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Application of edible oils as active coatings for postharvest management of guava fruits

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Abstract
More than 40% of harvested fruit is lost, largely due to decay. In parallel, restrictions on postharvest fungicides call for eco-friendly alternatives. The efficacies of 7 different edible oils (Coconut oil, Olive oil, Linseed oil, Sesame oil, Almond oil, mustard oil, castor oil) were evaluated in this experiment for maintaining the quality of guava fruits that were stored for 12 days at room temperature. The experiment was conducted on the Gwalior-27 variety of guava in a completely randomized design. All the oil treatments improved the fruits' quality in comparison to control, as indicated by the decrease in decay incidence, physiological loss in weight, better TSS content, color and other sensorial qualities of the fruits. The Castor oil recorded the least color change and minimum decay (20.1% at 12 days) among all the treatments and also maintained good level of total sugars (9.78% at 12 days) and reducing sugar (7.3% at 12 days) after coconut oil (10.1 and 7.94% respectively) but it was not able to maintain other sensory parameters like texture, flavour and taste. Whereas coconut oil followed by Olive oil got the highest scores in terms of taste, texture, flavour, with highest overall acceptability. So, it can be concluded that coconut oil followed by olive oil coatings can be an eco-friendly approach to extend the shelf life of guava up to 12 days.

Keywords: Edible oils, postharvest, sensory parameters, oil coatings, reducing sugar and non-reducing sugar

1. Introduction

The post-harvest losses are a major issue in food safety and security all around the globe. It simply means that the goal of a food secure world cannot be achieved by focusing only on the production of various fields and horticultural crops. Post-harvest management will always play a vital role in feeding the world. According to a study conducted by Central Institute of Post-Harvest Engineering and Technology (CIPHET) guava suffers maximum post-harvest losses among all fruits and vegetables. In their studies it was found that Guava suffered a total loss of as much as 15.88% during farm operations and storage channels. Guava is the fourth most important fruit crop which makes it a crucial research area. The important factors responsible for post-harvest losses are lack of infrastructure and storage facilities and the highly perishable nature of guava. Guava ripens within 3-4 days after harvest. So, edible coatings can be a boon in increasing the shelf life of Gwalior 27 as it is an eco-friendly and cost-effective method to extend the shelf life of fruits and vegetables. It has been proven that different oils have antimicrobial properties and they give a good glossy appearance to fruits. Different oil components have antimicrobial and antioxidant and anti-inflammatory properties like lauric acid in coconut oil (Widianingrum 2019) [23], oleic acid in olive oil (Battinelli, *et al*. 2006, Rupasinhe, *et al*. 2006) [3, 18], ricinoleic acid in castor oil, Sesamol, Sesamolin, Sezamin, Sesaminol, tocopherol in sesame oil (Nekozad, *et al*. 2011) [14]. Almond oil also has a substantial quantity of tocopherol and phytosterol content (Ouzir, *et al*. 2021) [15]. Allyl isothiocyanate (AIT) is the main pungent substance in mustard (Kanemaru and Miyamoto 1990) [8]. It has been found that metabolite leakages, detectable increases in 3-galactosidase activity, and a decline in viable bacteria were all brought on by gaseous AITC. The use of AITC in food preservation is supported by the substance's efficiency in preventing bacterial population at all phases of growth (Lin 2000) [12]. Oils are categorized as lipid-based coatings.

As lipids are naturally hydrophobic, they are excellent materials for edible coatings because they may prevent moisture from leaking into fresh food products, which can result in severe deteriorative changes in the food product (Owusu-Akyaw Oduro 2022) [16]. So, the main objective of this experiment was to see the effect of different edible oil coatings on different physical, biochemical and sensory attributes of guava fruits at different storage periods.

2. Materials and Methods

2.1 Materials

Fresh, uniformly sized guava fruits of variety Gwalior-27 were procured for the experiment from the Dry Land Horticulture Farm, Sirsod College of Agriculture, Gwalior, RVSKVV, (M.P.), India. Seven different commercially produced oils like virgin coconut oil, virgin olive oil, sesame oil, swe*et al*mond oil, mustard oil, and castor oil were purchased from the local market.

2.2 Preparation of guava fruits

On the day of harvest, as soon as the guavas arrived, they were treated. The fruit was rinsed with distilled water and air-dried, after cleaning with tap water, containing 0.3 ppm active chlorine. All guavas were mixed and distributed evenly for each test to avoid size homogeneity (only large or small guavas for each application), resulting in a heterogenic size distribution for each tested oil. The experiment was conducted in Completely Randomized Design (CRD). 12 fruits (10 fruits for physical, biochemical and sensorial analysis and 2 fruits for weight loss analysis) were taken in each treatment and each treatment was replicated three times.

