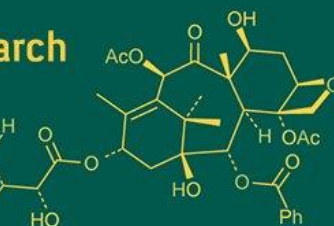
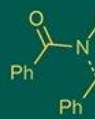
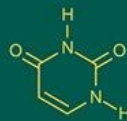
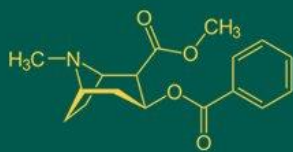


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(11): 273-277
www.biochemjournal.com
Received: 10-08-2025
Accepted: 14-09-20255

Praveen Kumar Nishad
Ph.D. Scholar, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Vijay Bahadur
Head, Associate Professor, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

KC Yadav
Assistant Professor, Department of Food Process Engineering, Vaugh Institute of Agricultural Engineering and Technology (VIAET), Uttar Pradesh, India

Manoj Kumar
Assistant Development Officer, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Sagar Kumar
PG Student, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

KM Nikam Kumari
Ph.D. Scholar, Department of Horticulture, Naini Agricultural Institute, College of Food Technology, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Anchal
PG Student, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Gagan Tiwari
Assistant Teacher, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Praveen Kumar Nishad
Ph.D. Scholar, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences (SHUATS), Allahabad, Prayagraj, Uttar Pradesh, India

Research on the chemical characteristics of osmotically dehydrated slices of guava (*Psidium guajava* L.) cv. Allahabad Safeda using polyethylene, dryers, and sucrose

Praveen Kumar Nishad, Vijay Bahadur, KC Yadav, Manoj Kumar, Sagar Kumar, KM Nikam Kumari, Anchal and Gagan Tiwari

DOI: <https://www.doi.org/10.33545/26174693.2025.v9.i11Sd.6226>

Abstract

The present investigation entitled “*Studies on sucrose brix, drying methods and packaging material treatment in relation to osmotically dehydrated guava (Psidium guajava L.) slices of cv. Allahabad Safeda*” was carried out during 2013 and 2014 to evaluate the influence of sucrose concentrations, drying methods, and packaging materials on total sugar content, ascorbic acid retention, and dehydration ratio during storage up to 120 days. Four levels of sucrose brix (control, 50°, 60°, and 70° Brix), three drying methods (vacuum, hot air oven, and solar), and two packaging materials (LDPE and HDPE) were tested. Results revealed that total sugar content increased progressively with storage period in all treatments. The highest total sugar (55.00%) was observed under 70° Brix (SB₃) at 120 days, while the lowest (54.28%) was recorded in the control (SB₀). The increase in total sugar was significant with sucrose brix, whereas the effect of drying method was non-significant. Between packaging materials, HDPE slightly maintained higher total sugar content than LDPE during storage. Ascorbic acid content showed a gradual decline with increasing storage period across all treatments. The maximum initial ascorbic acid content (141.34 mg/100 g) was recorded in the control, which decreased to 109.47 mg/100 g after 120 days. A significant decrease was noted with increasing sucrose concentration, with the minimum value (84.36 mg/100 g) observed at 70° Brix. Drying methods did not differ significantly, but LDPE packaging retained slightly higher ascorbic acid than HDPE during storage.

The dehydration ratio increased steadily throughout the storage period, influenced significantly by sucrose concentration. The highest dehydration ratio (3.91) was recorded in 70° Brix (SB₃) treatment after 120 days, whereas the lowest (3.49) was found in the control (SB₀). Drying methods and packaging materials had marginal effects, with vacuum drying and HDPE packaging showing slightly higher dehydration ratios.

Overall, osmotic treatment at 70° Brix combined with vacuum drying and HDPE packaging resulted in higher total sugar and dehydration ratio but led to greater loss of ascorbic acid during storage. Therefore, osmotic dehydration at 60° Brix with LDPE packaging may be considered optimal for retaining nutritional quality and stability of guava slices during extended storage.

