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Impact Of Various Packaging Poly Film Materials On Quality Of Pear (*Pyrus Communis*)

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Abstract

The present research entitled "Impact of various packaging poly film materials on quality of pear (*Pyrus communis*)" was conducted with a view to improve the post-harvest quality of pear fruits. The research work was carried out at laboratory of school of Agriculture, Department of Horticulture, Lovely Professional University, Punjab in the year of 2017-2018. In this experiment, different packaging films significantly influenced post- harvest quality of pear fruits with respect to all parameters. Packaging treatments of HDPE, LDPE, PP and shrink films effectively maintain and improved the quality parameters like total sugar, reducing and non-reducing sugar (%) as compare to control.

Key words: Total Sugar, Reducing and Non- Reducing Sugar

Introduction

Pear (*Pyrus communis* L.) fruit is very famous for its sweetness, aroma and fragrance also useful for table purpose as fruits have good eating quality (Nath *et al.,* 2012). Timing of harvest for pear fruit has been mostly based totally on fruits firmness. However, in some period the speed of softness slows or maybe seems to prevent. At a similar period starch of fruits continue to filter out the fresh of fruits, indicates that maturation continues. Starch pattern having so variation therefore, starch clearing of is harder to evaluate in pears than apple. Starch clearing to be analyse as a further determine the maturity of fruits. The starch clearing chars of pear unit now accessible. Through the maturity period pears gain size and growers area also tempted to late harvest to give the permission fruit to achieve a further box size. Late harvest for size of fruits must be evaluated against the reduction on storage of fruit life. A lot of mature fruit features a shortage fruit life than the less mature fruits.

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The storage life of pears is lengthened if they are cooled quickly immediately after harvest, temperature also play very important role for fruits respiration process and on the activity of decay caused by organisms. The respiration rate is an index of the valet which the fruit is using up its reserves of sugar and other metabolites. Most of the factors like immaturity of fruits, high fruits nitrogen, low calcium, warm preharvest weather, high storage temperature and high relative humidity during the storage time and delayed cold storage regularly increase the severity of the fruits disorder. On pear fruit very small experimental work has been noted in pear fruit storage and modified atmospheric packaging technique at room conditions. Now days, the wrapping of highest perishable fruits with polyfilms with specific gas combination and permeability in associated with the cold storage facilities has gain the more significance. (Kadar and Watkins 2000, steward *et al.,* 1999). Different gauge and types of packing materials are available in market. But the very few poly flims has been used in packaging of horticultural produce. LDPE, PP and polyvinyl chloride are the main films mostly used in packaging of fruits and vegetable crops (Kadar *et al.*1989).

Material and methods

The experiment was design in a completely randomise statistical design along with the 3 replications. Total 40 fruits were selected from each treatment so there were total 200 fruits for each replication. For all three replication there were total 600 fruits selected. Good quality pear fruits were harvested and selected for the experiment. Here we have used different packaging materials like HDPE, LDPE, PP and Shrink. Insert four fruit per package material and close the poly film by using sealing machine of different packaging materials. Push the bottom of the bag upwards to prevent fruit from touching the material. All the packaging materials like (LDPE) low density poly ethylene, (HDPE) high density poly ethylene, (PP) polypropylene and shrink paper were removed at a time of physiological and biochemical analysis of pear fruits.

Determination of total, reducing and non-reducing sugars (%): A 25 g known weight of sample was measured and added in a 250 ml of volumetric flask followed by 100 ml of water must be poured in it. By adding 1 N sodium hydroxide and 45 per cent lead acetate in 2 ml for 10 minutes the solution was neutralized. Extra quantity lead acetate was taken away from the sample by adding 2 ml potassium oxalate (22%) into volumetric flask. After the dilution of this

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solution it up to the mark, the required solution was filtered and clear filtrate solution selected for the estimation of reducing sugars by titrating with the exact amount of fehling A and fehling B liquid solution using the Methylene blue indicator representing the brick red color precipitate as an the end point of analysis. (Lane and Eynon, 1923). Analysis of reducing sugar from pear fruits were estimated and presented as per cent and calculated as mentioned below formula.

$$\text{Reducing sugar (\%)} = \frac{\text{Factor X Dilution}}{\text{Titrate value x weight of sample}} \times 100$$

Results and discussion

Total sugar in pear fruits during storage time showed a linear increment movement, which was increase up to 25 days after packaging but later time reduction rage has been found in all the treatment (table 1). The maximum total sugar per cent 14.72 % was observed on 25 days after packaging and storage which was significantly maximum % as comparative to other storage intervals. Highest total sugar per cent content (14.72 per cent) were noted in the treatment 5 *i.e* in shrink poly film packaging methods which was significantly maximum than other treatments. Significantly lower range of total sugar content *i.e.* 11.86 and 11.26 per cent was observed in fruit packed in Low density polyethylene and control treatment respectively. The initially higher in total sugars of fruits observed in the different poly films packaging methods which might be due to the losses of moisture and water from the different part of the fruits and most of the changes in the physiological and biochemical process like changes in polysaccharides and pectic molecules in to the sugar. The increment in the sugar level of the fruits during the storage time up to 25 days might be due to the hydrolysis of the starch and production of the mono and disaccharides during the storage period. Later on, reduction in total sugar can be attributed to the metabolic breakage and the senescence of the fruit cell as output of fruit water level and firmness losses during the storage time (Ryall and Pentzar 1982). The maximum sugar content of fruits in T5 treatment might be due to the results fast reduction of water and rapid starch hydrolysis and other polysaccharides to soluble sugar form. At the time of storage of patharnakh pear fruit and apple red delicious, an increment of the sugar level which was reported by Mahajan (1994). Increase in sugar level in fruits might be attributed to conversion of polysaccharide (starch) into

