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Effect of Post-harvest Treatments on the Shelf Life of Guava Fruit (*Psidium guajava L.*) cv. Dhawal

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The present investigation was carried out at Post harvest Laboratory, College of Horticulture, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut, India. The study was conducted in a completely randomized design with 11 treatments viz. T_0- Control, T_1- Aloe vera gel 1%, T_2- Aloe vera gel 2%, T_3- Corn starch (0.5%), T_4- Corn starch 1%, T_5- Cassava starch 1% with sunflower oil, T_6- Cassava starch 2% with sunflower oil, T_7- Cassava starch 3% with sunflower oil, T_8- $CaNO_3$ (0.5%), T_9- $CaNO_3$ 1%, T_{10}- Cassava starch 1% with sunflower oil and bee wax all of which were triplicated was conducted during the year 2023. The study faces several challenges, one of the primary difficulties being the need to ensure uniformity in applying the various physico-chemical treatments to the guava fruits in order to obtain reliable and comparable results. Additionally, controlling external factors like temperature and humidity during the postharvest period poses a significant challenge, as these factors must be managed carefully to accurately evaluate the impact of the treatments on the fruit's quality and shelf life. Out of 11 treatments applied the fruits treated with Corn starch (1%) and Corn starch (0.5%) had significantly better fruit quality over other treatments in respect of parameters i.e., Physiological loss in weight, Decay percent, Fruit firmness, Sensory evaluation test, T.S.S., pH, Titrability acidity and reducing sugar. The Aloe vera gel were also found to be significantly superior treatments over the control in respect of storage quality and shelf- life. Based on results obtained in the present study, it can be concluded that Corn starch 1% was found to be the most appropriate treatment in Guava cv. Dhawal on account of better shelf- life. Therefore, Corn starch 1% can be adopted with great success in Guava cv. Dhawal for physico-chemical traits, storage, quality and shelf-life on commercial scale.

Keywords: Post-harvest treatments; guava fruit; corn starch; aloe vera gel; shelf life.

1. INTRODUCTION

Guava (*Psidium guajava* L.) is a tropical fruit belonging to the Myrtaceae family, native to Central America, Mexico, and northern South America. It has been cultivated for centuries and is now grown widely in tropical and subtropical regions around the world. Guava is valued for its unique flavor, nutritional benefits, and versatility in culinary uses. According to the report of Anonymous [1], India leads the world in guava production, followed by neighbouring countries such as China, Pakistan, and Indonesia. “Uttar Pradesh is the top guava-producing state in India, followed by Madhya Pradesh and Bihar. India commercially cultivates a variety of guava types, with popular varieties including Sardar guava, Shweta, Allahabad Safeda, Arka Mridula, Chittidar, Lalit, and Pant Prabhat. In Punjab, guava is a significant crop, second only to citrus” [2]. It is grown extensively across nearly all districts, covering an area of 2.5 lakh hectares and producing 195.60 thousand metric tons, which accounts for 3.97% of the area and 4.42% of the state's production. Guava is also highly nutritious, with every 100 grams containing 228.3 mg of Vitamin C, 80.80 g of water, 68 kcal of energy, 2.55 g of protein, 0.95 g of total lipid (fat), 14.32 g of carbohydrates, 5.4 g of fiber, 8.92 g of sugars, 18 mg of calcium, 0.26 mg of iron, 22 mg of magnesium, 40 mg of phosphorus, 417 mg of potassium, 2 mg of sodium, 0.23 mg of zinc, and other nutrients.

Under normal ambient conditions, guava has a shelf life of approximately 3-4 days [3]. The fruit is climacteric, with a thin exocarp layer, making it difficult for the fruit to retain moisture. Post-harvest treatments can help preserve the fruit's quality and extend its shelf life. Chemical treatments are primarily used to reduce quality degradation and prolong the shelf life of guava. Besides fungicides, other compounds can be utilized to delay ripening and senescence, thereby extending the storage life of the fruit. Ethylene scavengers are employed to keep ethylene levels below the threshold. Additionally, plant growth regulators, also known as phytochemicals, have been shown to prolong the post-harvest life and enhance the value of guava when used at various concentrations. With 5.42MTproduced year, India leads the world's guava production rankings, followed by China, Indonesia, Pakistan, Mexico, Brazil, Malawi, Thailand, Bangladesh and Vietnam. Compared to the previous year, when it exported 12,301.63 tonnes of guava valued at Rs. 6714.61 lakhs in 2022–2023–India exported 11,740.67 tonnes in 2023–2024 according to Anon, [4].

