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To study the effect of different coating material and polythene packaging on physical characters and shelf life of hard pear (Pyrus communis) at Room temperature

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ABSTRACT

The experiment was conducted "To study the effect of different coating material and polythene packaging on the physical character and shelf life of hard pear under room temperature " at Agricultural laboratory, D.A.V. College, Abohar during year 2017 in August – September. Pears divided into six groups and each group treated with different treatment. 1st group treated with almond oil, 2nd with mustard oil, 3rd with linseed oil, 4th with petroleum jelly, in 5th treatment pears were packed in polythene and 6th group contain control fruits. The maximum juice percentage after 12 days (45.1%), minimum average loss in volume (1.537cc) and physiological loss in weight (0.972gm) until fruit spoil was observed in polythene packaging. So results revealed that maximum shelf life of hard pear was 27 days in polythene packaging with less affect on its quality under room temperature.

I.INTRODUCTION

Pear (*Pyrus communis*) is one of the superior temperate fruit having good taste and flavour. In India pear is largely grown for consumption as fresh fruits. Pear is commercially grown in North India and area under this crop is increasing due to its high yield and good economic returns. The another reason of area increasing under this crop it needs less care due to its hardy nature it is well even on water logged soils where other fruit trees fails to grow. It is also known for its keeping quality and transportation. Pears do not ripe on the tree. For ripening pears require warm and sunny area. Refrigeration stops the ripening process is regulated by ethylene, exhibit relatively short life time. During the ripening of pear there is change in firmness, colour, acidity, sugar content and development of aroma. The optimum quality for eating pears is characterized by a buttery texture, appropriate colour change, characteristic flavour associated with the content of sugars, acids, and volatile compounds (Cruz *et al* 2015). The use of growth regulator, edible coating, wax emulsion, storage at low temperature, use of fungicide, calcium treatment, silver nitrate, chemical application, oil coating, irradiation and different type of packing material as post harvest treatment has increased over the time (Bisen *et al*, 2011). As per our knowledge, fresh fruit and vegetables continue to 'breathe' or respire even after they have been harvested. This process consumes oxygen and produces carbon dioxide and water vapours. The key to keep these packaged products fresh as long as possible is to reduce the respiration rate without harming the quality of the product, its taste, texture and appearance. In general, the rate of respiration can be reduced by keeping the

temperature low, having lower levels of oxygen in the packaging atmosphere and increased levels of carbon dioxide. Packaging is a mean of providing a correct environmental condition for food. The method of food preservation is much more depending upon the packaging materials. Deterioration is a response to the external circumstances and the packaging, which remains in direct contact with food, delay the process of deterioration for the required time. Although chemical preservatives act upon controlling spoilage, but packaging provides support for chemical preservatives in addressing the issue of micro organism. Packaging also lowers the ingress of moisture, oxygen or foreign odours. Packaging, obviously play a vital role in keeping the food clean and in hygienic condition (Khan *et al*, 2013). Among the different methods used to extend the shelf life alternative of low cost technology i.e. the application of edible coating (oil, wax, chemical) to fruit has received attention word wide as these coating are maintaining quality even under ordinary storage condition. Keeping these in views, the experiment was conducted to find out best method of storage by using different oil and packaging material. The main aim of this research is to study the changes in physical parameters of hard pear and the effect of different coating and packing on quality and shelf life of hard pear

II.MATERIAL AND METHODS

The experiment was conducted at agriculture laboratory, D.A.V. College, Abohar. In this experiment, first fruits (pears) were purchased from market and collected in polythene bags and shifted to agriculture lab, D.A.V. College, Abohar on the same day. Pear fruits were washed and divided into 6 groups for each treatment and each group consisted of 7 pear fruits. The pear fruits were numbered as 1, 2, 3, 4, 5, 6, 7 for T_n treatments, here n = 1, 2, 3, 4, 5, 6. In each group sample no. 1 to 3 were used to observe the physiological loss in weight, volume and shelf life of fruits and another remaining fruits from sample no. 4 to 7 in each group were used to observe juice percentage at room temperature. Juice percentage was observed for 12 days and other characters were observed until pear fruits were spoiled.

In T_1 all samples are coated with almond oil, T_2 with mustard oil, T_3 with linseed oil, T_4 with petroleum jelly, in T_5 each sample is packed in different polythene and T_6 was controlled means no treatment was applied in this. After the application of treatment on pear fruit all fruits were placed at room temperature in laboratory.

2.1 Volume

The volume of fruit was determined using the water displacement method. In order to measurement of volume, the container was fill with water than fruit was immersed in it. The amount of volume increased from initial level is equal to volume of that fruit.

One millimetre (1 ml) has volume of 1 cubic centimetre (1 cm^3)

Volume of fruit = Final water level – Initial water level

2.2 Physiological loss in weight (PLW)

The weight of fruits was measured with the help of weighing machine. The loss in weight was measured after 3 days by using formula:

PLW = Intial weight – final weight

2.3 Juice percentage

The juice percentage was determined through formula in which firstly we weigh the fruit to determine its weight (w) and then juice was extracted from it and juice was weighted (u) then put values in the following formula:

$$JP = \frac{u}{w} \times 100$$

Where JP is juice percentage of sample fruit.

2.4 Shelf life

The maximum period for which fruits could be stored without deteriorating their quality. During this period fruits remain fresh, healthy and had no affect on their market value. After 50% spoilage of fruit marked end of the period of shelf life.

III.RESULTS AND DISCUSSION

3.1 Volume

From data in table 4.1 it is concluded that volume of all treatment decreased with increase in storage period. In case of petroleum jelly coated fruits volume decreased from 141 to 127.5 cc where as in case of polythene packaged fruit volume decreased from 162.33 to 148.5 cc and in case of control fruits volume decreased from 166.67 to 149 cc. Results showed that minimum average loss in volume was in polythene packaged fruits (1.5367 cc) and maximum volume loss was in linseed oil treated fruits (6.113 cc).