2.3 Application of treatments and storage

The following treatments were included in the trials: Control/water (T_0), coconut oil (T_1), olive oil (T_2), linseed oil (T_3), sesame oil (T_4), almond oil (T_5), mustard oil (T_6), and castor oil (T_7). Fruits were immersed in the different oil treatments for 5 minutes and then air-dried for an hour in a biological hood with sterile ventilation. After keeping them for an hour in a biological hood, the fruits treated with particular oil were randomly distributed in 3 different buckets, representing 3 replications of 1 treatment. The butter paper was used in the buckets to keep the fruits safe and hygienic. The fruits stored up to 12 days at room temperature, with sampling and quality observations at 0, 3, 6, 9 and 12 days of storage.

2.4 Observations of Physical Parameters of Fruits

2.4.1 Physiological Loss in Weight (%)

The physiological loss in weight of the fruits was recorded at 3, 6, 9 and 12 days after storage. The observations were taken from all the three replications and the average values were statistically analyzed. At the beginning of storage period, initial fruit weight was recorded. On each date of observation, the fruits were weighed and this weight was termed as final weight on the particular date of observation. The percent loss in weight for each observation by using the following formula:

$$\text{PLW\%} = \frac{(Initial\ Weight - Final\ Weight)}{Initial\ Weight} \times 100$$

2.4.2 Decay or Spoilage of Fruits

The percentage of infected fruits relative to the total number of fruits per replication was used to calculate the decay incidence. Three replications of each treatment are used to calculate the means for the results.

2.4.4 Specific Gravity

In order to compute specific gravity, the formula Specific gravity = density of fruit/density of water was used.

2.5 Observations of Biological Parameters of Fruits:

2.5.1 Titratable acidity (%)

Titration was used to determine the acid content of guava. Around 10 mL of the sample was diluted with 100 mL of distilled water to determine the titratable acidity (TA), and 3-4 drops of phenolphthalein indicator were also added. Guava acids were titrated with 0.1N sodium hydroxide. Percentages of malic acid were used to represent the results.

2.5.2 Total Sugar content (%)

Total sugar content was measured by anthrone reagent method (Yemm and Willis 1954). To produce anthrone reagent 40 ml distilled water is mixed with 100ml H2SO4. After that, the mixture is allowed to cool to ambient temperature. Anthrone was added once the liquid had cooled down. With the aid of a pipette, a 100 microliter sample was obtained from an eppendorf tube, and then anthrone reagent was added to the falcon tube. The falcon tube was heated at 100. Values were expressed as glucose equivalent. Graded glucose concentrations were used to create a standard curve.

2.5.3 Reducing Sugars (%)

Based on the Miller method, the dinitrosalicylic reagent was a 1:1:1 volumetric mixture of 3, 5-dinitrosalicylic acid (1%), Rochelle salt (40%) phenol (0.2%), potassium disulphide (0.5%), and sodium hydroxide (1.5%) (Miller 1959). Normally, 100 L of DNS reagent were added to a 100 L sample combination. The samples' optical densities were measured at 540 nm using a Sunrise microtiter plate absorbance reader after the microtiter plates had been cooked in the water bath installed in the standard microwave oven for 4 min. Values were expressed as glucose equivalent. Graded glucose concentrations were used to create a standard curve.

2.5.4 Phenol ((mg GAE/100gm pulp)

The phenol content was observed by the Swain and Hills method. 2 gm fruit pulp was used for the sample preparation and the absorption was taken at 650 nm in a spectrophotometer. The standard curve was prepared using graded concentration of gallic acid. The values were expressed as gallic acid equivalent.

2.6 Observations of Sensorial Parameters of Fruits

At 0, 3, 6, 9 and 12 days after storage, the fruits color, taste, and aroma were assessed. A panel of 5 judges was assembled to assess the fruits colors, taste, and aroma. Then their scores were averaged. The score was given on a scale of 0-10 according to very good, good, average, and poor taste and flavour of the fruits. For overall acceptability, the categories were highly acceptable, fairly acceptable, acceptable on an average and not acceptable.

3. Results and Discussion

3.1 Physiological Loss in Weight (%)

The result on physiological loss in weight as influenced by different oil treatments during storage are presented in Table 1 and depicted in Figure 1. A successive reduction was found in weight of the fruits in all treatments up to 9 days. After 9 days, a sharp reduction was observed in all treatments up to 12 days. The highest reduction was observed in control (T_0) (27.87% after 12 days of storage). The lowest weight loss was found in the castor oil coated fruits (T_7) (7.44% after 12 days of storage) followed by coconut (T_1) (12.89% after 12 days of storage) and olive oils (T_2) (12.89% after 12 days of storage). Transpiration is a mass transfer mechanism whereby water vapor is transferred from the surface of fruits to the surrounding air and causes reduction in fruit weight. Fresh fruits losing water after harvest, is a severe issue since it results in weight loss and shrinking. Lipid based coatings are widely regarded as the most effective moisture barrier due to their low affinity for water (Bourlieu 2009) [4]. Coatings primarily affect the skin's resistance to the diffusion of the persistent gases by partially or completely sealing the pores on the fruit's surface. The coating's ability to cover the pores and the ability to inhibit water vapor diffusion are both crucial. This explains the reported effects of coatings on internal atmosphere modification, respiration, and transpiration rates. The fruit started to become anaerobic after coating treatments.

