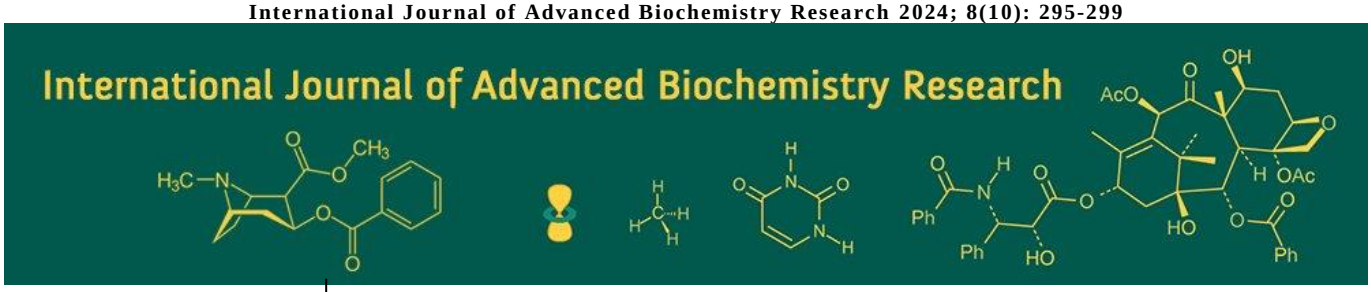

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Standardization of a recipe for the preparation of Tutti Frutti from watermelon rind (*Citrullus lanatus*)

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Abstract
The present experiment "Standardization of a recipe for the preparation of Tutti Frutti from watermelon rind" was carried out during August 2023 to December 2023 in the Post-Harvest Laboratory of Department of Horticulture, SHUATS, Prayagraj. The experiment was laid out in a Completely Randomized Design with 13 treatments and 3 replications with 0.1% $C_6H_8O_7$ (Citric Acid). The treatments consisted of sugar, jaggery and honey with 40%, 50%, 60% and 70% concentration each per kg watermelon rind. It was observed that the quality observations and sensory evaluation was affected by various treatments. Based on the results and findings of the present experiment, it was concluded that different treatment influenced the quality of Tutti Frutti throughout the storage period. The results indicated that the treatment T_4 (70% sugar) was recorded as the best in terms of Total soluble solids, T_5 (40% jaggery) in terms of titratable acidity, T_9 (40% honey) in terms of Reducing sugars, T_8 (70% jaggery) in terms of Total sugars and T_1 (40% sugar) in terms of Vitamin C. And, in terms of organoleptic parameters as well as benefit cost ratio, the treatment T_9 (40% honey) was recorded as the best during the storage period of 120 days among all the parameters.

Keywords: Organoleptic properties, physicochemical properties, storage, tutti frutti, watermelon rind

Introduction
Watermelon (*Citrullus lanatus*) is a plant species in the family Cucurbitaceae, which was originally originated in Africa. Main origin of watermelon is from Kalahari Desert of Africa but nowadays grew in tropical territories of various nations (Seed and Techniques, 2014) [18]. Watermelon is also known as Tarbooz in Hindi and Urdu, Tarbuj in Manipuri, Kadu Vrindavan in Marathi, Eriputccha in Telegu, Kallangadi balli in Kannada, Tormuj in Bengali, Indrak in Gujarati (Dubey *et al*., 2022) [8]. Watermelon is an extensive and a yearly plant which ordinarily have hairy pinnately-lobed leaves with yellow flowers. Watermelon is a characteristic item which is edible, which is kind of berry known as pepo. The outer layer of watermelon is thick with dark green colour with vertical stripes which ranges between the green or grey colour (Reetu and Tomar, 2017) [17].

