

## Biochemical changes of avocado (*Persea americana*) fruits packaged in selected permeable films

*T. Mahendran and K. Prasannath*

Department of Agric. Chemistry, Faculty of Agriculture, Eastern University of Sri Lanka

### Abstract

A study was undertaken to investigate the effect of modified atmosphere (MA) packaging on the quality of avocados. Mature pre-climacteric avocados were packed in several plastic films having a wide range of O<sub>2</sub> and CO<sub>2</sub> permeability and refrigerated at 4°, 7° and 10°C. The concentrations of O<sub>2</sub> and CO<sub>2</sub> in MA packs from each holding temperatures were monitored daily. Each pack contains avocados giving similar ratios between the weight of fruit to the area of the permeable film and the volume of free space of 750 cm<sup>3</sup> within the pack. The treated avocados along with fruits stored at normal atmosphere (control) were ripened at 20 ± 0.5°C and the relative humidity of 90-95%. The flesh firmness, ascorbic acid, total sugar, oil, pH and fatty acid composition were assessed during ripening following the combination treatments.

Ascorbic acid content of avocados was found to be affected by storage temperature, duration and atmospheric composition. All samples showed loss in ascorbic acid during ripening. Fruits stored at 7°C in MA of 4.8% O<sub>2</sub> + 8.4% CO<sub>2</sub> and air packs lost 11.7% and 15.6% of its ascorbic acid during ripening. Flesh firmness decreased as ripening progressed in both MA stored and control fruits. MA storage did not produce any significant (p<0.05) effect on oil content of ripe fruits and indicated that the equilibrium gas concentrations did not significantly affect the enzymes concerned with fat metabolism. Nine fatty acids were identified in avocado oil. The major saturated fatty acid is palmitic acid of 12.1 - 14.6% and the main unsaturated fatty acid is oleic acid of 69.3 - 73.7% in ripe fruits. Fruits sealed with insufficiently permeable film such as polypropylene, polyolefin and a laminate of 20μ Nylon + 60μ polyethylene has been found to contain highly modified atmospheres of >20% CO<sub>2</sub> + <2% O<sub>2</sub>. Under these conditions, fruits developed rind injury and produced off-flavours and off-odours during ripening. The modified atmosphere storage of avocados in plastic film MY-15 having the O<sub>2</sub> permeability of 3500 cm<sup>3</sup>/m<sup>2</sup>/day bar and the CO<sub>2</sub> permeability of 8500 cm<sup>3</sup>/m<sup>2</sup>/day bar in combination with refrigeration would help to maintain the biochemical quality of avocados throughout the marketing chain and to extend the shelf life of fruits for the retailer and consumer.

**Keywords:** Avocado, Modified Atmosphere, Permeable Films, Refrigeration, Shelf life