PHYSICO-CHEMICAL PROPERTIES AND SENSORY EVALUATION OF EXTRUDED SPICED SNACKS PRODUCED FROM RICE AND GROUNDNUT CAKE BLENDS

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Abstract

The study was conducted to generate data and compare the combined effect of formulations on the physico-chemical properties and organoleptic attributes of extruded spiced snacks produced from rice at varying levels of moisture and groundnut cake blends using standard techniques. The formulations designs were: $G_1G_2G_3$= 10 %, 15 %, 20 % groundnut cake; $R_1R_2R_3$= 90 %, 85 %, 80 % rice; and $W_1W_2W_3$= 15 %, 20 %, 25 % water. Data were statistically analyzed using Turkey's test method. Significant differences existed in the nutrient composition of the blends formulated from the different levels of feed composition and moisture. Water absorption capacity decreased proportionately in all the formulated samples with increased feed moisture level while viscosity decreased with increased groundnut levels. The wettability was less than 15 sec. Bulk density increased with increased in groundnut cake whilefeed moisture increased from 16 % to 26 %. Expansion ratio and bulk density showed an inverse relationship. Samples I, J, K and L extruded at 26 % feed moisture showed lower water swelling capacity values. Each control sample (A, E and I for R_{100}/W_{16}, R_{100}/W_{21} and R_{100}/W_{26} respectively) at different moisture levels had highest values for carbohydrates and moisture content but lower protein content.The fat and ash contents increased as the groundnut levels increased. Sample I (R_{100}/W_{26}) was most acceptable, though it had similarities with samples A (R_{100}/W_{16}), B($G_{10}/R_{90}/W_{16}$), C($G_{15}/R_{85}/W_{16}$), and E(R_{100}/W_{21}). However, sample J ($G_{10}/R_{90}/W_{26}$) had the least overall acceptability. The process variables suitable for processing of ready-to-eat extrudates from rice-groundnut cake blends based on optimum nutritive value obtained were found to be samples H ($G_{20}/R_{80}/W_{21}$) and D ($G_{20}/R_{80}/W_{16}$ [FJPAS 1(1)2016].

1.0 INTRODUCTION

For some time now, a good proportion of the household food budget in Nigeria is spent on snack food items. Snacks producing industries are growing continually with new products becoming available every year. Most of these snacks such as cookies, chin-chin, etc, are carbohydrate-based with low nutritional value [1]. Nutritious foods for these purposes can be best made from a mixture of locally grown cereals and locally available oil seeds. Groundnut (*Arachis hypogea*), a leguminous plant, contains high levels of protein and important amino acids that are lacking in cereals. It is a good source of niacin, folate, fiber, vitamin E, magnesium and phosphorus. The chemical composition of unshelled

groundnut consists of 4-13% water, 36-54% fat, 21-36 % protein, 12-45% carbohydrate and 2-3 % ash [2]. Moreover, legume proteins are rich sources of lysine and threonine [3] [4] which are limiting in a single cereal based product. Therefore, fortification of rice with groundnut would go a long way in enhancing the protein quantity and quality of snack which is usually made from rice solely.

Extrusion cooking technology is a high temperature short-time (HTST) process which retains many heat sensitive components, reduces microbial contamination and inactivates enzymes. It is the most used technique for the production of snack food [5]. As extrudate properties are a result of different combinations of extrusion conditions such as feed