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MARKET POTENTIALS OF BANANA AND PLANTAIN POWDER / PUREE IN THE NIGERIAN FOOD AND ALLIED INDUSTRIES.

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ABSTRACT

A survey of the market potential of banana/plantain powder and puree as raw materials in the food and allied industries was carried out. The study included a survey of the availability of banana/plantain for processing, identifying major cultivars grown, the demand for banana/plantain in the food and related industries, the potential for banana/plantain powder and puree as local substitute for imported raw materials, and the economic benefit of the processing of banana/plantain powder and puree in Nigeria. An industrial survey was carried out to determine the current and potential uses, users and create awareness of the potential in the food and related industries. From the study, the industrial uses were found to be mainly in the production of bread, cake, biscuit, beverages, banana flavoured breakfast cereals, milk drinks, baby food; ice-cream products and multivitamin drugs. The industrial sectors found to be users are the food and pharmaceutical sectors of which about 33.3% of the total respondents use banana powder and puree, 16.7% use plantain puree, while 50% do not use either. Vanilla flavour is used extensively as substitute and only 5% of the banana powder used is from local supply while 95% is by importation. The economic benefit of processing locally available banana/plantain into puree and powder lies in the replacement of the imported raw materials such as vanilla and other flavours with locally processed powder

and puree thereby generating employment and stimulating national economic growth.

INTRODUCTION

Banana and plantain (*Musa Sapientum* and *Musa parasidiaca*) respectively, belong to the group of tropical fruits which form part of the main tropical staple crops (1). Ripened fruits are known to be rich sources of natural soluble sugars, potassium, phosphorus and vitamins, and also characterized by their aromatic flavour, especially banana flavour which is dominated by isoamyl acetate ester (2). Nigeria is the largest producer of plantain and banana in West Africa, growing several local and hybrid cultivars (such as Bini, French, Chinensis, Cavendish) with annual production of over 2.4 million metric tones (3 and 4).

The development of new hybrids at International Institute for Tropical Agriculture (IITA) and the Nigeria Institute for Horticultural Research (NIHORT), Ibadan will make the production of Banana/Plantain more profitable in view of high yields of such hybrids. However, following maturity and harvest, there is a rapid rate of deterioration of ripe Banana occasioned by the hydrolysis of starch and accumulation of sugars. Therefore, dehydration of ripe fruits would serve as a measure of utilising surplus and over ripe Banana (5).

Processing of banana and plantain into various products for different food applications have been severally reported such as flour (obtained from nature green fruits), powder/puree (obtained from ripened fruits), chips or crisps, flakes, jam, wine and others (6 - 8).

Banana/plantain flavours which is much cherished by consumer of the fruit consists of several aromatic esters, dominated by iso-amyl acetate, which vary with variety or cultivar (9). Vaelery and cavendish banana cultivars grown in Brazil have been found to be suitable for powders and puree making respectively,

which serve as ingredients in various food products for purposes of nutrition and flavour enhancement (8).

Many local cultivars of banana/plantain are cultivated and produced in Nigeria, but domestic uses still dominate while industrial utilization is yet to be fully explored (3 and 10). The main constraints to the industrial utilization is the under production, since growing has been left in the hands of subsistent farmers who account for about 80% of Nigeria's agricultural output (3).

There is therefore need to encourage demand for indigenous locally processed food. This will preserve our cultural food selection and habit while ensuring proper nutrition. Also there will be reduction of dependence on foreign and imported food.

There is also need for building a new image for indigenous foods, considering the fact that the exponential nature of our population growth rate implies that our survival now and in the future lies in a massive and planned industrialization of agriculture and multiplication and diversification of food processing industries in every state of the federation (11).