Watermelon received a great deal of attention considering the phytochemicals, proximate, and antioxidant potentials found in them such as saponin, alkaloids, total phenol, lycopene, anthraquinones, flavonoids, phlobatannin, vitamin A, cucurbitacin E, flavonoids, vitamin C, thiamine, riboflavin, polyphenolic compounds, terpene, steroid, flavonoid, glycoprotein-vicilin, citrulline content. The fruits of watermelon contain high percentages of moisture, carbohydrates, and low percentage of fat (Akintunde and Thomas, 2021) [1]. It also contains a significant amount of vitamin B_6 and vitamin B_1 and minerals like iron, potassium, magnesium and phosphorus (Ashoka *et al*., 2022) [3]. The fruit of *Citrullus lanatus* has good anti-inflammatory and analgesic activities and can improve the nutritive values which are useful in human health (Akintunde *et al*., 2021) [2].

Watermelon rind is a thick white layer that is located between the exterior green shell and the interior red core. It makes up about 1/3 of the total fruit mass. Watermelon rind is considered as a rich source of significant phytochemicals. Watermelon constitutes of pectin, lignin, celluloses, and hemicellulose with entrapped sugars, carotenoids, polyphenolics, lycopene, citrulline, and proteins (Mustafa *et al*., 2022) [13]. A 1-inch cube of watermelon rind contains approximately 1.8 calories.

One serving provides 2% of the recommended intake of vitamin C and 1 percent of the vitamin B_6 required by the body every day. Watermelon rind also offers a high dose of L-citruline – an amino acid, which helps in dilating blood vessels, improve blood circulation and gives watermelon its antioxidant effects (Mohan *et al.*, 2016) [12]. Watermelon is rich in lycopene and citrulline. Citrulline content is more in watermelon rind than flesh. Citrulline present in this fruit reduces the body fat after converting it into arginine which blocks the activity of Tissue Nonspecific Alkaline Phosphatase (TNAP) and prevents the accumulation of fat (Devi and Prabhavathy, 2023) [6].

Watermelon (*Citrullus lanatus*) which is a very nutritious fruit is a widely consumed summer fruit in which all its parts can be utilized and processed into value-added products. Over production and lack of proper storage as well as infrastructure facilities may often lead to wastage of the product. But, the lack of knowledge of the nutrient potential of the watermelon rind and its unappealing taste often contributes to its wastage. Processed watermelon rind products are not commonly available in our market and in the process for the preparation of Tutti Frutti no systematic work has been done on processing of watermelon rind. Food processing industries in India has been witnessing a significant growth in the recent years and the rate of consumption of processed fruit products has also been increasing due to the changes in everyday lifestyle. A lot of processed fruit products are now widely available in the market with different packaging options. But there is a lack of watermelon rind processed product in the market. So, the scope for developing value-added products from watermelon rind in the future is high and significant growth in the economy can be achieved by reducing wastage of the fruit products.

Materials and Methods

The present experiment "Standardization of a recipe for the preparation of Tutti Frutti from watermelon rind (*Citrullus lanatus*)" was carried out during August 2023 to December 2023 in the Post Harvest Laboratory of Department of Horticulture, SHUATS, Prayagraj, Uttar Pradesh, India. The watermelon rind Tutti Frutti was laid out in a Completely Randomized Design with 13 treatments and 3 replications with 0.1% $C_6H_8O_7$ (Citric Acid). The sample was stored for a period of 120 days under ambient temperature. The treatments were T_0 (42% sugar), T_1 (40% sugar), T_2 (50% sugar), T_3 (60% sugar), T_4 (70% sugar), T_5 (40% jaggery), T_6 (50% jaggery), T_7 (60% jaggery), T_8 (70% jaggery), T_9 (40% honey), T_{10} (50% honey), T_{11} (60% honey) and T_{12} (70% honey).

