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Studies on physico-chemical, organoleptic properties and economic analysis of custard apple blended apple cheese

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Abstract
The present experiment was carried out during December 2018 to March 2019 in Post-Harvest Laboratory of Department of Horticulture, SHUATS, Prayagraj. The experiment was conducted in Completely Randomized Design (CRD), with seven treatments, replicated thrice. the treatments were T_1 (Apple pulp 1000g (Control)), T_2 (Apple pulp 900g + Custard Apple Pulp 100g), T_3 (Apple Pulp 800g + Custard Apple Pulp 200g), T_4 (Apple Pulp 700g + Custard Apple Pulp 300g), T_5 (Apple Pulp 600g + Custard Apple Pulp 400g), T_6 (Apple Pulp 500g + Custard Apple Pulp 500g) and T_7 (Apple Pulp 400g + Custard Apple Pulp 600g). From the present investigation it is found that treatment T_3 (Apple 800g + Custard Apple 200g) was found superior in respect of the parameters Total Soluble Solids, Acidity, pH, Ascorbic acid, Reducing Sugar, Non Reducing Sugar and Total Sugar. In terms of organoleptic properties like Colour and Appearance, Flavour and Taste, Texture and Overall Acceptability T_3 was found best. In terms of cost benefit ratio the highest net return, Cost Benefit Ratio was found in T_2 (Apple 900 g + Custard Apple 100g).

Keywords: Apple, custard apple and value addition

Introduction
Apple is highly nutritive food. It contains minerals and vitamins in abundance. The food value of the Apple is chiefly constituted by its contents of sugar which ranges from 9 to 115 per 100g of fruit contains moisture 84%, protein 0.5% fat 0.5%, Minerals 1.15% Fibre 6% and carbohydrates 11%. Among mineral and vitamins it contains 6 mg of Ca, 11 mg of phosphorus and 0.12 mg iron per 100 g of fruit. 100g of Apple gives calorific values of 50 Calories (USDA: National Nutrient database). Thus fruit are an important supplement of the human diet as they possess almost all the nutritive components required for the growth and development of the human body leading to a healthy physique and mind also these are ready source of energy with a unique capacity to guard against many deficiency diseases.

The custard apple (*Annona squamosa* L.) is known by different names, such as "Sitaphal*"* or "Sharifa" in India, sugar apple and sweet soup in other countries. It belongs to the family Annonaceae and is believed that the Annoaceous fruits are native of tropical regions of South America and is mainly grown in the aired zone of India and Africa of the 100 known species of Annona only the custard apple cherimoya, Soursoup and Ateyamoya have commercial importance of this custard apple (sitphal) is the most important and is widely used as dessert fruit having the maximum production efficiency. India is one of the major producers of custard apple. In India an estimated area and production of custard apple is 92,613 hectors and 68,582 tons, respectively. And productivity is 7.13 tons per hector (7 seven years old tree produce 100-150 fruits the total yield being 7.25 tones per hector). Rajasthan, Madhya Pradesh, Andhra Pradesh, Bihar, Maharashtra, Tamil Nadu and and Karnataka are the leading states producing custard apple in India.

Fruit and vegetable are highly perishable commodities as they are living tissues that are subject to continuous changes after harvest, because of their peculiar characteristics, i.e. high moisture content and rapid rate of metabolism, they are prone to deteriorate rapidly after harvest and also due to lack of adequate. Therefore post-harvest losses due to spoilage are very high. An attempt has been made to prepare cheese from apple and custard apple, and to know the better proportion of apple and custard apple. Value addition by blending fruit pulp is alternate option to minimize wastage of fruits.

