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Proximate Composition of Street Snacks Purchased from Selected Motor Parks in Lagos

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Abstract: In developing countries, street food including commercially produced snacks sold by street vendors are widely consumed by millions of people and they are sources of affordable nutrients to many sectors of the population. Snacks made by vendors on-site were purchased from five different motor parks along Agege motor road in Lagos and were analyzed for their proximate composition using standard analytical methods. The result indicated that fried yam had the highest moisture content 51.48-55.73 g/100 g while the fish roll had the lowest moisture content 11.49-555.73 g/100 g while the fish roll is the richest in protein 16.80 g/100 g.-18.83 g/100 g, with fried plantain having lowest protein content 3.49-3.84 g/100 g, the fat content of roasted yam 1.9-1.94d/100 g is the least and that of fish roll is the highest 15.24-16.49 g/100. Ojuelegba roasted yam has the highest fibre content 8.49 g/00 g and the lowest fibre content 0.14 g/100 g found in Mushin. Roasted plantain contain the highest carbohydrate (61.58 g/100 g Mushin), while the lowest found in Ojuelegba fish roll 28.87 g/100 g, fish roll purchased from Oshodi have the highest ash content 5.15 g/100 g, fish roll gave the highest energy value (403.60-415.19 Kcal). It was concluded that although the proximate composition of snacks purchased from the same location are significantly different, but the location of purchase has no significant effect on the proximate composition of individual snack.

Key words: Proximate composition, street snacks, protein

INTRODUCTION

Like many metropolises, Lagos is in the grip of sudden and unprecedented urban growth with an increase in the size of the city's labour force. Consequently, the demand for non-traditional services has increased; there has been a surge in service oriented activities that are not part of the formal economic systems. As the population pressure in the inner city grows, many people settle in suburbs and distant areas and daily commuting has become a way of life. People have been forced to change their schedules, tastes and attitudes towards food consumption (Chakravarty and Canet, 2002). Many urban residents obtain a significant portion of their diet from street foods-prepared meals or snacks sold cheaply on the street.

Street-vended foods are defined as those foods prepared on the street and ready to eat, or prepared at home and consumed on the street without further preparation (Martins and Anelich, 2000). Street foods are especially useful for the very poor, who like time and facilities to cook, but office workers and other segments of society rely on them. Street foods are adopted because they are inexpensive, the taste is acceptable and they are nutritious meals (Mosupye and Von Holy, 1999). Street food vendors usually take their products to their customers and therefore operate from such places as schools, office centers, market places, railway stations and motor parks, industrial sites and other street corners where they are ready and numerous clienteles (FAO/WHO, 2005).

Street food vending a source of a wide range of foods that may be nutritionally important for various groups of the population. These consist of the staple food served in various forms and in combination with side dishes such as stews, gravies and spices (Tomlins and Johnson, 2004). In addition, snacks such as dried meat, fish, roasted yam, fried plantain and cereal based ready to eat foods are also prepared and served. Snacking is a passion and snack foods are sold everywhere; from prisons to big supermarkets and may be eaten at every mealtime as well as in between meals. A snack should be balanced nutritionally, should provide quick energy, should be easy to eat and should be of great taste. One requirement transcends all others and is that, a snack should be perceived as healthy. The present study is aimed at investigation the wholesomeness and the proximate composition of the selected street snacks to their meeting consumer's nutritional needs.

MATERIALS AND METHODS

The street snacks: Puff puff; fish roll; fried yam; roasted yam; fried plantain and roasted plantain, used for this study were purchased from five different motor parks: Ojuelegba; Mushin; Oshodi; Iyana Ipaja and Abule Egba in Lagos. In each motor park, samples of individual snack were purchased from three different vendors who were preparing the snacks on site and the samples were milled together and kept in a well-labelled air-tight polythene bags in a refrigerator for further analysis. Proximate analysis of the samples was carried out

using AOAC method (AOAC, 1990) for moisture, crude fat, crude fibre, ash and crude protein. A nitrogen conversion factor of 6.25 was used. Carbonhydrate was calculated by difference. Energy values were calculated by multiplying protein, fat and carbohydrate by Atwater factor of 4.9.4 (Osborne and Voogt, 1978) respectively. The data obtained from the analysis was subjected to statistical analysis using univariate analysis of variance and significant treatments of means were separated by the multiple range test of Duncan according to the procedure stated in SPSS package (SPSS, 2001).

