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Studies on the effect of packaging materials on shelf life of mango cv. Amrapali

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Abstract
An investigation was conducted to study the effect of different packaging materials to maintain shelf life of mango cv. Amrapali at ambient storage conditions. Fruits of mango were harvested at firm mature stage, packed in different packaging materials, *viz*. LDPE + 5% perforation, LDPE +Blotting paper, LDPE + Blotting paper + 5% perforation, Gunny bag, cotton cloth bag, plastic fertilizer bag, mesh bag, control (without packaging). The fruits packed in different packaging materials had lower physiological loss in weight (PLW), more firmness, slower ripening, negligible spoilage, better colour development, as compared to control fruits. After two weeks of storage, fruits packed in perforated LDPE maintained lower PLW, desirable firmness, minimum spoilage and better quality as compared to other treatments. The study revealed that mango fruits of Cv. Amrapali packed in 5% perforated LDPE polythene films can be stored for 16 days, as compared to unpacked control fruits which had storage life of 9 days.

Keywords: Amrapali, Ldpe, Mango, Packaging, Shelf Life

Introduction
Mango (*Mangifera indica* L.) is one of the most important commercial fruit crops, being referred to as the 'King of fruits'. India accounts for 41% of world's mango production. Mango is cultivated in an area of 2.2million hectares with a production of 18.7 million tonnes and a productivity of 8.5 MT/ha. As per (NHB 2016) data base mango occupies 34.9% of total fruit area, 20.7% of total fruit production.The area and production of mango has been increased by 45-50% during the last one decade.

Mango has rich diversity with many cultivated varieties and hybrids among them, Amrapali is a well known as a regular bearing dwarf hybrid. The fruit is oblong in shape. It is excellent in taste and is regarded as a good table variety. The fruit quality of Amrapali is favorably superior over its parent, Dashehari. The flesh is deep orange red and has about 2.5 to 3.0 times more ß carotene content indicating higher vitamin A content. This variety is more suitable for export and processing industry for preparing coloured mango nectar and juice. Due to dwarf nature the cultivar is recommended and for high density planting & kitchen gardens (Ray, 1999) [7].

Post harvest management of fruits comprises of different steps and packagings are one of them. Because packaging is the most fundamental tool for the post harvest management of highly perishable commodities. Packaging is an essential and indispensable component at different steps of post harvest handling and adopted especially to reduce transportation losses.

Materials and Methods
The study was conducted at Department of Horticulture, CRIDA during the year 2015-16.The fruits of mango cv. Amrapali were harvested at physiological mature stage. The bruised and diseased fruits were sorted out, and only healthy and uniform sized fruits were selected for the study. The fruits were packed in different packaging materials. The experiment consisted of 8 packaging treatments v*iz*; T_1–LDPE + 5% Perforation, T_2–LDPE + Blotting paper inside, T_3 – LDPE +5% perforation+ blotting paper, T_4 – Jute Gunny Bag, T_5 – Cloth Bag, T_6 – Plastic fertilizer bag, T_7 –Mesh bag, T_8-Control. Thereafter, the packed fruits as well as control (non-packed) fruits were stored at 20-21°C and 85-90% RH. The fruits were subjected to physic-chemical analysis at 4 days interval, viz., 0^{th}, 4^{th}, 6^{th}, 8^{th}, 12^{th} and 16^{th} days of storage and analyzed statistically following the complete randomized design as out lined by Panse and Sukhatme, 1967 [5].

The physiological loss in weight (PLW) after each interval of storage was calculated by subtracting final weight from the initial weight of the fruits and expressed in per cent. The fruit

Firmness was measured with the help of a penetrometer (Model FT- 327, USA) using 8 mm stain less steel probe. The ripening percentage was calculated as the number of ripe fruit/total number of fruit x 100 and expressed as a percentage. The spoilage percentage was calculated as the number of spoiled fruit/total number of fruit x 100 and expressed as a percentage.

TSS was determined by Hand Refractrometer and expressed in ºbrix, acidity of fruits by AOAC method (Anon, 1984), total sugars, reducing and non reducing sugar and acidity of fruits were recorded by a method as suggested by Ranganna (1979) [6].

Results and discussion

Physiological loss in weight (PLW)

The physiological loss in weight (PLW) of fruits, in general, increased with the advancement of storage period rather slowly in the beginning but at a faster pace as the storage period advanced (Fig 1).The LDPE +5% perforation packed fruits recorded the lowest PLW of 17.51% on 12th day whereas in control it was 18.95% on the 8th day of storage. The PLW of fruits packed in LDPE + 5% perforations ranged between 3.19-19.72% from 4 to 16 days of storage as compared to control whereas PLW ranged between 4.15 to 19.79% during storage. The fruits packed in different packaging films recorded lower weight loss, which is obviously due to role of films in checking rate of transpiration, respiration and maintaining higher humidity inside the wrappers (Ben Yehoshua, 1985 [1].