Materials and Methods

The Experimental was conducted in Completely Randomized Design (CRD) with 7 treatments of Apple and Custard Apple Pulp with three replications in the Post-Harvest Laboratory of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj during December, 2018 to March, 2019. Total number of treatments were seven *viz.* T_1 (Apple pulp 1000g (Control)), T_2 (Apple pulp 900g + Custard Apple Pulp 100g), T_3 (Apple Pulp 800g + Custard Apple Pulp 200g), T_4 (Apple Pulp 700g + Custard Apple Pulp 300g), T_5 (Apple Pulp 600g + Custard Apple Pulp 400g), T_6 (Apple Pulp 500g + Custard Apple Pulp 500g) and T_7 (Apple Pulp 400g + Custard Apple Pulp 600g).

Results and Discussion

The results of the present investigation, regarding the value added custard apple blended apple cheese, have been discussed and interpreted in the light of previous research work done in India and abroad.

The results of the experiment are summarized below.

The Total Soluble Solids showed that there were significant differences among all the treatments during storage. There was subsequent increase in TSS content at different periods of storage. The highest score of TSS were found in T_7 i.e 76.54, 76.89, 77.26, 77.65, at initial, 30, 60, 90, days of storage respectively. However optimum TSS for making cheese ranges from 65-70/ which was found in T_3 i.e.71.65, 71.87, 72.29, 72.75 ^{0}Brix at initial, 30, 60, 90 days of storage respectively. Followed by treatment T_2 (Custard apple 100g +Apple 900g) with 73.57, 73.93, 74.32, and 74.71 ^{0}Brix at initial, 30, 60 and 90 days after storage. The total soluble solids content of value added custard apple blended apple cheese was showed increasing trend in all values added Apple blended Custard Apple Cheese during storage. An increase in total soluble solids content of custard apple blended apple cheese may possibly be due to conversion of polysaccharides and starch etc, in to sugars. Total soluble solids content of guava, similar regards were found by Singh, (1985) [13] and Pandey, (1995) [9], juice has also been reported to increase during storage. Shabi *et al.,* (2018) [11] reported in Guava Cheese.

It is evident in Table-1 that in terms of Acidity (%) the lowest score of Acidity (0.61, 0.65, 0.68 and 0.74 %) at Initial, 30, 60 and 90 days respectively after storage was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (0.70, 0.74, 0.77 and 0.82 %) at Initial,30, 60 and 90 days after storage, whereas the maximum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (1.07, 1.10, 1.14 and 1.17 %) during 90 days storage. The acidity (%) of guava cheese was showed increasing trend in all value added custard apple blended apple cheese during storage. An increase in acidity (%) of custard apple blended apple cheese Value added cheese during storage might be attributed to the chemical interaction between constituents of value added custard apple blended apple cheese induced by temperature and action of enzymes. Deka, (2000) [2] and Deka *et al.,* (2004) [3] reported similar finding with lime-aonla blended RTS and Nath and Yadav, (2005) [8] with ginger-kinnow squash. Shabi *et al.,* (2018) [11] in Guava Cheese, Singh *et al.,* (1983) [14] in guava cheese, Mehta and Bajaj (1984) in curing of citrus peel and Rana *et al.,* (2007) in bale toffee.

In terms of pH the lowest value of pH (3.19, 3.11, 3.07 and 3.01) at Initial, 30 60 and 90 days respectively after storage was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (3.39, 3.33, 3.26 and 3.18) at initial, 30 60 and 90 days respectively, whereas the maximum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (4.69, 4.56, 4.47 and 4.37) during 90 days storage. The pH content of value added custard apple blended apple cheese was showed decreasing trend in all value added custard apple blended apple cheese during storage. There was a negligible change in pH content decreased of the cheese during storage may possibly be due to increase in time interval, temperature and action of enzymes. Similar results were reported by Shanker *et al.,* (1967b) [12] in case of guava juice. Shabi *et al.,* (2018) [11] Chobe (1999) decrease in pH in squash, Awad *et al.,* (2003) in guava, mango and banana cheese, and Vinod *et al.,* (2012) in guava and cashew nut fruits