3.2 Decay or Spoilage (%)

The effect of edible oil coatings on decay or spoilage of guava fruits during storage is presented in Table 1 and depicted in Figure 2. Castor oil coated fruit had no deterioration after 3 days of storage, whereas fruits of other treatments had already begun to deteriorate or spoil. Castor oil began exhibiting the least amount of deterioration after three days, followed by coconut oil. Hence, even after 12 days of storage, castor oil-coated fruits had the least amount of decay or spoiling (20.1%), followed by coconut oil (20.46%). The control fruits had the highest levels of deterioration (33.24%). The decaying organisms (bacteria, fungi, and viruses etc.) that attack fruits and vegetables can get through intact skin or even natural openings. These infections may start while the plant is still growing in the field, but they do not manifest themselves until after harvest, frequently becoming obvious only as the fruit ripens or is stored. This leads to deterioration or spoilage (Prevention of post-harvest food losses 1989). Ricinoleic acid, which makes up more than 80% of the castor oil (Bafor M. 1991), also exhibits growth-inhibiting properties against pathogenic fungus (Chen Y.Y. 2016). The ricinoleic acid might be the reason behind the least decay in castor oil coated fruits. Other oils also showed antimicrobial properties and performed better than control.

3.3 Specific Gravity

Various post-harvest treatments significantly affected specific gravity, although the changes were minute. The data on specific gravity of guava fruits as influenced by different edible oil coatings during storage are presented in Table 1 and illustrated in Figure 3. The coconut oil-coated guava fruits had the smallest change and 0.98 specific gravity was found after 12 days, while the uncoated materials with 0.70 had the lowest specific gravity. Guavas reach maturity when their specific gravity falls to 1.00. On the 3rd day, the uncoated fruits showed specific gravity of 1.02, which was higher than coconut (T_1), olive (T_2), linseed (T_3), and sesame oil (T_4). On the 6th day, specific gravity of uncoated fruits was found to be 0.98, which was least among all the treatments. Then it followed the same trend up to 12 days and showed the least specific gravity as compared to other treatments. The olive oil and castor oil also showed higher specific gravity of 0.90 and 0.89 after 12 days of storage. The turgor of the cells is restored to give the fruits a turgid appearance, and the pressure in the cells causes the increase of cell volume, which leads to the enlargement of fruits. This high pressure is produced by gas production in the cells (Sakiyama and Nakamura 1976). As we have already discussed the decreasing pattern of weight, it can be concluded that the decrease in weight and increase in volume might be the reason for declining specific gravity of guava fruits (Singh *et al*., 2017) [22]. Similar results were found by Manpreet and Gurpreet (2019).

3.4 Titratable Acidity (%)

It was found that the titratable acidity was significantly affected during the storage time in all the treatments. The data on titratable acidity of guava fruits are presented in Table 2 and illustrated in Figure 4. From 3rd to 9th day the decrease in titratable acidity was gradual but after 9th day the decrease was sharp. The increase in respiration rate might be the reason for this increase, which increases the consumption of organic acids. It results in low titratable acidity. After 12 days, the maximum titratable acidity (0.20%) was found in coconut oil (T_1). Olive oil (T_2), linseed oil (T_3), almond oil (T_5), and castor oil (T_7) also had maintained a good level of titratable acidity, which shows their ability to reduce respiration rate and increase shelf life of guava fruits. The minimum titratable acidity (0.17%) was recorded in control guava fruits. This gradual loss in titratable acidity was also reported in apples coated with potato starch. The organic acids which are used in the respiratory process were oxidized less in coconut oil treated fruits because of the low respiration rate, resulting in maintaining the level of titratable acidity. The results are close to studies in strawberry by (Hazarika *et al*., 2019).

3.5 Total Sugars (%)

The data on total sugars of guava fruits as influenced by different edible oil coatings during storage are presented in Table 2 and illustrated in Figure 5. The sugar level rises to the 9th day and then starts declining up to the 12th day. The control followed the same trend but after the 9th day the decline was sharper than other treatments and the sugar level reached even lower than the reading of the 3rd day. So, the sugars which were 8.7% on the 3rd day uplifted and reached to 9.05% on the 9th day. Then sugar level started declining and reached 7.42% on the 12th day. At the same time in coconut and castor oil-coated fruits the sugar level declined after 9th day but still maintained the higher level of sugars. On the 3rd day, the sugar level in coconut and castor oil-coated fruits was 9.98% and 9.71%, which reached 11.6 and 11.28% on the 9th day. At last the sugar level was observed to be 10.1 and 9.78 on the 12th day. So, in the coconut and castor oil-coated fruits, the level of sugars on the 12th day was higher than the level of sugars on the 3rd day. After 12 days, other treatments also showed better levels of sugars than control. The stored starch in the fruit is hydrolysed during ripening into tiny molecules like sucrose, fructose, and glucose, which increases the sugar levels up to 9 days. This increasing sugar levels also increase the sweetness of the fruits. They also affect the sugar: Acid. After the 9th day, sugar levels may have decreased as a result of fruit senescence and metabolic breakdown during storage.