Much literature either in the form of survey work or otherwise has not been found reported on the industrial utilization of the Musa species, especially the ripened fruits. This study was therefore carried out with the objective of investigating the following:

- ❖ The availability of Banana/Plantain as raw materials for processing in Nigerian food and related industries.
- ❖ The demand for Banana/Plantain in the Nigerian food and related industries.
- ❖ The industrial uses of Banana/Plantain powder and puree in the food and related industries.
- ❖ The potential for local substitution of Banana/Plantain powder and puree for imported raw materials in Nigeria and

- ❖ The economic benefit of processing Banana/Plantain powders and puree in Nigeria.

MATERIALS AND METHODS

The study on availability of banana and plantain for processing in Nigeria was carried out using secondary data available at the Federal Office of Statistics (FOS), Central Bank of Nigeria (CBN) economics review and from literature. Also visits were made to the identified producing areas to investigate the cultivars that are available for processing.

The industrial uses of Banana powder and puree were obtained from literature and industrial survey. Using the data obtained companies that are likely and potential users of Banana/Plantain powder and puree were identified based on their products. The addresses of these companies were obtained from industrial directories, publications of Nigerian Chamber of Commerce and Industries Manufacturers Association of Nigeria (MAN) and National Association of Small Scale Industries (NASSI).

For the study, structured questionnaire was used, designed in form of a letter in which about ten questions were incorporated and the respondents were assured of confidentiality. Some of the processed questionnaires were administered to companies within Lagos environs through personal interviews while the remaining were mailed to companies located outside Lagos.

The retrieved questionnaires were subjected to statistical representations and interpretations to establish the companies using banana/plantain powder and puree in their production, the source of the banana/plantain powder or puree, the quantity used annually and the cost (12). Other flavours being used instead of banana/plantain powder and puree were investigated.

The possibility of the companies using banana/plantain powder and puree if processed locally was also investigated. Data

were obtained on importation of banana powder and other flavours being used in the Industries from the FOS. This was to ascertain the total quantity of banana powder being imported into the country and the cost of importation. Data were collected on vanilla flavour to substantiate the claim that it is used in place of the plantain/banana powder in the food and pharmaceutical industries. The main objective is to indicate the economic benefit of producing plantain/banana powder locally.

RESULTS AND DISCUSSION

Availability of banana/plantain as raw materials in Nigeria

Banana/plantain plantations and steds are found to be scattered all over the southern parts of Nigeria (Table I), and cultivation is dominated by peasant farmers, with only few research centres (National Institute for Horticultural Research, Ibadan and International Institute of Tropical Agriculture, Onne Station). Many local cultivars of both banana and plantain are grown as well as few hybrids developed through research efforts. Banana cultivars include cavendish (Yellow and red peel types), chinensis (known as paranta among the Yorubas), senior banana, saro, chikita, while plantains are, Bini Cultivar (long and robust fingers), French cultivar (Short and robust fingers) and short but small finger type (known locally as Asogba). However, similar report has been given which did not specify the various local cultivars of banana and plantain grown in each area (10). Quantitative aspects of fruits produced are however not carried out since more recent production data have been reported (13) (Table II).

Industrial uses of banana/plantain powder and puree in the food and pharmaceutical industries.

The different categories of food and related industrial applications of banana/plantain flour, powder and puree from the survey and also from literature are shown (Table II). Banana and plantain have been used in the production of various food products such as

bakery flour, biscuits, flavour, cereal based baby food, alcohol beverage like beer, wines and non-alcoholic beverages like banana drinks. Experiments were carried out using 25% banana flour and 75% standard wheat flour in baking bread (14). In carrying out an investigation on banana usage in biscuit making, ripe banana flour was incorporated into wheat flour at a level of 24% in the manufacture of army biscuits (15). Using equal amounts of green banana flour and wheat flour, cup cakes were prepared which were acceptable to consumers (16). Ogazi (4) used plantain flour produced after drying green plantain pulp at temperatures between 50°C and 65°C in the production of plantain biscuits. The production of plantain and banana composite bread was technically feasible (3).

Banana and plantain flour produced from green mature fruits were used to produce soy-banana and soy-plantain baby foods respectively at the Nigerian Institute for Horticultural Research (NIHORT), Ibadan.

