

Economic Analysis And Nutritional Evaluation of Some Processed Food Samples Produced By Nspri

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Abstract: The costs and returns analysis of some selected, processed food samples produced by the Nigerian Stored Products Research Institute (NSPRI), Nigeria was analyzed using Gross Margin analysis to determine the profitability of the enterprise. Pounded-yam, ground rice and flavored pap were produced by processing yam tubers (*Dioscorea rotundata*), Rice (*Oryza sativa*) and Guinea corn (*Sorghum bicolor*) respectively into their powdery forms. Hygienic drying was achieved for the products through the use of Multipurpose Dryer (MPD) developed by NSPRI. The proximate analysis of the samples was carried out to determine the nutritional content of the products which includes moisture content, crude protein, crude fibre, ether extract, ash content, nitrogen free extracts as well as energy content and vitamin A. The production of 1000kg of each product was found to be profitable. This paper shows that production of pounded-yam, ground rice and flavoured pap (ogi) for income is a viable enterprise.

Keywords: Pounded-yam, ground rice, flavored pap (ogi), multi-purpose dryer, Gross Margin, proximate.

I. Introduction

The economic situation of the Agricultural sector in developing countries such as Nigeria has been adversely affected mostly by post-harvest losses of commodities which are usually encountered, especially during storage (Arannilewa et al., 2002). Increased food production and improved productivity are necessary means of increased growth and improved living standards in developing countries. Ogugua (1994) stated that other things being equal the quantity of food available to a population is determined not just by the amount of food available or imported but also by the extent of post-harvest losses. This implies that reduction of post-harvest losses and production of convenient, safe and wholesome food through processing are equally important.

Processing of any food crops into other forms (i.e. paste, jam, or powdery flours) is primarily to add value and increase its shelf-life, thereby reducing post-harvest losses. This leads to increased food production and improved productivity, which are necessary means of increasing economic growth and improve living standard in developing countries. Processing of food for income needs to address the economic analysis of its production because net gains on agricultural investments promote sustainable farm production [18], [19].

Drying is one of the inexpensive processing methods used in food preservation which is also employed in the production of the food variables of this project. Drying is the oldest method known for preserving food. Drying of food involves the exposure of food to a temperature that is high enough to remove the moisture, but low enough that it does not cook. Good air circulation assists in evenly drying of food. The development of NSPRI dryers (hybrid and multipurpose) is an achievement in the area of drying technology which ensures the production of hygienic dried products [6], [7], [16], [17]. Also, Barrie (2002) revealed that it is essential when considering processing of any food for income, not only to examine and understand the technical aspect of that processing but aspects such as marketing, packaging, quality assurance and business economics. Furthermore, social changes and urbanization occurring worldwide are resulting in consumers requiring new product development, for example, those which are quick and convenient to prepare. The processing sector is very important for economic development in developing countries. Nowadays, processing of food crops should not only focus on small scale sustainable technologies that build on indigenous skills with minimum reliance on external inputs, it should also be nutritionally sensitive and economically viable, therefore, the need for this research.

The Products Overview:

The Flavored Pap [Ogi]:

The flavored pap [Ogi] is an example of traditional fermented food, a sour porridge widely consumed in Nigeria, prepared from maize, sorghum, or millets. This Africa delicacy is estimated to have contributed about 33.33% caloric intake to the average Nigerian, reason being that, it is either consumed as a weaning food for children or as a breakfast food for adults. It is usually supplemented when served with other beverages like milk, refried beans [phaseolus spp.], eggs etc.[3], [4]. Nowadays, both traditional and industrial methods of manufacturing of Ogi have been developed and improved on to a semi-industrial scale [8] [9]. It is a popular breakfast cereal and infant weaning food in Nigeria [9], [10], [11]. Fashakin in his findings later established that the low-income earners find ogi as a better alternative in infant food, but without fortification, kwashiorkor may be imminent [14].