Procedure for the preparation of watermelon rind Tutti Frutti

Peeled watermelon rinds were washed and cut into small cubes of uniform sizes with the help of cube maker. Cubes were then blanched with hot water for 10 mins. Later, syrups of different concentrations *viz.*, 40%, 50%, 60% and 70% were prepared accordingly for each treatment and the cubes were then blanched again for another 15 mins with the syrup prepared. Edible food colour and flavour were added. The end product was then stored at an ambient temperature for 24 hrs. Cubes were then dried at 60 ℃ for 10 mins until the moisture is less than 6%. The Tutti Frutti was then stored and sealed in a sterilized container at ambient temperature. This was then subsequently used for periodical evaluation at initial day, 30 days, 60 days, 90 days and 120 days.

Sensory analysis of watermelon rind Tutti Frutti

For statistical analysis samples were evaluated for TSS, Acidity, Reducing sugar, Total sugar, Ascorbic acid and sensory evaluation for colour and appearance, flavour and taste, texture and overall acceptability was performed by a panel of 9 members. The samples were presented to 9 members. The members were asked to rate the different composition presented to them on a 9-point hedonic scale with the ratings of: 9 = Like extremely; 8 = Like very much; 7 = Like moderately; 6 = Like slightly; 5 = Neither like nor dislike; 4 = Dislike slightly; 3 = Dislike moderately; 2 = Dislike very much; and 1 = Dislike extremely. The results were then analysed by statistical software (statistics).

Results and Discussion

Physicochemical properties of watermelon rind Tutti Frutti

The nutritional properties of watermelon rind Tutti Frutti was determined by evaluating its physicochemical parameters *viz.*, Total Soluble Solids, Acidity, Reducing Sugars, Total Sugars and Ascorbic acid.

Total Soluble Solids (°Brix)

The maximum TSS (Total soluble solids) (73.60, 74.41, 75.20, 76.02 and 76.95) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_4 (70% sugar) whereas the minimum TSS (Total soluble solids) (66.73, 67.54, 68.43, 69.15 and 70.11) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_9 (40% honey) throughout the storage period. The total soluble solids content of watermelon rind Tutti Frutti was observed to be increasing in all the treatments with respect to the increase in their storage period. This might be due to increase in total soluble solids content and caused by hydrolysis of polysaccharides like starch, cellulose and pectin substances into simpler substances. Similar results were also reported by (Katke *et al.*, 2018) [9] in aonla candy, (Kumar and Pathak, 2020) [10] in aonla candy enriched with natural oil/extract, (Mahato *et al.*, 2020) [11] in unripe mango candy and (Patel *et al.*, 2021) [15] in unripe papaya candy.

Acidity (%)

The maximum acidity (%) (0.81, 0.85, 0.90, 0.96 and 1.01) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_5 (40% jaggery) whereas the minimum acidity (0.51, 0.55, 0.60, 0.66 and 0.71) was observed in the treatment T_4 (70% sugar) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The acidity (%) of watermelon rind Tutti Frutti was showed increasing in all treatments during storage. The increase in acidity may be due to acid formation, degradation of polysaccharides and oxidation of reducing sugars. Similar reports were also made by (Navitha *et al.*, 2018) [14] in ber candy, (Kumar and Pathak, 2020) [10] in aonla candy enriched with natural oil/extract and (Bhand *et al.*, 2021) [5] in apple ber Tutti Frutti.

Reducing Sugar (%)

The maximum Reducing Sugar (%) (25.71, 26.11, 26.69, 27.50 and 28.37) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_9 (40% honey) whereas the minimum reducing sugar (23.03, 23.45, 24.02, 24.79 and 25.65) was observed in the treatment T_4 (70% sugar) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The Reducing Sugar content of watermelon rind Tutti Frutti was observed in increasing trend in all treatments during storage. The increase in reducing sugars during storage might be attributed to hydrolysis of non-reducing sugars to reducing sugars. Similar results were also reported by **(**Singh *et al.*, 2007) [19] in aonla candy, (Divya *et al.*, 2012) [7] in sapota candy, (Pawar and Patil, 2013) [16] in aonla candy and (Babariya *et al.*, 2014) [4] in papaya candy.