Keywords: Brix, method, packaging, Guava and polyethylene

Introduction

Among various preservation techniques, osmotic dehydration has emerged as a promising method for processing fruits such as guava. Osmotic dehydration involves the partial removal of water from fruit tissues by immersing them in a hypertonic sucrose solution, which allows water to diffuse out of the fruit and solutes to diffuse in. This technique offers several advantages such as better retention of flavor, color, texture, and nutrients compared to conventional drying methods. The process parameters, particularly the concentration of sucrose solution (°Brix), play a crucial role in determining the extent of water loss, solid gain, and overall quality of the dehydrated product. Slices of fruit are submerged in high sugar solutions for osmotic dehydration, a partial water removal method, before drying. The process shortens drying time while enhancing texture, flavor, and color retention. One technological option to lower postharvest losses is osmotic dehydration (Teles, 2006) [13].

It enhances the dehydration processes' economics to increase drying's sustainability. Putting solid food, whole or in bits, in an aqueous solution of salt or sugar with a high osmotic pressure is a practical method for producing food that is safe, stable, nourishing, pleasant, affordable, and concentrated (Fito *et al.*, 2001; Priyanka *et al.*, 2020)^[3, 9].

The drying method employed after osmotic treatment further influences the physico-chemical characteristics of the final product. Methods such as vacuum drying, hot air oven drying, and solar drying differ in their temperature and air movement, thereby affecting the drying rate, color, texture, and nutrient retention of guava slices. Among these, vacuum drying is often reported to provide better quality products with higher nutrient retention due to the absence of oxygen and lower drying temperature, while solar drying offers a cost-effective and environment-friendly alternative for rural processing units.

Packaging also plays a vital role in maintaining the quality of dehydrated guava slices during storage. The use of polyethylene packaging materials such as LDPE (Low-Density Polyethylene) and HDPE (High-Density Polyethylene) provides effective barriers against moisture, air, and microbial contamination, thereby preventing oxidative and enzymatic deterioration. Proper selection of packaging material helps in extending the shelf life and preserving the physico-chemical and sensory quality of dehydrated products.

Materials and methods

Total sugars

Ranganna's method for reducing sugars was used to obtain the lead acetate-free filtrate (1991). After adding 5 ml of concentrated 12N HCl to 50 ml of this filtrate, it was left overnight for a gradual inversion. 34. Using phenolphthalein as an indication, the acid was neutralized with 40% NaOH at the beginning and 0.1 N NaOH near the end. It was promptly cooled. The media is made slightly alkaline before the volume is adjusted to 100 milliliters. The purpose of this solution was to titrate against Fehling's solution. The estimated total sugar content was converted to percentages based on weight.

Total sugars (%) = Factor x Volume made up x Dilution x 1000/Titre x weight of sample taken

Sucrose (%) = (% total sugars - %reducing sugars) x 0.95

Total sugars (%) = % reducing sugars + % Sucrose

Ascorbic acid (%)

Procedure: After taking ten grams of the sample, 0.4% oxalic acid was added. After a thorough grinding and filtering, the volume was adjusted to 100 milliliters. Ten milliliters of this aliquot were titrated against a standardized 0.025 percent. 2, 6-Dichlorophenol-indophenol dye was used to achieve a pale pink final color. The amount of ascorbic acid in per 100 grams of fruit was determined and reported as milligrams.

Calculations: mg of ascorbic acid/100 g or ml of sample = Titre value x Dye factor x Volume made up x 100/Aliquot of extract taken for estimation x Wt or volume of sample taken for estimation

Dehydration ratio

Following guava slice dehydration, samples of known weight were dehydrated, and the weight of the dehydrated

samples was noted. The following formula was used to get the dehydration ratio:

Dehydration ratio = Weight of fresh fruit/Weight of dehydrated fruit

Statistical analysis

Factorial CRD with three factors

Below is a compact, ready-to-use statistical analysis section you can paste into your Methods chapter. It follows Fisher's ANOVA/F-test and Fisher's LSD approach (Fisher 1950) and is written for a three-factor factorial completely randomized design (CRD).

