

Development of cassava sticks using locally available cassava (*Manihot esculenta*) varieties

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Introduction

- Cassava (*Manihot esculenta*) is the third most important food source in tropics
- Cassava root is a good source of energy as it contains high amount of carbohydrate 84.20% (Somendrika *et al.*, 2017)
- The Department of Census and Statistics in Sri Lanka revealed that total cassava production in Sri Lanka was increased from 219,933 Metric ton in 2007 to 324,097 Metric ton in 2015 (Department of Census and Statistics, 2009)
- Post harvest loss of cassava is 35% as it is not a major food source of Sri Lankans (Department of Census and Statistics, 2009)
- In Sri Lanka cassava is mainly consumed after boiling
- Cassava chips, fufu, gari are the products that increase the shelf life of fresh cassava root (Zhou and Nzingamasobo, 2006)
- Although cassava chips are available in Sri Lankan market the hard texture is not much consumer acceptable
- The consumer appeal can be increased by using different cassava varieties and different processing methods
- Mu-51, CARI-555 and Kirikawadi are the most popular varieties that having high yield and acceptable horticultural qualities



Kirikawadi MU-51 Swarna

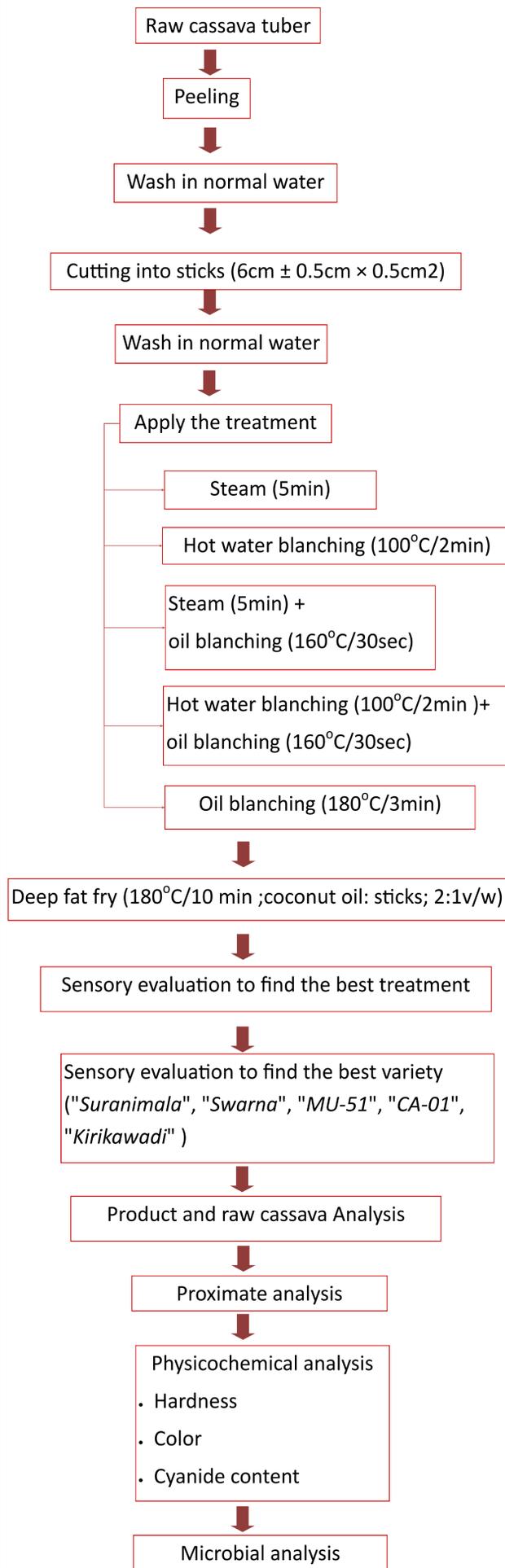
- Cassava varieties are classified according to the morphological traits, taste, cyanide content, average yield (MIC, 2007; Gbadegesin *et al.*, 2013)
- Cyanide limits the consumption of cassava root
- Recommended amount of cyanide that prevent acute toxicity in humans is less than 10mg/Kg according to the FAO/WHO (1991)
- Processing methods soaking, boiling, steaming and frying lead to a great reduction in the anti-nutritional quality by reducing cyanide content
- Frozen cassava sticks is an another product that can be consumed instead of French fries
- It is important in utilization of local tubers by reducing the post harvest loss to increase the economy of Sri Lanka

Objectives

- To develop fried cassava sticks and frozen cassava sticks using locally available cassava varieties
- To evaluate physicochemical, sensory and keeping quality for the processed products

Methodology

Preparation of fried cassava sticks



Preparation of frozen cassava sticks

Frozen cassava sticks were prepared with different frying methods as fried cassava sticks where they were freeze at (-18^oC) before frying.

Result & Discussion

- According to the sensory evaluations, (Steam + oil blanching) was the best treatment for fried cassava sticks while (hot water blanching+ oil blanching) was for frozen cassava sticks where "Swarna" cassava variety selected for both fried and frozen sticks

Table 1: Proximate composition of the cassava flesh of "Swarna" variety, fried and frozen cassava sticks

Composition	Cassava Flesh	Fried Cassava Sticks	Frozen cassava Sticks
Carbohydrate (%)	32.57 ± 0.58 ^b	61.48 ± 0.25 ^a	29.51 ± 0.58 ^c
Ash (%)	1.32 ± 0.25 ^a	1.14 ± 0.87 ^a	1.06 ± 0.01 ^a
Total fat (%)	0.53 ± 0.42 ^c	23.34 ± 0.94 ^a	6.27 ± 0.48 ^b
Protein (%)	0.77 ± 0.36 ^b	0.23 ± 0.3 ^c	0.47 ± 0.15 ^a
Crude fiber (%)	2.13 ± 0.14 ^a	7.54 ± 0.82 ^b	3.32 ± 0.77 ^a
Moisture (%)	62.68 ± 0.61 ^a	6.27 ± 0.32 ^c	59.37 ± 0.61 ^b

Means in the same row with same letter are not significantly different at p>0.05 (Mean ± SD, n = 3)

According to the results,

- There was significant difference (p<0.05) between the moisture, total fat, protein, and carbohydrate content of all three samples
- The fried cassava sticks contains relatively high amount of carbohydrate content (61.48 ± 0.25) than other two samples

Table 2: The physicochemical properties in the fried cassava sticks and frozen cassava sticks

Physicochemical properties	Fried cassava sticks	Frozen cassava sticks
Hardness (N)	8.32 ± 0.52 ^a	0.40 ± 0.08 ^b
Color		
lightness (L*)	58.57 ± 0.29 ^a	76.11 ± 0.90 ^a
redness (a*)	5.52 ± 0.06 ^a	3.20 ± 0.89 ^a
yellowness (b*)	41.12 ± 0.69 ^a	25.06 ± 0.59 ^a
Cyanide Content (md/Kg)	2.74 ^a	1.98 ^a

Means in the same row with same letter are not significantly different at p>0.05 (Mean ± SD, n = 3)

According to the results,

- There is a significant difference (p<0.05) in the hardness of the fried cassava sticks and frozen cassava sticks
- There is no significant difference (P>0.05) in the lightness (L*), redness (a*) and yellowness (b*)
- There is no significant difference (p>0.05) in the retained cyanide content in the fried and frozen sticks

Conclusion

There is a potential to develop fried and frozen cassava sticks which are nutritionally rich, microbiologically safe and with high consumer acceptance using locally available cassava varieties. "Swarna" cassava variety was the best locally available cassava variety selected for both fried and frozen cassava sticks.

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