Total Sugar (%)

The maximum total sugar (%) (68.29, 68.82, 69.60, 70.43 and 71.04) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_8 (70% jaggery) whereas the minimum total sugar (62.45, 62.97, 63.75, 64.57 and 65.18) was observed in the treatment T_9 (40% honey) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The total sugar content of watermelon rind Tutti Frutti was observed in increasing trend in all treatments during storage. The increase in total sugar content during the storage period could be due to the hydrolysis of polysaccharides resulting in conversion of soluble compounds like sugar. Total sugar content of products was dependent on the total soluble solids. Similar results were also reported by (Babariya *et al.*, 2014) [4] in unripe papaya candy (Tutti Frutti), (Patel *et al.*, 2021) [15] in unripe papaya candy and (Bhand *et al.*, 2021) [5] in apple ber Tutti Frutti.

Ascorbic acid

The maximum ascorbic acid (6.41, 5.86, 5.38, 4.77 and 4.23) was observed at initial day, 30 days, 60 days, 90 days and 120 days respectively in the treatment T_1 (40% sugar) whereas the minimum ascorbic acid (6.32, 5.87, 5.22, 4.65 and 4.07) was observed in the treatment T_8 (70% jaggery) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The ascorbic acid content of watermelon rind Tutti Frutti was showed decreasing trend in all treatments during storage. The decrease in ascorbic acid content may be due to the process of oxidation of ascorbic acid resulted into formation of dehydroascorbic acid in presence of ascorbinase enzyme. Similar results were also reported by **(**Vikram *et al.*, 2014) [20] in honey coated aonla candy, (Katke *et al.*, 2018) [9] in aonla candy and (Kumar and Pathak, 2020) [10] in aonla candy enriched with natural oil/extract.

Organoleptic properties of watermelon rind Tutti Frutti

The sensory acceptability of watermelon rind Tutti Frutti was evaluated by analysing its organoleptic properties *viz.*, colour and appearance, flavour and taste, texture and overall acceptability.

Colour and Appearance

The maximum colour and appearance score (7.85, 7.63, 7.34, 7.09 and 6.74) was observed in the treatment T_9 (40% honey) at initial day, 30 days, 60 days, 90 days and 120 days respectively whereas the minimum colour and appearance score (6.51, 6.37, 6.24, 6.11 and 6.01) was observed in the treatment T_8 (70% jaggery) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The colour and appearance of watermelon rind Tutti Frutti was observed to be decreasing throughout the storage period due to increase in time interval, temperature and action of enzymes. Similar results were also reported by (Babariya *et al.*, 2014) [4] in papaya Tutti Frutti and (Bhand *et al.*, 2021) [5] in apple ber Tutti Frutti.

Flavour and Taste

The maximum flavour and taste score (7.95, 7.76, 7.52, 7.33 and 7.14) was observed in the treatment T_9 (40% honey) at initial day, 30 days, 60 days, 90 days and 120 days respectively whereas the minimum flavour and taste score (6.24, 6.15, 6.03, 5.94 and 5.86) was observed in the treatment T_4 (70% sugar) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The flavour and taste of watermelon rind Tutti Frutti was observed to be decreasing throughout the storage period due to increase in time interval, temperature and action of enzymes. This finding was in conformity with (Navitha *et al.*, 2018) [14] in ber candy and (Bhand *et al.*, 2021) [5] in apple ber Tutti Frutti.

Texture

The maximum texture score (8.32, 8.16, 8.03, 7.87 and 7.65) was observed in the treatment T_9 (40% honey) at initial day, 30 days, 60 days, 90 days and 120 days respectively whereas the minimum texture score (6.36, 6.27, 6.16, 6.09 and 6.02) was observed in the treatment T_8 (70% jaggery) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The texture score of watermelon rind Tutti Frutti was observed to be decreasing throughout the storage period due to increase in time interval, temperature and action of enzymes. Similar results were also reported by (Katke *et al.*, 2018) [9] in aonla candy and (Patel *et al.*, 2021) [15] in unripe papaya candy.

