NUTRIENT COMPOSITION AND ACCEPTABILITY OF "PUPURU" FORTIFIED WITH SOY FLOUR

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ABSTRACT

The proximate composition and sensory evaluation of (a smoked ball – moulded fermented cassava dough) were investigated. Four different soy "Pupuru" were produced in the ratio of 95:5, 90:10, 85:15, 80:20 and 70:30 with100% references. The result obtained showed that protein content increased in proportion to the increase in level of substitution (2.10-9.10%).The fat content also increased in proportion to the increase in level of substitution (1.71-5.84%) likewise the fibre content. The "Pupuru" produced from 50% soy flour substitution had the highest crude protein content of 9.10%. The sensory evaluation result revealed that "Pupuru" fortified with 10% soyflour was the most accepted because there was no significant difference at 5% level between this sample and the control (100% "Pupuru"). The other samples were significantly different at 5% probability level from the control while 0:50 soy "Pupuru" having the lowest overall acceptability. This indicates that supplementation of "Pupuru" with soy flour would greatly improve the nutritional quality of "Pupuru" produced from the flour.

Key words: "Pupuru", substitution, soy flour, acceptability

INTRODUCTION

Cassava is one of the most drought tolerant crops and can be successfully grown on marginal soils, giving reasonable yields where many other crops do not grow well. One of the advantages of cassava over other starchy crops is the variety of uses to which the roots can be subjected to (Olatidoye et al., 2010). Cassava is a staple food for human beings especially Africa, it has excellent use as livestock feed, used in textile industry, plywood, paper, brewing, chemical and pharmaceutical industries (Olatidoye et al., 2010).Cassava, (Manihot esulenta) is a perennial woody shrub, grown as an annual and is a tropical root crop, requiring at least 8 months of warm weather to produce a crop. It is traditionally grown in a savanna climate, but can be grown in extremes of rainfall. Cassava is a major source of low cost carbohydrate for populations in the humid tropics (Onwueme, 1978). The largest producer of cassava is Brazil, followed by Thailand, Nigeria, Zaire and Indonesia.

In Nigeria, many traditional foods are processed from cassava roots among which are "Pupuru", lafun, fufu and gari amala and eaten with soup depending on the family income.Cassava may be supplemented with legumes in this zone, many people cannot afford the supplementation which in most cases are in form of expensive animal proteins(Olatidoye et al., 2010). Soya bean, Glycine max, a grain legume is one of the richest and cheapest source of plant protein (Ihekoronye and Ngoddy, 1985). Soya bean contains higher and essential fatty acids, and is a good source of calcium, magnesium, lecithin, riboflavin,

thiamin, fiber, folic acid and iron which if eaten along with cassava based foods could go a long way in improving its nutritional value status.

"Pupuru" is a smoke ball-moulded fermented cassava product, which is usually made into porridge in boiling water before consumption with any desired soup. It is a local food product in Nigeria, eaten mainly by the people of Ilaje and Ese-Odo (Ikale) area on Ondo in Nigeria.Soya beans have recently become popular in West African sub regions due to their high protein content and quality, and are being cultivated at a steadily increasing rate. Traditional food uses of soya beans are very limited, but efforts are being made to promote their incorporation in the peoples diets. Soya beans have high protein content and are not very expensive. Extensive research into the process characteristics, nutritional quality and consumer acceptability of "Pupuru" fortified with soy bean is necessary if these items are to be used effectively to improve the nutritional status of the vulnerable group of the population. The research this work evaluated the effect of supplementation of soy bean on nutritional content of "Pupuru" and consumers acceptability of the product.

MATERIALS AND METHOD

Material: Freshly harvested cassava roots of low cyanide were obtained from a farm in Abeokuta. The cassava roots used to produce fermented cassava balls called ""Pupuru"" were obtained from the farm between eight and nine months old.
Freshly harvested soybean seeds were purchased from a local market (Adatan) in Abeokuta, and these were used to produce the full fat soy flour.

Preparation of Full-Fat Soyflour: Freshly harvested soy beans seeds were purchased and processed into flour using IITA method (1990). Blends Formulations: Four blends (each of "Pupuru" and soy bean flour) were prepared by mixing the proportion of 100:0, 90:10, 80:20, 70:30, and 50:50

Preparation of "Pupuru" Flour: "Pupuru" was prepared using local methods .The cassava roots were washed, peeled and cut into 5cm thick before soaking in water inside plastic container at room temperature (28 ± 3^{o}c) for 72-84 hours. The fermented cassava roots were mashed manually. The cassava mash was measured and load pressed in a synthetic sack until moisture level was obtained. Thereafter, the mash was moulded into five balls, smoked and dried in smoking Kiln. The Kiln was fueled with charcoal and fuel. The balls were kiln dried for 36-48 hours, after which they were milled and sieved (0.25mm diameter).