The experiment was analyzed as a three-factor factorial in a completely randomized design (CRD). The three factors were: A — Sucrose Brix (levels = a), B — Drying method (levels = b), C — Packaging material (levels = c). Each treatment combination was replicated r times.

Results and discussion

Effect of sucrose brix, drying method, and packaging material on total sugar (%) of osmotically dehydrated guava (*Psidium guajava* L.) slices

The data presented in Table 1 revealed that total sugar (%) of osmotically dehydrated guava slices was significantly influenced by sucrose brix concentration throughout the storage period, while the effect of drying method was found to be non-significant. Packaging material showed partial significance during initial and later stages of storage.

Among the sucrose concentrations, the highest total sugar was consistently recorded in samples treated with 70°Brix (SB₃), followed by 60°Brix (SB₂) and 50°Brix (SB₁), whereas the lowest total sugar was observed in the control (SB₀). During storage, a gradual increase in total sugar content was noted up to 120 days in all treatments. This increase could be attributed to the hydrolysis of polysaccharides and moisture loss during storage, leading to sugar concentration in the slices.

According to several researchers, osmotic dehydration is characterized by the uptake of solutes and the consequent rise in sugar content in fruit slices (Tiwari, 2005)^[16]. As mentioned above, the uptake of solids by guava slices was noted during the current experiment. Therefore, there was a direct correlation between the amount of solids absorbed and the variance in sugar content among the dried slices. According to Giraldo *et al.*, (2003)^[4], factors influencing the kinetics of osmotic dehydration also impact the amount of sugar in finished goods. These outcomes are consistent with what the other researchers found. Osmotic agents have been shown to affect product quality in a variety of fruits, including pineapple (Tiwari and Jalali, 2004)^[15], apricot (Babic *et al.*, 2006; Sharma *et al.*, 2004)^[2, 10], mango (Amitabh *et al.*, 2000; Varany Anond *et al.*, 2000; Madamba and Lopez, 2002 and Thippanna, 2005)^[1, 17, 8].

Between drying methods, vacuum dryer (DM₁) showed slightly higher mean total sugar content than hot air oven (DM₂) and solar dryer (DM₃), although the differences were statistically non-significant.

Packaging materials, however, influenced sugar retention to some extent. LDPE (PM₁) and HDPE (PM₂) performed similarly, though HDPE-packaged slices showed marginally higher sugar stability by the end of the storage period, possibly due to its lower permeability to moisture and oxygen. Similar increases in total sugars during osmotic dehydration and storage have been documented by Kumar *et*

al., (2013)^[7] in guava, Kannan and Thirupathi, (2014)^[6] in papaya, and Singh *et al.*, (2015)^[11] in banana.

Effect of sucrose brix, drying method, and packaging material on ascorbic acid (mg/100 g) of osmotically dehydrated guava (*Psidium guajava* L.) slices

The results presented in Table 2 indicate that the ascorbic acid content of guava slices decreased continuously during storage irrespective of treatments. Sucrose brix concentration significantly affected ascorbic acid content throughout the study period, while drying method and packaging material had a comparatively minor influence.

Among the sucrose concentrations, the control (SB₀) retained the highest ascorbic acid initially (141.34 mg/100 g), followed by 50°Brix (SB₁) and 60°Brix (SB₂), whereas the lowest was recorded in 70°Brix (SB₃) treatment. The loss of ascorbic acid during osmotic dehydration at higher brix levels may be due to leaching of vitamin C into the osmotic solution and its oxidation during dehydration. During storage, a consistent decline in ascorbic acid was observed in all treatments, which could be attributed to non-enzymatic oxidation and reaction with reducing sugars during Maillard browning. It might be due to reduced oxidation of ascorbic acid (Anita).