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monosaccharide (sugars) and due to hydrolysis of starch into sugars reported by Banday (1996) and Mahajan *et al.*, (2004) in pear.

Table 1. To study the impact of variouse packaging poly film materials on total sugar (%) in pear fruits

Treatments	Total sugar (%)				
	5th day after packaging	**10th day after packaging**	**15th day after packaging**	**20th day after packaging**	**25th day after packaging**
T1 (Control)	8.92	9.64	10.15	10.74	11.26
T2 (LDPE)	9.46	10.37	10.88	11	11.86
T3 (HDPE)	10.07	10.26	11.49	12.02	12.63
T4 (Polyethylene)	10.63	11.49	12.01	12.68	13.25
T5 (Shrink)	11.28	11.84	12.26	13.19	14.72
S Ed	0.33	0.32	0.30	0.37	0.47
CD (1%)	1.01	0.99	0.93	1.14	1.44
CD (5%)	0.72	0.71	0.66	0.81	1.03
CV	6.04	5.64	5.01	5.85	6.97

With the increasing storage period reducing sugar content in pear fruits also increased up to the 25 days of storage and later on reduction in reducing sugar noted subsequently. The maximum mean reduction in the reducing sugar was observed in 10.40 per cent after the 25 days of storage, which was decline after 25 days of packaging and storage period. The T2 treatment *i.e.* fruits packed with the low-density polyethylene packaging materials recorded the significantly lower

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8.38 per cent reducing sugar content. However, the maximum mean reduction in reducing sugar per cent was observed in shrink packaging treatments *i.e* T5, 10.40 % which was followed by the T3 and T4 (9.22 % and 9.29 per cent) respectively. The continuous increment in sugar level during the storage time of 25 days and a gradual decrease after 25 days of storage it might be due to the hydrolysis of polysaccharide and concentrations of juice as a result of the dehydration. Moreover, the complete hydrolysis of starch materials, no again increment in sugar content occurred and consequently a reduction in total soluble sugar content had predictable as they are the primary substrate for the respiration and are mostly used by fruits in varies metabolic activities.

Table 2. To study the impact of variouse packaging poly film materials on reducing sugar (%) in pear fruits

Treatments	**Reducing sugar (%)**				
	5th day after packaging	**10th day after packaging**	**15th day after packaging**	**20th day after packaging**	**25th day after packaging**
T1 (Control)	5.95	6.43	6.82	7.35	7.75
T2 (LDPE)	6.44	7.10	7.55	7.63	8.38
T3 (HDPE)	6.70	6.80	7.94	8.38	9.22
T4 (Polyethylene)	7.12	7.80	8.24	8.80	9.29
T5 (Shrink)	7.49	7.94	8.38	9.22	10.40
S Ed	0.21	0.23	0.22	0.28	0.36
CD (1%)	0.64	0.70	0.68	0.85	1.09
CD (5%)	0.46	0.50	0.48	0.60	0.77
CV	5.72	5.85	5.32	6.25	7.41

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Table 3. To study the impact of variouse packaging poly film materials on non- reducing sugar (%) in Pear

Treatments	non reducing sugar (%)				
	5th day after packaging	10th day after packaging	15th day after packaging	20th day after packaging	25th day after packaging
T1 (Control)	2.97	3.21	3.33	3.39	3.51
T2 (LDPE)	3.02	3.27	3.33	3.37	3.48
T3 (HDPE)	3.37	3.46	3.55	3.64	3.41
T4 (Polyethylene)	3.51	3.69	3.77	3.88	3.96
T5 (Shrink)	3.79	3.90	3.88	3.97	4.32
S Ed	0.12	0.10	0.09	0.10	0.14
CD (1%)	0.37	0.31	0.27	0.30	0.42
CD (5%)	0.26	0.22	0.19	0.21	0.30
CV	6.46	5.28	4.60	4.92	6.93

Observations recorded on Non-reducing sugars exhibited significant differences among the treatments in 5, 10, 15, 20 and 25 days after storage of pear fruits (Table 3). Among the packaging treatments, the fruits under the treatment T5 retained maximum Non-reducing sugars‟ (4.32%) at 25 days after storage. The minimum Non-reducing sugars were recorded in T1 (3.51%). At 25 days after storage, the observations among various packaging treatments revealed that the fruits under treatment T5 retained maximum Non-reducing sugars (4.32%), which was

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on par with each other including T4 (3.96%). The minimum Non-reducing sugars were recorded in T1 (3.51%). In rest of the treatments, no fruits were found to be retained for observation.

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