Keywords: /*Alstroemeria* sp//calcium// maintenance solution//longevity//pigments

CUTFLOWERS

Dole, J.M., et.al. 2015. Vase life of new **cut flowers**. Acta Hort. 1097. 55 - 62.

Abstract

Stems of 42 cultivars from 14 genera were pretreated with either a commercial hydrating solution or deionized (DI) water and placed in either a commercial holding solution or DI water for 44 hours. Treatment with a holding preservative produced the longest vase life for 21 cultivars in the genera *Amaranthus*, *Antirrhinum*, *Capsicum*, *Carthamus*, *Celosia*, *Eustoma*, *Helianthus*, *Tagetes*, and *Zinnia*, indicating that holding preservatives should be used with most taxa. Compared to the water-only control commercial hydrator had a less positive effect as it reduced the vase life of seven cultivars in five genera: *Capsicum*,

Carthamus, Eucomis, Solanum, and Zinnia. All treatments produced a statistically similar vase life for 15 cultivars in the genera Capsicum, Carthamus, Celosia, Dianthus, Eucomis, Gomphrena, Helianthus, Matthiola, and Zinnia. Cultivar variation was noted in six genera, including Capsicum, Carthamus, Celosia, Eucomis, Helianthus, and Zinnia. Of the 42 taxa tested, six had a vase life longer than 21 days for at least one of the treatments, 12 had a vase life of 14 to 21 days and 13 had a vase life of 10 to 14 days, indicating that most of the taxa tested would be suitable for commercial production. The work presented here is part of 13 year study to determine overall effectiveness of commercial hydration and holding solutions.

Keywords: /holding solution//hydrator//preservative

Song, J., et.al. 2015. Quantitative proteomic investigation on the effect of 1 methylcyclopropene treatments on postharvest quality of selected **cut flowers**. Acta Hort. 1102. 311 - 318.

Abstract

Vase life or longevity of cut flowers is one of the important quality indices that determine the consumer preference and satisfaction. In this study, we evaluated the effect of 1-methyl-cyclopropene (1-MCP) on postharvest quality of selected cut flowers with different ethylene sensitivities, and applied quantitative proteomic tools to reveal the significantly changed proteins. Rose (*Rosa hybrida*), gerbera (*Gerbera jamesonii* H.), carnation (*Dianthus caryophyllus*) and snapdragon (*Antirrhinum majus*) were obtained from a local commercial grower and then divided into two groups. One group was exposed to 0.9 μ L L⁻¹ 1-MCP at 20°C for 16 h, while the other group served as control without 1-MCP treatment. During a period of 14 days' storage at 20°C, flower samples were taken after 1, 4, 7 and 14 days for quality evaluation. 1-MCP treatment significantly delayed the senescence of cut flowers and reduced wilting and abscission, especially for rose, gerbera and carnation flowers. The correlation between chlorophyll fluorescence (flower sepals) changes and senescence of cut flowers was also determined. By employing dimethylation labeling as a quantitative proteomic tool, more than 900 proteins were identified and quantified in rose flowers. Among them, 103 proteins were found to represent five significant clusters based on quantitative protein changes. Proteins involved in plant growth regulators, natural resistance and program cell death were increased during senescence, while those involved in protein metabolism, antioxidant and redox and methionine synthesis were decreased. This study provides new insights on the regulation of senescence and effect of 1-MCP on quality of cut flowers, which may lay the foundation for better quality management.

Keywords: /rose//*Rosa hybrida*// gerbera//*Gerbera jamesonii*//carnation//*Dianthus caryophyllus*//

Snapdragon//*Antirrhinum majus*// chlorophyll fluorescence// quality//OFFgel//proteomics

ROSE

U. van Meeteren, ., et.al. 2015. Predicting **rose** vase life in a supply chain. Actaort. 1099. 283 - 290.

Abstract

An important quality attribute of cut flowers is their vase life. With increasing market globalization, the vase life is more and more affected by transport and storage. However, techniques to measure the potential vase life at the point of sale in the chain are not available at this moment. Therefore, simulation models that can predict vase life based on temperature and time, as measured by data loggers, could be very valuable. Moreover, such simulation models could be used for scenario studies to investigate quality critical control points. A previously published simulation model, based on data from literature, was validated for cut rose flowers using data of a vase life experiment with flowers stored at 1, 5, 8 and 12°C for periods varying between 2 and 39 days. The experimental setup was designed to exclude the occurrence of *Botrytis* and water uptake problems due to bacteria as much as possible. The experimentally obtained vase life data confirmed that the relationship between temperature and loss of vase life during storage could very well be described by a sigmoidal curve. The predicted vase life applying the simulation model correlated very well to the measured vase life. However, the vase life after long storage was underestimated; this could be improved by adapting only one parameter of the model for the specific cultivar calculated from the vase life of fresh cut flowers without storage. Also a linear temperature sum model was tested. The temperature sum-model gave acceptable outcomes within narrow temperature and storage period ranges, but largely overestimated vase life of flowers with short remaining vase lives. Besides non-linear effects of temperature on the rate of vase life-loss, this was largely due to the non-linear effect of the length of the storage period.

