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# Acceptability of Noodles Produced from Blends of Wheat, Acha and Soybean Composite Flours

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## ABSTRACT

Acha (*Digitaria exilis*) and soybean (*Glycine max*) were processed into flours and used to substitute wheat flour (*Titicum aestivm*) as a composite flour at different proportions of 100:0:0 (Wheat); 75:25:25 (Wheat: Acha: Soybean); 75:25 (Wheat: Acha); 75:25 (Wheat: Soybean) and 50:50 (Acha: soybean). The formulated blends were used to produce noodles. The noodles were subjected to proximate analysis, functional properties and sensory evaluation using commercial instant noodles as control. The results revealed that the protein, moisture, ash and fat contents were higher in the formulated samples than in the control. Sample AS (50% Acha and 50% Soybean) had 26.47% protein and was significantly different ($p < 0.05$) from the control (8.97%). The protein and fat contents increased while carbohydrate decreased with increase in soybean addition to the blend. The functional properties showed that water absorption capacity increased with increase in wheat blend. There were no significant differences ($p < 0.05$) between the formulated samples in their swelling index and wettability. The result of the sensory evaluation based on a nine point hedonic scale showed that generally apart from the control, noodles from 100% wheat and wheat noodles supplemented with soybean up to 25% were acceptable to the panelists.

**Keywords:** Noodles, soybean, acha, wheat, acceptability.

## Introduction

Acha seeds are rich in methionine and cystine, amino acids vital to human health which are deficient in most cereals. According to (Ayo and Nkama, 2003), substitution of wheat flour with acha flour up to 30% has shown no significant difference in terms of sensory qualities and Lasekan (1994) reported that acha has high pentosan, high water absorption capacity that could be utilized in baked foods and pasta products like noodles.

Soybean is one of the common plant foods that contain complete protein which provides all the essential amino acids in amounts needed for human health. It is also rich in unsaturated fatty acids, low in saturated fatty acids and a source of omega-3-fatty acids. It contains beneficial phytochemicals such as isoflavones. Several studies have shown that consumption of soy foods is associated with a reduction in prostate cancer in men, breast cancer in women (Shu *et al.*, 2009), and colorectal cancer in postmenopausal women (Yang *et al.*, 2009). Omega-3-fatty acids in soybeans may reduce the risk of heart disease, control blood sugar and insoluble fiber increases stool bulk, may prevent colon cancer and relieve symptoms of several digestive disorders.

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Noodles are gaining wider acceptability especially in the developing world due to their versatility, simplicity, organoleptic appeal and satiety. Nutrient content of noodles varies widely depending on the type, quality and quantity of constituent materials as well as processing method (Hatcher, 2001). The main ingredient for noodle making is durum wheat flour that has high protein content with particle or grain size less than 140 microns. Flour and water are the mandatory ingredients in noodle production although salt, colour and flavour may be added depending on the noodle type (Marchylo and Dexter, 2011).

Noodles are mainly consumed by school children that need adequate protein for growth. The use of composite flour has been encouraged since it reduces the importation of wheat (Omeire and Ohambele, 2010). Utilization of locally available inexpensive cereals like acha and soybean that can substitute a part of wheat flour without adversely affecting the acceptability of the products will be a welcome development. Partial replacement of wheat flour with acha and soy flour will increase the overall nutrient, encourage the agricultural sector, increase the noodle variety, reduce dependence on wheat flour for manufacturing of noodles and lower the cost of production.

## Materials and Methods

The main materials used in this study were "Acha" *(Digitaria exilis)*, Soybean *(Glycine max)* and Wheat *(Triticum aestivum)*. The creamy coloured type of acha was purchased from Jos, Plateau State. Soybean and wheat flour were purchased from main market Owerri, Imo State.

### *Preparation of Acha flour*

Acha grains were manually cleaned and sorted by hand picking of the chaff and foreign materials. Dust and sands were removed by washing severally in tap water using plastic bowls. The washed grains were oven dried at 70°C for 6 h, after which the dried grains were finely milled into flour with an attrition mill sieved through a muslin cloth to remove coarse and fibrous materials. The resulting flour was stored in air tight polyethylene bags at room temperature 25°C for further use.

### *Preparation of Soybean flour*

This was produced according to the methods of (Oluwamukomi *et al.*, 2005). Soybeans were cleaned and sorted, washed and boiled in water at 100°C for 30 min. It was dehulled manually, oven dried at 70°C for 15 h milled in a disc attrition mill to obtain the flour followed by sieving using a muslin cloth. The resultant fine flour was stored in air tight polyethylene bags at room temperature for further use.

### *Formulation of composite blends*

Wheat flour, acha flour and soybean flour were mixed at different proportions as shown in Table 1.

**Table 1: Quantity of wheat, acha and soybean composite flour**

| Samples | Wheat flour (%) | Acha flour (%) | Soybean flour (%) |
|---|---|---|---|
| W | 100 | 0 | 0 |
| WAS | 50 | 25 | 25 |
| WA | 75 | 25 | 0 |
| WS | 75 | 0 | 25 |
| AS | 0 | 50 | 50 |

W = 100 percent Wheat, WAS = Wheat: Acha: Soybean (50:25:25), WA = Wheat: Acha (75:25), WS = Wheat: Soybean (75:25), AS = Acha: Soybean (50:50).

### *Noodle production*

Noodles were produced by blending separately flour samples as shown in Table 1 with warm water (40°C) and 5% CMC. The mixtures were thoroughly worked to form doughs. The formed dough was allowed to rest for 20 mins, then kneaded and rolled with a rolling pin to form sheets. The sheets were extruded using a cold extruder (Eurosonic, Globe 150) model. The noodle strands were put in cleaned aluminum trays and oven dried at 60°C. The process is as shown in Fig. 1.