

**Research Article**

## **DEVELOPMENT OF CULINARY PREPARATIONS FROM CASHEW APPLE (*ANACARDIUM OCCIDENTALE L.*)**

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### **ABSTRACT**

A study was conducted to develop culinary preparations from cashew apple. In order to reduce the extent of the astringent components pre – treatments were done, using boiling for five minutes in 2% salt solution. Fresh (T<sub>1</sub>) as well as pre – treated cashew apples (T<sub>2</sub>) were subjected to chemical analysis with respect to moisture, total minerals, acidity, reducing sugar, polyphenols, tannin and fibre. Different types of culinary preparations viz., gravy preparation (Masala curry), sweet chutney and salad were tried out from fresh as well as pre – treated cashew apple sample and also from their powders. Sensory qualities of culinary preparations were evaluated by a panel of 10 judges using 5 point score card and 9 point hedonic rating scale. Results from sensory analysis showed that consumers more preferred cashew apple salad prepared from T<sub>2</sub> (2 per cent salt treated cashew apple) with mean preference score of 8.8/9 followed by cashew apple sweet chutney (8.7/9) from 2 per cent salt treated cashew apple powder and cashew apple masala curry (8.6/9) from T<sub>2</sub>.

**Keywords:** *Cashew Apple, Chemical, Sensory Evaluation, Culinary Preparations*

### **INTRODUCTION**

Cashew, *Anacardium occidentale L.* is a hard drought resistant, tropical tree native of Brazil, widely grown primarily for its nuts. It is one of the major foreign exchange earning plantation crops grown in India. The economic part is the nut attached to a false fruit commonly called cashew apple (Shobhana *et al.*, 2015).

Cashew apple, the pseudo fruit is fibrous, juicy and weighs approximately 6-8 times of the nut (Talasila *et al.*, 2011). They are rich sources of vitamin C, carotenoids, organic acids, carbohydrate and phenolic compounds (Assuncao and Mercadante, 2003a, Kubo *et al.*, 2006, Sivagurunathan *et al.*, 2010) with anti-microbial and anti-mutagenic activities (Kubo *et al.*, 1993, Melo cavalcante *et al.*, 2008). In Kerala, plenty of cashew apple (around 40 lakh tons) are wasted due to unawareness about the effective preservation of the fruit, during the stage of harvesting, transporting and storing which affects both quality and quantity.

The seasonal production of cashew apple is one of the major handicaps for the processing industry, along with its astringent and acrid principles (Mini *et al.*, 2005).

Under exploited fruits like jackfruit, cashew apple, custard apple are not cultivated in orchards, their nutrition and plant protection management is not cared and very little is known about their utilization. They are highly nutritive and store house of essential vitamins and minerals. Exploring this fruit crops can be opined to meet the nutritional requirements of the under privileged population.

Thus, the present study is to investigate the possibility of utilizing cashew apple in culinary preparations so that family vegetable intake could be improved and wastage of this valid fruit can be minimized.

### **MATERIALS AND METHODS**

Fully ripened and sound cashew apples red as well as yellow types were selected and washed thoroughly in running water. The cleaned fruits were halved and boiled in 2 % salt solution for five minutes for removing the astringency.

#### **Chemical Composition**

The chemical components such as moisture, total minerals, fibre, polyphenols, tannin, acidity and reducing sugar were determined by using standard procedures in fresh as well as 2% salt treated samples.

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### Formulation of Cashew Apple Powder

For the preparation of cashew apple powder, fresh and 2% salt treated cashew apples was chopped and pulped with corn flour (10 per cent) and was dried in tray drier at 60°C till crisp and breaking stage. The dried cashew apple pulp was then powdered with a hand mixer, sieved through a 0.05m sieve and packed in polypropylene cover. Formulated powder from fresh cashew apple and treated cashew apple was used in culinary preparations.

### Development and Sensory Evaluation of Culinary Preparations

The culinary preparations viz., gravy preparation (Masala curry), sweet chutney and salad were tried out from fresh cashew apple (T<sub>1</sub>) and 2% salt treated cashew apple (T<sub>2</sub>) and also from their powders were standardized by trial and error method and evaluated by a five point score card and nine point hedonic rating scale.