The demand for banana/plantain powder and puree in the Nigerian food and related industries.

The companies found from the survey as users of banana/plantain powder and puree in their production in Nigeria are from the food and Pharmaceutical industries. These companies use banana/plantain powder as flavours and main ingredients. Figs. 1 and 2 showed that 33.3% of surveyed companies use banana powder and puree out of which 5% are obtained locally and 95% are obtained by importation. 16.7% of the companies utilize plantain puree which is produced locally while 50% are non users. These products of these companies are biscuits, breakfast cereals, ice-cream products, multivitamin syrups and baby food.

From the survey of 40 companies, only 2 indicated that about 5.6 metric tones of banana powder was imported annually, information on cost was however not given. Other flavours used by these companies were found to be vanilla, vanillin and other nature

identical flavours. There was enough indication that current users and potential users would prefer locally produced banana powder if available in commercial viable quantity to replace imported flavours, right quantity and suitable for product and at lower cost.

The potential for local substitution for imported raw material and economic benefit of local processing of banana/plantain into powder and puree.

The use of strictly non-wheat cereal flours and their blends with plantain and banana flours in the preparation of special breads such as corn bread, cakes, cookies and pastries has received substantial research and development attention by research and development teams at the Federal Institute of Industrial Research, Oshodi (FIRO), Institute of Agricultural Research (IAR), Zaria and some Universities such as University of Nigeria, Nsukka, Obafemi Awolowo University, Ile-Ife and Federal University of Technology, Owerri. Thus, indicating that the imported raw materials such as vanilla flavours and others could be substituted with locally processed plantain/banana powder and puree without compromising the quality and standards of the finished products. Also, NIHORT, Ibadan has conducted considerable research on plantain and banana as sources of flavour for confectionery, breakfast cereals and baby foods. These studies indicate the very high potential of these crops.

From the FOS, however, import data was obtained for 1995 and 1996 on banana powder (17) (Table III). Also presented are import data on vanilla from 1993 to 1996. From the data, it is observed that banana powder is recently being imported into the country. This is substantiated by the fact that data was not available until 1995. The quantity of banana powder imported in 1995 and 1996 is about 883kg on the average at a value of ₦168,992. This is in agreement with the quantity claimed as being used per annum by the two companies in the study. The quantity being used is not likely to be large since it is used mainly as

Table 1
List of Major banana and plantain production areas and the principal hybrid cultivars grown

Production Area	Banana Cultivars						Plantain Cultivars			
	Chinese	Cavendish (blue part)	Cavendish (red part)	Senior	Saro	Orin	ITA Hybrid	Mini	Frank	Asogba
Oyo State	✓	✓	✓	✓			✓	✓	✓	✓
Ekiti State	✓	✓		✓		✓	✓	✓	✓	✓
Oyo	✓	✓	✓	✓	✓		✓	✓	✓	✓
Ogun	✓	✓	✓	✓	✓		✓	✓	✓	✓
Edo/Anambra		✓				✓	✓	✓	✓	✓
Abia/Benue		✓				✓	✓	✓	✓	✓
Imo	✓	✓				✓	✓	✓	✓	✓
Ogoni	✓	✓					✓	✓	✓	✓
Lagos	✓	✓					✓	✓	✓	✓
Cross Rivers/Rivers	✓	✓				✓	✓	✓	✓	✓
Kwara/Kogi	✓	✓					✓	✓	✓	✓

flavours. The quantity of vanilla imported in the country ranged from 10,995kg to 38,511kg at values of N458,905 to N1,334,911. The quantity of vanilla imported into the country is an indication of demand for banana powder as flavour in the food and pharmaceutical industries.

Table 11. Different categories of food and related industrial applications of banana and plantain flour and powder/puree.