Similarly, Rajkumar and Das (2009) showed that sealed polythene and perforated polythene and 2% wax emulsion coating markedly reduced the percentage of volume loss per day at both temperature conditions (refrigerator and room temperature). Bahnasawy and EI-Sayed, (2014) also observed that the volume change decreased with increasing concentrations of wax solution, meanwhile, it increased with increasing storage temperature.

3.2 Physiological loss in weight

After observing the readings in table 4.2 it is concluded that there was increase in physiological loss in weight with the advancement in storage period. Results concluded that minimum average PLW was in polythene packaged fruits (0.972 gm) and maximum average PLW was in control fruits (5.0412 gm).

Similarly, Ngure *et al* (2009) observed that okra pods had greatest weight loss (79%) at 13^0C as compared to weight loss of pods (30%) stored at same temperature but kept in perforated packages. Singh *et al* (2017) also observed that maximum PLW (1.65%) was recorded in T_{12} i.e. untreated (without coating) guava fruits stored in cold storage conditions. Minimum PLW (0.22%) was recorded in the T_7 i.e. mustard oil coated guava fruits stored in cold storage conditions. The loss in weight increased as the storage period increased. Patil *et al* (2010) also gave similar results and found that percentage of physiological loss in weight increased at slower rate in zero energy cool chamber and also in polyethylene bag (100 gauge and 2% vent).

3.3 Juice percentage

Table 4.4 represents that juice percentage decreased with increase in storage period in all the treatments. Maximum juice percentage was found in case of polythene packaged pears (50.5) and minimum in linseed oil coated pears (34.29). In control fruits juice percentage decreased from 45.86 to 37.05, in polythene packaged fruits juice percentage decreased from 50.5 to 45.1 and in linseed oil coated fruits juice percentage decreased from 43.28 to 34.29.

Jan and Rab (2012) were also gave similar results that there was decline in juice percentage of fruit (apple cultivars) was recorded with increase in storage duration. Apple cultivar Red delicious had the highest juice content (58.47 %). Bisen *et al* (2012) concluded that the maximum juice content (42.3%) was recorded under pure coconut oil followed by castor oil (40.9%) and liquid paraffin wax coating at 18 days of storage in kagzi lime fruits.

3.4 Shelf Life:

In following table 4.4 data shows the shelf life of different treatments under room temperature. Table showed that maximum shelf life was observed in fruits packaged in polythene (30) with less effect on quality of fruits and minimum shelf life of pears coated with almond oil (12) and linseed oil (12). In control fruits shelf life of hard pear was 27 days.

Similarly, Pandey *et al* (2010) found that coconut oil treatment was significantly effective in increasing the post harvest life of fruits for 12 days over control without adversely affecting the fruit quality. Rajkumar and Das (2009) found that wax coating and polythene bags in refrigerator and wax coating at room temperature appreciably extended the shelf-life of freshly harvested water apple fruits.

IV. FIGURE AND TABLES

4.1 Volume

Table 4.1 Effect of different coating and packaging on volume (cm^3) of hard pear

Days interval of observation	T_1	T_2	T_3	T_4	T_5	T_6
0	140.00	166.67	165.00	141.00	162.33	166.67
3	130.00	160.67	151.00	140.00	161.67	165.00
6	126.67	160.00	148.00	138.33	160.00	160.00
9	121.67	159.00	146.66	137.33	154.00	155.00
12	-	158.00	-	135.00	153.50	152.50
15	-	155.00	-	131.00	153.00	151.00
18	-	149.00	-	127.50	152.50	150.00
21	-	-	-	-	151.50	149.50

24	-	-	-	-	150.00	149.00
27	-	-	-	-	148.50	-

4.2 Physiological loss in weight

Table 4.2 Effect of different coating and packaging on physiological loss in weight of hard pear

Days interval of observation	T_1	T_2	T_3	T_4	T_5	T_6
0	0.000	0.000	0.000	0.000	0.000	0.00
3	2.800	2.337	2.333	0.500	0.150	1.65
6	3.500	2.400	2.533	0.600	0.607	1.75
9	4.963	2.500	4.567	1.430	0.733	2.25
12	-	3.297	-	1.500	0.800	4.17
15	-	5.166	-	2.653	0.834	5.60
18	-	7.237	-	3.000	0.850	7.05
21	-	-	-	-	1.017	8.23
24	-	-	-	-	1.593	9.63
27	-	-	-	-	2.167	-

4.3 Juice percentage:

Table 4.3 Effect of different coating and packaging on juice percentage of hard pear

Days interval of observation	T_1	T_2	T_3	T_4	T_5	T_6
0	44.46	50.154	43.280	45.360	50.500	45.86
4	41.60	49.530	43.202	44.480	46.798	42.61
8	41.36	43.202	38.153	41.014	45.320	41.12
12	38.70	42.870	34.290	40.600	45.100	37.05

4.4 Shelf Life:

Table 4.4 Effect of different coating and packaging on shelf life of hard pear

Treatments	T_1	T_2	T_3	T_4	T_5	T_6
No. Of days	12	21	12	21	30	27

V.CONCLUSION

From experiment on the effect of different coating material and packaging on physical character and shelf life of hard pear under room temperature, a conclusion can be made that storage in polythene packaging increase shelf life of hard pear upto 27 days with less effect on its quality. In case of non availability of polythene petroleum jelly is beneficial for storage of hard pear. This experiment will help farmers to store pear fruits at room temperature with proper packaging in order to improve shelf life of pears.

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