**Statistical Analysis:** In order to obtain meaningful results the generated data was subjected to statistical analysis. Kruskal Wallis test were used in the present investigation.

## RESULTS AND DISCUSSION

Results of chemical analysis showed that 100g of fresh and treated cashew apple contain 86.11 and 84.60 per cent moisture respectively. The total mineral content was 0.2 g and 0.1g for fresh and treated cashew apple.

Acidity of fresh and treated cashew apple was found to be 0.15 per cent and 0.12 per cent. The reducing sugar content in fresh and treated cashew apple was 12.7 per cent and 10.4 per cent. Polyphenol content of fresh cashew apple was observed to be 0.26 per cent, but it was reduced in treated cashew apple with 0.11 per cent. Osmodehydration of amla using sucrose solution (30° - 60°B) was studied with respect to total phenol content.

The study revealed that maximum retention of total phenol (37.5±1.11mg/100g) was observed for amla after blanching in boiling water for 2- 3 minutes compared to untreated amla of 33.33±0.24 mg/100g total phenol content (Banarjee and Ghosh, 2015). Tannin content of cashew apple was found to be 0.33 per cent, while in treated cashew apple it was drastically reduced to 0.07 per cent. Price *et al.*, (1975) and Gunjate and Patwardhan (1995) found that tannin content of fresh cashew apple is ranged between 0.22 – 0.58 g/100g. Fiber content of fresh cashew apple was observed to be 1.1 g while in treated cashew apple it was 0.83g.

### Sensory Analysis of Developed Culinary Preparations

#### Salad

Salads come from the Latin word *Herba Salata* means salted greens. They are more popular today than ever before. It represents healthy choices. Salads can be low in calories and high in important nutrients, particularly vitamins and minerals from fresh fruits and vegetables. There are many types of salad, simple salad, mixed salad, fruit salad and combination salad.

The sensory analysis of cashew apple salad was done by a five point score card and data is depicted in Table 1.

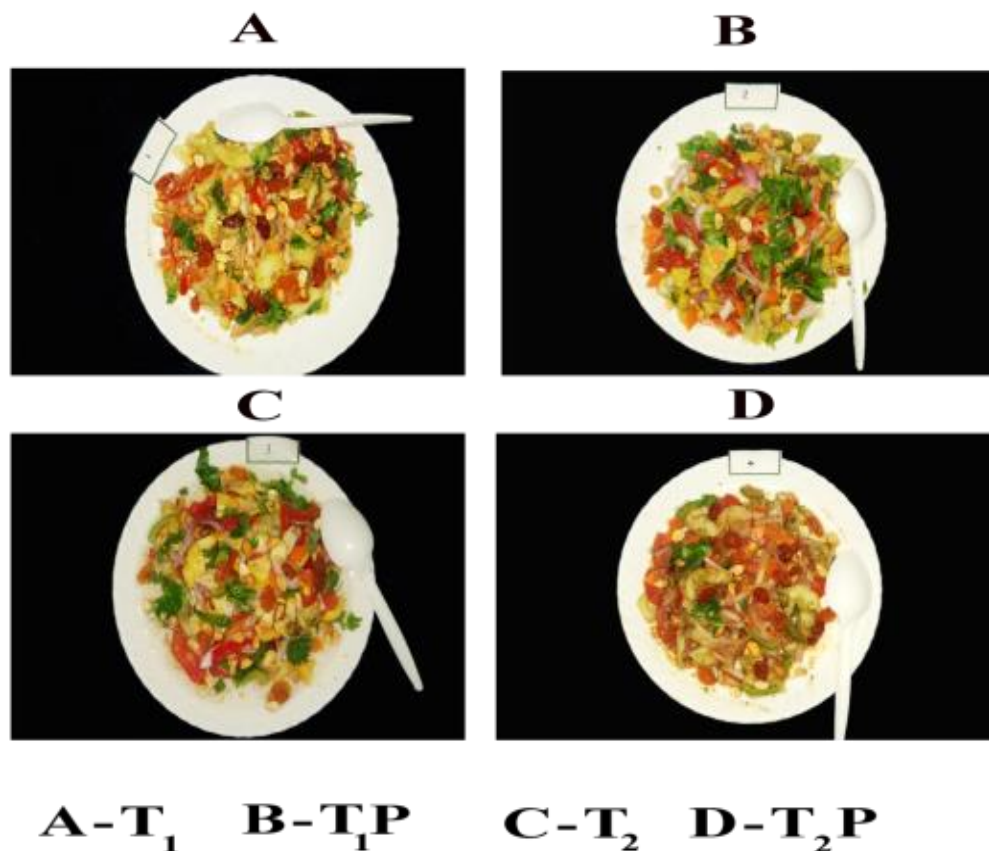
**Table 1: Mean Scores Obtained for Sensory Analysis of Cashew Apple Salad**