Dhawal, an improved variety. It is seedling selection, heavy bearer (about 20% higher than

Allahabad safeda. Mature fruits develop a light-yellow color on ripening. Fruits are soft seeded, pulp white, taste sweet with muskiness. Average yield should be 384q/ha.

Edible coatings have emerged as an innovative solution to fruit quality concerns by slowing down metabolism and reducing ethylene production, thereby delaying the ripening process. Post-harvest treatments are essential for maintaining the quality and extending the shelf life of fruits like guava. Chemical treatments are primarily used to minimize quality deterioration and prolong shelf life. Along with fungicides, other compounds can be employed to delay ripening, slow down senescence, and extend the storage duration of the fruit. Ethylene scavengers are used to keep ethylene levels below the threshold. Additionally, plant growth regulators, or phytochemicals, have been found to enhance the shelf life and value of guava when applied at different concentrations during storage, as reported by Baldwin et al. [5]. The use of edible coatings has become a valuable method for protecting the nutrients in food, particularly fruits and vegetables, while also enhancing their durability. These coatings consist of a thin layer of edible material that limits water loss, oxygen exposure, and the transfer of other soluble materials in food. Aloe vera gel, well-known for its ability to heal injured or irritated skin, shows potential as a nutritious addition for fruits and vegetables. The gel possesses antifungal properties and acts as a barrier to moisture, CO2, and O2, helping to reduce weight loss, browning, softening, and the growth of mold and yeast. An edible coating, which is a thin layer applied to the surface of fruit and consumed along with it, serves to extend shelf life, reduce moisture loss, improve handling characteristics, and decrease the need for additional packaging materials. This layer functions as a barrier against moisture and vapor transmission, thereby extending the shelf life of the product. Due to the polymers' ability to form hydrogen bonds effectively, the edible coating provides a robust lipid and oxygen barrier, especially at low to intermediate relative humidity (RH). The findings of such studies can lead to enhanced post-harvest handling techniques, prolonged shelf life, and optimized post-harvest quality processes for fruits like guava, benefiting both producers and consumers. With these considerations in mind, the present study focused on examining the post-harvest quality of guava (*Psidium guajava* L.) cv. Dhawal fruit as influenced by various physico-chemical treatments.

2. MATERIALS AND METHODS

The present investigation was carried out at the Postharvest lab, College of Horticulture and Agro processing Centre (CoPHT & FP) of Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut U.P. India, during the year 2022. Geographically, the Meerut is situated between 29º04' N L, 77°42' E L and at an altitude of 237.75 meters above the mean sea level. The variety Dhawal was selected for the study and periodically observed. The fruits were obtained from 06 years old orchard of guava cultivar "Dhawal" planted at a distance of 6×6 m. Observation taken during the period of storage, Physiological loss in weight, decay %, fruit firmness, sensory analysis, total soluble solid, ph of guava pulp, total titratable acidity percentage and reducing sugar. The trial was laid out in a Completely Randomized Design (CRD) and the number of treatments was 11, i.e are T0- control, T1- Aloevera gel 1%, T2- Aloevera gel 2%, T3- Corn starch (0.5%), T4- Corn starch 1%, T5- Cassava starch 1% with sunflower oil 1%, T6- Cassava starch 2% with sunflower oil 1%, T7- Cassava starch 3% with sunflower oil 1%, T8- $CaNO_3$(0.5%), T9- $CaNO_3$(1%), T10- Cassava starch 1% with sunflower oil 1% and beewax 1% each replicated thrice. The present observations were carried out at days 0, 3rd, 6th and 9th during storage. The physiological loss in weight (PLW) was manually calculated during the trial period using a formula provided by Srivastava and Tandon (1968). Data on decay and spoilage were recorded throughout storage, with percentages based on the visible symptoms of spoilage and unmarketable fruit. The firmness of the guava fruit was measured using a penetrometer during the trial period, expressed in kg/cm². Sensory analysis of the fruit, assessing organoleptic taste, flavor, aroma, freshness, and overall acceptability, was conducted using the Hedonic scale (0-9). A panel of eight judges, aged 21-50 years, was selected based on the consistency and reliability of their judgments. The total soluble solids (TSS) in the fruit juice were determined with a hand refractometer (0-32 range) and recorded in degrees Brix. Freshly collected clear juice from each guava treatment was used to measure the pH of the pulp with a pH meter. The reducing sugar content was determined using titrimetric methods, while the total titratable acidity (%) was calculated by titrating the extracted juice with 0.01N NaOH, following the standard procedure with phenolphthalein as the indicator. Statistical test applied, and process of doing analysis of the

data was performed using standard procedure as described by Gomez and Gomez (1996).

