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Varietal screening of cashew apple for preparation of RTS and jam

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Abstract

Cashew apple is a tropical fruit which is an important byproduct of the cashew nut processing industry. It is rich in vitamins, polyphenols, sugars, minerals, amino acids and dietary fibre and can be considered as a functional food. Cashew tree cultivation is done primarily aiming cashew nut production. The cashew apple is a nutritious fruit available in abundance during the summer in almost all parts of the world and is reported to possess high therapeutic and medicinal properties. It is also useful as raw material for many industrial applications however, utilization of cashew apple has been very limited due to certain disadvantages, such as high perishability and its astringent taste. Short shelf life prevent the effective utilization of cashew apples. It is also crucial to create awareness and confidence among farmers about cashew apple processing for better economic returns. Cashew apple (*Anacardium occidentale* L.) has multi-purpose; it can be processed to obtain human food. The present study was undertaken at Regional Agricultural Research Station, Pilicode during 2014-15 to 2016-17 aimed at screening varieties suitable for the preparation of cashew apple RTS drink and jam and conducted sensory evaluation.

Keywords: Cashew apple, jam, RTS, sensory scoring

Introduction

Cashew (*Anacardium occidentale* L.) belongs to family *Anacardiaceae* and native of tropical central and South America having originated in Brazil. It has a perishable fruit, known as Pera, cashew apple, caju, mercy, etc., named in different part of world. The fruit consists of a cashew nut (the true fruit) and a cashew apple (*pseudofruit*). The cashew nut is the most important product of the cashew tree; whereas the cashew apple has increased in value (da Silveira Vasconcelos *et al.*, 2015) [4]. Cashew apple is a soft but fibrous juicy fruit having exotic flavour. It contains sugars, tannins, phenols, amino acids, ascorbic acid, minerals and fibre. It is found that cashew apple juice contain the highest amount of vitamin C/Ascorbic acid (203.5 mg/100 ml), almost 5-6 times higher than citrus fruits (Akinwale, 2000) [2].

Cashew apples can be made suitable for consumption by removing the undesirable tannins and processing them into value-added products, such as juices, syrups, RTS, pickles, jams, candy and toffee. The process of removal of tannin and other polyphenols from cashew apple is called as clarification, which can be done with different materials like gelatin, sago, PVP, starch etc. The study conducted by Mini and Mathew (2008) [6] standardized the quantity of sago required for the clarification of cashew apple juice as 5 g/litre of juice. Talasila *et al.* (2012) [8] found different amount of organics, polyphenols and tannin in different varieties of cashew. A study conducted by Jayalekshmy and John (2004) [5] proposed that sago was the efficient and economic natural product for clarification of cashew apple juice compared with other clarifiers All these factors influence the sensory and nutritional qualities of the products prepared out of it.

Moreover, cashew apples and their products contains significant amounts of phenolic compounds generally related as antioxidant (Adou *et al.*, 2012) [1], which play an important role in maintaining human health, since they have a preventive effect against various types of diseases such as cancer, cardiovascular diseases, neuropathies and diabetes (Amara *et al.*, 2015) [3]. Cashew apple juice is widely utilized in the cosmetic industry due to the presence of antioxidants and is used in the preparation of various creams and shampoos. Cashew extract contains anarcadic acid which is an antioxidant and has been shown to limit the pigmentation effects of aging and to eradicate the cancer cells. So by keeping these point in view the present study aimed at screening varieties suitable for the preparation of cashew apple RTS drink and jam and conducted sensory evaluation.

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Materials and Methods

The present study was conducted at Regional Agricultural Research Station, Pilicode, Kerala Agricultural University. Thirty one cashew varieties were selected for the study. During 2014-15, ten varieties of cashew apple was selected i.e., Amritha, Bhaskara, Raghav, MLR-3, AR-2, MDK-1, KM, PCC-9, Dhana, Priyanka and In 2015-16, ten germplasm collection maintained at RARS Pilicode were selected namely PLD1, PLD 3, PLD 4, PLD 12, PLD 15, PLD 16, PLD 17, PLD 18, PLD 19, PLD 20 and eleven germplasm such as PLD 75, PLD 54, PLD 44, PLD 64, PLD 62, PLD 40, PLD 48, PLD 67, PLD 66, PLD 45, PLD 82 was selected in the year 2016-17 for the preparation of value added products like ready to serve beverage and jam.