That might be the reason for declining sugar levels from the 9th to 12th days of storage. During storage, the total sugar content of the apple-based beverage also significantly decreased (Sharma *et al.,* 2019) [21].

3.6 Reducing Sugar %

The reducing sugar content of guava fruits was significantly influenced by the application of edible oil coatings over the 12-day storage period, as presented in Table 2 and illustrated in Figure 6. At 3 days, all coated treatments showed higher reducing sugar percentages compared to the uncoated control (T_0). Coconut oil (T_1) exhibited the highest reducing sugar content at 6.64%, followed by Olive oil (T_2) at 6.4% and Castor oil (T_7) at 6.46%. The control group (T_0) started at 5.81%. The reducing sugar content generally increased for all treatments up to 9 days, indicating ripening. Coconut oil (T_1) consistently maintained the highest levels, reaching 7.29% at 6 days and 7.94% at 9 days. The control (T_0) also showed an increase but at a slower rate, reaching 5.86% at 6 days and 5.95% at 9 days. All coated fruits maintained significantly higher reducing sugar levels than the control throughout this period. By 12 days, a slight decrease in reducing sugar content was observed in most treatments, likely due to senescence. However, the coated fruits still retained significantly higher reducing sugar levels compared to the control. Coconut oil (T_1) again showed the highest retention at 7.54%, while the control (T_0) dropped to 4.98%. Coconut oil (T_1) proved most effective in maintaining higher reducing sugar content throughout the storage period, suggesting its role in delaying the over-ripening or degradation of sugars.

3.7 Phenol (mg/100gm fruit pulp)

Phenolic compounds, known for their role as vital antioxidants and free radical scavengers, are presented in Table 3 and Figure 7. One of the key factors in determining a sample's antioxidant capacity is the measurement of its total phenol concentration (Sadiq *et al.*, 2023) [19]. At 3 days, all coated treatments had higher phenol content than the control (T_0), which started at 54.4 mg/100gm. Coconut oil (T_1) recorded the highest initial phenol content at 60.8 mg/100gm, followed by Olive oil (T_2) at 59 mg/100gm. Phenol content generally decreased in all treatments over time, which is typical as fruits ripen and senesce. However, the rate of decrease was slower in coated fruits, especially those treated with Coconut oil (T_1) and Olive oil (T_2). At 6 days, T_1 had 54.3 mg/100gm compared to T0's 43.5 mg/100gm. At 9 days, T_1 maintained 49 mg/100gm, while T_0 was at 34.6 mg/100gm. By 12 days, T_1 still had 42.6 mg/100gm, significantly higher than T_0 (27.4 mg/100gm). Coconut oil (T_1) and Olive oil (T_2) were most effective in preserving phenol content, suggesting a better retention of antioxidant compounds and possibly a slower ripening process compared to the control. Sarikhani *et al.,* 2010 [20] also observed the same, where postharvest treatment improved the phenol content as compared to non-coated grape fruits.

3.8 Flavour

Flavour, a crucial sensory attribute, was positively influenced by edible oil coatings, as presented in Table 3 and Figure 8. At 3 days, all coated treatments showed considerably higher flavour scores than the control (T_0) which was 5.12. Coconut oil (T_1) achieved the highest flavour score of 8.76, followed by Olive oil (T_2) at 8.42. Flavour scores generally decreased over time for all guavas. However, the decline was less pronounced in coated fruits. At 6 days, T_1 maintained 8.51, while T0 dropped to 4.11. At 9 days, T_1 had 8.22, significantly higher than T_0 (4.02). By 12 days, T_1 still recorded a high score of 7.72, whereas the control (T_0) had a much lower score of 3.52. Coconut oil (T_1) consistently provided the best flavour retention throughout the storage period, followed closely by Olive oil (T_2). This indicates that these coatings effectively preserved the desirable flavour characteristics of the guava. The potential loss of volatile aromatic compounds during storage could be the cause of the decline in flavour scores (Sharma *et al.,* 2019) [21].

3.9 Taste

Taste, an important sensory attribute, showed improvement due to oil coatings, as depicted in Table 4 and Figure 9. Similar to flavour, all coated treatments had higher taste scores at 3 days compared to the control (T_0) at 6.01. Coconut oil (T_1) scored highest at 9.29, with Olive oil (T_2) at 8.91. Taste scores generally declined over time across all treatments, but the coated fruits retained better taste. At 6 days, T1 was 8.29, significantly higher than T_0 (5.01). At 9 days, T_1 maintained 8.02, while T_0 was at 4.69. By 12 days, T_1 still had a score of 7.56, considerably higher than T_0 (3.57). Coconut oil (T_1) consistently led in taste retention, followed by Olive oil (T_2). This suggests that the coatings helped in preserving the desirable taste attributes of the guava over the storage period. Weight loss and microbial infection of the fruit, which alters its nutritional qualities, may be the cause of the changes in sensory qualities (Khodaei *et al.*, 2021) [11].

