

Influence of wrapping material on physico-chemical characters during storage of custard apple

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ABSTRACT

The uniform size, shape, colour and maturity fruits of custard apple (cv. Local) were stored in 100 gauge polyethylene package with 2% vents for five days after harvesting at ambient temperature without any loss in palatability of fruits. Studies conducted on physiological weight loss, external appearance of fruits, fruit softening, TSS, acidity, reducing sugars, non-reducing sugars, total sugars, chlorophyll content and organoleptic score revealed that it is beneficial to wrap the custard apple fruits in the said polyethylene for increasing its shelf-life.

Key words : Annona, Polyethylene packaging, Storable, and Physicochemical characters.

INTRODUCTION

Custard apple is commercially grown mostly in semi-arid region in India. In Maharashtra, the area under this crop is increasing because Government Maharashtra is giving 100% subsidy to the farmers under Employment Guarantee scheme for growing different fruit crops including custard apple. Out of five edible species of *Annona*, only *A. squamosa* L. (Custard apple) is commercially grown. The fruits of custard apple are very delicate and highly perishable in nature. After harvest (maturity) biochemical changes in the fruits occur at the faster rate and fruit become unfit for consumption with short period and in turn limits the transportation to the distant markets.

These biochemical changes occurring during the storage could be lowered down, to some extent, and increase shelf-life without deteriorating the quality of the fruits. One of the methods to achieve this is to lower down the temperature by Wills *et al.* (1984) but fruits of *Annona atemoya* show typical symptoms of chilling injury. Role of polyethylene packaging to increase the shelf-life of the fruits is well documented in many fruits. The present study was conducted to study the effect of polyethylene packaging to prolong the shelf-life of custard apple fruits stored at ambient conditions.

MATERIALS AND METHODS

The healthy matured fruits of Custard Apple cv. 'Local' were harvested and used in the present experiment. A preliminary study was conducted to standardize the polyethylene gauge and vent percentage required for packaging of fruits of custard apple. In this trial, polyethylene gauge of 5, 100, 200, 250 and vent percentage of 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5, 5.0 were used.

The selected 20 fruits were washed with water, wiped dry. Ten fruits were wrapped in 100 gauge polyethylene bags with 2% vents and remaining 10 fruits were kept unwrapped under room temperature as adopted by Kumbhar and Desai (1986) and Chaudhary *et al.* (1985).

Thy physiological and chemical observations were recorded immediately after laid down the experiment. The physiological changes in fruits were recorded every day i.e. after 24 hours and chemical changes in fruits were recorded on 1st, 2nd, 3rd, 5th and 7th day of storage. The estimation of chlorophyll content was done by standard method (Arnon, 1949). This fruits were also evaluated organoleptically (Amerine *et al.* 1965).

RESULTS AND DISCUSSION

It is revealed from Table 1, effective polyethylene packaging on physiological changes in fruits that the storage losses of fruits increased progressively as the storage period advance in both the polyethylene wrapped and unwrapped fruits of custard apple. The fruits packed in 100 gauge/polyethylene bags of 2% vents showed less loss in weight, external appearance and also softening rate at all the storage periods compared to the control (unwrapped fruits) upto 4th day of storage. On 5th day, packed fruits showed 22.9% weight loss as against 29.8% in unpacked fruits. As far as external appearance (%) is concerned, the unpacked fruits showed only 42.9% external appearance on 4th day itself while in packed fruits even on 5th day it was 38.4%. Even 100% softening delayed by 1 day in packed fruits (i.e. 100% softening was occurred on 5th day). These results are agreement with Chaudhary *et al.* (1985) and Pareek (1993). Further it was observed that wrapping slows down the softening rate and increases the acceptability of external appearance by one more day than the unwrapped fruits. Similar findings were recorded by Chaudhary *et al.* (1985).

It is revealed from Table 2 effect of polyethylene packaging on chemical change in fruits that, initially the T.S.S., sugars and acidity content of fruits was very low and chlorophyll content was high in all the fruits. As fruits started ripening, a significant increase in T.S.S., sugars, acidity and decrease in chlorophyll content of fruits wrapped in polyethylene as well as in unwrapped fruits kept open were noted. On third day of storages, T.S.S., sugars, acidity was more in unwrapped fruits as compared to wrapped fruits. On 5th day onward, the T.S.S., sugars, and acidity

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Table 1 : Effect of polyethylene packaging on physiological characters of custard apple fruits during storage.

Treatment/ Characters		Physiological weight loss (%)	External appearance of fruits (%)	Fruits softening (%)
1 st Day	Unwrapped	0.0	100.0	0.0
	Wrapped	0.0	100.0	0.0
2 nd Day	Unwrapped	6.3	90.0	20.3
	Wrapped	4.5	97.6	20.2
3 rd Day	Unwrapped	17.2	82.1	48.3
	Wrapped	11.0	82.1	32.3
4 th Day	Unwrapped	22.9	42.9	100.0
	Wrapped	19.2	79.9	82.6
5 th Day	Unwrapped	29.8	29.4	100.0
	Wrapped	22.9	68.4	100.0
6 th Day	Unwrapped	33.4	0.0	100.0
	Wrapped	30.0	33.1	100.0
7 th Day	Unwrapped	39.5	0.0	100.0
	Wrapped	32.4	0.0	100.0

were decreased in the fruits kept open. However, higher T.S.S., sugars and acidity content were seen in the fruits packed in polyethylene on 5th and 7th day of storage than open but less content of T.S.S., sugars and acidity on 7th day than 8th day in wrapped fruits. The results reported

Sapota respectively.

This indicate that besides reduction in weight loss and maintaining the turgidity of fruits polyethylene packaging was also found beneficial in arresting the ripening process of custard apple. The fruits wrapped in polyethylene with

Table 2 : Effect of polyethylene packaging on chemical characters of custard apple fruits during storage.

Characters/ Days		1 T.S.S. (%)	2 Acidity (%)	3 Reducing sugar (%)	4 Non reducing Sugar (%)	5 Total sugar (%)	6 Chlorophyll content (mg/100g)	7 Organo leptic score
1 st Day	Unwrapped	10.0	0.07	8.4	0.8	9.2	0.29	-
	Wrapped	10.0	0.07	8.4	0.8	9.2	0.29	-
2 nd Day	Unwrapped	26.2	0.30	22.0	2.6	24.7	0.19	8.53
	Wrapped	25.1	0.25	21.3	1.2	22.5	0.22	8.10
3 rd Day	Unwrapped	24.0	0.25	20.3	1.7	22.0	0.10	6.0
	Wrapped	24.5	0.29	21.1	2.0	23.1	0.14	7.6
4 th Day	Unwrapped	23.0	0.22	19.9	1.6	21.6	-	-
	Wrapped	23.0	0.25	20.1	1.7	21.9	-	-

earlier in custard apple by Chaudhri *et al.* (1985).

Initially fruits skin had higher chlorophyll content (0.3 mg/g) and it decreased progressively with increase in storage periods. However, fruits wrapped with polyethylene showed higher content of chlorophyll than unwrapped fruits. Organoleptic score indicated that in unwrapped fruits the score was high on 3rd day. On the contrary, in wrapped fruits this score was high even on 5th day. These observations on physical and chemical change during storage were also reported earlier by Ben Yehoshua (1966), Dhoot *et al.* (1984) and Kumbhar and Desai (1986) in Banana, Guava and *Internat. J. agric. Sci.* (2007) 3 (1)

2% vents stored upto 5th day without any considerable loss in palatability.

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