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Screening of Local Sugar Syrup Clarifiers for Brown Sugar Production

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Introduction

Brown sugar is a raw sugar which contains about 97% pure sucrose crystals, covered by a thin film of molasses and brownish in color with polarity about 97.5-98.0.[1] It may be eaten without further processing. Factories producing brown sugar dry the products in dryer, temper it, grade it into sizes and package, ready for sales or for use or it is processed into refined sugar. Processing methods adopted for brown sugar production is divided into; the batch system and the continuous flow system[2] . The batch system is developed for small scale production and used by local producers while the continuous flow system is used by large industrial concerns. Clarification is the process of removing all extraneous materials (dirt which includes soil particles, fibers, waxes etc) and removing the dark coloration to be able to have clear juice for high purity sugar and also to arrest the activities of micro-organisms which cause inversion and fermentation. Ojehomon and Akinsanya (1995) evaluated the clarifying activities of *Calotropis procera* (Sodom apple, also known as blom-blom leaves) and *Hibiscus esculentus* (back of Okro stem). Liquid extracts of these materials were evaluated. The back of okro stem extract was reported to be effective in clarifying sugar syrup. The problem of this work is that since the extract is liquid it cannot be preserved or stored for any reasonable length of time hence, the user would need to prepare it each time the need arises. Also, the problem of handling the extracts is pronounced. The need to produce a shelf stable sugar syrup clarificant, thereby reducing the cost of local brown sugar production and conserve scarce foreign exchange became imperative.This work therefore was aimed at producing shelf stable powders of several potential local sugar syrup clarifiers and assesses their physicochemical properties.

Materials and Methods

Blomblom Leaves (*Calotropis Procera*), Okoho Stem (*Cissus Polpunea*) and Okro (Hibiscus *Escilentus*) Stem were obtained from Lapai'naguari in Gidan –Kwano Area Of Minna, Niger State. Industrial Cane, C 0957 Variety was obtained from The National Cereal Research Institute; Badeggi. The Calcium Hydroxide was obtained from a chemical laboratory in Minna, Niger State. The samples were dried at 40°c in air oven and milled into powder. The powder was packed in cellophane and stored. Freshly harvested canes were detached accordingly and then crushed using Jeffco cutter grinder and the juice extracted using the sugar cane juice extractor (hydraulic press). The cane juice (2L) was transferred into four different pans (500ml each) and heated until it started boiling. The clarificants was added as the sugar brix reached 22°. The dirty particles formed (scum) were removed from time to time until a clear juice was formed. The juice brix was determined. After clarification the clear juice was left to crystallize for 5 hours. The time taken for clarification the brix % and quantity of clarificant were recorded (Table1).

Results and Discussion

Table1: Time, Quantity and Brix of sugar syrup using Ca (OH)$_2$ Okro, Blom-blom, Okoho

Clarificants quantity (g) / Time (min)					Brix (%)			
	$Ca(OH)_2$	Okro	Blomblom	Okoho	$Ca(OH)_2$	Okro	Blomblom	Okoho
0	-	-	-	-	Trace	Trace	Trace	Trace
14	10	10	10	10	Trace	Trace	Trace	Trace
24	8	10	10	10	65	55	Trace	Trace
35		5	3	10	68	68	30	35
45					72	71	33	36
50							33	36
50mins	18	25	23	30	72%	71%	33%	36%

Conclusion

The final brix after 50 minutes were in agreement with the report of Busari (2004) that brix of brown sugar ranges between 65 – 72°. There was no good yield (percentage brix) for blom blom and okoho samples with increase in resident time. The sugar syrup gotten from them was not brown in colour because the syrup was not well clarified. The dark green colour of the sample (blom blom) was seen on the juice; there was also no scum formed during their clarification. The okoro bark samples had striking close performance to the check Ca (OH)$_2$. It attained a brix of 71% compared to the 72% of the check in 50 minutes compared to 42 minutes of the check. The result showed that okoro stem bark could be exploited for development of a good local sugar syrup clarifier.

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Effect of Process Parameters and Levels of Breadfruit Flour Substitution on some Functional Properties of Yam-Breadfruit Extrudate

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Introduction

Yams tubers are prone to gradual physiological deterioration after harvesting. However, yams can be processed into less perishable products such as yam flour.[1] Breadfruit (*Artocarpus altilis*) is primarily used for its nutritious, starchy fruits which is also rich in fats, ash, fibre and protein. Breadfruit pulps are made into various dishes such as, fried, boiled and matched to make porridge and its flour is used in bread and biscuit making.[2] In Nigeria, breadfruit is regarded as the poor man's substitute for yam (*Dioscorea rotundata*) because it is cheaper (one-third less the cost) than yam.[3] In recent years, there is an increasing demand for development of new food products from various sources especially from neglected crops. One viable method for utilization of such food crops is extrusion processing due to its versatility, high productivity, energy efficiency and lack of effluents. Successful incorporation of breadfruit flour into yam flour for the production of extrudates that deliver acceptable functional properties may represent a healthy yam-based product. Thus, the effect of the level of breadfruit flour substitution, barrel temperature and screw speed on some functional properties of extrudates were evaluated.

Materials and Methods

Matured yam tubers (*Dioscorea rotundata*) and freshly harvested matured but unripe Breadfruits (*Artocarpus altilis*) were obtained from Kila market, Kila, Ogun State, Nigeria.