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CHEMICAL COMPOSITION AND SOAPING CHARACTERISTICS OF PEELS FROM PLANTAIN *(MUSA PARADISIACA)* AND BANANA *(MUSA SAPIENTUM)*

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ABSTRACT

Chemical studies were carried out on banana and plantain peels. Ripe and unripe plantain peels were labelled RPP and UPP, respectively, while that of the banana peels were RBP and UBP respectively. RBP had the highest moisture content (65.2%) of the four samples while the lowest, 48.5% was from UPP. The highest values (mg / 100g dry matter DM) for crude fibre, lipid, protein, ash and carbohydrates were: 1.2, 1.7, 0.013, 9.25, 98.3 respectively, while the lowest values were 0.33, 0.96 0.012, 0.75 and 89.3 were respectively. The ranges of minerals in mg / 100g were as follows: P(0.33 – 0.35); Ca(24.1 – 158); Mg(3.80 – 138); K (5.0 – 245); Na(39 – 202) and Fe(50 –950). The carbonate ranges were 0.14 – 1.1g/L while for the hydroxides the ranges were from 0.66 – 1.74g/L. The pH ranged from 8.5 – 9.5. Saponification characteristics of the black soap derived from plantain peels were: Total fatty matter (TFM) 125g/Kg, the lather volume (LV) 411.2ml and the foaming time (FT) 6 hrs 40 mins.

KEYWORD: Chemical Composition, lather volume, foaming time, quality characteristics.

INTRODUCTION

The plantain (Musa paradisciaca) and banana (Musa Sapientum) are tropical plants. They flourish with optimum growth conditions of 27°C and 2000mm rainfall per annum (Philips, 1977). The production of plantains and bananas together account for about 54,809 metric tons of fruit crops in developing countries (FAO , 1978). These crops are common in the Southern parts of Nigeria. Unripe plantains are consumed boiled, or fried and milled into flour for 'amala' in parts of Southern Nigeria. Ripe peeled plantain may be eaten directly, boiled or sliced and fried in oil to produce 'dodo' (Ladele et al 1984). Ripe bananas are usually eaten fresh. The peels are thrown away. The present study investigates the chemical contents and the possible uses of ripe and unripe peels of plantains and bananas vis-a-vis soap production.

MATERIALS AND METHODS

Plantains and bananas were bought from Ika Ika Oqua Market in Calabar. They were cleaned with distilled water and the peels removed and dried in an oven for 48 hours at 60°C. The dried peels were ground into powder using blender (Model 35 BL 64, USA) and stored. The moisture contents, crude fibre, and protein were determined according to AOAC (1980) method. The lipid extract from the powder was carried out by exhaustive extraction with petroleum ether (b.p 40-60°C) using the soxhlet apparatus as described by Ifon and Udosen (1990). Na and K were determined using the flame photometer (Jenway PF P7) using the method of Vogel (1962) after aopropriate calibration of the instrument. Other minerals were analysed using the Atomic Absorption Spectrophotometer (Unicam 919 Solar System Unicam PLC, England). The P was determined by the molybdovanadate method as described by Udoessien and Aremu (1991).

The double indicator method (Bassett et al 1986) was used for the carbonate and hydroxide determinations. 5g of sample was dissolved in 40ml of distilled water then heated in a steam bath for 30mins, followed by filtration. 10ml of the filtrate was titrated against 0.1MHCL using phenolphthalein to V_1 end point. One drop of methy1 orange indicator was then added and titrated till the light yellow coloration changed to pink V_2. The total carbonates A and hydroxides B were obtained by the relationship $A = 2(V_2-V_1)$ and $B = V_2 - 2(V_2 - V_1)$. Soap was prepared using the method of Onuchukwu (1989). 100g of the plantain peel ash was added to 200ml of warm water, stirred and allowed to settle before filtering with a white cloth. 100ml of the filtrate was added gradually to 40g of bleached palm oil, heated and stirred until the foam subsided. A paste of hot cassava starch (5.0g) was then stirred into the hot soap solution and allowed to cool into a solid black soap. The method of Ekpa (1995) was used for the TFM, LV and FT determinations.

RESULTS AND DISCUSSION

Proximate analysis (Table 1) showed that the peels have a lot of moisture, ash and carbohydrate, but low in fibre, lipid and protein. Fibre could be useful if incorporated into foods, because it could increase stool bulk, facilitates bowel movement leading to decreased digestive diseases and the lowering of blood

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sugar and cholesterol (Porth, 1990). The mineral contents of the peels are high (TableII) except for phosphorus. K is useful in soap making and is also required by crops e.g yams, cassava, plantain and melon for growth (Ajayi et al 1991).

The ash extracts from plantain peels was used in the black soap preparation and its quality characteristics compared with soaps from other sources. The results showed that the quality characteristics such as TFM. LV and FT obtained from black soap made from plantain peels compares favourably with soap from other sources (Ekpa 1995). Hence instead of throwing away these peels, they could be incorporated into animal feeds, or used in domestic soap making. The ash could be used in the preparation of 'otong' an Ibibio delicacy, prepared by stirring the ash of peels with excess palm oil to obtain yellowish sauce which could be used for eating yam and for making salads.

CONCLUSION

The proximate analysis of the peels show that they have high moisture, ash and carbohydrate content while the crude protein and lipid are low. The peels also have very high mineral contents, the solution made from the peels are alkaline and the ash could be useful in local soap production and could also be used to reduce soil acidity.

TABLE I. PROXIMATE ANALYSIS OF UPP, RPP, UBP AND RBP (mg/100G)

Sample	Moisture Content % wet wt	Crude Fibre	Crude Lipid	Crude Protein	Ash	Carbohydrate By difference
UPP	48.5	0.33	1.48	0.013	9.25	89.3
RPP	55.5	1.10	1.60	0.012	1.25	97.1
UBP	58.5	1.05	0.96	0.013	0.75	98.3
RBP	65.2	1.20	1.70	0.012	3.10	95.2

TABLELII MINERAL CONTENT FOR UPP, RPP, UBP, AND RBP (mg/100G)

Sample	P	Ca	Mg	K	Na	Fe
UPP	0.35	24.1	3.8	62.5	202	50
RPP	0.33	158	138	5.0	39	82
UBP	0.35	38.5	36.5	245	165	64
RBP	0.35	27.5	31.5	77	85	95

TABLE III. LEVELS OF CARBONATES, HYDROXIDES AND THE PH VALUES IN UPP, RPP, UBP AND RBP

Sample	Carbonate (g/l)	Hydroxide (g/l)	PH
UPP	0.14	0.66	8.5
RPP	1.10	1.74	9.2
UBP	0.74	1.50	9.5
RBP	0.60	1.40	9.4

TABLE IV. COMPARISON OF BLACK SOAP QUALITY PARAMETERS WITH THOSE FROM OTHER SOURCES.

Soap	TFM(g/kg)	LV(ml)	FT
* Black Soap	125	411.2	6hrs 40mins
** Soda Soap	187	410.1	5hrs 20mins
*** Soap from Spikelets	382	230	4hrs 20mins.

* From Plantain Peels ** Locally made Soap *** Data Obtained from Ekpa et al 1995.

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