In terms of Ascorbic acid the highest score of Ascorbic acid (9.14, 8.75, 8.35 and 7.93 mg/100g) at Initial, 30 60 and 90 days respectively after storage was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (8.60, 8.22, 7.74 and 7.26 mg/100 g) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.53, 6.12, 5.70 and 5.24 mg/100 g) during 90 days storage. The ascorbic acid content of value added custard apple blended apple cheese was showed decreasing trend in all value added custard apple blended apple cheese during storage. Results indicated that ascorbic acid content of cheese decreased continuously during entire period of storage. This reduction may be due to oxidation of ascorbic acid in to dehydro ascorbic acid by oxygen. Several authors have also recoded the loss of ascorbic acid in fruit juice during storage Ghosh *et al.,* (1982) [4] and Shabi *et al.,* (2018) [11] reported in Guava Cheese, Singh *et al.,* (1983) [14] in guava cheese, Chobe (1999) increase in acidity in squash and Jawheer *et al.,*(2003) in guava jam and squash.

In terms of Reducing Sugar the highest score of Reducing Sugar (46.90, 48.39, 49.73 and 51.38 %) at Initial, 30 60 and 90 days respectively after storage was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (41.94, 43.72, 45.75 and 47.31 %) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (32.35, 33.87, 35.38 and 36.90 %) during 90 days storage. The Reducing Sugar content of value added custard apple blended apple cheese was showed increasing trend in all value added custard apple blended apple cheese during storage. The increase in reducing sugar was slightly higher in storage condition that could be attributed to more rapid hydrolysis of polysaccharides and their subsequent conversion into sugars. Deka, (2000) [2] and Deka *et al.,* (2004) [3] reported similar finding with lime-aonla blended RTS and Nath and Yadav, (2005b) [8] with ginger-kinnow squash. Shabi *et al.,* (2018) [11] in Guava Cheese, Pathak (1990) increase in total and reducing sugars in Aonla candy, Rana *et al.,*(2007) in toffee of bael fruit and Singh (2007) in cheese and toffee prepared from bael.

In terms of non-reducing sugar the highest score of non-reducing sugar (8.35, 8.52, 8.74 and 8.93 %) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (7.72, 7.83, 7.99 and 8.25 %) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.13,

6.32, 6.52 and 6.72 %) during 90 days storage. The non-reducing sugar content of value added custard apple blended apple cheese was showed increasing trend in all value added custard apple blended apple cheese during storage due to increase in time interval and temperature. Kumar *et al.,* (2012) [6] and Shabi *et al.,* (2018) [11] reported similar finding with Guava Cheese, Pathak (1990) increase in total and reducing sugars in Aonla candy, Rana *et al*.,(2007) in toffee of bael fruit and Singh (2007) in cheese and toffee prepared from bael.

In terms of total sugar the highest score of total sugar (55.25, 56391, 58.47 and 60.31 %) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (49.66, 51.55, 53.73 and 55.56 %) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (38.48, 40.19, 41.90 and 43.62 %) during 90 days storage. The total sugar content of value added custard apple blended apple cheese was showed increasing trend in all different value added custard apple blended apple cheese preserve and sugar levels concentration during storage. The result showed a progressive and increase in total sugar content through the storage period increase in total sugar might be due to hydrolysis of polysaccharides like starch, pectin etc, and there conversion into sample sugars. The similar findings reported by Deka, (2000) [2] and Deka *et al.,* (2004) [3] for lime-aonla blended RTS and Tiwari, (2000) for RTS beverages prepared from guava-papaya. Shabi *et al.,* (2018) [11] reported in Guava Cheese, Pathak (1990) increase in total and reducing sugars in Aonla candy, Rana *et al*.,(2007) in toffee of bael fruit and Singh (2007) in cheese and toffee prepared from bael.