Chemical Analysis: Proximate composition of samples was determined according to the method of AOAC (1990) for crude protein, crude fat, ash, moisture and fibre. Carbohydrate was obtained by difference. Sensory evaluation: The resulted "Pupuru" was assessed organoleptically for texture, taste, colour and overall acceptability using panelist that are farmiliar with "Pupuru". Statistical analyses were carried out for the entire sample using general linear model procedure using SAS package. Differences between means were calculated by Duncan Multiple range. Significant difference was at 0.05

RESULT AND DISCUSSION

Result of Proximate Analysis

Table 1

Samples	Moisture Content %	Protein %	Crude Fat %	Crude Fibre %	Ash %	Carbohydrate %
Full-fat Soyflour	8.94	16.10	11.24	1.96	1.48	60.28
100% PF	9.86	2.10	0.62	1.47	0.18	85.77
90:10 PF/SP	9.77	3.85	1.71	1.52	0.33	82.84
80:20 PF/SF	9.65	4.90	2.74	1.57	0.31	80.78
70:30 PF/SF	9.58	5.43	3.92	1.62	0.57	78.88
50:50 PF/SF	9.40	9.10	5.84	1.72	0.85	73.09

Means of triplicate Analysis
PF = ""Pupuru"" Flour
PF/SF = ""Pupuru"" Flour: Soyflour Blends

Result of Sensory Evaluation

Table 2: Sensory scores of

Dough Samples	Colour	Texture	Aroma	Taste	Mouth Feel
90:10 PF/SP	6.7a	7.2a	5.8a	6.6a	6.2a
80:20 PF/SF	5.6b	6.0b	5.4b	5.1b	4.9b
70:30 PF/SF	6.66	6.1b	3.8b	5.6b	5.7b
50:50 PF/SF	4.5c	4.5c	3.1c	4.0c	4.1c

Means score followed with the same letter in a column were not significantly difference
PF = ""Pupuru"" Flour
PF/SF= ""Pupuru"" Flour: Soyflour blends

DISCUSSION

The proximate compositions of "Pupuru" supplemented with soybean flour are presented in Table 1. The table showed that protein, fat, and fibre increased as the proportion of soy flour increased ranging from 2.10-9.10%, 1.71-5.84% and 1.52-1.72% respectively. The "Pupuru" produced from 50% soy flour substitution had the highest crude protein content of 9.10%. This indicates that supplementation of "Pupuru" with soy flour would greatly improve the nutritional quality of "Pupuru" produced from the flour. This could obviously be due to the significant quality of protein in soy bean seeds (Kure et al., 1998, Basman et al., 2003). The high protein content in the soy supplemented "Pupuru" would be of nutritional importance in most developing countries like Nigeria where the cost of obtaining high protein containing food is high. This similar observation was made in the study conducted by Akpapunam et al .,1997,Olatidoye etal., 2010, they observed that there was an increase in protein content with corresponding increase in proportions of soy flour supplementation in maize flour

during the production of Agidi a fermented cereal products. Also, this work is in agreement with the work of Jimoh and Olatidoye (2009) who reported an increase in the protein content with corresponding increase in the proportions of soy flour supplementation in yam flour. A decrease was observed in carbohydrate content (82.84-73.09) this could be as a result of different substitution level of soy flour. This finding is in support with the research work carried out by other researchers as they observed similar findings (Jimoh and Olatidoye 2009; Akpapunam et al., 1997). The moisture content of "Pupuru" increases with increase in level of substitution. Table 2 shows the result of the sensory evaluation of fortified "Pupuru" There was no significant difference between control (100% "Pupuru") and 10%. Soy fortified "Pupuru" in term of colour, texture, aroma, taste and mouth feel. Also there was no significant difference between the "Pupuru" fortified with 20% and 30% soyflour in term of taste, aroma, colour, texture and mouth feel. On the whole "Pupuru" fortified with 10% soy flour was as acceptable as the control sample in terms of all the sensory attributed.
The least preferred sample is the cassava dough from fortified with 50% level of soy flour.

CONCLUSION

From the findings of this study, it was observed that ""Pupuru"" flour could be fortified with soybean flour at 10% level to improve its nutritive value. The result of the sensory evaluation showed that dough from the 10% soy flour inclusion into ""Pupuru"" flour was the most acceptable dough as inclusion above 10% produced less acceptable products

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