



Short communication

'Sago' - a natural product for cashew apple juice clarification

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Abstract

Clarification of cashew apple juice by removing phenols and tannins is an important step in cashew apple processing. The common clarifying agent recommended presently is poly vinyl pyrrolidone (PVP), a costly chemical. A study to evaluate the efficacy of different clarifying agents, and to find a cheap substitutes for PVP showed that 'sago', which is a natural commercial starch preparation, has considerable potential in this respect. Juice clarified by sago was not only qualitatively similar to that clarified by PVP, but also had a higher recovery percentage.

Key words: Cashew apple syrup, PVP, natural clarifier

Cashew apple is a tropical fruit rich in vitamins and minerals. It contains 0.099% vitamin B₂, 0.24% vitamin C, 0.041% calcium, 0.011% phosphorous and 0.003% iron. Indeed, the vitamin C content of Cashew apple is almost ten times more than that of pineapple, a customary tropical fruit (Ohler, 1988). Cashew apple juice though sweet and nutritious, has astringency, which makes it less palatable. The phenolic compounds present in apple are mostly responsible for astringency of the juice.

There are many traditional ways of removing the astringency of cashew apple juice while clarifying the juice. The efficiency of such methods, however, varies with the material used. Augustin (1982) standardized a technique for clarification of cashew apple juice using a chemical substance called poly vinyl pyrrolidone (PVP), which, however, is not only expensive but also difficult to obtain locally. Our earlier investigations revealed that sago, which is a natural product, is a potential cheap substitute in this respect. Hence, a study was conducted mainly to compare the efficacy of substances such as starch, gelatin, sago and PVP in the clarification of cashew apple juice.

Comparison of sago, starch, gelatin and PVP were made using three kg samples of cashew apple juice, which was replicated six times. Starch, gelatin and PVP used for this study were of analytical grade, and for sago, a commercial preparation of starch from cassava (*Manihot esculenta*), which is usually used for culinary purposes, was used. The quantity of clarifiers used per kg juice was 1.4 g for PVP (Augustin, 1982), 4 and 5 g respectively for gelatin and starch (Department of Processing Technology, College of Horticulture, pers. comm.) and 2 g for sago (authors' unpublished work). PVP, starch and gelatin were completely dissolve in luke-warm water. The sago was powdered and then boiled (2 g in 10 ml of water) to dissolve it. The clarifiers were added to the individual cashew apple juice samples with constant stirring, and kept overnight for settlement. The clarified juice was siphoned out and the weights were estimated. Visual clarity was evaluated using a 0 to 4 scale; where '0' corresponds to completely clear and '4' corresponds to turbid solutions. Tannin content was analyzed using Folin-Denis method (Sadasivam and Manickam 1992).

Percentage weight/recovery of the clarified juice, visual

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Table 1. Recovery percentage, visual clarity and tannin content of clarified cashew apple juice

Treatments	Weight (kg)	Percentage recovery score	Visual clarity	Tannin content ($\mu\text{g ml}^{-1}$)
Sago	2.745	91.5	0	761.15
Gelatin	2.367	78.9	1	710.94
PVP	2.000	66.6	1	718.88
Starch	2.688	89.6	4	840.55
SEm (\pm)	0.28	0.28		16.14
CD	0.68	1.106		62.32

PVP= poly vinyl pyrrolidone

clarity score and tannin content are presented in Table 1. Among the four substances used, sago gave the highest juice recovery. With regard to the visual clarity also, sago was the best with a value of 'zero' followed by PVP and gelatin, both having a modestly higher score of 'one'. Clarified juice using starch as the clarifying agent was turbid with the highest score of 'four', despite having the second highest recovery percentage. Again, tannin content of the juice clarified with starch was significantly higher than that of sago, PVP and gelatin. Surprisingly, percent recovery of the clarified juice was lowest for PVP.

The mechanism of separation of tannin from the cashew apple juice is different for different clarifiers, and may probably explain the variations in the quality parameters observed. For instance, PVP chelates tannins and sediments it at the bottom. Starch, however, owing to its great affinity for tannins, removes it from the juice through a process of flocculation. The efficiency with

which different types of starch remove tannins from the juice may vary depending on the size and arrangement of amylose and amylopectin chains. Furthermore, the organics available in the natural starch grains may interfere with the flocculation process negatively. Gelatin is presumably having a mechanism similar to that of starch. Its animal origin, however, precludes using it as a clarifier in cashew juice processing, in view of the difficulty for labeling the finished product as of plant origin. Sago, being a refined natural commercial starch preparation of plant origin, has the additional advantage of being substantially cheaper especially in comparison to the traditionally used PVP, which is not only costly (Rs.6000 per kg) but also has to be imported. This study, therefore, proposes 'sago' as an efficient and economic natural product for clarification of cashew apple juice.

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