Preparation of Ready to serve beverage and jam

Freshly harvested cashew apples free from damages were collected from farm. After cleaning, juice was extracted from fruits using manual hydraulic press. Clarification of the juice was done by adding sago @ 5g/litre of juice. The clear juice obtained after clarification was used for RTS drink preparation. For preparing pulp, the collected cashew apples were cleaned and detanned by dipping in the common salt solution at 5% level for three consecutive days, changing the salt solution daily. After three days, the detanned fruits were taken out and washed. These were steamed with pressure cooker for 15 minutes without putting the whistle, and then made in to a pulp, which was used for the preparation of jam (Mini and Mathew, 2008)^[6].

The standard procedure for the preparation of RTS beverage and jam was adopted as given by (Mini and Mathew, 2008)^[6]. In this process, Clarified juice (150 g) Sugar (20 g), water (730 g) and citric acid (5 g) was used as ingredient. Required

quantity of sugar and citric acid was added in water and boiled, after switching off the flame, added cashew apple juice transferred in to bottles, when cooled.

For jam preparation, Cashew apple pulp (1 kg), sugar (1 kg) and citric acid (5 g) was taken. Sugar and pulp were mixed thoroughly and there after citric acid was added to it and cooked with continuous stirring. When it reached the stage of jam, which was assessed by sheet test, transferred in to sterilized glass bottles.

Sensory analysis

The products RTS drink and jam, prepared out of thirty one varieties were subjected to sensory evaluation using 5-point scale i.e., Excellent-5, Very Good-4, Good-3, Fair-2, Poor-1 (Each sample scored by 25 judges). The judges scored the RTS drink and jam for appearance, colour, flavour, taste, texture, sweetness/saltiness and overall acceptability.

Statistical analysis

Factorial completely randomised design (FCRD) was adopted for analysing the data by using Design –Export software. Statistical significance was examined by analysis of variance (ANOVA) for each response.

Results and discussion

The data on sensory analysis of cashew apple jam and ready to serve beverage (RTS) of ten varieties selected during 2014-15. Sensory evaluation was conducted on a five point scale. Among the varieties tried, Dhana had the highest score for taste, texture, sweetness/saltiness and overall acceptability of the jam, whereas Raghav had the highest score for colour of the jam (Table 1).

Table 1: Sensory evaluation of cashew apple jam of different varieties (2014-15)

Variety / Germplasm	Appearance	Colour	Flavour	Taste	Texture	Sweetness / Saltiness	Overall acceptability
Amritha	2.60	2.68	2.48	2.6	2.56	3.00	2.72
Bhaskara	2.40	2.48	2.72	3.04	2.76	3.60	2.88
Raghav	3.64	3.48	3.20	3.48	3.08	3.64	3.64
MLR-3	3.28	3.16	2.80	3.08	2.80	3.32	3.04
AR-2	2.52	2.36	2.32	2.12	2.48	2.64	2.60
MDK-1	2.88	2.96	2.84	2.92	2.96	3.00	2.96
KM	2.68	2.64	2.88	2.68	2.84	3.00	2.84
PCC-9	3.20	3.08	2.96	2.92	3.20	3.12	3.16
Dhana	3.56	3.52	3.16	3.68	3.44	3.64	3.68
Priyanka	3.56	3.32	3.24	3.24	3.24	3.56	3.48

In the sensory evolution of ready to serve (RTS) beverage, overall acceptability of different varieties of cashew apple for jam making ranges from 2.60 to 3.68 (Fig 1). The variety of

cashew apple Priyanka recorded the highest means score for appearance, colour, flavour, taste, texture, sweetness/saltiness and overall acceptability followed by Dhana.