Drying methods showed non-significant differences, though solar drying (DM₃) retained slightly higher ascorbic acid compared to vacuum (DM₁) and hot air oven (DM₂) drying, possibly due to reduced thermal exposure. Packaging materials exhibited a minor but noticeable effect — HDPE (PM₂) retained marginally higher ascorbic acid at 60 days compared to LDPE (PM₁), attributed to its better barrier properties against oxygen and light.

Effect of sucrose brix, drying method, and packaging material on dehydration ratio of osmotically dehydrated guava (*Psidium guajava* L.) slices

Data presented in Table 3 demonstrate that dehydration ratio was significantly affected by sucrose brix concentration and packaging material, whereas drying method had little to no significant effect across storage intervals. The dehydration

ratio increased gradually during storage, reflecting moisture reduction and dry matter stabilization over time. Among sucrose treatments, the highest dehydration ratio was observed in 70°Brix (SB₃), followed by 60°Brix (SB₂), 50°Brix (SB₁), and the lowest in the control (SB₀).

The higher dehydration ratio at elevated brix levels can be attributed to increased osmotic pressure and higher solid gain coupled with greater water loss during the osmotic process. The dehydration ratio increased with an increase in sucrose concentration from control (SB₀) to 70° Brix (SB₃). This trend may be attributed to the greater osmotic pressure gradient at higher sucrose concentrations, which enhances water loss from the fruit tissue and results in a higher dry matter content after drying. The movement of water out of the cells and simultaneous uptake of solutes during osmotic treatment effectively reduces moisture content and increases the solid gain, thereby increasing the dehydration ratio. Similar observations were reported by Sutar and Gupta, (2007)^[12] and Kumar *et al.*, (2013)^[7] during osmotic dehydration of guava and other tropical fruits.

Among the drying methods, vacuum drying (DM₁) resulted in slightly higher dehydration ratio compared to hot air oven (DM₂) and solar drying (DM₃), likely due to its efficient removal of moisture under reduced pressure. Packaging materials also influenced dehydration ratio; HDPE (PM₂) showed a higher mean value compared to LDPE (PM₁), indicating better moisture barrier properties that prevent reabsorption during storage.

Regarding packaging materials, slices packed in HDPE (High-Density Polyethylene) showed marginally higher dehydration ratios than those in LDPE, likely due to lower permeability to moisture and air, which helps retain the solid matrix and reduce rehydration during storage. Overall, the increase in dehydration ratio with sucrose concentration indicates efficient osmotic dehydration and effective water removal, leading to enhanced product stability and reduced spoilage risk during storage. These findings are in close agreement with those of Tiwari and Vidya (2011)^[14] in guava, Kannan and Thirupathi (2014)^[6] in papaya, and Singh *et al.*, (2015)^[11] in banana.



Fig 1: Fresh fruit is used to make osmotically dehydrated guava slices (A), fresh fruit is sliced for osmotically dehydrated guava slices (B), and osmotically dehydrated guava slices are prepared.

Table 1: Effect of sucrose brix, drying method and packaging material on total sugar(%) of osmotically dehydrated guava (*Psidium guajava* L.) slices