Keywords: /storage//temperature// senescence rate//vase life// simulation//modelling, temperature sum// cut flower

VEGETABLES

CABBAGE

Gajewski, M., et.al. 2015. The influence of storage conditions on quality parameters of head with conical heads. Acta Hort. 1099. 233 - 240.

Abstract

Head cabbage cultivars (*Brassica oleracea*L. var. *capitata*f. *alba*), which form small heads of conical shape, are a new alternative vegetable crop in Europe. They are grown on a limited scale yet, mainly in West Europe. The objective of the study was to determine the effect of controlled atmosphere storage on the quality of the conical cabbage heads in comparison with normal atmosphere storage. Two Dutch cultivars of the conical cabbage: 'Caraflex F1' and 'Bejo 2654' were stored for 3 months in a cold store, under normal (NA) and controlled (CA, 5% CO₂ + 3% O₂) atmospheres. Other storage parameters were: temperature of 0-1°C and RH 95%.

Before and after the storage some parameters of the quality of the cabbage were determined, including dry matter, vitamin C, soluble solids, nitrate (V) contents, as well as the colour of the cabbage heads leaves in CIE L*a*b* system. After the storage mass percentage of marketable product, natural weight losses of the heads and sensory quality (overall sensory quality and consumer liking) were also determined. CA storage resulted in a higher percentage of marketable products, less mass loss of the heads and in their better quality than storage under normal atmosphere. Also changes in vitamin C and soluble solids contents were inhibited as a result of the atmosphere modification. Nitrate (V) content in the heads was not affected by storage conditions and remained stable during the storage period. Consumer acceptance of the cabbage was also higher for CA stored heads. Therefore, storage of cabbage heads in CA conditions, with gas composition of 5% CO₂ + 3% O₂, seems to be a better alternative for storage of the heads than storage in a regular cold store, i.e., under normal atmosphere conditions.

Keywords: /Brassica oleraceae cultivars//controlled atmosphere//nitrate (V)//storage Losses//sensory quality

Pace, Bernardo, et.al. 2015. Adaptive self-configuring computer vision system for quality evaluation of fresh cut **radicchio**. *Innov.Food Sci. &Emerg.Technol.* 32. 200 - 207.

An innovative computer vision system (CVS) that extracts color features discriminating the quality levels occurring during fresh-cut radicchio storage in air or modified atmosphere packaging was proposed. It self-configures the parameters normally set by operators and completely automates the following steps adapting to the specific product at hand: color-chart detection, foreground extraction and color segmentation for features extraction and selection. Results proved the average value of a^* over the white part and the percentage of light white with respect to the whole visible surface to be the most discriminating color features to significantly separate ($P \leq 0.05$) the three desired quality levels (high, middle and poor) occurring during fresh-cut radicchio storage (whose true value was verified on the base of ammonium content and human evaluated visual quality). The proposed procedure significantly simplifies the CVS design and the optimization of its performance, limiting the subjective human intervention to the minimum. Industrial relevance: The non-destructive quality control represents a valuable tool to monitor fruits and vegetables along the whole chain from production to the end-user. Increased consumers' satisfaction and reduction of waste are only two examples of benefits that can come from a frequent and consistent control of food. CVS represents the most powerful and flexible way to reach these results. The current state-of-the-art makes their design strongly related to the specific product at hand. Thresholds and features are characteristics that play a critical role in determining the final performance of the system but are generally set by designers or operators using a-priori knowledge and/or trial-and-error processes. The proposed innovative procedure allows the CVS to self-configure most of these parameters and to easily adapt to different products regardless of the number and kind of colors associated to their surface. It results of practical applications in food processing, providing a non-destructive, automatic, cheap, fast and simple technology for the quality level

evaluation, whose configuration requires a reduced, less critical and less technical human intervention.

Keywords: //Computer vision system//Non-destructive quality evaluation//Self-configuration//Automatic colors features selection //Image analysis