RESULTS AND DISCUSSION

There is little or no significant difference in the moisture content of the same type of snacks collected from different locations except in the case of puff puff, this could be attributed to the method of preparation of all these snacks. Fried yam had the highest moisture content 51.48-55.73 g/100 g while the fish roll had the lowest moisture content 1.49-13.96 g in snacks bought from all the locations. Moisture (Water) is important in human diet because it provides body fluids and help to regulate the body temperature.

There is a slight variation in the protein content of the same snacks, bought from different locations, except snacks made from plantain that has no significant difference, with fried plantain having lowest content protein 3.49-3.84 g/100 g. The protein content of puff puff varied significantly from 5.69 g/100 g-8.55 g/100 g, these differences could be attributed to the source of the oil and composition of the recipe used by the vendors to prepare the puff puff. The fried yam collected from the sampling points had comparable protein content except in fried yam obtained form Oshodi and Mushin. This is to be expected since they are made from the same raw material and are subjected to the same processing techniques. Fish roll is the richest in protein 16.80 g/100 g, this is because one of its ingredients is fish, which is a good source of protein. The amount of protein 3.49-18.883 g/100 g derivable from all the snacks analyzed is lower than the (ADR) Average Daily Requirement (52.5 g) for adult (WHO, 1985), hence consumption of any of these snacks alone will be grossly inadequate to meet the significant role of protein in human diet in controlling growth and cell differentiation.

Fats are a concentrated source of energy, highly useful in increasing density of diet. this is particularly important for young children who have limited gastric capacity. For this reason and on the basis of fats providing essential fatty acids and their influence on the absorption of liposoluble nutrients (Jose *et al*., 1989), the fat content of each of the snacks purchased from all the motor parks were analyzed and result shown in Table 1 of the fat content of each snack sample collected from all the motor parks did not vary significantly, except that of roasted yam 1.19-1.94 g/100 g varied slightly and puff puff 11.88-15.92 g/100 g that is significantly different. These could be attributed to the fat content and/or the frying methods used in preparing puff puff. In all the motor parks roasted plantain and roasted yam had lowest fat content, while fish roll has the highest fat content 15.24-16.48 g/100 g. It is not surprising that fish roll is relatively high in fat, because apart from the fact that fat is one of the component of its recipe, (just like fried yam, fried plantain and puff puff), fish, which is also one of its main ingredient is appreciably rich in fat.

According to data presented in Table 1, there is slight or no significant difference in the fibre content of the same type of snacks bought from all the motor parks, except puff puff. Roasted yam has the highest fibre content, with the highest being 8.49 g/100 g (Ojuelegba) followed by fried yam 5.18 g/100 g (Abule Egba) and fish roll contain the lowest fibre content. It is not surprising that the two yam products are the most fibrous, because of all the raw materials used in production of the six snacks samples; yam is the most fibrous. According to FAO (1988) increased fibre consumption may contribute to a incidence of certain diseases, including diabetes, coronary heart disease, colon cancer and various digestive disorders; it also absorbs water thus producing soft and bulky stools. Hence the consumption of unbalanced, fat-rich snacks low in fibres such as fish roll and puff puff can lead to consumption and heartbum, also frequently eating of such snacks promotes obesity (SAN, 2003).

Carbohydrate are the single most important source of food energy in the world. They comprise some of 40-80 percent of total food energy intake. Depending on locale, cultural considerations or economic status (FAO, 1998). The carbohydrate content of the street snacks bought from the six different motor parks as presented in the table, showed that there is no significant difference in the carbohydrate content of yam products and plantain products, but that of fish roll has slight variation, while the difference in carbohydrate content of puff puff is significant. However the little variation observed in the yam and plantain products could be as result of the different varieties, since the vendors might have used different species of yam and plantain in producing the snacks. In all, the two plantain snacks ranked best in carbohydrate content, with roasted plantain having the highest carbohydrate content 916.58 g/100 g Mushin), this is because raw plantain is the richest in carbohydrate content 32 g/100 g fresh weight (FAO, 1988).