Samples*	Appearance	Colour	Flavour	Texture	Taste	Overall Acceptability
T <sub>1</sub>	4.0	4.2	4.1	4.0	3.9	4.0
T <sub>2</sub>	4.6	4.5	4.8	4.7	4.7	4.6
T <sub>1</sub> P	4.5	4.5	4.3	4.0	4.6	4.3
T <sub>2</sub> P	3.5	3.7	3.4	4.1	3.4	3.6
Kruskall Wallis Test Statistic	3.00	3.00	3.00	3.00	3.00	3.00
$\chi^2$ (3,0.05)	7.81					

\*T<sub>1</sub> – Fresh cashew apple, T<sub>2</sub> – 2% salt treated cashew apple

T<sub>1</sub> P - Fresh cashew apple powder, T<sub>2</sub> P - 2% salt treated cashew apple powder

## PLATE 1. CASHEW APPLE SALAD



### *Sweet Chutney*

Chutney is a term applied to a variety of spicy relishes and condiments in Indian cookery. Good quality chutney should be palatable and appetizing. The quality of chutney depends to a large extent on its cooking which should be done for a long time at a temperature below the boiling point. Table 2 represents the results of sensory analysis of sweet chutney.

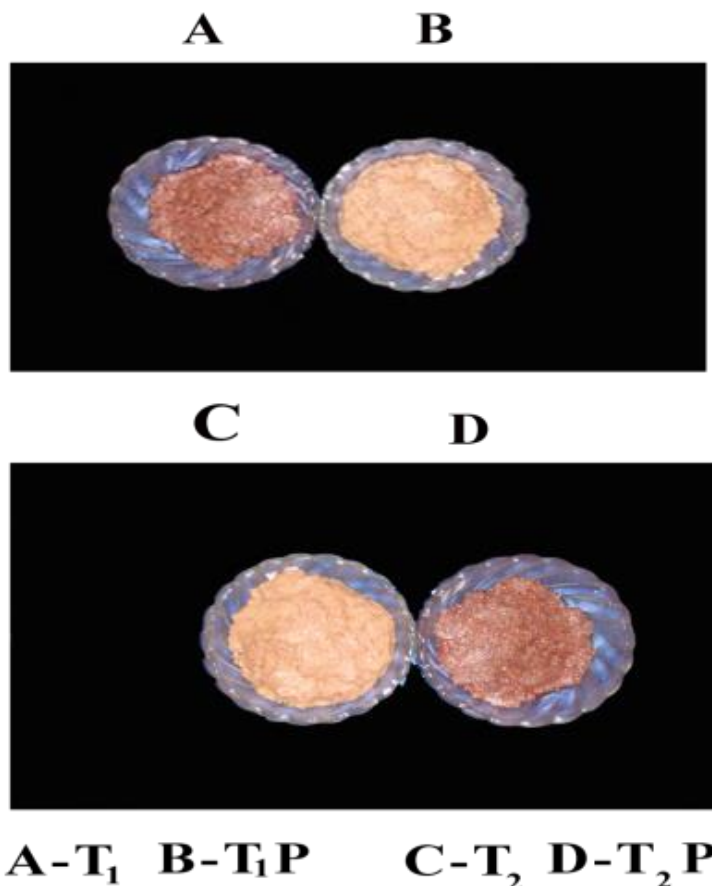
**Table 2: Mean Scores Obtained for Sensory Analysis of Cashew Apple Sweet Chutney**

