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Studies on preparation and preservation of wood apple chutney

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Abstract
The wood apple chutney was prepared by using eight recipes which include, two levels of sugar (250 and 500 g), salt (50 and 100 g), spice mixture (50 and 75 g) and a constant amount of wood apple pulp (1000 g). Significant differences were observed with respect to physico-chemical parameters between the recipes. The chemical constituents *viz*., moisture content and acidity were found to increase marginally from 68.40 to 69.32 percent and 1.45 to 1.54 percent, respectively. Whereas pH (3.01 to 2.94), ascorbic acid (6 to 3.13 mg/100 g), antioxidant activity (83 73 to 63.94%), total phenol content (176.33 to 141.89 mg GAE/g) and carbohydrates (43.65 to 43.61 g/100 g) were decreased during the storage period of three months. The mean organoleptic score decreased significantly during the storage period of three months from an initial value of 8.10 to 7.44 for colour and appearance, 8.08 to 7.14 for aroma, 8 to 7.20 for texture, 7.19 to 6.96 for taste and 7.84 to 7.18 for overall acceptability. The results of the organoleptic evaluation signify that, the recipe containing 1000 g pulp + 250 g sugar + 100 g salt + 75 g spice mixture was found superior in their acceptability compared to other recipes throughout the organoleptic study.

Keywords: Wood apple, chutney, spice mixture, organoleptic score

Introduction
Underutilized tropical fruits are species that have regional importance but are not widely cultivated, traded or consumed globally. Despite their limited commercial presence, they have significant nutritional, economic, ecological and cultural value. Among underutilized indigenous fruit species, wood apple (*Feronia limonia* Swingle) is one, sometimes referred to as elephant apple, curd apple, monkey fruit, kavat, kathbel, Kotha, Vilanga, Kapith, and Vela marum (Mazumder *et al.*, 2006) [14]. In Karnataka, it is known as bellada hannu in the south and balolakai in the north (Gorabal *et al.*, 2020) [7, 8].

The flesh of the wood apple fruit is sweet, somewhat acidic and aromatic and it is commonly eaten as a raw along with or without jaggery and has high nutritional value particularly rich in minerals. Gorabal (2020) [7, 8] studied the nutrient composition of 108 wood apple genotypes and noticed that fruit comprises 40.47 to 66.46 percent of pulp. The moisture content ranges between 65.32 to 74.04 percent, TSS 12.08 to 18.44°B, acidity 2.44 to 6.12 percent, brix:acid ratio 2.46 to 6.48, pH 2.80 to 3.54, total sugars 2.23 to 6.83 percent, pectin 1.02 to 2.13 percent, vitamin C 2.88 to 6.24 mg/100 g, vitamin B12 0.05 to 0.27 mg/100 g, calcium 80.1 to 111.35 mg/100 g, iron 0.05 to 16.29 mg/100 g and phosphorus 37.10 to 69.17 mg/100 g.

The wood apple tree is one of India's important medicinal plants because of its fruit's therapeutic qualities. According to Singh (2001) [24], the fruit is used in India as a liver and heart tonic, an astringent to stop diarrhea and dysentery, and a good remedy for hiccups, sore throats, and gum problems when it is not mature. In addition to having hypoglycemic, anticancer, larvicidal, antibacterial, and hepatoprotective properties (Kirtikar and Basu, 1935) [11], the pulp can be applied as a poultice to venomous insect bites and stings (Vidhya and Narain, 2011) [26]. Because of its potential to scavenge radicals through a variety of phytochemicals, this fruit is regarded as one of the natural sources of antioxidants (Nithya and Saraswathi, 2010) [17]. The fruit is not popular as a desert fruit as it has hard shell containing mucilaginous pulp with numerous seeds.

Therefore, it is not easily marketed in the fresh form therefore it has to be processed into acceptable products. Because of its excellent flavor and nutritive value, this fruit has a great potential for value addition.