Treatments	Total sugar(%)																
	Initial days			30 days			60 days			90 days			120 days				
	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled		
Factor: A (Sucrose Brix)																	
SB ₀ : Control	46.271	46.822	46.547	47.351	47.622	47.486	47.959	48.577	48.268	51.717	51.849	51.783	54.082	54.488	54.285		
SB ₁ : 50° Brix	46.551	47.191	46.871	47.759	47.772	47.765	48.171	48.578	48.375	52.043	52.421	52.232	54.572	54.903	54.737		
SB ₂ : 60° Brix	47.015	47.229	47.122	47.381	47.764	47.572	48.030	48.359	48.194	51.918	52.075	51.996	54.535	54.708	54.622		
SB ₃ : 70° Brix	47.390	47.791	47.590	48.132	48.280	48.206	48.815	49.213	49.014	52.844	52.594	52.719	55.017	54.983	55.001		
F-test	S	S	S	NS	NS	NS	S	S	S	S	S	S	S	NS	S		
SEm±	0.290	0.222	0.227	0.232	0.218	0.219	0.176	0.208	0.167	0.238	0.200	0.208	0.202	0.182	0.172		
CD (P=0.05)	0.824	0.632	0.646				0.501	0.592	0.476	0.677	0.570	0.591	0.574		0.490		
Factor: B (Drying Method)																	
DM ₁ : Vacuum dryer	46.888	47.443	47.166	47.812	47.976	47.894	48.474	48.884	48.679	52.266	52.433	52.350	54.756	55.070	54.913		
DM ₂ : Hot Air oven dryer	46.832	47.307	47.070	47.434	47.662	47.548	48.079	48.621	48.350	52.019	52.238	52.129	54.385	54.653	54.519		
DM ₃ : Solar dryer	46.700	47.024	46.862	47.722	47.940	47.831	48.179	48.540	48.359	52.106	52.032	52.069	54.513	54.589	54.551		
F-test	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
SEm±	0.251	0.193	0.197	0.200	0.189	0.189	0.152	0.180	0.145	0.206	0.174	0.180	0.175	0.157	0.149		
CD (P=0.05)																	
Factor: C (Packaging Material)																	
PM ₁ : LDPE (Low density polyethylene)	46.777	47.183	46.980	47.545	47.829	47.687	48.241	48.460	48.351	52.047	52.200	52.123	54.526	54.762	54.644		
PM ₂ : HDPE (High density polyethylene)	46.837	47.333	47.085	47.767	47.889	47.828	48.246	48.903	48.575	52.214	52.270	52.242	54.578	54.780	54.679		
F-test	S	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	S	S		
SEm±	0.205	0.157	0.161	0.164	0.154	0.155	0.124	0.147	0.118	0.168	0.142	0.147	0.143	0.128	0.122		
CD (P=0.05)	0.583							0.419						0.365	0.346		

Table 2: Effect of sucrose brix, drying method and packaging material on ascorbic acid (mg/100 g) of osmotically dehydrated guava (*Psidium guajava* L.) slices

Treatments	Ascorbic acid (mg/100 g)														
	Initial days			30 days			60 days			90 days			120 days		
	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled
Factor: A (Sucrose Brix)															
SB ₀ : Control	138.751	143.938	141.344	128.857	128.406	128.631	117.860	120.732	119.296	114.519	118.613	116.566	106.640	112.307	109.474
SB ₁ : 50° Brix	135.530	138.454	136.992	120.529	117.245	118.887	111.902	112.449	112.175	97.653	96.100	96.876	96.639	96.972	96.806
SB ₂ : 60° Brix	126.363	144.444	135.404	115.630	113.743	114.687	112.311	108.985	110.648	108.667	105.535	107.101	100.476	96.232	98.354
SB ₃ : 70° Brix	122.192	131.771	126.981	113.102	108.441	110.772	88.752	95.591	92.172	88.529	88.274	88.402	85.000	83.722	84.361
F-test	S	NS	S	S	S	S	S	S	S	S	S	S	S	S	S
SEm±	2.652	5.268	3.198	2.634	2.777	1.865	2.785	2.497	1.926	3.762	2.734	2.657	3.079	3.622	2.686
CD (P=0.05)	7.542		9.096	7.490	7.898	5.303	7.920	7.102	5.478	10.700	7.775	7.558	8.758	10.302	7.638
Factor: B (Drying Method)															
DM ₁ : Vacuum dryer	128.571	135.808	132.190	118.813	114.688	116.751	105.772	107.162	106.467	100.441	102.165	101.303	95.710	93.408	94.559
DM ₂ : Hot Air oven dryer	131.138	139.620	135.379	118.881	116.327	117.604	109.108	107.931	108.520	102.102	102.702	102.403	95.916	97.993	96.954
DM ₃ : Solar dryer	132.417	143.527	137.972	120.895	119.861	120.378	108.238	113.226	110.732	104.482	101.524	103.003	99.940	100.524	100.232
F-test	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SEm±	2.297	4.563	2.770	2.281	2.405	1.615	2.412	2.163	1.668	3.258	2.368	2.301	2.667	3.137	2.326
CD (P=0.05)															
Factor: C (Packaging Material)															
PM ₁ : LDPE (Low density polyethylene)	131.939	140.000	135.970	120.658	118.078	119.368	108.236	109.474	108.855	102.997	102.244	102.620	97.659	97.462	97.561
PM ₂ : HDPE (High density polyethylene)	129.478	139.303	134.391	118.401	115.840	117.120	107.176	109.404	108.290	101.687	102.017	101.852	96.718	97.155	96.936
F-test	NS	NS	NS	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS
SEm±	1.875	3.725	2.261	1.862	1.964	1.318	1.969	1.766	1.362	2.660	1.933	1.879	2.177	2.561	1.899
CD (P=0.05)								5.022							