The ash content of a feedstuff is the inorganic residue remaining after the organic matter has been destroyed by combustion in the muffle furnace (AOAC, 1990; MAFF, 1981). The ash content of each snack sample collected from the five motor parks as depicted in Table 1 revealed that ash content in fish roll and the two plantain snacks have not significant difference, while the three other

Table 1: Proximate compositons of street snacks from five motor packs in Lagos g/100 g

Snacks	location	moisture	protein	fat	fibre	carbohydrate	ash	energy
Puff-puff	Ojuelegba	24.56^{b*}	5.69^{a}	13.85^{c}	0.43^{a}	53.66^{c}	1.82^{a}	362.01^{c}
	Mushin	20.65^{a}	6.55^{b}	11.88^{a}	0.66^{c}	58.21^{d}	2.06^{a}	265.94^{d}
	Oshodi	26.66^{d}	8.55^{d}	14.50^{d}	0.40^{a}	48.27^{a}	1.64^{a}	357.70^{b}
	Iyana Ipaja	25.89^{c}	7.50^{c}	15.92^{e}	0.71^{d}	47.10^{a}	2.90^{b}	361.64^{c}
	Abule Egba	27.07^{e}	7.22^{c}	12.55^{b}	0.58^{b}	49.95^{b}	2.64^{b}	341.61^{a}
	±SEM**	0.78	0.23	0.48	0.04	1.36	0.17	2.84
Fish-Roll	Ojuelegba	13.27^{c}	17.42^{ab}	16.21^{a}	0.24^{b}	48.33^{a}	4.45^{a}	408.87^{a}
	Mushin	12.12^{ab}	17.54^{ab}	14.21^{a}	0.14^{a}	52.21^{b}	3.80^{a}	406.81^{a}
	Oshodi	11.49^{a}	16.80^{a}	16.49^{a}	0.18^{a}	49.90^{a}	5.15^{a}	415.19^{a}
	Iyana Ipaja	13.96^{c}	18.35^{bc}	15.24^{a}	0.20^{ab}	48.29^{a}	4.00^{a}	403.60^{a}
	Abule Egba	13.10^{bc}	18.83^{c}	15.43^{a}	0.16^{a}	48.07^{a}	4.42^{a}	406.45^{a}
	±SEM	0.13	0.26	0.40	0.01	0.56	0.21	2.23
Fried Yam	Ojuelegba	53.04^{ab}	4.86^{b}	10.27^{a}	2.90^{a}	36.69^{a}	2.25^{a}	258.59^{bc}
	Mushin	53.39^{ab}	4.10^{a}	11.61^{a}	2.64^{a}	35.92^{a}	2.36^{a}	264.51^{c}
	Oshodi	55.73^{b}	4.14^{a}	11.94^{a}	4.54^{a}	30.06^{a}	3.60^{b}	244.20^{ab}
	Iyana Ipaja	54.17^{ab}	5.05^{b}	10.65^{a}	3.80^{ab}	32.91^{a}	3.43^{b}	247.65^{abc}
	Abule Egba	51.48^{a}	4.94^{b}	10.88^{a}	5.15^{b}	28.87^{a}	3.69^{b}	233.14^{a}
	±SEM	0.56	0.15	0.29	0.34	1.29	0.22	4.04
Roasted Yam	Ojuelegba	34.17^{a}	8.40^{ab}	1.73^{ab}	8.94^{b}	45.28^{a}	1.49^{ab}	230.27^{a}
	Mushin	36.31^{a}	7.86^{a}	1.19^{a}	7.51^{ab}	25.47^{a}	1.68^{ab}	223.97^{a}
	Oshodi	35.84^{a}	8.88^{bc}	1.94^{b}	6.51^{a}	45.86^{a}	1.39^{a}	236.34^{a}
	Iyana Ipaja	37.02^{a}	7.71^{a}	1.55^{ab}	6.51^{ab}	45.36^{a}	1.86^{b}	226.21^{a}
	Abule Egba	37.64^{a}	9.44^{c}	1.39^{ab}	7.10^{ab}	43.93^{a}	1.25^{ab}	221.95^{a}
	±SEM	0.50	0.22	0.10	0.40	0.62	0.07	2.33
Fried Plantain	Ojuelegba	30.06^{a}	3.60^{a}	8.00^{a}	0.54^{a}	55.44^{a}	2.38^{a}	308.12^{a}
	Mushin	32.91^{a}	3.43^{a}	7.36^{a}	0.58^{a}	53.44^{a}	2.30^{a}	293.64^{a}
	Oshodi	30.37^{a}	3.50^{a}	7.10^{a}	0.57^{a}	55.93^{a}	2.54^{a}	301.62^{a}
	Iyana Ipaja	34.70^{a}	3.84^{a}	7.51^{a}	0.58^{a}	51.21^{a}	2.17^{a}	287.77^{a}
	Abule Egba	34.08^{a}	3.49^{a}	7.10^{a}	0.54^{a}	55.45^{a}	2.36^{a}	299.60^{a}
	±SEM	0.87	0.08	0.20	0.02	0.92	0.09	3.78
Roasted Plantain	Ojuelegba	26.66^{ab}	4.87^{a}	1.49^{a}	1.19^{a}	61.57^{a}	4.24^{a}	279.11^{a}
	Mushin	25.89^{a}	5.11^{a}	1.38^{a}	1.18^{a}	61.58^{a}	4.88^{a}	279.12^{a}
	Oshodi	27.07^{b}	4.94^{a}	1.40^{a}	1.20^{a}	61.02^{a}	4.39^{a}	276.38^{a}
	Iyana Ipaja	26.45^{ab}	5.07^{a}	1.76^{a}	1.21^{a}	60.87^{a}	4.66^{a}	279.54^{a}
	Abule Egba	26.26^{ab}	4.95^{a}	1.53^{a}	1.22^{a}	61.35^{a}	4.72^{a}	278.50^{a}
	±SEM	0.17	0.15	0.06	0.07	0.32	0.23	1.15