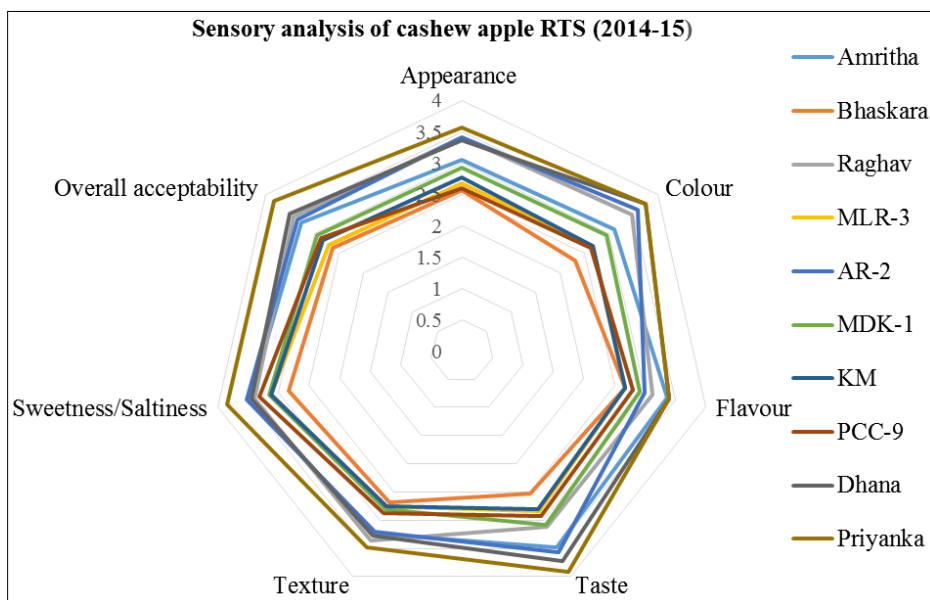


Fig 1: Sensory analysis of cashew apple RTS of different varieties (2014-15)

During 2015-16, different varieties of cashew apple were tried to find out the best variety for the preparation of cashew apple RTS beverage and jam and are presented in Table 2. Among the varieties tried, PLD 1 had high overall acceptability when processed in to cashew apple RTS. This was followed by PLD 15, PLD 16, PLD 20 and PLD 18. RTS prepared from PLD 16 had the highest score for appearance. Regarding colour,

RTS prepared from PLD 16 had the highest score. In case of cashew apple jam, PLD 16 had the highest overall acceptability. The score was highest for PLD 16 for appearance of the product (Jam). PLD 16 had the highest score for colour, whereas PLD 18 had the highest score for flavour. Highest score for taste was obtained for the variety, PLD 18 and PLD 16.

Table 2: Organoleptic scoring of cashew apple RTS and jam of different varieties (2015-16)

Variety/ Germplasm	Appearance		Colour		Flavour		Taste		Texture		Sweetness / Saltiness		Overall acceptability	
	RTS	Jam	RTS	Jam	RTS	Jam	RTS	Jam	RTS	Jam	RTS	Jam	RTS	Jam
PLD1	2.68	2.60	2.56	2.68	2.68	2.48	2.98	2.60	2.80	2.56	2.80	2.56	2.98	2.72
PLD 3	2.56	2.40	2.32	2.48	2.68	2.72	2.52	2.54	2.68	2.76	2.84	2.60	2.64	2.88
PLD 4	2.57	2.50	2.67	2.48	2.98	2.50	2.96	2.48	2.66	2.88	2.80	2.64	2.82	2.64
PLD 12	2.68	2.56	2.68	2.66	2.68	2.80	2.84	2.68	2.76	2.80	2.90	2.68	2.72	2.74
PLD 15	2.80	2.52	2.60	2.36	3.00	2.32	2.96	2.52	2.80	2.48	2.90	2.64	2.95	2.60
PLD 16	2.92	2.88	2.96	2.96	2.92	2.84	2.78	2.92	2.80	2.96	2.98	2.85	2.96	2.96
PLD 17	2.76	2.68	2.68	2.64	2.68	2.88	2.80	2.68	2.76	2.84	2.98	3.00	2.84	2.84
PLD 18	2.60	2.68	2.64	2.58	2.80	2.96	2.92	2.92	2.88	2.68	2.98	2.85	2.88	2.66
PLD 19	2.68	2.56	2.68	3.52	2.82	2.46	2.72	2.68	2.76	2.88	2.96	2.85	2.85	2.68
PLD 20	2.76	2.56	2.76	2.32	2.80	2.54	2.92	2.54	2.86	2.65	2.86	2.56	2.90	2.48

Eleven varieties such as PLD 75, PLD 54, PLD 44, PLD 64, PLD 62, PLD 40, PLD 48, PLD 67, PLD 66, PLD 45, PLD 82 was selected in the year 2016-17 to find out the best variety for the preparation of cashew apple RTS beverage and jam. The results of the present study shoes that, among the varieties tried, PLD 75 had high overall acceptability (2.98)

when processed in to cashew apple RTS (Table 3). This was followed by PLD 62, PLD 40 and PLD 45. RTS prepared from PLD 40 had the highest score for appearance. Regarding colour, RTS prepared from PLD 40 had the highest score. RTS prepared from PLD 62 had highest score for flavour.