In terms of Score for colour and Appearance the maximum score of colour (8.43, 8.27, 8.06 and 7.92) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (7.95, 7,78, 7.30 and 7.18) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.57, 6.45, 6,28 and 6,13) during 90 days storage. The colour and appearance of value added custard apple blended apple cheese was showed decreasing trend in all value added custard apple blended apple cheese during storage due to increase in time interval, temperature and action of enzymes. Similar findings previously also reported by Shabi *et al.,* (2018) [11] in Guava Cheese, Singh *et al*., (1983) [14] increase in organoleptic score, Ashraf (1987) in jamun beverage Rabbani (1992), reduction of organoleptic score in mango beverage and Singh and Singh (1994) increase in organoleptic score in litchi beverage.

In terms of Flavour and taste the highest score of taste and flavour (8.57, 8.48, 8.35 and 8.25) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (8.32, 8.17, 8.09 and 7.90) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.63, 6.45, 6.22 and 6.07) during 90 days storage. The taste and flavour of value added custard apple blended apple cheese was showed decreasing trend in all value added custard apple blended apple cheese during storage due to increase in time interval, temperature and action of enzymes. Similar results previously also reported by Shabi *et al.,* (2018) [11] in Guava Cheese, Singh *et al*.,(1983) [14] increase in organoleptic score, Ashraf (1987) in jamun beverage Rabbani (1992), reduction of organoleptic score in mango beverage and Singh and Singh (1994) increase in organoleptic score in litchi beverage.

In terms of texture the highest score of texture (8.62, 8.49, 8.40 and 8.17) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (7.94, 7.90, 7.81 and 7.70) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.67, 6.55, 6.43 and 6.24) during 90 days storage. The texture is directly related to the setting of product and setting is a result of good pectin content Custard Apple 200g +Apple 800g was judged best for consistency value added custard apple blended apple cheese from it. There results coincide with the Studies conducted by Ishu *et al*., (1989) [5], Lal *et al*., (1967) [7], Vail *et al*., (1978) and Shabi *et al.,* (2018) [11], Singh *et al*., (1983) [14] increase in organoleptic score, Ashraf (1987) in jamun beverage Rabbani (1992), reduction of organoleptic score in mango beverage and Singh and Singh (1994) increase in organoleptic score in litchi beverage.

In terms of overall acceptability the highest score of overall acceptability (8.70, 8.61, 8.51 and 8.36) at Initial, 30 60 and 90 days respectively was observed in treatment T_3 (Custard Apple 200g +Apple 800g), followed by treatment T_2 (Custard Apple 100g +Apple 900g) with (8.33, 8.19, 8.06 and 7.97) whereas the minimum score was observed in treatment T_7 (Custard Apple 600g +Apple 400g) with (6.58, 6.46, 6.31 and 6.22) during 90 days storage. However, the organoleptic characters showed a gradual decreasing during storage due to increase in time interval, temperature and action of enzymes at room temperature. This finding was in conformity with Singh *et al*., (1983) [14], Vinod *et al.,* (2007) and Shabi *et al.,* (2018) [11] in guava cheese storage and decrease there after Ranganna (2001) in food selection Ahmad *et al.,* (2004) [1] in Apple cheese.

It was very clear in Table 4 that in terms of Economics the Cost Benefit Ratio showed that there were significant differences among all the treatments in Total cost, Net Return, Gross Return and Cost Benefit Ratio of different treatments. The Gross return of Rs. 500 is recorded in treatments T_2 to T_7 but Highest Net Return Rs. 180.50, Cost Benefit Ratio 1:1.56 was recorded in treatment T_2 (Custard Apple 100g +Apple 900g), followed by Treatment T_3 (Custard Apple 200g +Apple 800g) with Net Return of Rs. 171.50 and Cost Benefit Ratio 1:1.52 whereas lowest Gross Return Rs. 420.00, Net Return Rs. 55.50 and Cost Benefit Ratio 1:1.15 was recorded in treatment T_7 (Custard Apple 600g +Apple 400g).