Chutney is a popular indigenous and traditional food prepared and served at every homes, restaurants and public eating places *etc*. Chutney is also good appetizer, boosts immune system, stimulates a healthier cardiovascular system and has antioxidant properties. These health advantages will result in high demand both domestically and abroad for processing into value-added products with potential long-term storage. Therefore, the current study was carried out to utilize the excellent and delightful pulp characteristics of wood apple fruit, which may have potential nutritional and medicinal value, by turning them into value-added product like wood apple chutney in order to combat market glut and ensure the fruit's profitable prices.

Materials and Methods

Ripe wood apple fruits were used to remove the pulp, which was then, homogenized by hand squeezing. The pulp was then combined in various ways with salt, sugar, and spice blends as described in the recipe specifications (Table 1). The spice blend was made by combining powdered red chilli, black pepper, cardamom, coriander and cumin. All of the recipes included the addition of chopped onion, garlic and clove. By hand crushing, the chutney was properly combined after all the ingredients had been added. The prepared chutney was placed in pet jars and kept at room temperature for storage studies.

Results and Discussion

Moisture content (%): The ideal moisture content in chutney should be more than 50 percent depending on its chemical composition. The present investigation irrespective of treatments moisture content in the wood apple chutney increased marginally during storage as the time moved on (Table 2). The increase in moisture content of the chutney might be due to its hygroscopic nature, which might have absorbed moisture from the environment. Similar findings were observed by Kousalya *et al.* (2018) [12] in gongura chutney; Singhania *et al.* (2020) [25] in wood apple chutney and Yadav *et al.* (2020) [27] in amla chutney. Among the different recipes high moisture content in freshly prepared chutney was noticed in recipe containing low sugar, salt and spice mixture levels *i.e.*, T_1 and T_2 as compared to others, whereas, the recipe containing high levels of sugar, salt and spice mixtures *i.e.*, T_8 and T_7 exhibited lowest moisture content. Kalra and Tandon (1983) [10] opined that low moisture content was due to adding of more sugar and salt which caused osmosis.

Titratable acidity (%): The mean values for titratable acidity of chutney increased (from 1.45% to 1.54%) as the storage period progressed (Table 2). The recipes containing more spice mixture, namely T_2, T_4, T_6 and T_8, consistently had higher acidity levels throughout the storage period. The metabolism of microbes present in the chutney's may be responsible for the oxidation of organic material into organic acids, which is why the acidity increases as the storage time increases (Singh and Singh, 2014) [23]. Sharma *et al.* (2019) [21] speculate that the concentration of weakly ionized acids brought on by the breakdown of pectinic compounds, oxidation of reducing sugars, degradation of polysaccharides, and uronic acid may also be the cause of the increase in acidity. Similar observations have been reported by Mishra *et al.* (2011) [16] in ready-to-eat amla chutney; Chaudhary and Verma (2012) [3] in aonla chutney and Singhania *et al.* (2020) [25] in wood apple chutney.

pH: The pH value of the wood apple chutney decreased significantly with increase in storage period irrespective of recipe used (Table 2). The little drop in pH was matched by an increase in titratable acidity. The titratable acidity increased and the pH decreased, indicated that the chutney's acid concentration elevated with advancement of storage period. Similar findings *i.e.*, decrease pH and increase in acidity was observed by Saroj (2005) [20] in mango chutney; Chaudhary and Verma (2012) [3] in aonla chutney; Singhania *et al.* (2020) [25] in wood apple chutney.