3. RESULTS AND DISCUSSION

The present guava data in Table 1 showed that the (PLW %) of stored fruits treated with corn starch (1%) was found statistically superior over rest of the treatments with minimum percent physiological loss in weight during 3rd, 6th and 9th day of the storage (3.17%, 7.22%, 10.34%) respectively followed by Corn starch (0.5%) (3.74%, 8.06% and 10.42%). A similar trend was also observed by Jagdeesh et al. [6]. No decay percent was recorded in all the treatments on the 3rd day after storage, while on 6th day Corn starch (0.5%) fruits remain no decay and Corn starch (1%) was found to be minimum decay of (1.00). On 9th day of storage, the minimum decay percentage was recorded in Corn starch (0.5%) and Corn starch (1%) are (5.10 and 5.73) respectively and the maximum percent of decay were recorded in control (0.0, 6.00 and 14.00). Similar trend was also observed by Wang et al. (2019). **"**On the initial day fruit firmness were recorded (4.70kg/cm^2). On the 3rd day of storage, the treatment with Corn starch (1%) was the most effective in retaining fruit firmness, followed by Corn starch (0.5%) (5.39kg/cm^2 and 5.24kg/cm^2) respectively. By the 6th day of storage, the most effective treatments for preserving fruit firmness were Corn starch 1% and Corn starch (0.5%) are (4.65kg/cm^2, 4.48kg/cm^2). On the 9th day of storage, the treatments with Corn starch 1%, Corn starch (0.5%) were effective in slowing down the decline in fruit firmness (3.38, 3.10) kg/cm^2 respectively. In general, the firmness decreases as fruits become more mature and decreases rapidly as they ripe. The firmness (kg/cm^2) of guava fruits decreased continuously throughout the storage period which probably due to enzymatic degradation" Chitarra et al. [7]. Sensory evaluation test on the 3rd day obtained maximum mean 7.83 value when fruit was treated with Corn starch 1% followed by Corn starch (0.5%) 7.42 respectively, while on 6th and 9th day, sensory evaluation tests were conducted in which Corn starch (0.5%) and Corn starch (0.5%) obtained highest Sensory evaluation score (8.48, 8.09) respectively. While the minimum sensory score (5.98 and 5.77) on 3rd day of storage were recorded when fruit treated with Cassava starch 1% with Sunflower oil 1% and Beewax 1% and the control. On the 6th and 9th day of storage lowest sensory evaluation scores (6.52, 7.21) and (5.97, 6.81) were obtained by Cassava starch 1% with Sunflower oil 1% and Beewax and Control respectively. A similar trend was followed by Chauhan et al. [8] in their experiment Aloe vera 5% and Aloe vera 10% found best sensory evaluation scores.

The present guava data in Table 2. Showed, there was a gradual increase in TSS from the 3rd to the 6th day of storage, followed by a notable decline. The fruits treated with Corn starch (1%) consistently exhibited statistically superior results over the other treatments, showing the highest TSS levels on the 3rd, 6th and 9th day of storage (10.74, 11.62 and 12.10) ºBrix respectively. Corn starch (0.5%) (10.70, 11.48 and 11.96) ºBrix also performed well, yielding superior TSS levels on the respective days. Similar trend was also observed by Martinez-Romero et al. [9] found that "guava fruits treated with corn starch and aloe vera gel had higher levels of TSS. On the 3rd day of storage, the fruits treated with Corn starch 1% exhibited higher pH (3.87) values compared to other treatments, followed by Corn starch (0.5%) (3.85) and Cassava starch 1% with sunflower oil 1% and beewax 1% also exhibited pH (3.86). The treatments with Cassava starch 2% with sunflower oil 1% resulted in the lowest pH values on the 3rd, 6th and 9th day (3.72, 3.80 and 3.94) respectively. On the 6th day of storage, the maximum pH values were observed when fruits were treated with Corn starch 1% and Corn starch (0.5%) were (4.17 and 4.12) respectively". "During the 9th day of storage, the maximum pH values were recorded when fruit was treated with Corn starch 1% (4.36). An increasing trend in pH value was recorded during storage period. This fluctuation in pH due might be due to the variations in titrable acidity or temperature or storage" (Hames and Hooper 2000).