Table 1: Physico-chemical properties of value added custard apple blended apple cheese

Treatment Symbol	Treatment Details	Total Soluble Solids (°Brix)				Acidity (%)				pH (%)			
		Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS
T_1	Apple 1000g	74.35	74.64	75.19	75.65	0.81	0.78	0.81	0.85	3.73	3.65	3.57	3.50
T_2	Custard Apple 100g +Apple 900g	73.57	73.93	74.32	74.71	0.70	0.74	0.77	0.82	3.39	3.33	3.26	3.18
T_3	Custard Apple 200g +Apple 800g	71.65	71.87	72.29	72.75	0.61	0.65	0.68	0.74	3.19	3.11	3.07	3.01
T_4	Custard Apple 300g +Apple 700g	75.40	75.85	76.45	76.92	0.91	0.93	0.96	0.98	3.58	3.51	3.43	3.34
T_5	Custard Apple 400g +Apple 600g	75.27	75.62	75.96	76.36	0.89	0.92	0.95	0.99	3.87	3.79	3.71	3.62
T_6	Custard Apple 500g +Apple 500g	75.80	76.21	76.60	76.97	0.90	0.93	0.98	1.01	4.25	4.16	4.04	3.95
T_7	Custard Apple 600g +Apple 400g	76.54	76.89	77.26	77.65	1.07	1.10	1.14	1.17	4.69	4.56	4.47	4.37
F-test		S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.538	0.514	0.527	0.559	0.016	0.021	0.018	0.022	0.082	0.086	0.080	0.077
C.V.		0.883	0.839	0.856	0.903	2.377	2.934	2.488	2.852	2.644	2.834	2.684	2.645
C.D. at 5%		1.166	1.113	1.142	1.211	0.035	0.045	0.040	0.047	0.178	0.187	0.173	0.167

Table 2: Ascorbic acid and total different sugars of value added custard apple blended apple cheese

Treatment Symbol	Treatment Details	Ascorbic Acid (mg/100 g)				Reducing Sugar (%)				Non - Reducing Sugar (%)				Score for Texture			
		Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS
T_1	Apple 1000g	7.80	7.25	6.82	6.35	36.15	37.95	39.82	41.76	6.56	6.67	6.81	7.05	42.71	44.62	46.63	48.81
T_2	Custard Apple 100g +Apple 900g	8.60	8.22	7.74	7.26	41.94	43.72	45.75	47.31	7.72	7.83	7.99	8.25	49.66	51.55	53.74	55.56
T_3	Custard Apple 200g +Apple 800g	9.14	8.75	8.35	7.93	46.90	48.39	49.73	51.38	8.35	8.52	8.74	8.93	55.25	56.91	58.47	60.31
T_4	Custard Apple 300g +Apple 700g	8.19	7.75	7.27	6.84	39.68	41.05	42.75	44.29	7.29	7.47	7.69	7.86	46.97	48.52	50.44	52.15
T_5	Custard Apple 400g +Apple 600g	7.26	6.85	6.47	6.07	36.59	38.24	39.70	41.06	6.79	6.96	7.18	7.38	43.38	45.20	46.88	48.44
T_6	Custard Apple 500g +Apple 500g	6.67	6.24	5.82	5.32	34.55	36.26	37.96	39.72	6.66	6.79	6.97	7.16	41.21	43.05	44.93	46.88
T_7	Custard Apple 600g +Apple 400g	6.53	6.12	5.70	5.24	32.35	33.87	35.38	36.90	6.13	6.32	6.52	6.72	38.48	40.19	41.90	43.62
F-test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.989	0.106	0.132	0.136	0.947	0.935	0.811	0.818	0.143	0.140	0.146	0.155	1.010	0.989	0.890	0.866
C.V.		2.568	1.782	2.352	2.590	3.027	2.869	2.389	2.320	2.480	2.376	2.419	2.497	2.727	2.568	2.225	2.087
C.D. at 5%		0.266	0.230	0.286	0.294	2.051	2.025	1.756	1.772	0.310	0.303	0.317	0.336	2.188	2.141	1.927	1.875

Table 3: Organoleptic score of value added custard apple blended apple cheese during storage

