

**Title** Storage life enhancement of avocado fruits  
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### **Abstract**

Avocado Fruit (*Persea americana* Mill. Var. Hass) is one of the most perishable commodities available in the market. It has a very high rate of postharvest respiration, limited shelf life and has special unique characteristics of ripening.

In the first part of this study, a silicon membrane system was used for the storage of 'Hass' avocado fruits. The silicone membrane system is an efficient method for attaining and maintaining modified atmosphere (MA) in experimental storage chambers.

The storage was performed in small sealed experimental chambers fitted with silicon membrane windows. The areas of the windows were calculated in order to achieve 3% oxygen assuming 30, 50, and 70% reduction of the respiration rate due to the effect of the modified atmosphere on the products' metabolic activity. Fruit stored at regular atmosphere (control) was kept under the same temperature (7°C) and relative humidity (90%) as those stored with silicon membrane system. The gas concentration in the chambers was analyzed using a gas chromatograph. The respiration rate was measured at storage (7°C) and ripening (15°C) temperatures. The effect of sulphur dioxide treatment on 'Hass' avocado fruit stored in the silicon membrane system was also evaluated.

Fruit quality before storage, after storage and after ripening was evaluated through physiological assessments. Fruit stored under the silicon membrane system remained in an excellent condition for 47 days. Following this period avocados ripened normally in a course of 4-10 days at 15°C and regular atmosphere. After ripening, the fruit did not show any apparent physiological deterioration or damage, neither development of undesirable organoleptic changes. The chambers with the small membrane area reached stable gas concentration in 6 days, the chambers with the large membrane area never reached steady gas concentration to the desired levels; while the chambers with medium membrane area reached steady gas concentration in 15 days. Optimum results were obtained using small membrane area (28 cm<sup>2</sup> for a kilogram of stored avocado fruit) in the presence of sodium metabisulphate. This treatment has potential for commercial use after pilot scale studies. In the second part of this study, observations were made on the effects of several plant regulators, 2,4-dichlorophenoxyacetic acid, gibberellic acid, and 6-

benzylamino purine on the respiration pattern, ethylene production, and the number of days to ripen the avocado fruits. These substances were vacuum infiltrated to insure good penetration and distribution. The results indicated that these hormones inhibited the rate of degreening and softening. The metabolic activity of the treated fruit, as judged with the respiration rate, was diminished by using 6-benzylamino purine, it was more effective than the other hormones in reducing respiration rate throughout the ripening period. Stimulation of ethylene synthesis by hormone application was observed; however, enhanced ethylene evolution could not overcome the inhibition of degreening, softening, and the respiratory activity by the phytohormones. The results reinforce several previous observations with other fruits that auxins, gibberellins, and cytokinins may largely constitute 'resistance to ripening' and may be responsible for the lack of ripening shown by unpicked fruits.