Table 3: Effect of sucrose brix, drying method and packaging material on dehydration ratio of osmotically dehydrated guava (*Psidium guajava* L.) slices

Treatments	Dehydration ratio														
	Initial days			30 days			60 days			90 days			120 days		
	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled	2013	2014	Pooled
Factor: A (Sucrose Brix)															
SB ₀ : Control	1.667	1.649	1.658	2.049	1.685	1.867	2.383	2.078	2.230	2.900	2.887	2.894	3.383	3.600	3.492
SB ₁ : 50° Brix	1.667	1.635	1.651	2.047	1.706	1.876	2.353	2.108	2.230	3.095	3.115	3.105	3.600	3.687	3.643
SB ₂ : 60° Brix	1.651	1.605	1.628	2.060	1.708	1.884	2.284	2.025	2.154	2.878	2.953	2.916	3.656	3.941	3.798
SB ₃ : 70° Brix	1.766	1.856	1.811	2.102	1.838	1.970	2.389	2.222	2.306	3.113	3.161	3.137	3.841	3.985	3.913
F-test	NS	S	S	NS	S	NS	NS	S	NS	NS	NS	NS	NS	S	S
SEm±	0.037	0.039	0.025	0.086	0.027	0.046	0.122	0.041	0.067	0.090	0.109	0.082	0.114	0.106	0.085
CD (P=0.05)		0.111	0.071		0.078			0.116						0.300	0.242
Factor: B (Drying Method)															
DM ₁ : Vacuum dryer	1.701	1.720	1.710	2.092	1.802	1.947	2.462	2.175	2.318	3.107	3.110	3.109	3.695	3.856	3.775
DM ₂ : Hot Air oven dryer	1.688	1.683	1.685	2.050	1.681	1.865	2.305	2.078	2.192	3.030	3.045	3.038	3.648	3.823	3.735

DM ₃ : Solar dryer	1.675	1.656	1.666	2.052	1.720	1.886	2.289	2.071	2.180	2.853	2.931	2.892	3.518	3.730	3.624
F-test	NS	NS	NS	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SEm±	0.032	0.034	0.022	0.074	0.024	0.040	0.106	0.029	0.058	0.078	0.094	0.071	0.098	0.091	0.074
CD (P=0.05)					0.067										
Factor: C (Packaging Material)															
PM ₁ : LDPE (Low density polyethylene)	1.647	1.653	1.650	2.051	1.682	1.867	2.341	2.085	2.213	2.949	2.963	2.956	3.583	3.788	3.686
PM ₂ : HDPE (High density polyethylene)	1.729	1.720	1.725	2.078	1.786	1.932	2.363	2.131	2.247	3.045	3.095	3.070	3.657	3.818	3.737
F-test	S	NS	S	NS	S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SEm±	0.026	0.028	0.018	0.061	0.019	0.033	0.086	0.029	0.047	0.064	0.077	0.058	0.080	0.075	0.060
CD (P=0.05)	0.073		0.050		0.055										

