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Banana and plantain-based foods consumption by children and mothers in Cameroon and Southern Nigeria: A comparative study

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Bananas and plantains (*Musa* spp.) play an important role in the diet of people in Central and West Africa. In Cameroon and Southern Nigeria, a comparative study was carried out in 480 households to assess the frequencies and levels of consumption of banana and plantain-based foods commonly consumed by children under five years-old and their mothers. The results revealed some degree of similarities in the areas of boiled, roasted and fried banana or plantain between the two countries. Consumption frequencies of banana and plantain-based foods and consumption levels were higher among the respondents in Cameroon compared to Southern Nigeria surveyed. The daily consumption levels of boiled plantain, fried plantain and ripe banana were 225, 136 and 145 g respectively for children from Cameroon, while in Nigeria, the figure were 112, 82 and 80 g respectively. The daily consumption levels of the same recipes among the Cameroonian mothers were 402, 300 and 304 g respectively whereas among the Nigerian mothers, there were 265, 158 and 165 g. The study showed that banana and plantain-derived food were more consumed in Cameroon than in Southern Nigeria.

Key words: *Musa* spp., plantain-based foods, consumption frequency, level of consumption.

INTRODUCTION

Banana (*Musa* spp., AAA or ABB groups) and plantain (*Musa* spp., AAB group) are major food crops in the humid and sub-humid parts of Africa and major sources of energy for millions of people in these regions (John and Marchal, 1995). Nutritionally, *Musa* spp. constitute a rich energy source, with carbohydrates accounting for 22 and 32% of fruit weight for banana and plantain, respectively, and rich in vitamins A, B₆, C, minerals and dietary fibre (Chandler, 1995; Honfo et al., 2007a, b). The dense caloric content coupled with nutritional quality makes *Musa* spp. one of the most important and regularly consumed staple food in Cameroon and Nigeria (Ajayi and Aneke, 2002; Lusty et al., 2006). They contribute significantly to food security and provide more than 25 and 10% of the daily intake of carbohydrates and calories, respectively, for more than 70 million people in

Sub-Saharan Africa (IITA, 2000).

Cameroon and Nigeria are two major banana and plantain producing, consuming and exporting countries in Africa, and are ranked among the 20 most important banana and plantain producing countries worldwide (FAO, 2011). In Cameroon, total production of bananas and plantains was estimated at 1,400,000 metric tons in 2009 with dessert banana accounting for 35% whereas plantains and other cooking bananas accounted for 65% (FAO, 2011). In Nigeria, plantain production was estimated at 2,722,000 metric tons in 2009, with an average consumption level of 190 kg/person/year (FAO, 2011).

In the two countries, banana and plantain are widely consumed by the entire population, especially women and children because of their sweetness. Their consumption crosses multi-ethnic groups irrespective of locations and socio-economic status largely due to easiness of their preparation and consumption (Sharrock and Frison, 1998; INIBAP, 2002; Honfo et al., 2007a). This study aimed to provide a better understanding of the banana and plantain-based foods consumption in Central

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(Cameroon) and West (Nigeria) Africa. The main objective was to determine the frequency and levels of consumption of banana and plantain derived foods most commonly consumed in Cameroon and Southern Nigeria among the children and their mothers using survey data.

MATERIALS AND METHODS

Study area and selection of respondents

The survey was carried out in the Abia, Akwa-Ibom, Edo, and Ogun, States in southern Nigeria, targeting their capital cities, that is, Umuahia, Uyo, Benin City, and Abeokuta, respectively. In Cameroon, the survey was carried out in Bafia in the Central region, Bamenda in the North-Western region, Bertoua in the Eastern region, and Ebolowa in the Southern region. These locations were chosen due to their high production level of banana and plantain. In each location, sub-samples of 30 urban and 30 rural households with a fully weaned child under five year-old and whose mother was present were randomly sampled for a total of 240 households in each country.

Data collection

Structured questionnaires were administered to mothers in each household to identify their socio-demographic status (that is, age, number of children, household size, major occupation and educational back-ground). Also, data on banana and plantain varieties used, different banana and plantain derived foods preferred by households, periods that banana and plantain derived foods are consumed, daily amounts consumed by children under five and their mothers were assessed using the questionnaire.

The daily consumption level was evaluated using the 24 h recall method (Bingham et al., 1988) for three consecutive days. Each day and in each household, the mother recalled all the types and quantities of banana and plantain foods fed to their children and themselves during the last 24 h. The consumed quantities were estimated using local containers which were later converted into standard units (grams).

Data analysis

For each type of banana and plantain-based food, the daily consumption level was estimated as the average of three days' consumption for this type of food for each respondent (children or mothers).

Statistical analyses were performed using SPSS Software, Version 12. One-way analysis of variance (ANOVA) was used to determine the influence of region (Cameroon or Nigeria) or age (child or mother) on the banana and plantain level consumption. Least Significant Difference (LSD) test at 0.05 and 0.01 levels was used for means separation.

