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THE DEVELOPMENT, PRODUCTION AND QUALITY EVALUATION OF CAKE MADE FROM COOKING BANANA FLOUR

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ABSTRACT

The quality evaluation of cakes made from two cooking banana cultivars (Cardaba and Bluggoe, *Musa* ABB) were studied in relation to Wheat cake. Proximate analysis of the cake shows that Bluggoe, Cardaba and Wheat cake had a moisture content of 32.8%, 27.1%, and 22.9% respectively. The carbohydrate and fibre contents of the products are 35.7% and 2.4% for Bluggoe; 42.2% and 1.3% for Cardaba; 44.3% and 4.9% for Wheat. Bluggoe cake contained 8.8% protein while Cardaba and Wheat cakes had 9.2% protein each. The fat content of Wheat cake was 15.8% while Bluggoe and Cardaba cakes had 18.5% and 17.2%, respectively. Bluggoe, Wheat and Cardaba cakes had 1.8%, 2.9% and 3.1% ash, respectively. The energy content of the cakes were 344.5KJ/100g, 356.2KJ/100g and 360.4KJ/100g for Bluggoe, Wheat and Cardaba, respectively. Wheat cake was preferred to Bluggoe and Cardaba cake by the panellists. There was no significant difference between Wheat and Cardaba cake in their sweetness. Cardaba cake did not differ significantly from Bluggoe cake in colour, taste and sweetness. The cakes were all acceptable to the panelists and were preferentially ranked in order of Wheat, Cardaba and Bluggoe. The grain size of cakes from the two cultivars did not differ significantly from the control. The trend was the same when the volumes were compared.

Key Words: Cooking Banana; Baking; Quality Evaluation; Flour

Introduction

In 1987, cooking banana was introduced by the International Institute of Tropical Agriculture (IITA) as a temporary solution to the problem of black sigatoka diseases of plantain. Five cultivars of black sigatoka resistant cooking bananas were introduced from East Africa and southeast Asia for distribution to the worst affected areas (Hahn et al. 1990). These included Cardaba, Bluggoe, Pelipita, Fougamou and Nzizi.

Although cooking bananas had better agronomic and yield traits compared to plantain, but had poor market value due to fruit size, shape and lack of awareness among farmers on the food uses of the crops (Ferris et al. 1994). Cooking banana and plantain flour can be made traditionally by sun-drying sliced pulp for 2-3 days. Processing constitute a means of adding value to the fruits, while extending the shelf life and facilitating transportation.

The demand for bakery products in Nigeria is increasing rapidly (Ogazi and Vaidya, 1983). Most of the bakery products are made from wheat flour. Acceptable plantain madeira cake has been produced using plantain pulp at a substitution rate of 40% solids (Ogazi, 1996). However, cooking banana flour has so far not been used in such trials. This study was aimed at using otherwise rejected cooking bananas to produce acceptable cake in order to reduce dependence on wheat flour in the manufacture of bakery products. This will consequently help to promote the cultivation of starchy cooking banana cultivars that are resistant to black sigatoka disease in the plantain belt of south eastern Nigeria.

Materials and Method

Flour from two cooking banana cultivars (Cardaba and Bluggoe) were used for this study. Bunches were obtained from the experimental plots of the IITA Onne. Granulated sugar, powdered milk, margarine, egg, baking powder, mixed fruits, food colouring, flavour and preservatives (Brandy Flavour Essence) were purchased from a local market in Port Harcourt, Nigeria.

Flour was produced by drying slices of peeled pulp in a Sanyo Gallenkamp Forced-Air Moisture Extraction Oven at 60°C for 48 hours. Dried pulps were milled using a Retsch Muhle, 2850 RPM Hammer Mill with a sieve of 150-850 microns mesh size. Sieving was not required since the whole pulp was milled into the desired fine particle size flour. Data on bunch traits were used to estimate flour yield.

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The cakes were made using multi-stage mixing technique. Flour was mixed with baking powder and milk. Margarine was separately mixed with sugar to produce a whitish-yellow cream. Eggs were whipped and gently blended with the cream. Flour was mixed with cream/whipped eggs mixture. Water was added to obtain a droppy paste. Mixed fruits and few drops of food colour/flavour were also added.

The batter was poured into greased baking pans to 2/3 full and baked in a commercial gas oven Comstock Castle Stove Co. Quincy, Illinois USA for about 60-75 minutes at 250°C. Baking time were determined by the size of the baking pans and temperature. The cake was removed from the oven, and then from the baking pans.

The proximate composition of the cakes were determined using the AOAC (1980) procedures. The energy content of the cakes (KJ/100g) was computed from the proximate data using Atwater formula (FAO, 1973).

A taste panel was constituted to assess the quality of the cakes. Paired : multiple comparisons test was used. All the statistical procedures were performed using SAS (1992). The analysis of variance was used to test for difference among samples. Least Significance Difference (LSD) was used to compare sample means that were significantly different at 5% level of probability.