3.10 Overall acceptability

It is a composite measure of all sensory attributes and was significantly enhanced by edible oil coatings, as presented in Table 4 and Figure 10. At 3 days, all coated treatments showed much higher overall acceptability scores than the control (T_0) at 4.9. Coconut oil (T_1) had the highest score of 8.5, followed by Olive oil (T_2) at 8.4. Overall acceptability scores decreased over time, but the decline was less pronounced in the coated fruits. At 6 days, T_1 maintained 8.11, while T0 dropped to 4.29. At 9 days, T_1 had 7.58, compared to T_0 (4.02). By 12 days, T_1 still showed a high score of 7.58, significantly better than the control (T_0) at 3.58. Coconut oil (T_1) consistently resulted in the highest overall acceptability, indicating its superior ability to maintain the combined quality attributes of guava during storage. Olive oil (T_2) also performed very well.

6. Conclusion

From the present studies it can be concluded that the coconut oil coating greatly extends the shelf life of guava and lowers post-harvest losses. Coconut oil maintained optimum level of sugars, phenol and titratable acidity and showed great results in most of the observations. After coconut oil olive oil also maintained a good flavour, taste and overall acceptability scores. Other oils also performed well as compared to uncoated fruits but among all coconut oil followed by olive oil is significantly superior to all other treatments. Coconut oil is cost effective, eco-friendly and easily available in the market.

Table 1: Effect of different edible oil coatings on physiological weight loss (%), decay or spoilage (%) and specific gravity at 3, 6, 9 and 12 days of guava

Treat. No.	Treatment Details	Physiological Loss in Weight (PLW%)				Decay or Spoilage (%)				Specific gravity			
		3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days
T_0	Control (without coating)	5.63	8.56	12.54	27.87	1.81	16.92	21.98	33.24	1.025	0.988	0.885	0.708
T_1	Coconut oil	1.51	2.42	4.65	7.44	0.12	7.67	17.11	20.46	1.018	1.016	0.992	0.984
T_2	Olive oil	3.62	3.78	5.45	12.89	0.46	7.99	16.46	21.45	1.008	1.021	0.994	0.9
T_3	Linseed oil	4.49	4.72	7.01	15.11	1.67	17.21	22	27.23	1.001	1.013	0.969	0.858
T_4	Sesame oil	3.99	4.23	6.89	14.04	1.32	16.22	20.45	25.69	1.005	1.009	0.973	0.872
T_5	Almond oil	4.84	5.95	8.57	20.12	0.84	13.96	18.88	24.76	1.036	0.997	0.949	0.786
T_6	Mustard oil	4.61	5.49	7.26	17.23	0.77	12.56	17.03	23.08	1.038	0.997	0.964	0.828
T_7	Castor oil	3.46	4.43	4.89	12.56	0	7.41	16.01	20.1	1.031	1.005	0.983	0.895
C.D. (5%)		1.633	1.746	3.492	3.492	1.069	1.746	3.754	3.492	0.002	0.003	0.003	0.006
SE(m)		1.155	1.155	1.155	1.155	0.354	0.577	1.242	1.155	0.001	0.001	0.001	0.002

Table 2: Effect of different edible oil coatings on titratable acidity (%), total sugar (%) and reducing sugar (%) at 3, 6, 9 and 12 days of guava

Treat. No.	Treatment Details	Titratable Acidity (%)				Total Sugar (%)				Reducing Sugar (%)			
		3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days
T_0	Control (without coating)	0.234	0.214	0.204	0.174	8.84	8.91	9.05	7.42	5.81	5.86	5.95	4.98
T_1	Coconut oil	0.257	0.244	0.227	0.203	9.98	10.8	11.6	10.1	6.64	7.29	7.94	7.54
T_2	Olive oil	0.255	0.240	0.224	0.197	9.63	10.51	11.1	9.6	6.4	7.04	7.59	7.15
T_3	Linseed oil	0.256	0.242	0.226	0.198	9.1	10.02	10.92	9.54	6.04	6.6	7.47	7.12
T_4	Sesame oil	0.245	0.234	0.213	0.187	8.88	9.84	10.74	9.36	5.9	6.5	7.35	6.98
T_5	Almond oil	0.248	0.235	0.214	0.190	8.61	9.71	10.6	9.23	5.72	6.42	7.25	6.89
T_6	Mustard oil	0.244	0.230	0.212	0.185	9.33	10.2	10.84	9.4	6.2	6.81	7.41	7.01
T_7	Castor oil	0.250	0.237	0.219	0.195	9.71	10.53	11.28	9.78	6.46	7.04	7.72	7.3
C.D. (5%)		0.002	0.003	0.003	0.004	0.19	0.246	0.323	0.353	0.018	0.026	0.021	0.025
SE(m)		0.001	0.001	0.001	0.001	0.063	0.081	0.107	0.117	0.006	0.008	0.007	0.008

Table 3: Effect of different edible oil coatings on phenol (mg/100gm fruit pulp) and flavour (0-10scale) at 3, 6, 9 and 12 days of guava

