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LECTURES AND ORAL PRESENTATIONS

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EFFECT OF CONTROLLED ATMOSPHERE (CA) STORAGE ON THE SHELF LIFE AND QUALITY OF MANGO FRUITS.

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Mango being a tropical fruit has a shelf life of only 3 weeks even at the optimum low temperature of 13-15°C. Attempts have been made to determine the optimum Controlled atmosphere (CA) storage conditions for 'Alphonso' and 'Baneshan' cultivars to prolong the shelf life and to study its quality changes associated with CA storage. Mangoes were stored at 13°C under a continuous flow system with three levels of oxygen viz., 3, 4 and 5% and two levels of carbon dioxide (3.0 - 4.0 % CO₂ and 1.5 - 2.0% CO₂). Concentration of CO₂ was maintained by the respiration of fruits itself by adjusting the flow rate of inlet gases. Alphonso mangoes could be stored for 30 days under 5% O₂ and 3-4% CO₂ and Baneshan mangoes for 35 days under 5% O₂ and 1.5 - 2.0% CO₂ with a post storage ripening period of 4 to 5 days at ambient conditions. Reducing the O₂ level below 4% inhibited normal ripening of the fruit. Pre-storage treatment of mangoes with hot water (HW) at 55°C for 5 minutes did not help in preventing the spoilage during post storage ripening. However, post storage treatment with HW helped in reducing the spoilage during ripening. Though the sugar and carotene contents of ripe mangoes was slightly less after CA storage, the overall quality was acceptable as compared to those held 13°C.

HIGH CO₂ LEVELS DURING CA STORAGE AFFECTS ASCORBATE METABOLISM IN CONFERENCE PEARS

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Several authors already showed that enhanced CO₂ during CA storage induce a decrease in ascorbate. The reason for such a decrease is not established. To determine this cause, Conference pears (*Pyrus communis*) were harvested 3 days after the estimated ideal time for commercial harvest and stored for 6 months in controlled atmosphere (CA) at 2 % O₂ + 0.7 % CO₂, 2 % O₂ + 5 % CO₂ or in air at - 0.5 °C. Changes in the amounts of ascorbate and glutathione, activity of superoxide dismutase (SOD), catalase (CAT), ascorbate peroxidase (APX) and glutathione reductase (GR) were followed during storage. Fruits stored at high CO₂ concentration (5%) showed a significant decrease in ascorbate and lose their ability to regenerate this compound. No differences were found for glutathione. In this condition, the activity of SOD increased and the activity of CAT, APX and GR remained unchanged. Collectively, these results suggest that high CO₂ storage impair the fruit capability to regenerate ascorbate and that APX and GR are not involved in this impairment.

CA-STORAGE RELATED DISORDERS IN 'CONFERENCE' PEAR

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The main CA-storage problem of 'Conference' pear are the browning of tissue around the core and the formation of cavities. The causes for the occurrence of these disorders are very complex and comprise pre- and post- harvest conditions. The purpose of this paper is to elucidate the importance of the factors: Mineral nutrition, crop load, picking date, and storage conditions in respect to the appearance and intensity of flesh browning. Fruits of 'Conference' pear with variations in mineral application, crop load and picking date were stored under CA-conditions with high CO₂ (5%) and low CO₂ (0,7%) combined with 2% O₂. The incidence of flesh browning and cavities were judged several times during a 6 months CA-storage period. According to our results, there exist no relationship between the macro-nutrients K, Ca, Mg, P, but the micronutrient boron seems to be strong related to occurrence of browning disorders. Late picking as well as high CO₂-concentrations in the storage atmosphere have a very obvious promoting effect on the appearance and intensity of the browning disorders. Possible causes for the damages are: (1) The increase in respiration and/or the change in the fruit texture of riper fruits result in detrimental CO₂/O₂-concentration in the inner part of the fruit tissue. (2) There is a range of evidence in support of a role of boron in membrane integrity and functioning. (3) Living tissue needs a continuous supply of energy to maintain the integrity of cells. The energy production of is reduced in CA storage. (4) The endogene defence mechanism of cells against stress is exhausted very soon under extreme CO₂- and O₂-concentrations.

PHENOLIC COMPOUNDS IN PEARS AFTER STORAGE IN CONTROLLED ATMOSPHERE

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The changes of phenolic compounds during storage may be used as an indicator of the effects that different postharvest technologies have on the quality of fresh fruits. For example, the degradation of flavanols were correlated with the development of brown pigments in pears after storage in CA [1]. The objective of this study was the evaluation of the effects of controlled atmosphere storage on the phenolic compounds of 'Rocha' pear. Fruits were stored under five different atmospheres. After nine months of storage and after exposure to air at room temperature, phenolic compounds were extracted and then separated into acidic and neutral fractions on a preconditioned C18 SEP PAK cartridge. Right After six days of exposure the concentration of phenolic acids decreased in pears that had been stored in 2% O₂ + 1.5% CO₂. The concentration of flavanols was almost constant and no degradation of the catechin content was observed. These results might indicate that pears stored under 2% O₂ + 1.5 % CO₂ were less susceptible colour changes after long-term storage in CA.