Colour development

The packaging films delayed the loss of green colour in mango fruits. Maximum loss of green colour was found in unpacked fruits control (Table 1). The colour of mango fruits kept in LDPE+5% perforation turned 100% yellow on 16th day but fruits under control turned 100% yellow on 8th day and the fruits softened earlier compared to other treatments due to early formation of carotenoid pigments and loss of tissue turgidity (Leopold, 1964) [2]. Colour development was closely associated with climacteric peak in all the treatments and in control. The colour development which started prior to the onset of climacteric was completed at the peak climacteric (Lesecke, 1950) [3]. The earliest visual sign of ripening was a change in colour primarily due to disappearance of chlorophyll at peak and post climacteric stage.

Firmness

It is evident from the data that the fruit firmness, in general followed a declining trend commensurate with advancement in storage period (Fig1). The fruits packed in LDPE +5% perforations maintained the highest average firmness (6.76kg force) closely followed by LDPE +5% perforations +blotting paper in side (6.51kg forces) and also at all stages of storage intervals. The control fruits registered the lowest mean firmness (4.08 kg forces). In case of LDPE +5% perforations packed fruits the decline in firmness was gradual, whereas in case of control fruits, the decline was found to be sharp. This reveals that LDPE +5% perforations packaging delays the softening process in mango fruits, and finally retained the desirable fruits firmness, which might be due to reduced transpiration loss and respiration activity and thus retained more turgidity of the cells. Decrease in fruit firmness during storage is presumably due to change in cell wall polysaccharides. Similar results were obtained by Singh *et al.* (1989) in mango.

Ripening

Maximum reduction in ripening was found in LDPE +5% perforations packed fruits, while untreated control fruits reached the completed ripening within 12 days (Fig 1).

Spoilage

The minimum average cumulative spoilage incidence (22.49%) was recorded in fruits packed in 5% perforated LDPE film, which was closely followed by fruits packed in 5% perforated LDPE film +blotting paper with an incidence of 25.83% (Fig 1). The maximum decay incidence was recorded in control (53.33%) followed by fruits packed mesh bag (49.08%). The spoilage of fruits increased as the storage period advances. Among packaging films, the spoilage was observed to be higher in fruits in control as compared to fruits packed in perforated films. This might be due to condensation of moisture in the surface of fruits, anaerobic conditions and break down of enzymes etc. during storage, which encouraged the multiplication of micro-flora. Fruits soften due to ripening and senescent changes results in fruit softening which further predisposes it to the fungal pathogenic rots. Likewise, Yameshita and Benassi (1998) [9] observed similar results in guava. The high spoilage loss in control fruits may be due to early senescence, which is highly associated with high polygalacturonage and cellulase activities, resulted in fast degradation of protopectin and cellulose causing early softening of fruits (Roe and Bruemmer, 1981) [8].

Shelf life (days)

Shelf life of the mango fruits as affected by different packing materials were presented in (Fig 1).The maximum shelf life (17.33 days) was recorded in fruits of T_1-LDPE 5% perforation) followed by fruits of T_3-LDPE+5% perforation+ Blotting Paper (16.00 days). Minimum shelf life was observed in (T_8) control (9.66).

Fruits packed in LDPE +5 % perforation recorded highest shelf life. This might be due to accumulation or maintenance of high relative humidity in the polythene bags that reduced rate of transpiration.

Conclusion

From the above findings, it can be concluded that LDPE +5% perforation proved to be the best treatment. Hence it can be used for the post harvest storage of mango fruits.

Tables

Table 1: Effect of packaging materials on Colour change Mango cv. Amrapali.

Treatments	Colour change(DAYS)				
	0th	4th	8th	12th	16th
T_1	Green	Breaker	Up to 25% yellow	25-<50% yellow	75-100% yellow
T_2	Green	Up to 25% yellow	50- <75% yellow	75-100% yellow	-
T_3	Green	Breaker	25-<50% yellow	75-100% yellow	-
T_4	Green	Up to 25% yellow	25-<50% yellow	75-100% yellow	-
T_5	Green	Up to 25% yellow	25-<50% yellow	75-100% yellow	-
T_6	Green	Breaker	25-<50% yellow	75-100% yellow	-
T_7	Green	Upto 25% yellow	25-<50% yellow	75-100% yellow	-
T_8	Green	25-<50% yellow	75-100% yellow	-	-