Table 3: Score Card for Organoleptic Scoring- Cashew Apple RTS of different varieties (2016-17)

Variety/ Germplasm	Appearance	Colour	Flavour	Taste	Texture	Sweetness/Saltiness	Overall acceptability
PLD 75	2.68	2.56	2.68	2.98	2.80	2.80	2.98
PLD 54	2.56	2.32	2.68	2.52	2.68	2.84	2.64
PLD 44	2.57	2.67	2.98	2.96	2.66	2.80	2.82
PLD 64	2.68	2.68	2.68	2.84	2.76	2.90	2.72
PLD 62	2.80	2.60	3.00	2.96	2.80	2.90	2.95
PLD 40	2.92	2.96	2.92	2.78	2.80	2.98	2.96
PLD 48	2.76	2.68	2.68	2.80	2.76	2.98	2.84
PLD 67	2.60	2.64	2.80	2.92	2.88	2.98	2.88
PLD 66	2.68	2.68	2.82	2.72	2.76	2.96	2.85
PLD 45	2.76	2.76	2.80	2.92	2.86	2.86	2.90
PLD 82	2.74	2.64	2.68	2.80	2.76	2.98	2.84

However, in case of jam, the variety PLD 40 had the highest overall acceptability. The score was highest for PLD 40 for appearance of the product (Jam). PLD 66 had the highest score for colour, whereas PLD 67 had the highest score for flavour (Fig 2). Highest score for taste was obtained for the variety, PLD 67 and PLD 40. Statistical analysis showed that

different varieties of cashew apple have significant effect on sensory analysis of cashew apple jam and RTS. Similar results were observed with the studies conducted by Sobhana (2019)^[17] on evaluation of cashew varieties for RTS beverage and jam.

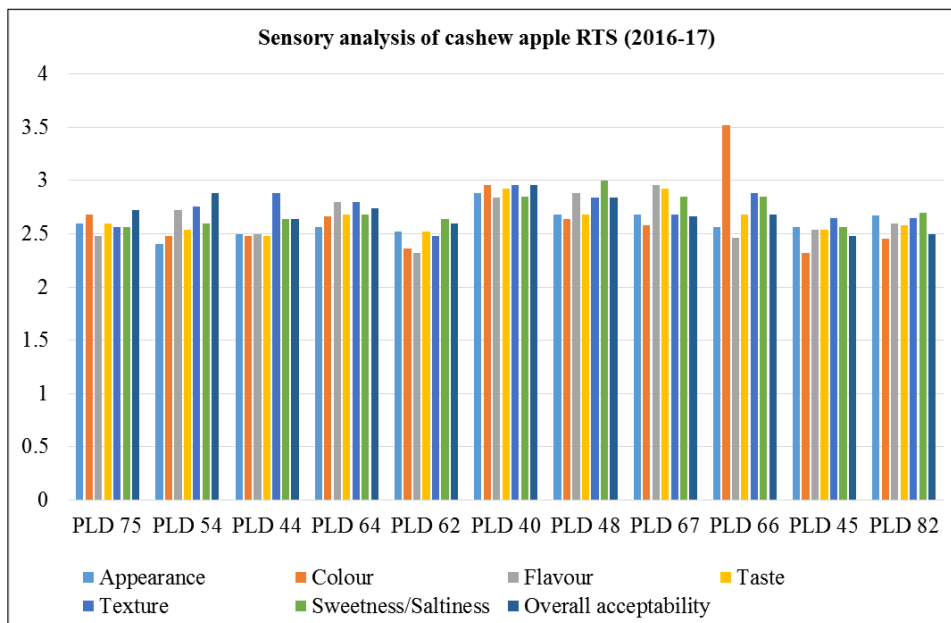


Fig 2: Sensory analysis of cashew apple RTS of different varieties (2016-17)

Conclusion

It can be concluded that, Priyanka, PLD1 and PLD 75 were found as the best cashew varieties for preparing cashew apple RTS beverage. In case of cashew apple jam Dhana, PLD16 and PLD 40 was found to be best.

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