Table 1. Recipe Formulation for Cooking Banana Cake Production

Ingredients	% of the Quantity	Quantity	
Cooking Banana Flour	100		600g
Egg	88		528g
Granulated Sugar	50	300g	
Margarine	30	180g	
Baking Powder	1-2		6-12g
Powdered Milk	2		12g
Water	38.3		230ml
Mixed Fruit (optional)			180g
Food Colour (optional)			3-5 drops
Brandy Flavour			2-3 drops

The % of the ingredients is based on the weight of the flour

Table 2. Flour yield from a given bunch of cooking banana (kg)

Cultivar	Bwt	Puwt	Pewt	Pedwt	Pudwt	Flwt	%Flour
Cardaba	30	15.1	12.3	1.8	4.8	4.79	15.9
Bluggoe	30	14.8	12.1	2.4	5.0	4.98	16.6

Bwt: Bunch weight; Puwt: Pulp weight; Pewt: Peel weight; Pedwt: Peduncle weight; PuDwt: Pulp Dry weight; Flwt: Flour wight.

Table 3. Proximate Composition of Cakes

Chemical Components	Bluggoe Cake %	Wheat Cake %	Cardaba Cake %
Moisture	32.8	22.9	27.1
Carbohydrate	35.7	44.3	42.2
Crude Protein	8.8	9.2	9.2
Fat	18.5	15.8	17.2
Fibre	2.4	4.9	1.3
Ash	1.8	2.9	3.1

Table 4: Sensory Evaluation Scores

Sample	Colour	Taste	Sweetness	Acceptability	Texture	Overall
Wheat	4.591a	4.545a	3.682a	2.818a		4.714a
Cardaba	3.591b	3.773b	3.409a	2.591a	3.857b	
Bluggoe	3.409b	3.591b	2.818b	2.909a	3.476b	

Results and Discussion

Flour yield from Cardaba and Bluggoe were 15.9% and 16.6% respectively (Table 2). Cardaba and Bluggoe had a pulp to peel ratio of 1.2. This low pulp to peel ratio contributed to the poor flour yield in these two cultivars. The proximate composition of cake (Table 3) shows that Bluggoe had a moisture content of 32.8%, while Cardaba and Wheat had 27.1% and 22.9% moisture content, respectively.

The carbohydrate and crude fibre contents were 35.7% and 2.4% for Bluggoe, 42.2% and 1.3% for Cardaba; 44.3% and 4.9% for Wheat. Bluggoe cake had 8.8% protein while Cardaba and Wheat cake had 9.2% protein each. The fat content of the cake from the two cooking banana are similar with a slight difference in that of Wheat cake. The percentage fat in Bluggoe cake was 18.5% and 17.2% for Cardaba. Wheat cake however had 15.8% fat. The analysis also shows that Bluggoe, Wheat and Cardaba cake had 1.8%, 2.9% and 3.1% ash respectively. The energy content of the cakes (Figure 1) shows that Cardaba had 360.4KJ/100g, Wheat had 356.2KJ/100g while Bluggoe contributed 344.5KJ/100g.

Cake made from wheat was significantly different from Cardaba and Bluggoe cake in colour, taste and sweetness (Table 4). Inspite of this, all the samples were acceptable to the

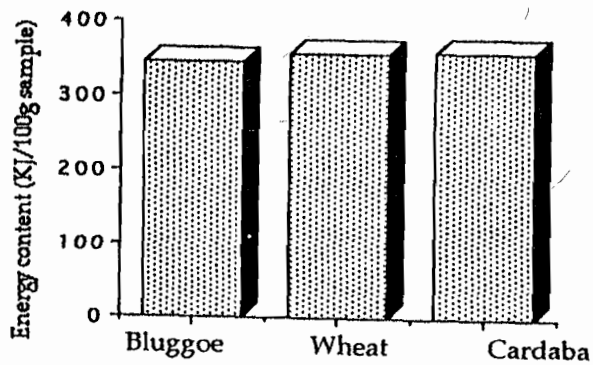

Figure 1: Energy Content of Cakes

panelists. There was no significant difference between cakes from Cardaba and Bluggoe except in sweetness. Mean separation however shows that Cardaba cake was preferred to Bluggoe cake except in textural quality. The texture of Bluggoe cake was better than that of Wheat and Cardaba, but there was no significant difference among all the samples. On the whole, cakes produced from the flours of Bluggoe and Cardaba had an overall acceptance. The production of 100% cooking banana cake confirms the work of Ogazi (1996). This author succeeded in making 100% plantain madeira cake which was acceptable in texture and taste, although the crust was dark due to caramelisation effect. This method of utilisation of cooking bananas which otherwise are rejected by consumers should therefore be exploited fully.

Conclusions : Cooking bananas have great potentials in terms of their utilization. A circumvention of poor acceptability of these crops can be achieved through diversification of their product base. The cakes produced from cooking bananas would compete with similar products on the market. This would serve as a means of reducing post harvest loss and promote the cultivation, processing and utilization of cooking bananas.

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