

Production and sensory evaluation of African star apple (*Chrysophyllum albidum*) fruit juice

Chukwumalume, R. C.*¹, Garba, S. A.², Ijah, L.² and Agary, A.³

¹. Agricultural Research Council of Nigeria, Abuja

². Department of Microbiology, Federal University of Technology, Minna.

³. Department of Biological Sciences, University of Abuja.

Email: nelofina@yahoo.com



Introduction

- African star apple (*Chrysophyllum albidum*) is a wild tropical tree belonging to the Sapotaceae family and occur in diverse eco-zones in Nigeria, and in other tropical African countries such as Uganda, Niger Republic, Cameroon and Cote d'Ivoire
- It has good flavour and is source of vitamins C (more than oranges/guava), minerals, calcium, iron and fibre (Chukwumalume *et al.*, 2010; Amusa *et al.*, 2003 and Nwadigwé, 1982)
- In Nigeria, the seasonal edible fruits locally known as 'Udara' or 'Agbalumo' is oval in shape and pale orange when it is ripe, when ruptured it produces a milky brownish sap and is available during December to April
- More than 30% postharvest losses of African star apple fruits occur within a period of 5 days, due to high tropical temperature and humidity, poor handling practices, lack of processing and preservation techniques (Amusa *et al.*, 2003)

Aim

- The aim of this work was to evaluate the overall acceptability of natural unsweetened fruit juice produced from African star apple by a ten man untrained panelist

Materials and methods

- The fresh African star apple fruits (fig. 1.) were randomly purchased from retailers within Zuba fruit market in the Federal Capital Territory, Abuja, Nigeria



Fig 1: African star apple market (Source: Google images)

Production of Star apple fruit juice



- Fig 2. Mature, ripe African star apple fruits
- The fruits were aseptically handled as they were sorted, cut open, deseeded and pulp scraped out



- Fig.3. African star apple pulp.
- The pulp was blended with water (1:1 w/v), sieved/filtered, filled into containers, preserved (with sodium benzoate 350 mg/L), pasteurized (83°C for 3 min), cooled & stored



- Fig. 4. African star apple juice.
- The juice was treated differently and grouped into four. Samples coded 414: were preserved and pasteurized. Sample 413: pasteurized without preservative; 412: Not pasteurized but preserved 411 No pasteurization and no preservation

Adapted from FIIRO, (2009)

Sensory evaluation

- A ten - member taste panel was randomly selected from the laboratory staff, industrial trainees and other laboratory workers. The taste samples were coded 411, 412, 413 and 414 and arranged randomly
- A 9 Point hedonic scale was used to score the panelist's overall acceptability of the product with 1 corresponding to dislike extremely while 9 is like extremely
- A descriptive assessment of aroma, taste, and colour in comparison to the four samples was also done by the panelists
- The panelists' result was statistically analyzed using Analysis of Variance ANOVA Table 2

Results and Discussion

- The juice obtained from the African Star Apple fruits was a cloudy, pale yellow fresh juice (fig 5) with good aroma, convenient to consume and as natural as the fruit itself
- The fruit juice produced conformed to Codex description of single Strength juice (CODEX, 2003) and composition (Table 1.) compared within range reported in Nwadigwé, (1982)
- The overall acceptability of the juice samples which was statistically analyzed (Table 2) using ANOVA revealed that samples were insignificant at both 5% and 1% levels of significance since F calculated is less than F from the table (i.e. $p > 0.05$)

Table 1. Nutritional composition of *C. albidum* fruit juice

Moisture	79.20±0.07 (values in % v/v)	Calcium	108.0± 1.00 (values in mg/100 ml w/v)
Lipid	2.30 ± 0.05	Magnesium	20.0±0.80
Ash	2.00±0.02	Sodium	1.0±0.50
Protein	2.00±0.02	Iron	0.57±0.03
Fibre	4.34±0.04	Potassium	0.30±0.05
Reducing Sugar	2.43±0.03	Vitamin A	3.0±1.03 (10117.31U)
Soluble solids	4.50±0.10	Vitamin C	28.27mg/100 ml±0.07

Values are triplicate mean ± standard deviation (SD)

Table 2. Panelist taste test. Analysis of Variance (ANOVA)

Source of variation	DF	SS	MS	Fo	F.05	F.01
Judges	9	12.05	1.34	2.68*	2.51	3.71
Sample	3	0.3	0.1	0.2**	3.55	6.01
Error	7	13.0	0.50			

F calculated for samples $F_o = 0.2$ is $< F.05$ & $F.01$ ($p > 0.05$) NSD

Constraints

- The gummy (latex) nature makes it difficult to handle
- It is a seasonal fruit and may affect the availability as raw material
- No genetic modification has been successfully put in place to improve the fruiting period
- No mechanical means of separating the pulp from the seed and the outer skin (pericarp)

Conclusion

- African star apple fruit juice (first of its kind and unsweetened) was acceptable to untrained panellists
- A potential option to improve the utilization of this neglected and underutilized species could be by possible exploitation in the formulation of the African Star Apple fruit into juice and other potential products

References

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