RESULTS AND DISCUSSION

Socio-demographic characteristics of the respondents

In Cameroon, respondents are from different ethnic groups such as Ngamba (20%), Bafia (18%) and Boulou

(14%). As for their education level, 7.9% of them had no formal education while primary level was the most dominant both in rural area (35% of respondents) and urban area (45% of respondents). Agriculture was the most dominant activity that occupied 50% of rural surveyed women while trading was the activity for 32% of the urban women. The majority of urban women (41%) and 19% of rural women were housewives without any specified occupation. The age distribution for mothers ranged between 25-34 years (52% of respondents) and 35-44 years (37% of respondents). Similarly, children's age ranged between 24-35 months (43%), and 36-37 months (33%).

In Nigeria, the main ethnic group of the women were Yoruba (26% of respondents), Ibo (25% of respondents), and Ibibio (22% of respondents). The most education level was primary level among the rural surveyed women (48% of respondents) while the highest education level among the urban respondents (61%) was the secondary level. The principal occupation of the rural women was agriculture, accounting for 49%, while 46% of urban respondents were engaged in trading and 33% of urban respondents were civil servants. The data showed that 58% of respondents aged between 25-34 years and 37% of respondents aged between 35-44 years. Most of the children had aged between 24-35 months (25% of surveyed) and 36-47 months (41% of surveyed).

Main forms of plantain-based foods in the households

Different varieties of banana and plantain were consumed by the households in both countries. The most consumed (banana or plantain) varieties in Cameroon were 'Ebang' and 'Essong' while 'landrace Agbagba' was the most consumed in Nigeria. Various recipes were used for processing plantain at different ripening stage and the main predominant dishes are presented in Table 1.

In the two countries, boiled ripe or unripe plantain, fried and roasted ripe plantain represented the most important consumption forms preferred by households because these forms could be easily accompanied by many other complements foods such as stew, vegetables sauces, fried kidney beans, roasted fish or meat. Banana and plantain processed into porridge (*malaxé* or *kondre*) and ripe banana were also more preferred in the two countries. Some of these recipes were reported by Honfo et al. (2007a) and Ngoh et al. (2005) in Cameroon; and by Sharrock (1996) in South-East Asia. Plantain chips seemed to be a popular snack in Nigeria, however, they were not known in Cameroon. Among these recipes, the less preferred forms in all households surveyed in the two countries were pounded banana/plantain and plantain flour paste (often associated with cassava, *Manihot esculenta*; or yam, *Dioscorea* spp. flour in Nigeria).

Table 1. Forms of plantain (% of N respondents) preferred in the households.

Forms of meal	Cameroon (N = 240)	Nigeria (N = 240)
Boiled ripe or unripe plantain	100	100
Fried plantain	100	100
Plantain chips	95	100
Plantain flour paste	18	79
Roasted plantain	100	100
Banana / plantain porridge	100	66
Pounded banana/ plantain	49	74
Ripe banana	100	100

Table 2. Preferred times (% of N respondents) for plantain foods consumption in the households.

Country	Meal	Boiled ripe/ unripe plantain	Fried plantain	Plantain chips	Plantain flour paste	Roasted plantain	Banana/ plantain porridge	Pounded banana/ plantain	Ripe banana
Cameroon (N = 240)	Breakfast	56*	12	0	0	5	13	4	21
	Lunch	88	51	3	15	27	72	41	35
	Snack	6	30	41	0	39	39	0	49
	Dinner	91	43	0	20	25	25	24	18
Nigeria (N = 240)	Breakfast	30	47	0	2	9	9	2.1	4.2
	Lunch	37	9	4	18	16	16	62	12
	Snack	4	32	60	0	24	24	1	32
	Dinner	27	8	0	27	7	7	4	9

* = sum < or > 100 because several answers were possible.

These dishes were generally accompanied by stew or vegetables sauces with fish or meat, depending on the income of the household. Plantain flour paste was less consumed in the South and Central Cameroon because it was not in their food habit. However, pounded banana/plantain (often associated with cocoyam, *Xantosoma sagittifolium*) was popular in North-West Cameroon, and plantain flour paste was a popular traditional dish in Nigeria (Ukhum and Ukpebor, 1991).

Period and frequency of consumption of plantain-based foods in the households

Periods of the day that banana and plantain-based foods are mostly consumed were not significantly different in the two countries. Thus in Cameroon or Southern Nigeria, most of the surveyed households consumed ripe banana, boiled or fried plantain and plantain porridge throughout the day (Table 2). Ripe banana was most consumed as dessert fruit or as snack at the appropriate stage of ripeness between meals. Most of the respondents (41% in Cameroon and 60% in Nigeria) consumed plantain chips in the afternoon as snack. Pounded banana/plantain and paste of plantain flour

were more preferred at lunch (41% of respondents in Cameroon and 62% of respondents in Nigeria) and at dinner (24% of respondents in Cameroon and 43% of respondents in Nigeria). The same trend was observed for the plantain paste food in the two countries. Boiled ripe/unripe plantain was consumed through the day by the respondents.