Conclusion

From the above findings, it can be concluded that: Sucrose brix concentration significantly influenced total sugar, ascorbic acid, and dehydration ratio. Higher brix (70°Brix) enhanced total sugar and dehydration ratio but resulted in greater ascorbic acid loss. Drying methods showed non-significant differences overall, though vacuum drying marginally outperformed others. HDPE packaging offered better retention of quality attributes compared to LDPE due to superior barrier properties. Thus, osmotic dehydration at 70°Brix, followed by vacuum drying and HDPE packaging, was found most effective for producing stable and high-quality guava slices during 120 days of storage.

Conflict of Interest

The authors declare no conflict of interest in connection with this article.

References

- Amitabh, Singh RD, Tomar MC. Studies on osmotic dehydration of some varieties of ripe mangoes grown in Uttar Pradesh. *Indian Food Packer*. 2000;54(3):66-72.
- Babic L, Babic M, Pavkov I. Apricot drying by a new technology. *Vocarstvo*. 2006;40(3):245-253.
- Fito P, Chiralt A, Barat JM, Andres A, Martinez M. Vacuum impregnation for development of new dehydrated products. *J Food Eng*. 2001;49:297-302.
- Giraldo G, Talens P, Fito P, Chiralt A. Influence of sucrose solution concentration on kinetics and yield during osmotic dehydration of mango. *J Food Eng*. 2003;58:33-43.
- Gomez KA, Gomez AA. *Statistical Procedures for Agricultural Research*. 2nd ed. New York: John Wiley and Sons; 1984. 680 p.
- Kannan S, Thirupathi V. Osmotic dehydration of papaya: influence of sugar concentration and temperature on quality. *Int J Food Eng*. 2014;10(3):567-573.
- Kumar M, Bawa AS, Singh S. Effect of osmotic dehydration on quality characteristics of guava. *J Food Process Preserv*. 2013;37(4):356-362.
- Madamba PS, Lopez RI. Optimization of the osmotic dehydration of mango (*Mangifera indica* L.) slices. *Dry Technol*. 2002;20(6):1227-1242.
- Priyanka, Verma A, Kumar A, Sharma PC, Saini R, Thakur M, Shivani. Standardization of process for preparation of osmo-dried guava slices cv. Lalit and Shweta. *J Pharmacogn Phytochem*. 2020;9(6):1030-1033.
- Sharma KD, Kumar R, Kaushal BNL. Mass transfer characteristics, yield and quality of five varieties of osmotically dehydrated apricot. *J Food Sci Technol*. 2004;41(3):264-275.
- Singh B, Panesar PS, Nanda V. Osmotic dehydration kinetics and quality evaluation of banana slices. *J Food Sci Technol*. 2015;52(2):1230-1238.
- Sutar RF, Gupta DKD. Mathematical modeling of mass transfer in osmotic dehydration of fruits. *J Food Eng*. 2007;78(3):986-996.
- Teles UM. Optimization of osmotic dehydration of melons followed by air drying. *Int J Food Sci Technol*. 2006;41(6):674-680.
- Tiwari AK, Vidya S. Effect of osmotic dehydration on chemical composition of guava slices. *J Food Sci Technol*. 2011;48(2):211-214.
- Tiwari RB, Jalali S. Studies on osmotic dehydration of different varieties of mango. In: *Proceedings of the First Indian Horticulture Congress*; 2004 Nov 6-9; New Delhi. 2004. Abstract No. 8.21, p. 391.
- Tiwari RB. Application of osmo-air dehydration for processing of tropical fruits in rural areas. *Ind Food Ind*. 2005;24:62-69.
- Varayanond W, Wongkrajang K, Warunee VA, Wongkrajang K. Effects of some parameters on the osmotic dehydration of mango cv. Kaew. *Thai J Agric Sci*. 2000;33:123-135.