
Production and Evaluation of Breakfast Cereals from Blends of Acha (*Digitaria exilis*) and Fermented Soybean (*Glycine max*) Paste (Okara)

Ifeoma Nwaoha (nee Mbaeyi)*¹

¹Department of Food Science and Technology, University of Nigeria, Nsukka (UNN) – Department of Food Science and Technology, University of Nigeria, Nsukka, Enugu State, Nigeria

Abstract

Breakfast cereals was formulated from blends of acha and fermented okara (soybean residue). Acha grains were cleaned, winnowed, washed, dried (at 50C for 4 hours) and milled into flour. Okara was processed from soybean seeds through the stepwise procedure of cleaning, soaking, washing, milling and sieving. The residue was divided into five portions, fermented differently for 0, 12, 24, 36, and 48 hours (FEOK1 to 4) and then dried at 50C for 6 hours. Acha flour (UFAC) was milled and blended at 50, 60, 70, 80, 90, 100% ratio with milled okara flour. Functional properties, microbial load and proximate composition were determined on the flours. The blended flours were conditioned, partially heat treated (for 10 minutes), aged (4C for 6 hours), cut, toasted (120C for 1 hour), cooled and packaged. The toasted breakfast cereals, TBFC, were subjected to sensory evaluation, proximate, micronutrient and microbial analyses (mould and total viable count). Results showed that the bulk density of the unfermented okara (UFOK) sample was 0.59g/cm³ while that of the fermented okara, FEOK1 to 4 samples was from 0.60 to 0.63 g/cm³. The water absorption capacity of UFAC, was 314.17% and FEOK1 to 4 okara samples (301.20 to 250.33%). The proximate composition of the unfermented okara (UFOK) and FEOK1 to 4 flour samples showed that fermentation increased moisture (4.71±0.06 - 6.11±0.05%), fibre (36.62±0.01 - 46.18±0.55%) and carbohydrate (2.50±0.18 - 2.71±0.34%) contents. There was a decrease in the fat (13.27±0.22 - 16.29±0.04%), ash (1.41±0.17 - 6.36±0.17%) and protein (30.32±0.21 to 33.53±0.11%) contents. The high sensory scores showed that 70:30, 60:40 and 50:50 FEOK TBFC were the preferred products based on colour, taste, flavour, mouth feel and overall acceptability. There was an increase in the protein, fat, ash, crude fibre content but the moisture and carbohydrate contents decreased in best products. There were significant differences (p< 0.05) among samples. A decrease was found in vitamin A and B1 contents of the products, whereas vitamin B2 and B3 increased. The fermenting bacteria count ranged from 3.8 × 10⁴ to 7.7 × 10⁴(cfu/g) in fermented samples compared to unfermented sample (8.9 × 10⁴ (cfu/g) and no mould growth. Nutrient-dense breakfast cereal can be formulated from unfermented and fermented (0 to 48hrs) okara.

*Speaker