Overall acceptability

The maximum overall acceptability score (8.35, 8.14, 7.96, 7.73 and 7.48) was observed in the treatment T_9 (40% honey) at initial day, 30 days, 60 days, 90 days and 120 days respectively whereas the minimum overall acceptability score (6.53, 6.37, 6.21, 6.14 and 6.06) was observed in the treatment T_8 (70% jaggery) during the storage period at initial day, 30 days, 60 days, 90 days and 120 days respectively. The overall acceptability score of watermelon rind Tutti Frutti was observed to be decreasing throughout the storage period due to increase in time interval, temperature and action of enzymes. Similar results were also reported by (Bhand *et al.*, 2021) [5] in apple ber Tutti Frutti and (Katke *et al.*, 2018) [9] in aonla candy.

Economics

In terms of economics, the maximum benefit-cost ratio (2.49) was recorded in the treatment T_9 (40% honey) with the gross return, net return and total cost being (₹350), (₹249.83) and (₹100.17) respectively and minimum benefit-cost ratio (0.97) was recorded in the treatment T_8 (70% jaggery) with their gross return, net return and total cost being (₹150), (₹73.83) and (₹76.17) respectively.

Table 1: Total Soluble Solids (°Brix), Acidity (%) and Reducing sugar of watermelon rind Tutti Frutti during storage in ambient condition

Treatment Symbol	Treatment Combination	Total Soluble Solids (°Brix)					Acidity (%)					Reducing Sugar				
		Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS
T_0	Control	71.27	72.08	72.87	73.69	74.65	0.55	0.58	0.63	0.69	0.74	23.44	23.84	24.41	25.21	26.06
T_1	Sugar (40%)	70.63	71.43	72.22	73.05	74.01	0.56	0.59	0.64	0.70	0.76	23.53	23.95	24.54	25.33	26.19
T_2	Sugar (50%)	71.83	72.64	73.43	74.25	75.21	0.53	0.57	0.62	0.68	0.73	23.28	23.72	24.29	24.09	25.96
T_3	Sugar (60%)	72.40	73.21	74.00	74.82	75.75	0.52	0.56	0.61	0.67	0.72	23.15	23.55	24.12	24.91	25.76
T_4	Sugar (70%)	73.60	74.41	75.20	76.02	76.95	0.51	0.55	0.60	0.66	0.71	23.03	23.45	24.02	24.79	25.65
T_5	Jaggery (40%)	68.37	69.18	69.97	70.79	71.72	0.81	0.85	0.90	0.96	1.01	24.75	25.17	25.71	26.53	27.40
T_6	Jaggery (50%)	68.87	69.68	70.47	71.29	72.25	0.79	0.84	0.88	0.94	1.00	24.61	25.01	25.59	26.39	27.25
T_7	Jaggery (60%)	69.43	70.24	71.03	71.85	72.81	0.79	0.83	0.88	0.94	1.00	24.44	24.86	25.44	26.24	27.09
T_8	Jaggery (70%)	70.10	70.91	71.70	72.51	73.48	0.78	0.82	0.87	0.93	0.99	24.31	24.71	25.25	26.11	26.94
T_9	Honey (40%)	66.73	67.54	68.43	69.15	70.11	0.66	0.71	0.76	0.83	0.88	25.71	26.11	26.69	27.50	28.37
T_{10}	Honey (50%)	67.00	67.81	68.72	69.42	70.38	0.65	0.70	0.75	0.82	0.87	25.56	25.97	26.54	27.34	28.18
T_{11}	Honey (60%)	67.30	68.11	68.89	69.72	70.68	0.64	0.68	0.74	0.80	0.86	25.38	25.81	26.38	27.20	28.08
T_{12}	Honey (70%)	67.90	68.73	69.03	70.34	71.30	0.63	0.67	0.72	0.78	0.84	25.29	25.72	26.29	27.08	27.94
F-Test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.093	0.037	0.030	0.032	0.023	0.002	0.002	0.002	0.002	0.002	0.019	0.022	0.018	0.016	0.020
CV		0.161	0.062	0.052	0.058	0.039	0.352	0.355	0.298	0.285	0.300	0.097	0.108	0.088	0.076	0.090
CD at 5%		0.188	0.073	0.062	0.070	0.049	0.004	0.004	0.004	0.004	0.004	0.040	0.045	0.037	0.033	0.041