Ascorbic acid (mg/100 g): It was observed that, a significant decrease in ascorbic acid content (from 6.00 to 3.13 mg/100 g) as the storage period advanced (Table 3). At the end of the storage period, the highest ascorbic acid content was found in the recipe containing 1000 g of pulp + 250 g of sugar + 100 g of salt + 75 g of spice mixture (T_4), whereas the lowest ascorbic acid content was observed in T_5, which included 1000 g of pulp + 500 g of sugar + 50 g of salt + 50 g of spice mixture. Ascorbic acid oxidizes to dehydro ascorbic acid, which is then hydrolyzed to 2, 3-diketogluconic acid, which is the cause of the drop in ascorbic acid level. This acid then undergoes polymerization, resulting in the formation of other nutritionally inactive products. Gupta (2000) [9] suggested that ascorbic acid degradation occurs due to thermal oxidation during processing and subsequent oxidation of residual oxygen in the glass bottles. Similar findings were reported by Singh and Singh (2014) [23] in aonla chutney; Meena *et al.* (2017) [15] in chilli-garlic chutney; Yadav *et al.* (2020) [27] in amala chutney and Singhania *et al.* (2020) [25] in wood apple chutney.

Total carbohydrates (g/100 g): The total carbohydrates consist of multiple nutrients including sugars, starches and dietary fibre. The total carbohydrate content of wood apple chutney was very slightly decreased with advancement of storage period irrespective of recipe used (Table 3). Usually total carbohydrate content in the product was unaffected by storage period and conditions. The marginal decrease in the total carbohydrates content of chutney may be due to corresponding increase in the moisture content of chutney during the storage period of three months. In the present study total carbohydrates content may vary according to the quantity of ingredients used. The total carbohydrates content in the freshly prepared chutney ranged between 42.17 to 45.03 g/100 g. A narrow significant difference was seen among the treatments could be due to corresponding little variation in sugar content. Similar results were seen by Yadav *et al.* (2020) [27] in amla chutney; Chauhan *et al.* (1994) [4] in wild pomegranate chutney.

Total phenol (mg GAE/g): Total phenol content decreased as the storage period increases (Table 3). The phenolic content of the chutney significantly differed with ingredients added over the storage period. At three MAS, maximum retention of phenolic content was noticed in T_4 whereas

minimum retention was in T_1 followed by T_7. The decrease in phenols during storage might be due to their condensation into brown pigments (Fenemma, 1976) [6]. High molecular weight brown products are produced when the very volatile phenolic compounds are readily oxidized to O-seminoquinone radicals or O-quinine molecules, which are extremely reactive [Roy and Singh, 1979] [18]. Similar results were also reported by Shivani (2008) [22] in jamun jam and chutney; Sharma *et al.* (2019) [21] in bael and mango chutney and Kumar *et al.* (2020) [13] in guava-papaya chutney.

Antioxidants (%): The key antioxidants found in wood apple chutney are Vitamin C, Vitamin E and ß-carotene. However, it is important to note that the antioxidant activity of the chutney decreases over time during storage. This decline may be attributed to the presence of molecular oxygen in the product/package, which degrades the quality of the chutney. Ascorbic acid, a major antioxidant present in wood apple chutney, also experiences a decline during storage. The present investigation confirms a significant decrease in ascorbic acid content with the advancement of the storage period. Since ascorbic acid is an integral part of the antioxidant activity, its decline inevitably reduces the overall antioxidant activity of the chutney. Similar findings were observed by Bhatti *et al.* (2010) [2] and Amir *et al.* (2011) [1]; Meena *et al.* (2017) [15] and Deng *et al.* (2018) [5]. Among the different treatments, T_2 showed the highest retention of antioxidant activity at 65.62 percent, while T_5 had the lowest at 62.89 percent at the end of the storage period (Table 4).