On the 3rd day of storage, the treatments with Corn starch (0.5%), Corn starch 1% and $CaNO_3$ resulted in higher titrable acidity levels (0.47, 0.45 and 0.46) respectively. Conversely, the Cassava starch 2% with Sunflower oil 1% and Cassava starch 1% and 3% with Sunflower oil 1% treatments exhibited the lowest titrable acidity levels (0.34, 0.37,0.37) on the 3rd day of storage. On the 6th day of storage, the highest titrable acidity levels were observed in the Corn starch 1% treatment (0.44), followed by the Corn starch (0.5%) treatment (0.42). The lowest titrable acidity (0.30) levels were recorded in the

Table 1. Observations of PLW, Decay percent, Firmness and Sensory evaluation of guava cv. Dhawal

		Day of storage (at ambient room temperature)														
		Physiological weight in loss (PLW)				Decay percentage				Firmness of guava fruit				Sensory evaluation test		
	Treatments	**0**	**3**	**6**	**9**	**0**	**3**	**6**	**9**	**0**	**3**	**6**	**9**	**3**	**6**	**9**
T0	Control	0	5.14	12.62	14.46	0	0	6.00	14.00	4.70	5.09	4.10	2.30	5.77	6.52	5.97
T1	Aloe vera gel 1%	0	5.46	11.33	13.23	0	0	5.20	11.23	4.70	4.50	3.80	2.25	7.14	7.26	7.25
T2	Aloe vera gel 2%	0	4.44	13.33	13.30	0	0	5.23	12.00	4.70	4.70	3.97	2.28	7.17	7.30	7.17
T3	Corn starch (0.5%)	0	3.74	8.06	10.42	0	0	0.00	5.10	4.70	5.24	4.48	3.10	7.42	8.48	8.09
T4	Corn starch 1%	0	3.17	7.22	10.34	0	0	1.00	5.73	4.70	5.39	4.65	3.38	7.83	8.31	8.00
T5	Cassava starch 1%+ Sunflower oil 1%	0	4.04	7.80	11.10	0	0	5.08	12.00	4.70	5.15	4.27	3.03	7.09	7.23	6.92
T6	Cassava starch 2%+ Sunflower oil 1%	0	3.46	8.68	11.85	0	0	5.16	12.01	4.70	5.20	4.35	3.14	7.08	7.21	6.96
T7	Cassava starch 3%+ Sunflower oil 1%	0	3.98	8.70	9.44	0	0	5.01	11.10	4.70	5.28	4.42	3.22	7.09	7.23	6.99
T8	CaNO3(0.5%)	0	3.65	7.83	9.33	0	0	5.53	8.16	4.70	5.22	4.50	3.45	6.99	7.34	6.99
T9	CaNO3(1%)	0	4.31	8.03	9.68	0	0	5.66	8.66	4.70	5.35	4.70	3.88	7.00	7.35	6.98
T10	Cassava starch 1%+ Sunflower oil 1%+Beewax 1%	0	4.68	7.24	10.84	0	0	5.10	12.04	4.70	5.12	4.28	3.15	5.98	7.34	6.81
	Mean		4.18	9.16	10.32			4.63	10.18		5.11	4.32	3.016			
	SE(m)		0.286	0.47	0.426			0.447	0.416		0.191	0.61	1.069			
	C.D at 5%		0.843	0.98	1.242			1.319	1.227		0.27	0.23	0.352			
	C.V. (%)		11.24	6.266	6.498			17.01	7.069		5.497	6.477	6.852			

Table 2. Observations of TSS, Ph, Titrability acidity and Reducing sugar of guava cv. Dhawal.