Treat. No.	Treatment Details	Phenol (mg/100gm fruit pulp)				Flavour (0-10Scale)			
		3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days
T_0	Control (without coating)	54.4	43.5	34.6	27.4	5.12	4.11	4.02	3.52
T_1	Coconut oil	60.8	54.3	49	42.6	8.76	8.51	8.22	7.72
T_2	Olive oil	59	51.8	45.6	41.9	8.42	7.5	8.1	7.09
T_3	Linseed oil	56.8	49.1	43.5	40.6	7.91	7.54	7.22	6.47
T_4	Sesame oil	56.1	47.3	41.4	37.9	7.25	6.59	7.06	6.19
T_5	Almond oil	55.9	46.7	41	37.5	6.75	5.52	7.01	6.01
T_6	Mustard oil	56.4	47.8	42.1	38.3	7.21	6.25	7.01	6.11
T_7	Castor oil	57.9	50.5	44.1	41.1	7.45	6.72	7.1	6.21
C.D. (5%)		0.346	0.315	0.34	0.369	0.167	0.175	0.177	0.184
SE(m)		0.115	0.104	0.112	0.122	0.055	0.058	0.058	0.061

Table 4: Effect of different edible oil coatings on taste (0-10 scale) and overall acceptability (0-10 scale) at 3, 6, 9 and 12 days of guava

Treat. No.	Treatment Details	Taste (0-10 scale)				Overall acceptability (0-10 scale)			
		3 Days	6 Days	9 Days	12 Days	3 Days	6 Days	9 Days	12 Days
T_0	Control (without coating)	6.01	5.01	4.69	3.57	4.9	4.29	4.02	3.58
T_1	Coconut oil	9.29	8.29	8.02	7.56	8.5	8.11	7.58	7.58
T_2	Olive oil	8.91	8.04	7.54	7.01	8.4	7.72	7.27	7.27
T_3	Linseed oil	8.15	7.14	7.45	6.09	8.02	7.27	6.98	6.81
T_4	Sesame oil	7.1	6.2	6.04	5.1	7.78	6.51	6.27	6.01
T_5	Almond oil	6.98	6.02	5.9	5	7.76	6.42	6.05	5.58
T_6	Mustard oil	6.99	6.03	6.01	5.01	7.54	6.42	6.27	5.74
T_7	Castor oil	7.58	6.59	6.11	5.77	8	7.2	6.76	6.67
C.D. (5%)		0.150	0.167	0.175	0.177	0.196	0.197	0.245	0.253
SE(m)		0.050	0.055	0.058	0.058	0.065	0.065	0.081	0.084

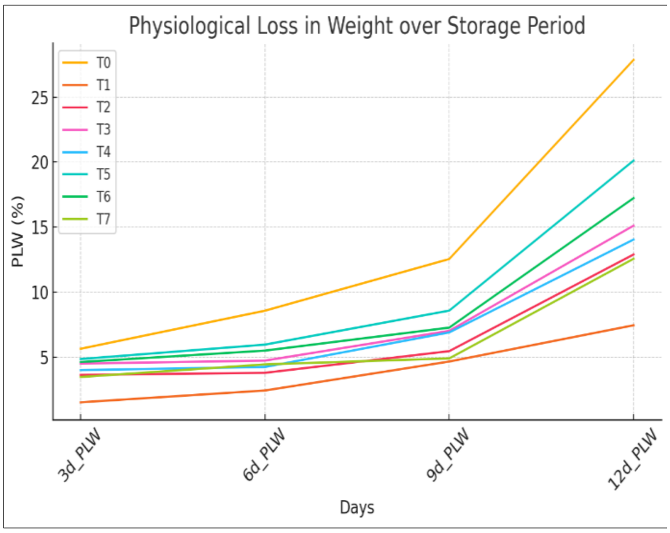

Fig 1: Impact of Edible Oil Coatings on Physiological Loss in Weight (PLW%) of Guava

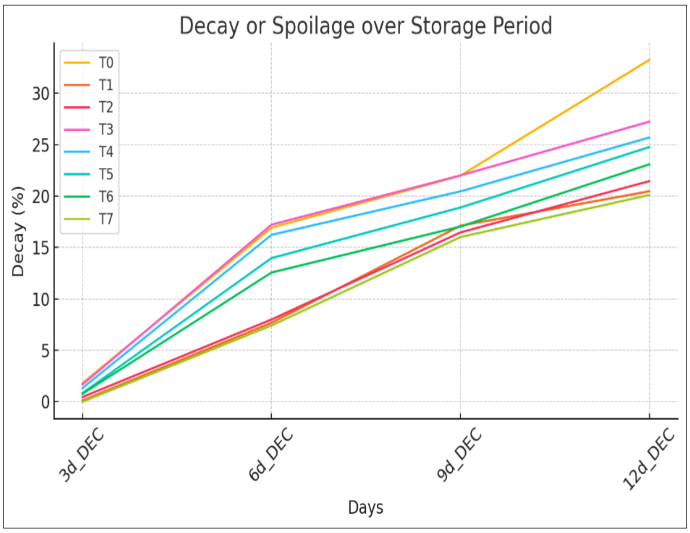

Fig 2: Effect of edible oil coatings on decay or spoilage (%)