Sensory parameters: Evaluating the sensory quality of a product is an important tool for determining consumer acceptability. When considering the performance of wood apple chutney in terms of colour and appearance, taste, flavour and overall acceptability, the chutney prepared with a recipe containing 250 g of sugar + 100 g of salt + 75 g of spice mixtures per 1000 g of pulp (T_4) stands out as superior which was on par with T_5. This superiority may be attributed to the appropriate amount of sugar content and spices, as well as a lower level of acidity, resulting in a greater aroma, taste, and overall acceptability compared to the other treatments. As the storage period progressed, there was a gradual decrease in sensory values (Table 4 and 5). This decline in sensory score can be attributed to the decrease in scores for colour and appearance (8.10 to 7.44), aroma (8.08 to 7.14), texture (8.00 to 7.2) and taste (7.19 to 6.96). Changes in the product's chemical composition or specific enzymatic and non-enzymatic alterations could potentially be the cause of the decline in organoleptic quality. Similar observations were noticed by Sharma *et al.*, (2019) [21] in bael-mango chutney; Kumar *et al.* (2020) [13] in guava-papaya chutney.

Microbial load: Over three months of storage period, there was a slight increase in the number of microbes present (Table 6). However, this small increase did not impact the overall safety of the product. The rise in microbial load in wood apple chutney during storage can be attributed to the slow pace of chemical and enzymatic reactions. During the initial and one month storage periods, no bacterial or fungal count was observed. However, during the second and third months of storage, the total fungal count increased from 1.11 to 1.45 CFU/g and the total bacterial count increased from 1.07 to 1.41 CFU/g. There were also differences among different treatments on total bacterial and total fungal count of wood apple chutney. This may be explained by variations in the physico-chemical makeup of the products during storage and by variations in the physico-chemical composition of the products across different treatments. Microbial growth decreased with increase in proportion of spice mixtures as they have antimicrobial properties. The results are in accordance with those of Sachin *et al.* (2018) [19] in aonla-papaya jam and chutney; Meena *et al.* (2017) [15] in chilli-garlic chutney and Kumar *et al.* (2020) [13] in guava-papaya chutney.

Table 1: Different recipes involved in preparation of wood apple chutney

T_1 1000 g pulp + 250 g sugar + 50 g salt + 50 g spice mixture
T_2 1000 g pulp + 250 g sugar + 50 g salt + 75 g spice mixture
T_3 1000 g pulp + 250 g sugar + 100 g salt + 50 g spice mixture
T_4 1000 g pulp + 250 g sugar + 100 g salt + 75 g spice mixture
T_5 1000 g pulp + 500 g sugar + 50 g salt + 50 g spice mixture
T_6 1000 g pulp + 500 g sugar + 50 g salt + 75 g spice mixture
T_7 1000 g pulp + 500 g sugar + 100 g salt + 50 g spice mixture
T_8 1000 g pulp + 500 g sugar + 100 g salt + 75 g spice mixture

Table 2: Effect of storage period on moisture content, titratable acidity and pH of wood apple chutney

Treatments	Moisture content (%)				Titratable acidity (%)				pH			
	Months after storage											
	Initial	1	2	3	Initial	1	2	3	Initial	1	2	3
T_1	69.57	69.83	70.13	70.43	1.32	1.35	1.37	1.41	3.09	3.07	3.07	3.03
T_2	69.23	69.53	69.89	70.17	1.55	1.58	1.61	1.63	2.97	2.93	2.90	2.90
T_3	68.93	69.30	69.63	69.89	1.34	1.38	1.45	1.50	3.07	3.03	3.00	2.97
T_4	68.87	69.03	69.52	69.73	1.53	1.55	1.60	1.64	2.97	2.97	2.93	2.87
T_5	68.07	68.33	68.61	68.97	1.33	1.35	1.39	1.43	3.09	3.07	3.03	3.03
T_6	67.87	67.17	68.47	68.73	1.58	1.60	1.63	1.65	2.93	2.90	2.90	2.87
T_7	67.37	67.63	67.87	68.40	1.35	1.38	1.41	1.44	3.07	3.03	3.00	3.00
T_8	67.30	67.71	68.03	68.27	1.57	1.60	1.62	1.65	2.93	2.93	2.87	2.87
Mean	68.40	68.57	69.02	69.32	1.45	1.47	1.51	1.54	3.01	2.99	2.96	2.94
S.Em±	0.031	0.034	0.025	0.029	0.010	0.010	0.009	0.008	0.029	0.031	0.024	0.029
C.D. @ 1%	0.129	0.142	0.105	0.120	0.041	0.042	0.038	0.034	0.121	0.129	0.097	0.119