Samples*	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
T <sub>1</sub>	4.2	4.0	4.3	4.3	4.1	4.1
T <sub>2</sub>	3.6	3.5	4.2	4.0	3.6	3.7
T <sub>1</sub> P	4.6	4.7	4.5	4.5	4.8	4.6
T <sub>2</sub> P	4.8	4.8	4.6	4.7	4.8	4.7
Kruskka Wallis test statistic	3.00	3.00	3.00	3.00	3.00	3.00
$\chi^2$ (3,0.05)	7.81					

### *Gravy Preparation (Masala Curry)*

Cashew apple masala curry is the gravy preparation standardized from cashew apple by trial and error method.

## PLATE 2. CASHEW APPLE SWEET CHUTNEY



**Table 3: Mean Scores Obtained for Sensory Evaluation of Cashew Apple Masala Curry**

Samples *	Appearance	Colour	Flavour	Consistency	Taste	Overall Acceptability
T <sub>1</sub>	4.5	4.6	3.9	4.4	4.5	4.3
T <sub>2</sub>	4.7	4.7	4.5	4.8	4.8	4.7
T <sub>1</sub> P	3.7	3.9	4.4	3.5	3.6	3.8
T <sub>2</sub> P	4.6	4.2	4.8	4.5	4.4	4.5
Kruskka Wallis test statistic	3.00	3.00	3.00	3.00	3.00	3.00
$\chi^2(3,0.05)$	7.81					

Results from sensory analysis showed that no significant difference was observed in the sensory attributes such as appearance, color, flavour, texture, taste and overall acceptability of developed salad, sweet chutney and gravy preparation from fresh and 2% salt treated cashew apple and also from their powders. Nimmi *et al.*, (2012) reported that an Indian culinary called ‘thoran’ or ‘subji’ was prepared from calcium chloride treated tender jackfruit. Organoleptic evaluation of sample shows that successful retaining in all sensory parameters like appearance, colour, odour, texture and taste.

### **Preference Scores of the Culinary Preparations**

Consumer preference of the culinary preparations was carried out using the nine point hedonic rating scale. Hedonic rating comprising from ‘like extremely’ to dislike extremely. Consumer preference was done among the 10 subjects. The scores obtained for hedonic rating are presented in the Table 4.

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**Table 4: Hedonic Rating of the Culinary Preparations**

Rating Scale	Score	Culinary Preparations											
		Cashew Apple Masala Curry				Cashew Apple Salad				Cashew Apple Sweetchutney			
		T <sub>6</sub>	T <sub>2</sub>	T <sub>6</sub> P	T <sub>2</sub> P	T <sub>6</sub>	T <sub>2</sub>	T <sub>6</sub> P	T <sub>2</sub> P	T <sub>6</sub>	T <sub>2</sub>	T <sub>6</sub> P	T <sub>2</sub> P
Like extremely	9	-	54 (6)	9(1)	9(1)	-	45(5)	18(2)	18(2)	18(2)	-	36(4)	36(4)
Like very much	8	16(2)	-	8(1)	16(2)	48(6)	32(4)	32(4)	8(1)	8 (1)	32(4)	16(2)	32(4)
Like moderately	7	35(5)	7 (1)	21(3)	49(7)	14(2)	-	14(2)	21(3)	21(3)	-	14(2)	7(1)
Like slightly	6	6(1)	12 (2)	18(3)	-	6(1)	6(1)	12(2)	12(2)	24(4)	24(4)	6(1)	6(1)
Neither like nor dislike	5	10(2)	5 (1)	5(1)	-	5(1)	-	-	5(1)	-	5(1)	-	-
Dislike slightly	4	-	-	4(1)	-	-	-	-	4(1)	-	4(1)	4(1)	-
Dislike moderately	3	-	-	-	-	-	-	-	-	-	-	-	-
Dislike very much	2	-	-	-	-	-	-	-	-	-	-	-	-
Dislike extremely	1	-	-	-	-	-	-	-	-	-	-	-	-
Maximum score	90	67	78	65	74	73	83	76	68	71	65	76	81
Mean preference score	9	7.4	8.6	7.2	8.2	8.1	8.8	8.4	7.5	7.8	7.2	8.4	8.7
Percent score	100	82.22%	95.51%	80.16%	91.11%	90.00%	97.72%	93.30%	83.20%	86.62%	80.00%	93.36%	96.64%
Rank	-	3	1	4	2	3	1	2	4	3	4	2	1