Poundo-Yam:

Poundo-Yam is a bright white coloured solid food, hygienically produced from a processed powdery form (i.e. yam flour) of selected yam tuber. This is an extraordinary energy given food, produced from selected yam tubers. Instant yam flour otherwise known as poundo yam is a perfect substitute for pounded yam due to its evident shelf life extension property, as well as its time saving property, convenient method of preparation, and also its property of being easily served with any soup of choice. It is popularly eaten in all parts of Nigeria and many parts of West African countries. This state of yam evidently increases wide functionality or usages of yam tuber after harvest [10], [11].

Ground Rice:

Ground rice is usually made from either white rice or brown rice. For this research, the ground rice in our context was produced by milling unparboiled white rice, which resulted into a flour with appealing physical and textural property. However, rice was cleaned and free of any contamination using warm water for brief washing. This is a kind of rice flour, made by removing the husk of rice or paddy of raw rice, which is then ground to flour using a stainless steel grinder, and was allowed to cool before packaging. It is a recent and gradually evolving staple flour for food and confectioneries especially in Nigeria these days.

II. Materials And Methods

2.1 Collection Of Samples:

The raw materials such as rice grains, yam tubers and guinea corn and other used materials were purchased from Oja – Oba market in Ilorin, Kwara State, Nigeria.

2.2 Methods:

Processing of poundo yam, ground rice and flavored pap (Ogi) from their raw materials were carried out as stated below respectively.

2.2.1 Preparation Of Poundo-Yam

The method employed in the processing of poundo-yam involves washing of the tubers, followed by peeling, slicing into oval shapes and later sliced thinly to obtain fine chips, then blanched for five minutes before draining. The drained chips were spread on trays in the dryer for about eighteen hours. Each loading is at the maximum capacity of the dryer. The dried product was sorted to improve the quality, market acceptability and value [11], [12], and [13].

2.2.2 Preparation Of Ground Rice

Rice grains were washed with warm water, sieved, and then dried using Multi-purpose dryer, followed by milling, after which it was allowed to cool and packaged.

2.2.3 Preparation Of Flavoured Pap

Guinea corn grains were cleaned, soaked for three days in water, after which the water was drained and the fermented grains were re-washed, wet milled, and sieving method of separation was used to remove residue, and the filtrate was pressed, and then spread thinly on trays in the Multi-purpose dryer for thin layer drying for ten hours in order to produce safe and hygienic product, then re-milled into powdery forms and packaged [6], [7], [8], [12].

2.2.4 Fortification And Proximate Analysis Of Products.

Poundo yam and ground rice were fortified with **vitamin A**. The proximate composition of the three products such as the crude fiber, moisture content, protein and fat of the sample was determined using the A-O-A-C standard method (2000). Carbohydrate was calculated by differences [1] [4] and [15].

2.2.5 Measure Of Profitability

The data obtained in the production of 1000kg of these products were analyzed using gross margin analysis as a measure of profitability. The prevailing market prices were used for the outputs and inputs used [5], [14],[15], [16], and [17].

III. Results And Discussion

The total variable production cost of producing 1000kg of each product was shown in table 1.0A and table 1.0B revealed total revenue from sales of products and their residues. The prevailing market prices of inputs used in purchasing and processing of the products were considered while table 2.0 shows the proximate composition of the products. Table 3.0 shows the Gross Margin for the product. Table 1.0A indicates that N494,432.78 as production cost for Poundo yam N326,324.35 for flavored pap and that of ground rice is N276,375.00.

Table 2.0: Results of Proximate analysis of Poundo yam, flavored pap and ground rice.