The consumption patterns for the different plantain foods by children and mothers of Cameroon showed that ripe banana, boiled plantain, plantain porridge, and fried plantain were consumed regularly (2-3 times/week) by 27, 35, 19 and 12% of the respondents respectively (Table 3). In Nigeria, the same foods were consumed regularly by 15, 25, 5 and 31% of respondents respectively. Boiled and fried plantain frequency consumption indicated their general preference in the two countries. Pounded boiled banana and paste made with plantain flour appeared to be marginal dishes since they were rarely consumed by 67% in Cameroon versus 58% in Nigeria for pounded banana, and 88% in Cameroon versus 63% in Nigeria for plantain flour paste. The weakness of the frequency consumption of plantain flour paste in Cameroon was due to its non incorporation in the food habit of all Cameroonian people; it was more consumed in the North-West. The same trend on the

Table 3. Frequency (% of N respondents) of consumption of banana and plantain meals among households in the two countries.

Country	Frequency of respondents	Boiled ripe/unripe plantain	Fried plantain	Plantain chips	Plantain flour paste	Roasted plantain	Banana/plantain porridge	Pounded banana/plantain	Ripe banana
Cameroon (N = 240)	Frequently*	10	5	0	0	3	8	0	8
	Regularly	35	12	10	2	12	19	8	27
	Occasionally	50	48	25	10	25	48	25	60
	Rarely	5	35	65	88	60	25	67	5
Nigeria (N = 240)	Frequently	6	13	6	2	7	0	1	5
	Regularly	25	31	14	10	16	5	6	15
	Occasionally	46	47	47	25	35	29	35	46
	Rarely	23	9	33	63	42	66	58	34

*Frequently: once/day; regularly: 2-3 times/week; occasionally: 3-4 times/month; rarely: once or less than once/month.

Table 4. Average daily quantity (g of edible portion) of banana and plantain meals consumed by children and mothers surveyed, according to the country where they living.

Forms of meal	Children		Mothers	
	Cameroon	Nigeria	Cameroon	Nigeria
Boiled plantain	225.55±125.7 ^{b**} (142)	112.8±62.7 (96)	402.06±186.2 (126)	265.9±203.9 (97)
Fried plantain	136.49±65.6 (85)	82.5±56.3 (132)	300.21±168.1 (82)	157.6±216.1 (126)
Plantain chips	68.29±49.8 (73)	54.5±49.6 (92)	92.43±46.8 (68)	63.5±110.5 (84)
Roasted plantain	136.0±64.4 (58)	85.2±104.8 (96)	237.58±110.9 (51)	184.9±303.2 (78)
Banana/ plantain porridge	344.71±124.0 (101)**	158.9±96.3 (41)	618.94±327.8 (113)**	372.3±242.1 (45)
Ripe banana	144.67±87.1 (135)	80.1±50.6 (63)	333.64±130.6 (128)	165.4±247.3 (79)

^b: mean ± standard deviation; in bracket: number of persons that consumed the considered product at least once 3 days survey; **: Significant difference at 5%

frequency consumption of banana flour paste was observed by Ngoh et al. (2005).

The consumption frequencies of some banana and plantain derived foods were slightly higher in Cameroonian households than in Nigerian households.

Consumption level of plantain-based foods

For each country, the daily quantity of banana and plantain derived foods consumed by mothers and

children are presented in Table 4. For some derived foods the data showed differences between the two countries. The daily quantities of boiled plantain consumed by children were higher ($P < 0.05$) in Cameroon (225 g) than in Nigeria (113 g) (Table 4). The difference is due to this form of derived food of plantain (boiled plantain) which was popular and frequently consumed in Cameroon. The consumption frequency and the quantities of banana porridge consumed individually by children and by mothers were significantly higher in Cameroon than in Nigeria. Thus, children in Cameroon

consumed 344 g of porridge banana/plantain per day versus 159 g for the Nigerian children.

In the same way, the daily consumption level was 619 g for the Cameroonian mothers versus 372 g for Nigerian mothers. The average daily consumption levels of other forms (ripe banana, fried, roasted plantain) by children or mothers were similar in the two countries. Globally, the consumption level of banana and plantain was higher in Cameroon compared to Nigeria because banana and plantain are their favorite staples foods and their inclusion as meal option during some ceremonies like weddings or funeral is paramount (Tchango-Tchango et al., 1999). Moreover, statistical analysis did not reveal any significant correlation between the consumption level and social factors (ethnic, educational level or principal activity).

Conclusion

This study has the merit to show the difference between Cameroon and southern Nigeria children and mothers in the consumption of banana and plantain derived foods. There was a similarity between the two countries for the diverse forms of banana and plantain derived foods. Some variations were observed in the frequencies and the consumption levels of certain banana and plantain-based foods by children and their mothers in the two countries such as banana flour paste or pounded plantain. Overall, the study showed that banana and plantain-derived food were more consumed in Cameroon than in Southern Nigeria.

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