		Days of storage (At ambient room temperature)															
				T.S.S Brix			pH of guava fruits			Titrability acidity %				Reducing sugar of guava fruits			
	Treatments	**0**	**3**	**6**	**9**	**0**	**3**	**6**	**9**	**0**	**3**	**6**	**9**	**0**	**3**	**6**	**9**
T0	Control	9.15	9.19	10.33	9.24	3.60	3.76	4.02	4.10	0.40	0.38	0.32	0.22	3.20	2.62	3.30	3.15
T1	Aloe vera gel 1%	9.15	9.29	10.10	11.23	3.60	3.78	4.04	4.17	0.40	0.42	0.38	0.32	3.20	3.42	4.12	4.07
T2	Aloe vera gel 2%	9.15	9.16	10.22	10.96	3.60	3.75	3.96	4.16	0.40	0.41	0.36	0.31	3.20	3.45	4.20	4.22
T3	Corn starch (0.5%)	9.15	10.7	11.48	11.96	3.60	3.85	4.12	4.34	0.40	0.47	0.42	0.36	3.20	3.78	4.29	4.26
T4	Corn starch 1%	9.15	10.74	11.62	12.10	3.60	3.87	4.17	4.36	0.40	0.45	0.44	0.32	3.20	3.84	4.35	4.29
T5	Cassava starch 1%+ Sunflower oil 1%	9.15	9.72	10.02	9.82	3.60	3.75	3.82	4.00	0.40	0.37	0.32	0.3	3.20	3.14	3.18	3.14
T6	Cassava starch 2%+ Sunflower oil 1%	9.15	9.80	10.20	9.02	3.60	3.72	3.80	3.94	0.40	0.34	0.30	0.22	3.20	2.84	3.15	3.07
T7	Cassava starch 3%+ Sunflower oil 1%	9.15	9.15	10.14	9.00	3.60	3.74	3.79	4.00	0.40	0.37	0.30	0.23	3.20	2.70	3.11	3.11
T8	CaNO3(0.5%)	9.15	8.20	10.00	10.26	3.60	3.82	4.25	4.20	0.40	0.44	0.40	0.32	3.20	3.34	4.19	4.10
T9	CaNO3(1%)	9.15	8.13	10.13	10.96	3.60	3.84	4.30	4.32	0.40	0.46	0.38	0.35	3.20	3.40	4.25	4.11
T10	Cassava starch 1%+ Sunflower oil 1%+Beewax 1%	9.15	8.73	9.50	9.77	3.60	3.86	3.90	4.09	0.40	0.38	0.31	0.25	3.20	2.91	3.10	3.01
	Mean		9.34	10.25	10.40		3.79	4.00	4.15		0.41	0.35	0.29		3.22	3.74	3.68
	SE(m)		0.35	0.379	0.36		0.03	0.021	0.062		0.013	0.011	0.008		0.177	0.122	0.133
	C.D at 5%		1.015	1.092	0.987		0.088	0.064	N/A		0.038	0.034	0.032		0.344	0.359	0.393
	C.V. (%)		6.371	7.146	6.022		1.351	0.829	3.76		5.417	6.268	6.41		6.261	5.674	6.261

