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## Effect of post harvest treatments on physical, physiological and shelf life of mango (*Mangifera indica* L.) CV. Amrapali

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### Abstract

Mango is considered as national fruit of India. Because of its excellent flavor, delicious taste, delicate fragrance and attractive color, it is known as 'King of fruits'. An investigation entitled the "Effect of containers and covering materials on quality and shelf life of Mango (*Mangifera indica* L.) cv. Amrapali" was conducted at P.G. Laboratory, Department of Horticulture, B.A. College of Agriculture, Anand Agricultural University, Anand during the month of June 2012. The research was carried out in Completely Randomized Design with four replications, having thirteen treatments. In experiment, the graded fruits of mango were packaged in various packaging containers (Bamboo basket, CFB box and Plastic crates, with or without covering material) and stored at ambient condition. On the basis of the above findings, it can be concluded that fruits packed in CFB box with newspaper covering proved to be effectively reduced the physiological loss in weight as well as spoilage loss and thereby maintain good balance between vitamin C and sugar content of fruits during storage and improved TSS, acidity, fruit firmness and ripening while decrease spoilage loss as compared to control and also extending the shelf life of mango fruits.

**Keywords:** mango, post-harvest treatment, ripening, shelf-life

### Introduction

Mango is considered as national fruit of India. Because of its excellent flavor, delicious taste, delicate fragrance and attractive color, it is known as 'King of fruits'. It has good nutritional as well as medicinal value. Every 100 g of mango fruit contains 81.7g water, 16g carbohydrate, 0.7g protein, 0.4g fat and 0.1g fiber. A single fruit can provide up to 40% daily dietary fiber need. Mango also has medicinal uses. The ripe fruit has fattening, diuretic and laxative properties. It helps to increase digestive capacity. Post-harvest losses are occurring in the period between harvesting and consumption. Hence there is an urgent need to adopt proper post harvest management practices by adopting improved packaging methods. Selection of packaging material and properly packed mango fruits will remain healthy, safe and fit for consumption. For packaging of mango, different containers and covering materials are used like plastic crates, bamboo basket, corrugated fiber board box (CFB), newspaper, paddy straw, polythene etc. Wooden, cardboard box and bamboo basket having capacity to accommodate 5 to 8 kg of fruits and it is use for packaging and transportation of mango fruits.

### Materials & Methods

The experiment was carried out during June 2012 at the Post graduate Laboratory, Department of Horticulture, B.A. College of Agriculture, Anand Agricultural University, Anand. The experiment was conducted in a completely randomized design with four replications along with thirteen treatments. Mango fruits cv. Amrapali of uniform weight and size were taken for experimentation. The details of the treatments applied in the present investigation are as: P<sub>1</sub>: Bamboo basket with newspaper covering, P<sub>2</sub>: Bamboo basket with polyethylene covering, P<sub>3</sub>: Bamboo basket with paddy straw covering, P<sub>4</sub>: Bamboo basket without covering, P<sub>5</sub>: Plastic crates with newspaper covering, P<sub>6</sub>: Plastic crates with polyethylene covering, P<sub>7</sub>: Plastic crates with paddy straw covering, P<sub>8</sub>: Plastic crates without covering, P<sub>9</sub>: CFB box with newspaper covering, P<sub>10</sub>: CFB box with polyethylene covering, P<sub>11</sub>: CFB box with paddy straw covering, P<sub>12</sub>: CFB box without covering, P<sub>13</sub>: Gunny bag (control).

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Note:

0.5% vents were used.

1. 20 fruits were taken for each treatment.
2. Transparent polyethylene bags having 150 gauge and

## Result & Discussion

**Table 1:** Effect of different levels of post harvest treatments of containers and covering materials on physical, physiological and shelf life of Mango fruit (*Mangifera indica* L.) cv. Amrapali”.