Table 2: Total Sugar (%), Ascorbic acid (%) and Colour and appearance of watermelon rind Tutti Frutti during storage in ambient condition

Treatment Symbol	Treatment Combination	Total Sugar					Ascorbic Acid (%)					Colour and Appearance				
		Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS
T_0	Control	64.99	65.51	66.33	67.13	67.74	6.40	5.85	5.36	4.72	4.15	7.45	7.19	6.92	6.68	6.39
T_1	Sugar (40%)	64.73	65.37	66.21	67.00	67.60	6.41	5.86	5.38	4.77	4.23	7.41	7.25	6.96	6.64	6.36
T_2	Sugar (50%)	65.16	65.66	66.44	67.27	67.89	6.38	5.84	5.25	4.67	4.14	7.58	7.34	7.08	6.76	6.44
T_3	Sugar (60%)	65.29	65.81	66.59	67.42	68.03	6.36	5.83	5.21	4.64	4.09	7.32	7.15	6.87	6.54	6.27
T_4	Sugar (70%)	65.46	65.99	66.75	67.58	68.20	6.35	5.95	5.37	4.76	4.13	7.21	7.10	6.84	6.51	6.24
T_5	Jaggery (40%)	67.82	68.32	69.09	69.92	70.54	6.35	5.90	5.35	4.78	4.19	6.88	6.67	6.49	6.26	6.13
T_6	Jaggery (50%)	67.95	68.45	69.22	70.05	70.67	6.34	5.89	5.33	4.72	4.17	6.72	6.56	6.38	6.15	6.08
T_7	Jaggery (60%)	68.12	68.64	69.44	70.27	70.88	6.33	5.87	5.28	4.75	4.13	6.58	6.41	6.29	6.13	6.04
T_8	Jaggery (70%)	68.29	68.82	69.60	70.43	71.04	6.32	5.87	5.22	4.65	4.07	6.51	6.37	6.24	6.11	6.01
T_9	Honey (40%)	62.45	62.97	63.75	64.57	65.18	6.37	5.95	5.39	4.81	4.14	7.85	7.63	7.34	7.09	6.74
T_{10}	Honey (50%)	62.50	63.01	63.79	64.61	65.22	6.34	5.94	5.25	4.69	4.12	7.76	7.58	7.26	6.94	6.68
T_{11}	Honey (60%)	62.66	63.19	63.97	64.79	65.40	6.34	5.93	5.21	4.63	4.11	7.57	7.31	6.99	6.72	6.46
T_{12}	Honey (70%)	62.81	63.33	64.17	65.01	65.59	6.33	5.92	5.15	4.46	4.09	7.28	7.09	6.78	6.49	6.25
F-Test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.017	0.021	0.022	0.015	0.021	0.001	0.002	0.002	0.002	0.002	0.024	0.033	0.028	0.034	0.031
CV		0.032	0.039	0.040	0.027	0.038	0.032	0.044	0.039	0.047	0.064	0.410	0.576	0.506	0.639	0.604
CD at 5%		0.035	0.043	0.045	0.031	0.043	0.003	0.004	0.004	0.004	0.004	0.050	0.068	0.058	0.070	0.064

Table 3: Flavour and Taste, Texture and Overall acceptability of watermelon rind Tutti Frutti during storage in ambient condition