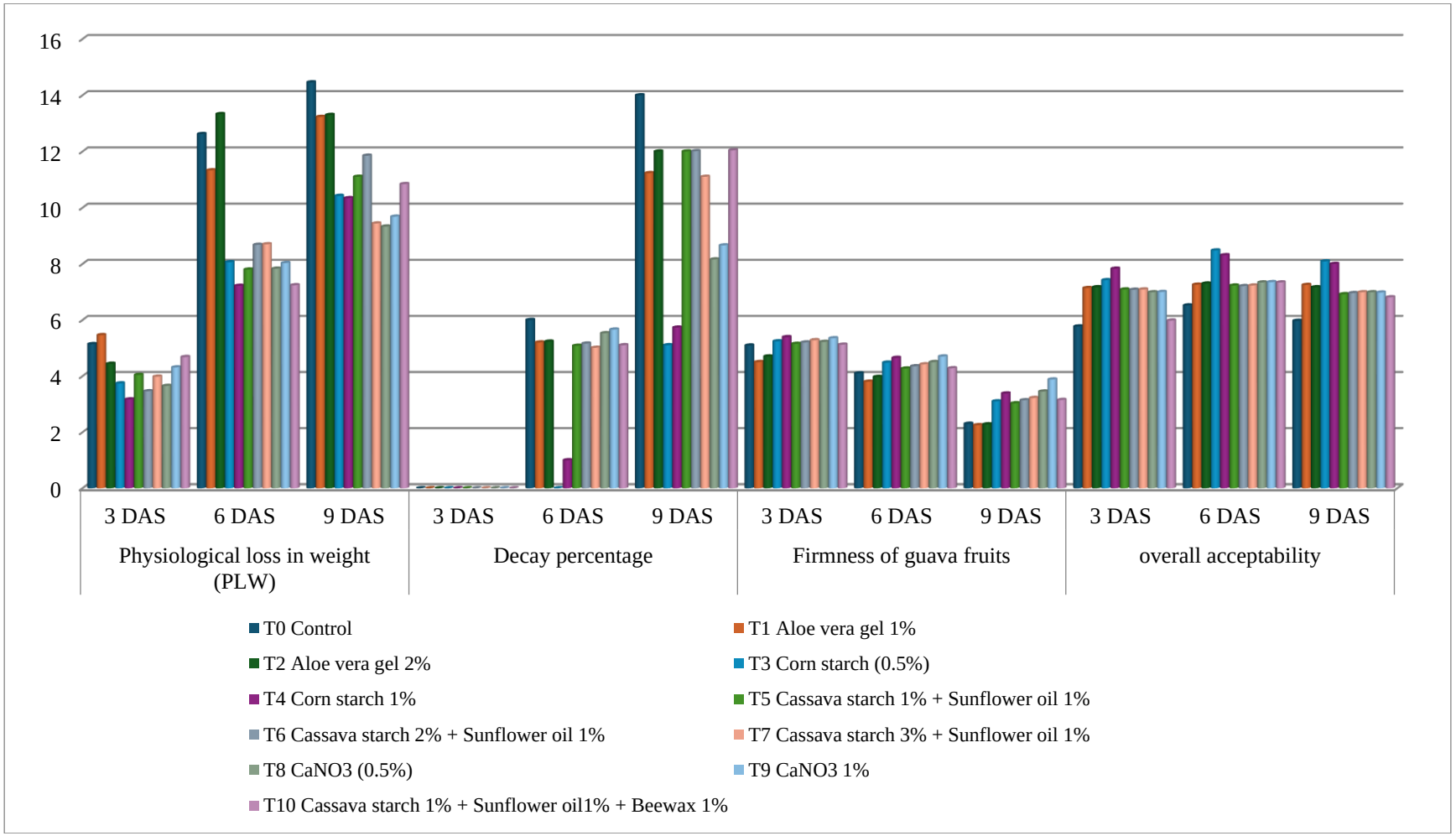

Fig. 1. Bar graph showing physiological and firmness in guava

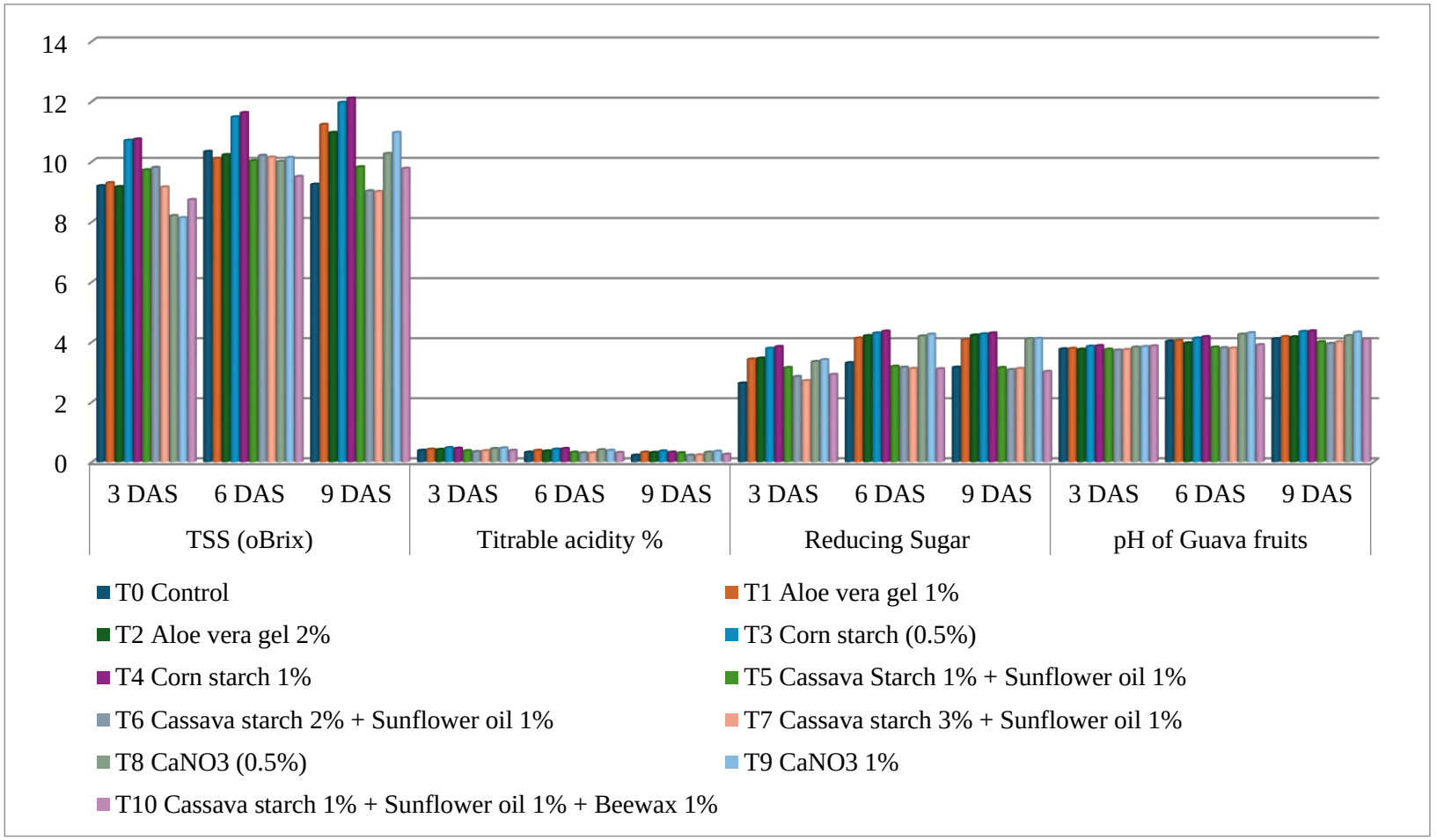

Fig. 2. Bar graph showing parametric evaluation among guava fruits

treatment the Cassava starch 2% with Sunflower oil 1% and the Cassava starch 3% with Sunflower oil 1% are same. Moving on to the 9th day of storage, the treatments with Corn starch (0.5%) and $CaNO_3$ (1%) resulted in the highest titrable acidity levels 0.36 and 0.35 respectivelly. Overall, the best treatment for titrable acidity percentage throughout the study was found to be Corn starch (0.5%). The decrease in total acidity in guava during ripening is probably due to decrease in citric acid. Garg et al. [10] reported that "Corn starch with waxol found minimum titrable acidity during storage of guava fruits. The reducing sugar of guava was recorded on the 3rd day of storage, Control, Cassava starch 3% with Sunflower oil 1% and Cassava starch 2% with Sunflower oil 1% were found to minimum reducing sugar (2.62, 2.70 and 2.84) on the other hand maximum reducing sugar will be recorded on Corn starch 1% and Corn starch (0.5%) were the (3.84, 3.78) respectively. while on 6th day of storage Cassava starch 1% with Sunflower oil 1% and beewax 1%, Cassava starch 3% with Sunflower oil 1% and Cassava starch 2% with Sunflower oil 1% found minimum reducing sugar (3.10, 3.11 and 3.15) respectively and maximum were recorded on Corn starch 1% and Corn starch (0.5%) are (4.35 and 4.29) respectively. On 9th day of storage, the lowest reducing sugar (3.01, 3.07 and 3.11) were recorded when fruit were treated with Cassava starch 1% with Sunflower oil 1% and bee wax 1%, Cassava starch 2% with Sunflower oil 1%, Cassava starch 3% with Sunflower oil 1% respectively and maximum were be Corn starch 1% and Corn starch (0.5%) are (4.29, 4.26) respectively. Reducing sugar increased with increasing in storage period". This might be due to the hydrolysis of polysaccharides and conversion of non- reducing sugar into reducing sugar. The Results are well supported by Jagdeesh [6] in corn starch coated fruits, Singh and Mohammad (1993) in wax coated guava [11-14].