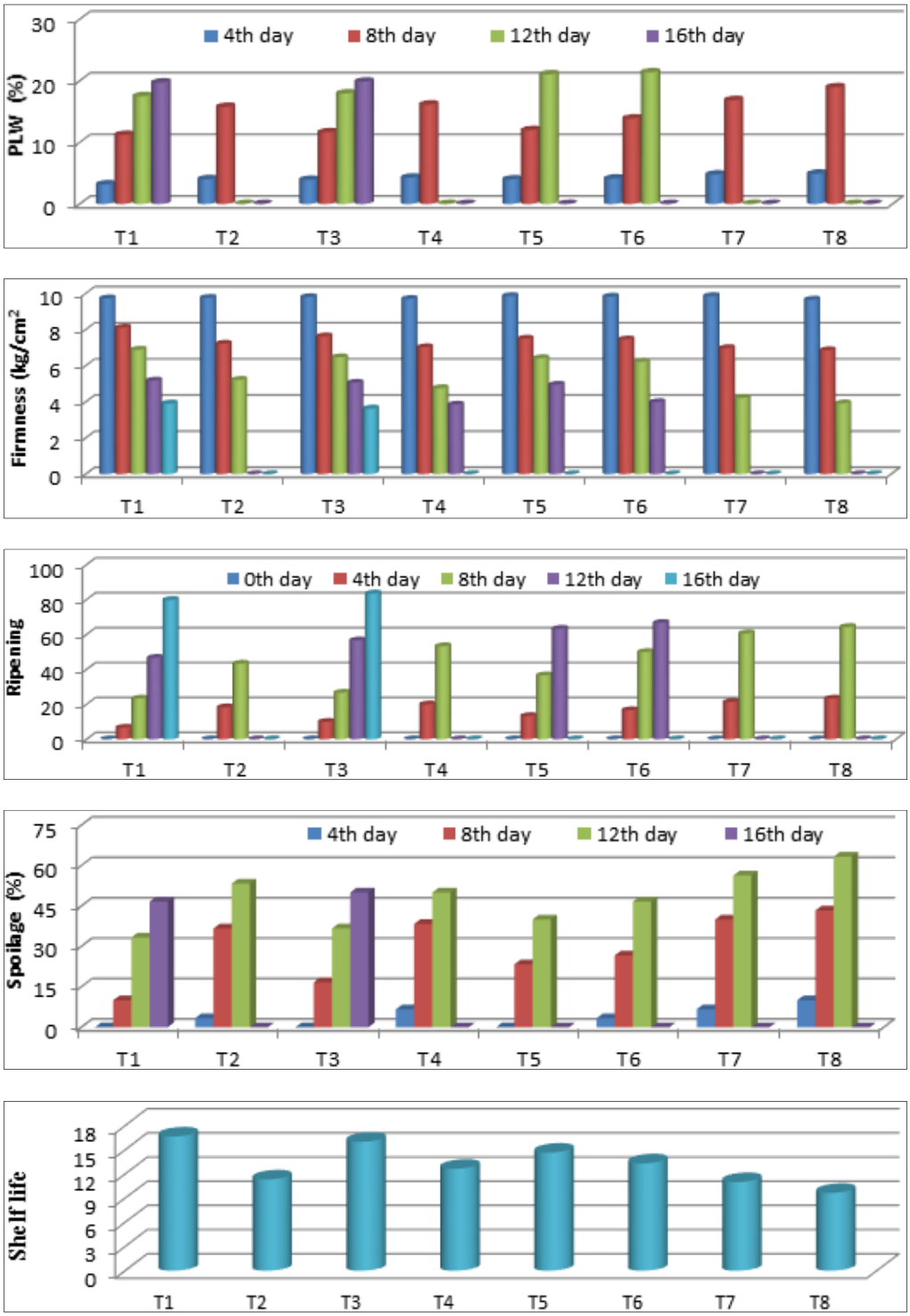

Fig 1: Effect of packaging materials on PLW (%), firmness, ripening and spoilage(%),shelf life (days) of Mango cv. Amrapali.

0-End of shelf life, T_1-LDPE + 5% Perforations, T_2-LDPE + Blotting paper inside, T_3-LDPE + 5% Perforations + Blotting paper inside, T_4-Jute gunny bag, T_5-Cloth bag, T_6-Plastic fertilizer bag, T_7-Mesh bag, T_8-Control (no packing).

References:

1. Ben Yehoshua. Individual seal packaging of fruits and vegetables in plastic films- a new post harvested technique. Horticutural Science. 1985; 94:524-528.
2. Leopold AC. Plant growth and development, Mc Graw-Hill Book Company, New York, 1964, 183-295.
3. Leoseck HW. Bananas 2nd edition. Inter Science, New York, 1950.
4. National Horticulture Database, National Horticulture Board, Ministry of Agriculture, Government of India. http:nhb.gov.in/area-pro/database, 2016.
5. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers, ICAR Publication, New Delhi, 1967, 167-174.
6. Ranganna S. Manual of analysis of fruit and vegetable products. Tata McGraw Hill Publishing Company Ltd., New Delhi, 1979.
7. Ray PK. Mango hybrids developed in India. Tropical horticulture Prakash, Calcutta, India. 1999; 1:102-177.
8. Roe B, Bruemmer JH. *Changes in pectic substances and enzymes during ripening and storage of 'Keitt' mangoes*. Journal of Food Science Technology, 1981; 46:186-89.
9. Yamashita F, Benassi MT. Influence of different modified atmosphere packaging on overall acceptance of white guava (*Psidium guajava* L. var. Kumagai). Mantidas Sob Refrigeracao Alimentos Nutrica. 1998; 9:9-16.