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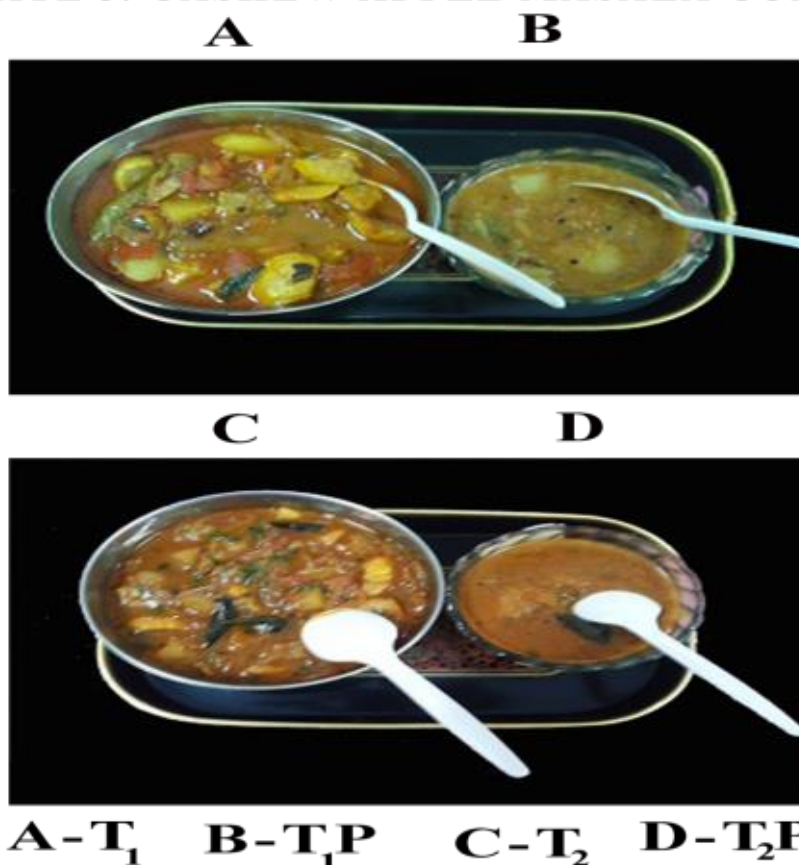
From the above table, it was observed that consumers more preferred cashew apple masala curry from sample T<sub>2</sub> with maximum score of 78, mean preference score 8.6 followed by T<sub>2</sub>P and T<sub>1</sub>. Based on the mean preference scores obtained T<sub>2</sub> (8.6) was found to be suitable for gravy preparation.

As indicated in the table it was found that cashew apple salad from T<sub>2</sub> with maximum score of 83, mean preference score 8.8 was more accepted followed by T<sub>1</sub>P and T<sub>1</sub>. Among the four samples of cashew apple salad T<sub>2</sub> was found to be more suitable for salad preparation.

From the table, it was found to be sweet chutney from T<sub>2</sub>P sample was more preferred by consumers with maximum score 81, mean preference score 8.7 followed by T<sub>1</sub>P. On the basis of hedonic rating T<sub>2</sub>P identified as best sample for the preparation of sweet chutney from cashew apple.

Midhila (2013) standardized a traditional ready to cook product namely 'thoran' mix from nendran banana blossom variety. This product was found to be very much acceptable.

### PLATE 3. CASHEW APPLE MASALA CURRY



### ACKNOWLEDGEMENT

The authors address their sincere thanks to the teaching and non – teaching staff of Department of Home Science, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala.

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