Treatment details

T_1-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (50 g)	T_5-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (50 g)
T_2-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (75 g)	T_6-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (75 g)
T_3-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (50 g)	T_7-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (50 g)
T_4-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (75 g)	T_8-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (75 g)

Table 3: Effect of storage period on ascorbic acid, total carbohydrates and total phenol content of wood apple chutney

Treatments	Ascorbic acid (mg/100 g)				Total carbohydrates (g/100 g)				Total phenol content (mg GAE/g)			
	Months after storage											
	Initial	1	2	3	Initial	1	2	3	Initial	1	2	3
T_1	5.87	5.06	4.02	2.98	42.18	42.17	42.17	42.14	175.23	166.58	154.99	139.70
T_2	6.12	5.18	4.23	3.16	42.41	42.41	42.40	42.40	177.53	169.09	157.04	140.96
T_3	5.91	4.95	3.89	3.07	42.21	42.21	42.19	42.17	175.32	167.33	156.11	141.43
T_4	6.09	5.18	4.21	3.32	42.35	42.35	42.33	42.33	177.28	170.31	159.72	145.17
T_5	5.85	4.90	3.92	2.97	44.98	44.98	44.96	44.95	175.25	166.93	155.15	140.57
T_6	6.13	5.20	4.28	3.21	45.03	45.01	45.00	44.98	177.45	169.47	157.38	143.70
T_7	5.89	4.97	3.96	3.03	44.97	44.96	44.95	44.93	175.15	166.03	154.40	139.71
T_8	6.17	5.23	4.35	3.28	44.05	45.03	45.01	45.00	177.43	169.45	158.59	143.91
Mean	6.00	5.08	4.11	3.13	43.65	43.64	43.63	43.61	176.33	168.15	156.67	141.89
S.Em±	0.025	0.022	0.022	0.020	0.048	0.038	0.037	0.036	0.256	0.273	0.336	0.279
C.D. @ 1%	0.105	0.092	0.092	0.083	0.198	0.158	0.154	0.147	1.055	1.127	1.390	1.152

Treatment details

T_1-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (50 g)	T_5-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (50 g)
T_2-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (75 g)	T_6-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (75 g)
T_3-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (50 g)	T_7-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (50 g)
T_4-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (75 g)	T_8-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (75 g)

Table 4: Effect of storage period on antioxidant activity, colour and appearance and texture of wood apple chutney

Treatments	Antioxidant activity (%)				Colour and appearance				Texture			
	Months after storage											
	Initial	1	2	3	Initial	1	2	3	Initial	1	2	3
T_1	82.90	78.13	71.88	63.83	8.00	8.00	7.67	7.33	8.00	7.67	7.50	7.33
T_2	84.38	80.04	73.60	65.62	8.00	7.83	7.50	7.17	8.00	8.00	7.67	7.08
T_3	83.18	78.26	71.24	63.12	8.08	8.00	7.50	7.33	8.00	7.67	7.50	7.17
T_4	84.13	79.58	72.21	64.15	8.33	8.17	7.83	7.67	8.00	8.00	7.83	7.33
T_5	83.42	78.19	71.31	62.89	8.33	8.17	7.83	7.67	8.00	8.00	7.83	7.33
T_6	84.21	79.16	72.13	64.24	8.00	8.00	7.67	7.50	8.00	8.00	7.67	7.17
T_7	83.39	78.42	71.28	63.19	8.00	8.00	7.67	7.50	8.00	8.00	7.67	7.17
T_8	84.24	79.26	72.59	64.48	8.08	8.00	7.50	7.33	8.00	8.00	7.50	7.00
Mean	83.73	78.88	72.03	63.94	8.10	8.02	7.65	7.44	8.00	7.92	7.65	7.20
S.Em±	0.843	0.350	0.374	0.379	0.093	0.102	0.167	0.177	0.072	0.167	0.167	0.147
C.D. @ 1%	NS	1.447	1.545	1.565	NS	NS	NS	NS	NS	NS	NS	NS