Treatments	Fruit firmness (kg/cm <sup>2</sup> )	Physiological loss in weight (%)	Spoilage loss (%)	Shelf life (Days)
<b>Containers</b>				
Bamboo basket	1.23	28.18	13.13	14.13
Plastic crate	1.00	28.54	15.63	13.94
CFB box	1.39	26.49	13.44	14.94
S.Em. ±	0.02	0.23	0.90	0.14
C.D. 0.05	0.05	0.67	NS	0.41
<b>Covering materials</b>				
Newspaper	1.28	25.76	12.92	14.75
Polyethylene	1.24	27.48	12.92	14.33
Paddy straw	1.22	28.33	15.00	14.42
Without	1.08	29.36	15.42	13.83
S.Em. ±	0.08	1.52	1.33	0.38
C.D. 0.05	NS	NS	NS	NS
Containers X Covering materials	Sig.	NS	NS	NS
<b>Control v/s Rest</b>				
Control	0.50	40.06	23.75	12.75
Rest	1.20	27.73	14.06	14.33
S.Em. ±	0.03	0.48	1.83	0.29
C.D. 0.05	0.10	1.37	5.26	0.83
CV.%	6.12	3.22	23.87	3.94

**Table 2:** Interaction effect of different levels of post harvest treatments of containers and covering materials on physical, physiological and shelf life of Mango fruit (*Mangifera indica* L.) cv. Amrapali”.

Treatments	Fruit firmness (kg/cm <sup>2</sup> )
Bamboo basket X Newspaper	1.31
Bamboo basket X Polyethylene	1.30
Bamboo basket X Paddy straw	1.19
Bamboo basket X Without	1.10
Plastic crate X Newspaper	1.03
Plastic crate X Polyethylene	0.97
Plastic crate X Paddy straw	1.11
Plastic crate X Without	0.90
CFB box X Newspaper	1.49
CFB box X Polyethylene	1.44
CFB box X Paddy straw	1.37
CFB box without covering	1.25
C.D. 0.05	0.10
CV.%	6.09

**Fruit firmness (kg/cm<sup>2</sup>):** Among the containers the individual treatment of CFB boxes recorded the maximum fruit firmness (kg/cm<sup>2</sup>) (1.39 at 12<sup>th</sup> day of storage, respectively), which was significantly higher as compared to rest of the containers. Whereas the interaction between containers and covering materials, combination of CFB box with newspaper covering treatment recorded the maximum firmness 1.49 kg/cm<sup>2</sup> at 12<sup>th</sup> day of storage, respectively), which were maximum as compared to rest of the combinations, while at 12<sup>th</sup> day of storage combination of CFB box with polyethylene covering at par with CFB box with newspaper covering. The firmness of mango fruits was decreased during storage period, the reduction being more in control. The decrease in fruit firmness during storage is presumably due to change in cell wall polysaccharides. Similar results were obtained by Joshi and Seth (1985) [4] in apple.

**Physiological loss in weight (%):** Among the containers the individual treatment of covering materials, newspaper covering treatment recorded minimum physiological loss in weight (25.76% at 12<sup>th</sup> day of storage, respectively) as compared to rest of the covering materials but the differences were non-significant. This is might be due to at the time of packaging, there is often a vapour pressure difference between the produce (fruit) and the package so that water is evaporated from the produce and is absorbed by packaging material (Baviskar *et al.*, 1995) [1]. Singh and Pathak, 1988, Chelvan, 1988, Pareek and Gupta, 1988, Ladania and Dhillon, 1989 also recorded similar trends during storage of fruits.

**Spoilage loss (%) and Days of shelf life:** Among the different containers, the individual treatment of covering materials bamboo basket recorded the minimum spoilage (13.13% at 12<sup>th</sup> day of storage, respectively), as compared to rest of the containers. While, CFB box treatment recorded the maximum shelf life (14.94 days), which was significantly higher as compared to rest of the containers. Whereas the interaction effect of the containers and covering materials were reported non-significant. This is might be due to proper packaging of the fruits had an antagonistic effect on the biogenesis of endogenous ethylene, which at threshold level, triggers the ripening process and consequently biochemical changes are retarded (Singh *et al.*, 2005) [9]. This is in close agreement with findings of Dhillon *et al.*, 1988 [3], Rameshwar, 1988c [8], Thakur and Lal, 1989 [11], Neeraj *et al.*, 2004, Yadav *et al.*, 2005 [12] in kinnow, apple, guava, aonla and ber respectively.

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