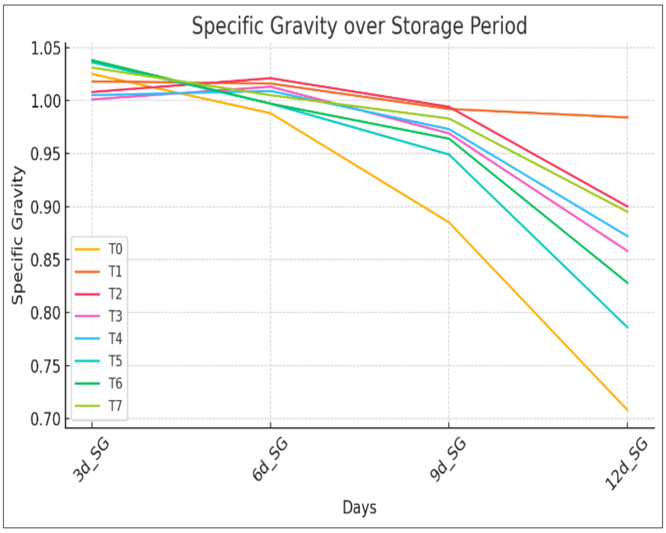

Fig 3: Influence of edible oil coatings on specific gravity

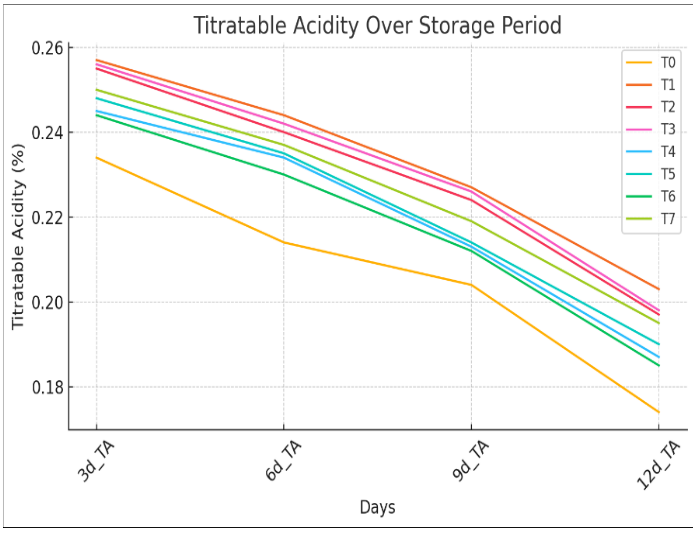

Fig 4: Changes in Titratable Acidity (%) during Storage

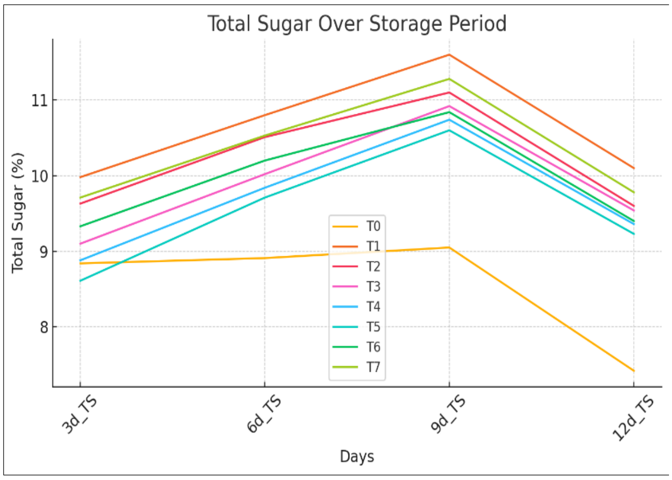

Fig 5: Effect of edible oil coatings on total sugar (%)

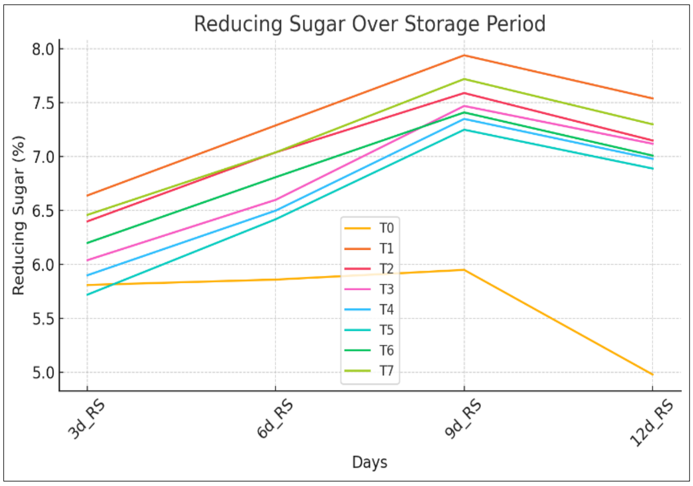

Fig 6: Impact of oil coatings on reducing sugar (%)