Nutritional Status Per 100g

FOOD SAMPLE	Moisture %	Crude Protein %	Crude fibre %	Ether extract %	Ash %	Nitrogen free extract %	Energy content KJ/100g	Vitamin I.U
Poundo Yam	10.61	6.72	4.65	4.42	0.98	83.23	1499.98	30,000
Flavored pap	11.38	9.64	0.25	5.62	0.28	84.21	1601.12	-
Ground Rice	11.09	5.97	0.80	3.95	0.72	88.56	1563.20	30,000

Physical Assessment Of The Three (3) Products:

Composition	Poundo yam	Flavored pap	Ground rice
Color	White	Pink	White
Texture	Fine	Fine	Fine

Table 1.0B reveals the total revenue from each product and its residue. Yam flour(Elubo) and Sorghum chaff(called “Eeri” in Yoruba land area of Nigeria and usedfor animal feeds) generate N48,000.00 andN6,104.00 respectively from their sales, while revenues from these products were N550,000.00,N400,000.00 and N350,000.00 accordingly. The total revenue for each product is the summation of its revenue and that of its residue. The result of Gross Margin analysis in Table 3.1 after payment of 10% interest on loans used in operating the processing indicates that N103,567.22, N79,779.85 and N73,625.00 are realized from Poundo yam, flavored pap and ground rice respectively. [18],[19], [20], [21], [22], [23] and [24]

IV. Conclusion

The study reveals that the three commodities are of high quality grade and good nutritional content.The Gross Margin of each product shows that investing in their production is lucrative(i.e. It is a profitable venture for anyone who wants to be a processor).

The result of the quality assessment of the fortified poundo yam, ground rice, and flavored pap, is a versatile tool in Nigeria and many other countries where the infants, children and adults have been found to consume more of these foods as their major staple.

Table 1.0a: Production Cost Of 1000kg Of Poundo Yam, Flavoured Pap And Ground Rice

PRO DUC TS	FRESH CROPS	FUEL USED (KER OSENE)	OPP. COST OF DRY ER	OPP.C OST OF PROC ESSIN G BUIL DING	MIL LIN G COS T	PACK AGIN G MATE RIAL S	MANA GEME NT & LABO UR COST	UTI LITI ES	TRANS PORT COST	MA RKE TIN G COS T	OTH ER INP UTS	CAP ITA L COS T (INT ERE ST)	TOT AL COST
Pound o yam	Yam tuber (4297.8 7kg) N212,7 65.84	(1276. 60litre s) N1021 27.60	N3,3 00.0 0	N6,600 .00	N12, 600. 00	N26,4 00.00	N77,40 0.00	N2,0 00.00	N5,000. 00	N2,0 00.00	N2,2 00.00	N44, 039.3 4	N494, 432.7 8

Flavoured pap	Guinea corn(1,555.65 kg) N166,167.14	(500litres) N42,500.00	N1,900.00	N3,800.00	N14,691.36	N20,000.00	N31,800.00	N5,000.00	N5,000.00	N2,000.00	N3,000.00	N29,665.85	N32,6324.35
Ground rice	Rice (1000kg) N166,000.00	(250litres) N21,250.00	N2,000.00	N4,000.00	N11,500.00	N20,000.00	N18,000.00	N2,000.00	N1,500.00	N2,000.00	N3,000.00	N25,125.00	N27,6375.00

Table 1.0b: Revenue From The Products And Their Residues

PRODUCTS	QUANTITY(KG)	PRICE/KG	REVENUE (N)	TOTAL REVENUE (N)
Poundo yam	1000	N550.00	N550,000.00	} N598,000.00
Yam flour	320	N150.00	N48,000.00	
Flavoured pap	1000	N400.00	N400,000.00	} N406,104.00
Chaff(“eeri”)	305	N20.00	N6,104.00	
Ground rice	1000	N350.00	N350,000.00	N350,000.00

Table 3.0: Gross Margin(Gm) Of The Products

PRODUCTS	TOTAL REVENUE(TR)	TOTAL COST(TC)	GROSS MARGIN(GM = TR-TC)
Poundo yam	N598,000.00	N494,432.78	N103,567.22
Flavoured pap	N406,104.20	N326,324.35	N79,779.85
Ground rice	N350,000.00	N276,375.00	N73,625.00

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