NS: Non Significant

Treatment details

T_1-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (50 g)	T_5-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (50 g)
T_2-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (75 g)	T_6-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (75 g)
T_3-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (50 g)	T_7-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (50 g)
T_4-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (75 g)	T_8-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (75 g)

Table 5: Effect of storage period on aroma, taste and overall acceptability of wood apple chutney

Treatments	Aroma				Taste				Overall acceptability			
	Months after storage											
	Initial	1	2	3	Initial	1	2	3	Initial	1	2	3
T_1	8.00	7.83	7.50	6.83	7.50	8.00	7.50	6.50	7.88	7.88	7.54	7.00
T_2	8.17	8.00	7.50	7.08	7.00	8.00	7.67	7.00	7.79	7.96	7.58	7.08
T_3	8.00	8.00	7.67	7.17	7.50	8.17	7.67	7.08	7.90	7.96	7.58	7.19
T_4	8.08	8.00	7.83	7.50	7.00	8.33	7.67	7.08	7.85	8.13	7.79	7.40
T_5	8.08	8.00	7.83	7.33	7.00	8.33	7.83	7.17	7.85	8.13	7.83	7.38
T_6	8.33	7.83	7.33	7.00	7.33	8.17	7.50	7.00	7.92	8.00	7.54	7.17
T_7	8.00	7.58	7.33	7.00	7.00	8.00	7.33	6.83	7.75	7.90	7.50	7.13
T_8	8.00	7.83	7.33	7.17	7.17	8.00	7.33	7.00	7.81	7.96	7.42	7.13
Mean	8.08	7.89	7.54	7.14	7.19	8.13	7.56	6.96	7.84	7.99	7.60	7.18
S.Em±	0.093	0.059	0.072	0.066	0.083	0.051	0.072	0.078	0.038	0.053	0.069	0.057
C.D. @ 1%	NS	0.243	0.298	0.272	0.344	0.211	0.298	0.322	NS	NS	0.285	0.236

NS: Non Significant

Treatment details

T_1- Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (50 g)	T_5-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (50 g)
T_2-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (75 g)	T_6-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (75 g)
T_3-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (50 g)	T_7-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (50 g)
T_4-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (75 g)	T_8-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (75 g)

Table 6: Effect of storage period on total fungal count and total bacterial count (CFU/g) of wood apple chutney

Treatments	Total fungal count				Total bacterial count			
	Months after storage							
	Initial	1	2	3	Initial	1	2	3
T_1-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (50 g)	-	-	1.07	1.65	-	-	1.32	1.87
T_2-Pulp (1000 g) + sugar (250 g) + salt (50 g) + spice mixture (75 g)	-	-	1.03	1.58	-	-	1.28	1.66
T_3-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (50 g)	-	-	0.94	1.35	-	-	0.92	1.28
T_4-Pulp (1000 g) + sugar (250 g) + salt (100 g) + spice mixture (75 g)	-	-	0.86	1.33	-	-	0.76	1.03
T_5-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (50 g)	-	-	1.33	1.65	-	-	1.40	1.78
T_6-Pulp (1000 g) + sugar (500 g) + salt (50 g) + spice mixture (75 g)	-	-	1.45	1.74	-	-	1.32	1.56
T_7-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (50 g)	-	-	-	1.24	-	-	0.88	1.02
T_8-Pulp (1000 g) + sugar (500 g) + salt (100 g) + spice mixture (75 g)	-	-	-	1.08	-	-	0.68	1.10
Mean	-	-	1.11	1.45	-	-	1.07	1.41

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