4. CONCLUSION

Based on the findings of this study, it can be concluded that Corn starch at a concentration of (1%) showed the best treatment for the enhancing of shelf life of guava cv. Dhawal during the 3rd, 6th and 9th day of storage to be found effective, followed by Corn starch (0.5%). Corn starch at 1% was observed to positively affect the post-harvest quality of guava fruits. Post-harvest life of guava fruits extended when fruit were treated with Corn starch (1%) during the storage period.

5. FUTURE SCOPE

The future prospects of the study hold significant promise for the fruit industry and consumers. The insights gained from this research can pave the way for the development of advanced post-harvest handling techniques and storage methods that can extend the shelf life of guavas and maintain their quality during transportation. By optimizing the ripening process, it may be possible to offer consumers guavas with better taste, texture and nutritional value. Additionally, the findings could potentially lead to the formulation of eco-friendly and sustainable treatments to enhance post-harvest characteristics, reducing food waste and improving overall supply chain efficiency. The study's results could play a crucial role in shaping the guavas industry's practices, benefiting growers, exporters, retailers and consumers by ensuring a more reliable and enjoyable guava experience.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Anonymous. Horticultural Statistics at a Glance. Horticulture statistics division, department of agriculture, cooperation and farmers welfare, ministry of agriculture and farmers welfare, Government of India. 2021; 2017.
2. Singh SK, Tripathi SK, Chandra S, Kumar A, Prakash S. Postharvest quality of Mango (*Mangifera indica L.*) Cv. Pusa

Arunima Fruit as affected by different Physico-Chemical Treatments. Biological Forum – An International Journal. 2023; 15(5a): 282-287.

3. Pratap, Sudhir, Saxena, Deepika, Sharma S. Evaluation of performance of different edible coating treatments on post-harvest quality of guava fruit during ambient storage. Advance Journal of Advances in Food Science and Technology. 2021; 8(1):32-44.
4. Anonymous. Agricultural and processed food products export development authority (APEDA), Indian Agri-export Database. Ministry of Commerce, Government of India; 2022. Available: https://agriexchange.apeda.gov.in.
5. Baldwin EA, Nisperos MO, Baker RA. Use of edible coatings to preserve quality of lightly (and slightly) processed products. Crit. Rev. Food Sci. Nutr.. 1995;35:509-552.
6. Jagadeesh SL, Rokhade AK, Lingaraju S. Influence of post-harvest treatments on storage behaviour of guava fruits cv. Sardar. J. Maharashtra Agric. Univ. 2001; 26(3):297-300.
7. Chithra M, Venkatesan S, Krishna RK. Influence of plant-based edible coatings on shelf-life of banana cv. Ney Poovan. Progressive Horticulture. 2022;54(1):50-56.
8. Chauhan S, Gupta KC, Agrawal M. Application of biodegradable aloe vera gel to control post-harvest decay and longer the shelf life of grapes. International Journal of Current Microbiology and Applied Sciences. 2014;3(3):632-642.
9. Martinez-Romero D, Alburquerque N, Valverde JM, Guillen F, Castillo S, Valero D. Postharvest sweet cherry quality and safety maintenance by Aloe vera treatment: A new edible coating. Postharvest Biol. Technol. 2006;39:93-100.
10. Garg RC, Ram HB, Singh SK. A note on the effect of post-harvest treatment with indole butyric acid and wax-emulsion on the storage behaviour of guavas (*Psidium guajava L.*). Prog. Horti. 2015;8(2):85-88.
11. Pratap S, Saxena D, Sharma SIMPL. Evaluation of performance of different edible coating treatments on post-harvest quality of guava fruit during ambient storage. Advance Journal of Advances in Food Science and Technology. 2021;8(1):32-44.
12. Elabd M. Effect of antimicrobial edible coatings on quality and shelf life of minimal processed guava (*Psidium guajava L.*). Alexandria Journal of Food Science and Technology. 2018;15(1):65-76.
13. Ruzaina I, Norizzah AR, Zahrah HM, Cheow CS, Adi MS, Noorakmar AW, Zahid MA. Utilization of palm-based and beeswax coating on the postharvest-life of guava (*Psidium guajava L.*) during ambient and chilled storage. International Food Research Journal. 2013;20(1):265.
14. Singh H, Kachway DS, Kuschi VS, Vikas G, Kaushal N, Sigh A. Edible oil coatings prolong shelf life and improve quality of guava (*Psidium guajava L.*). Int. J. Pure app, biosci. 2017;5:837-843.

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