Treatment Symbol	Treatment Combination	Flavour and Taste					Texture					Overall acceptability					Benefit: Cost Ratio
		Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS	Initial	30 DAS	60 DAS	90 DAS	120 DAS	
T_0	Control	6.38	6.27	6.18	6.11	6.08	7.56	7.48	7.38	7.24	7.15	7.58	7.42	7.34	7.20	7.14	1.70
T_1	Sugar (40%)	6.55	6.43	6.36	6.21	6.13	7.43	7.36	7.21	7.12	7.01	7.62	7.48	7.30	7.24	7.17	1.76
T_2	Sugar (50%)	7.85	7.61	7.38	7.15	6.97	7.68	7.59	7.45	7.36	7.22	7.85	7.58	7.39	7.16	7.07	1.49
T_3	Sugar (60%)	7.32	7.16	6.94	6.71	6.48	7.75	7.69	7.58	7.47	7.39	7.43	7.34	7.26	7.12	7.03	1.26
T_4	Sugar (70%)	6.24	6.15	6.03	5.94	5.86	7.58	7.43	7.34	7.16	7.04	7.27	7.15	7.03	6.96	6.84	1.08
T_5	Jaggery (40%)	6.58	6.47	6.32	6.17	6.05	6.85	6.73	6.68	6.61	6.58	7.35	7.11	6.96	6.73	6.47	1.88
T_6	Jaggery (50%)	6.85	6.76	6.58	6.24	5.97	6.62	6.54	6.46	6.37	6.12	7.15	6.97	6.69	6.54	6.38	1.49
T_7	Jaggery (60%)	6.47	6.35	6.28	5.96	5.78	6.43	6.37	6.31	6.26	6.18	6.75	6.52	6.36	6.21	6.11	1.20
T_8	Jaggery (70%)	6.39	6.25	6.07	5.86	5.69	6.36	6.27	6.16	6.09	6.02	6.53	6.37	6.21	6.14	6.06	0.97
T_9	Honey (40%)	7.95	7.76	7.52	7.33	7.14	8.32	8.16	8.03	7.87	7.65	8.35	8.14	7.96	7.73	7.48	2.49
T_{10}	Honey (50%)	7.47	7.25	7.03	6.84	6.57	7.86	7.65	7.48	7.32	7.26	7.85	7.63	7.47	7.28	7.19	1.91
T_{11}	Honey (60%)	7.75	7.51	7.29	7.04	6.78	7.48	7.32	7.26	7.15	7.03	7.35	7.18	7.06	6.92	6.79	1.50
T_{12}	Honey (70%)	7.28	7.14	6.98	6.74	6.34	7.65	7.54	7.41	7.25	7.13	7.55	7.38	7.16	7.04	6.91	1.19
F-Test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
SE(d)		0.021	0.030	0.029	0.027	0.030	0.028	0.023	0.026	0.022	0.025	0.027	0.021	0.017	0.026	0.022	
CV		0.370	0.537	0.534	0.502	0.581	0.462	0.389	0.448	0.390	0.449	0.442	0.353	0.300	0.462	0.396	
CD at 5%		0.044	0.062	0.060	0.055	0.061	0.057	0.047	0.054	0.046	0.052	0.055	0.043	0.036	0.054	0.045	

Conclusion

Based on the results, it was concluded that the treatment T_4 (70% sugar) was recorded as the best in terms of Total soluble solids, T_5 (40% jaggery) in terms of titratable acidity, T_9 (40% honey) in terms of Reducing sugar, T_8 (70% jaggery) in terms of Total sugar and T_1 (40% sugar) in terms of Vitamin C. And, the treatment T_9 (40% honey) was recorded as the best in terms of organoleptic parameters as well as benefit-cost ratio (2.49) during the storage period of 120 days among all the parameters. Hence, it was finally concluded that Tutti Frutti prepared by using the treatment combination (40% honey) i.e. the treatment T_9 is economically viable and therefore, can be commercially processed at a large scale.

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