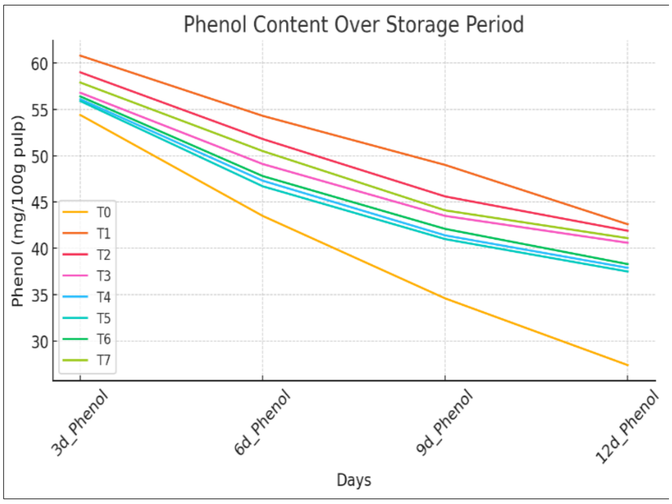

Fig 7: Total Phenol Content (mg/100gm) over storage period

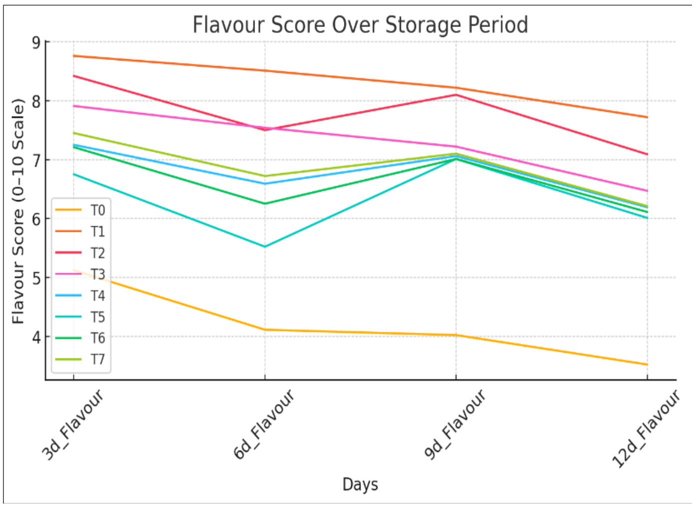

Fig 8: Total Phenol Content (mg/100gm) over storage period

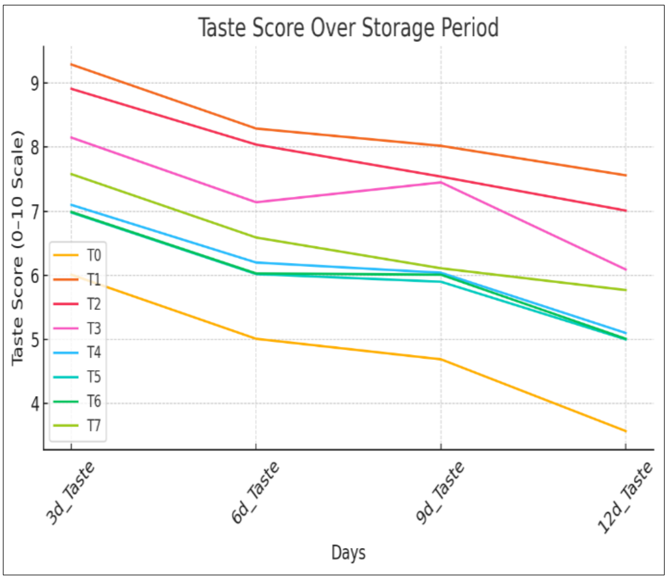

Fig 9: Sensory Evaluation: Taste Scores (0-10 Scale)

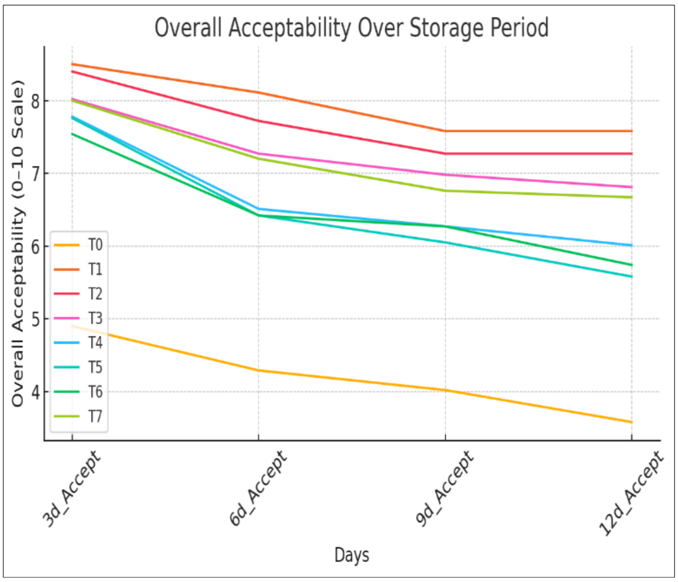

Fig 10: Sensory Evaluation: Overall Acceptability (0-10 Scale)

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