*Mean values in a column within a group denoted by different superscripts differ significantly at $p<0.05$, **±SEM Standard error of the mean

snacks are significantly different in their ash content. Fish roll and plantain are the richest in ash content with fish roll purchased from Oshodi having the highest ash content (5.15 g/100 g). and Oshodi roasted yam possessed the least concentration of ash (1.39 g/100 g). Considering the snacks prepared from both yam plantain, it was observed that the processing techniques have pronounced effects on the ash contents.

The energy needs of individuals are the amount of food energy required to compensate for energy expenditure when their size, body composition and level of physical activity are compatible with a lasting state of good health and the maintenance of physical activity that is economically necessary and socially desirable (Jose *et al*., 1989; FAO, 2004). The chief sources of energy to the human body are fat, carbohydrate and protein. Using Atwater factor of 4,9,4 (Osborne and Voogt, 1978). The energy values of puff puff and fried yam varied significantly while other snacks' energy values are statistically the same. Fish roll obtained in all sampling sites gave the highest energy (403.60-415 Kca.l) and the least energy was found in roasted yam (221.95-2236 kcal), It is surprising that fish roll and puff puff were relatively richer in energy than other snacks because they have high fat content and carbohydrate content, considering the Average daily requirement for energy by males 3050 Kcal and females 2350 Kcal. (WHO, 1985), none of the street snacks investigated in the study is adequate to meet the energy requirement.

Going by the result of the proximate composition of the analyzed street snacks, fish roll stand to be the best snacks followed closely by puff puff and one may be tempted to support and recommended their consumption, but according to SAN (2003) that the consumption of unbalanced, fat-rich snacks low in nutritive fibers such as fish roll and puff puff, can lead consumption and heartburn, also frequent and prolong eating of such snacks promotes obesity, there is great need to exercise caution consuming such snacks. It was also observed that the location of purchase did not have

any pronounced effect on the nutrient of snacks rather it was the processing methods and the species of the raw materials used in the preparation of the snacks that affect their proximate compositions.

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