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Effect of Substitution of Melon with Soybean on the Nutrient Content and Sensory Properties of Traditional Cakes

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ABSTRACT

Traditional cakes were prepared from a blend of melon and soybean meal. The blended meal contained 10% and 20% soybean respectively while unblended meal contained 100% melon meal which served as control. Cakes obtained from the blends were analysed for proximate composition, amino acid content and organoleptic properties. The moisture content and protein content of the cakes increased significantly ($p < 0.05$) as the level of soybean inclusion was increased while the fat, ash and crude fibre contents of the cakes decreased significantly ($p < 0.05$) as the level of soybean inclusion was increased. Inclusion of as little as 10% soybean increased the quantity of amino acids in the cake than the control cake. The organoleptic properties of the cakes were also acceptable at 10% level of soybean inclusion.

Keywords: Traditional cake, proximate composition, melon, soybean, amino acid content, organoleptic properties.

Introduction

Melon *(Citrullus vulgaris Schrad)* belongs to the family of *cucurbitaceae* and is a monoecious plant grown from seeds and creeps with plant population density of 20,000 to 40,000 plants per hectare (Achinewhu, 1998). Melon seeds are milled and used to prepare the popular *egusi* soup where they act as food thickeners. In addition, they are milled, mixed with pepper, salt, crayfish and other ingredients and moulded in balls, cooked and dried over fire to produce *Mbam* or *Ikpan* (in Ibibio), otherwise known as melon cake. Melon seed is rich in oil and protein but poor in carbohydrate. Its seeds are low in lysine content but high in methionine content (Achinewhu, 1998).

Soybean *(Glycine max L)*, an important oil seed belonging to the family *leguminosae* is usually grown as food crop (Iwe, 2003). Soybean is a source of vegetable oil, high protein cake, soy flour, soy milk, soy beverages and tofu. Soybeans are incorporated into cereals, tubers, roots and other legumes to improve the nutrient content of these food materials (Enwere, 1998). The mature seeds of soybean are rich in protein (40%) and oil content (20%), and have a carbohydrate content of about 30%. It is rich in lysine but poor in cysteine and methionine content (Elegbede, 1998).

Snacks can be considered as tasty, savoury or sweet foods eaten at non-meal occasions. They are small meals eaten between main meals. Healthy snacks help to bridge the gap between meals. Melon cake is a traditional snack made from melon, ground yeast and other ingredients such as pepper, salt, onion, knorr cube and water. Variation in nutrient contents of melon and soybean (especially with regard to lysine and methionine) necessitated the combination of these local seeds to produce traditional snack with a more balanced nutrient. This work was aimed at substituting melon with

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various proportions of soybean and evaluating the effect of substitution on the nutrient and sensory properties of the cakes produced from the blends.

Materials and Methods

The melon kernels, soybean seeds and ground yeast (*isuo*) were purchased from Nsukka market and taken to the Food Science and Technology laboratory, University of Nigeria, Nsukka, where the study was carried out. The melon kernels were sorted and ground into meal using a manual grinder. The soybean seeds were cleaned to remove contaminants and thereafter dehulled and milled into meal. The ground yeast was milled into flour after scraping off the external portion.

Melon meal was substituted with 10% and 20% soybean meal while the 100% melon meal was used as the control sample. The two levels of soybean substitution were chosen for this study after preliminary experiment because above 20% soybean substitution, the dough of desired consistency could not be formed. The recipe used for the preparation of the control and blended samples is as shown in Table 1.

Table 1: Recipe used in the preparation of cakes (unblended/blended)

Ingredients	Weight (g)	Percentage (%)
Melon meal (unblended/blended)	247.54	70.00
Ground yeast	31.16	8.81
Pepper	2.0	0.57
Knorr cube	4.1	1.16
Onion	32.1	9.08
Salt	17.2	4.86
Water	19.53	5.52
Total	353.63	100

In preparing the cake, the ground yeast flour and the melon meal were blended in a mortar using a pestle. Pepper, salt, knorr cubes and onion were added to the meal in the mortar and blended to the desired consistency. Hot water was added in small quantities continuously and blended with pestle to express oil from the meal. The oil was separated from the meal to get the dough; the dough was moulded into size, wrapped in plantain leaves and cooked for 5 h. The cakes obtained were used for various determinations.

The proximate composition of melon kernel used in preparing the cake were moisture (4.40%), crude protein (32.04%), ash (3.40%), crude fibre (6.59%), fat (43.07%) and carbohydrate (10.05%) while those of soybean were moisture (6.20%), crude protein (39.02%), ash (4.32%), crude fibre (3.46%), fat (19.94%) and carbohydrate (27.06%).

Methods of analysis

Proximate analysis was carried out on the cakes using the methods of the Association of Official Analytical Chemists (AOAC, 1995) while the amino acid analysis was carried out on the preferred cake and control sample using Technicon Sequential Multisample Amino acid Analyser (TSM) Technicon Instrument Co. Ltd., Basingstoke, United Kingdom as described by Benitez (1989).

Sensory evaluation

Sensory evaluation was carried out using a panel of 20 trained judges (students of the Department of Food Science and Technology, University of Nigeria, Nsukka), who were familiar with the snack