Treatment Symbol	Treatment Details	Score for Colour and Appearance				Score for Flavour and Taste				Score for Texture				Score for Overall Acceptability			
		Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS	Initial	30 DAS	60 DAS	90 DAS
T_1	Apple 1000g	7.60	7.52	7.33	7.17	7.79	7.57	7.39	7.19	7.53	7.44	7.35	7.31	7.63	7.52	7.42	7.32
T_2	Custard Apple 100g +Apple 900g	7.95	7.78	7.30	7.18	8.32	8.17	8.09	7.90	7.94	7.90	7.81	7.70	8.33	8.19	8.06	7.97
T_3	Custard Apple 200g +Apple 800g	8.43	8.27	8.06	7.92	8.57	8.48	8.35	8.25	8.62	8.49	8.40	8.17	8.70	8.61	8.51	8.36
T_4	Custard Apple 300g +Apple 700g	7.26	7.12	6.87	6.79	7.32	7.19	7.04	6.96	7.43	7.26	7.15	7.03	7.43	7.29	7.18	7.05
T_5	Custard Apple 400g +Apple 600g	7.62	7.45	7.24	7.09	7.58	7.40	7.31	7.19	7.79	7.64	7.50	7.29	7.70	7.56	7.48	7.35
T_6	Custard Apple 500g +Apple 500g	7.08	6.89	6.72	6.60	7.02	6.85	6.57	6.44	7.36	7.09	6.94	6.78	6.83	6.75	6.65	6.51
T_7	Custard Apple 600g +Apple 400g	6.57	6.45	6.28	6.13	6.63	6.45	6.22	6.07	6.67	6.55	6.43	6.24	6.58	6.46	6.31	6.22
F-test		S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
SE(d)		0.177	0.177	0.224	0.222	0.128	0.110	0.092	0.076	0.157	0.160	0.161	0.170	0.170	0.154	0.145	0.118
C.V.		2.886	2.945	3.860	3.895	2.063	1.806	1.548	1.310	2.523	2.625	2.683	2.881	2.747	2.523	2.414	2.000
C.D. at 5%		0.383	0.383	0.486	0.481	0.277	0.238	0.199	0.165	0.340	0.347	0.350	0.368	0.369	0.334	0.315	0.256

Table 4: Economic analysis of preparation of custard apple blended apple cheese

Treatment No.	Treatment	Total cost (Rs.)	Apple and Custard Apple cheese output (kg)	Selling rate (Rs./kg)	Gross return (Rs.)	Net return (Rs.)	Benefit cost ratio
T_1	Apple 1000g	310.50	1.250	350.00	437.50	127.00	1.40
T_2	Custard Apple 100g +Apple 900g	319.50	1.250	400.00	500.00	180.50	1.56
T_3	Custard Apple 200g +Apple 800g	328.50	1.250	400.00	500.00	171.50	1.52
T_4	Custard Apple 300g +Apple 700g	337.50	1.250	400.00	500.00	162.50	1.48
T_5	Custard Apple 400g +Apple 600g	346.50	1.250	400.00	500.00	153.50	1.44
T_6	Custard Apple 500g +Apple 500g	355.50	1.250	400.00	500.00	144.50	1.40
T_7	Custard Apple 600g +Apple 400g	364.50	1.200	350.00	420.00	55.50	1.15

Conclusion

Based on findings of the present experiment it is concluded that treatment T_3 (Apple 800g + Custard Apple 200g) was found superior in respect of the parameters like Total Soluble Solids, Acidity, pH, Ascorbic acid, Reducing Sugar, Non Reducing Sugar, Total Sugar. With respectively Colour and Appearance, Flavour and Taste, Texture and Overall Acceptability also T_3 was the best. In terms of cost benefit ratio the highest net return, Cost Benefit Ratio was found in T_2 (Apple 900 g + Custard Apple 100g) and minimum was recorded in treatment T_7 in all the parameters.

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