Major Ingredients			
Food and related product	Plantain and banana flour	Banana Powder/puree	Plantain Powder/puree
Composite flour	"	"	"
Biscuit/cracker	"	"	"
Beverage(wine, fruit drink)	"	"	"
Cake	-	"	"
Flavoured breakfast cereals	"	"	"
Banana milk	-	"	"
Enriched baby food	-	"	"
Cream biscuit and wafer	"	"	"
Ice-cream and Yoghurt	-	"	"
Pharmaceutical syrups	-	"	"

The economic benefit of the use of banana/plantain powder and puree in the food and pharmaceutical industries, lies mainly in the substitution of the imported raw materials such as wheat flour and vanilla flavour with locally processed banana/plantain powder and puree which has the added advantages of employment opportunity generation and the stimulation of

national growth. Also, the increased demand for banana and plantain powder will encourage the establishment of plantations, thus directly and indirectly stimulating rural agricultural and commercial ventures leading to accelerated development through establishment of processing factories. The establishment of banana/plantain agro industrial projects in the rural areas will help to bring about a more balanced development by opening opportunities for business which will then translate into other new demand and savings which are the factors in economic growth.

Table III. Import data on banana powder and vanilla

Year	Product	Quantity (KG)	Value (₦)
1993	Banana powder	-	-
1993	Vanilla	38,511	458,905
1995	Banana powder	350	168,139
1995	Vanilla	10,835	1,334,911
1996	Banana powder	1,415	169,845

Source : Nigerian Trade Summary, FOS (17)

CONCLUSION

The industrial uses of banana/plantain powder and puree were established as flavours and raw materials in the manufacture of biscuits, breakfast cereal, baby food, ice-cream products, syrups and other consumer health products. The study has established the awareness of the importance and demand for banana/plantain powder and puree in the industries and the need for more research and development work in the area of primary production and processing of banana/plantain has been revealed by this work.

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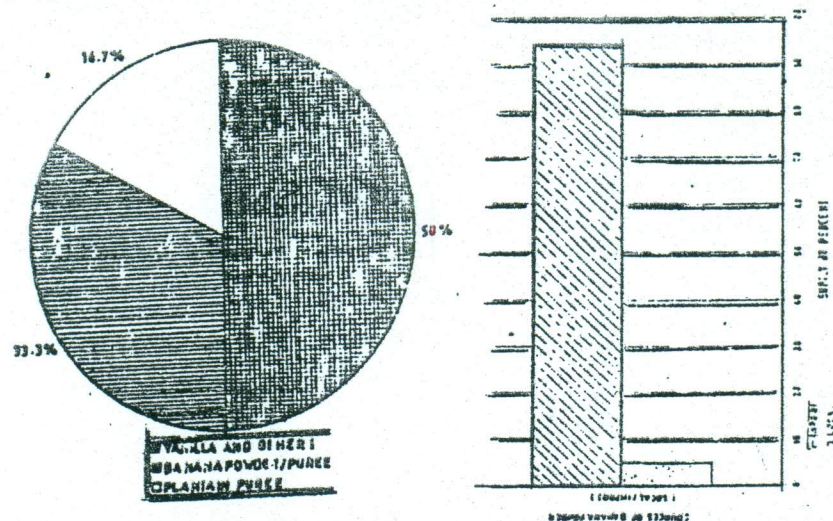


Fig. 1. Banana/plantain powder and application in Nigerian food industries.

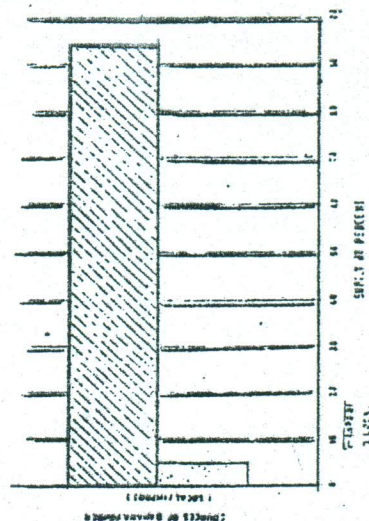


Fig. 2. Sources of banana puree powder/puree supply to the the Nigerian food industries.

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