

Impact of Enzyme-Treated Bran on the Physical and Functional Properties of Extruded Sorghum Snacks

Authors : Charles Kwasi Antwi, Mohammad Naushad Emmambux, Natalia Rosa-Sibakov

Abstract : The consumption of high-fibre snacks is beneficial in reducing the prevalence of most non-communicable diseases and improving human health. However, using high-fibre flour to produce snacks by extrusion cooking reduces the expansion ratio of snacks, thereby decreasing sensory properties and consumer acceptability of the snack. The study determines the effects of adding Viscozyme®-treated sorghum bran on the properties of extruded sorghum snacks with the aim of producing high-fibre expanded snacks with acceptable quality. With a twin-screw extruder, sorghum endosperm flour [by decortication] with and without sorghum bran and with enzyme-treated sorghum bran was extruded at high shear rates with feed moisture of 20%, feed rate of 10 kg/hr, screw speed of 500 rpm, and temperature zones of 60°C, 70°C, 80°C, 140°C, and 140°C toward the die. The expanded snacks that resulted from this process were analysed in terms of their physical (expansion ratio, bulk density, colour profile), chemical (soluble and insoluble dietary fibre), and functional (water solubility index (WSI) and water absorption index (WAI)) characteristics. The expanded snacks produced from refined sorghum flour enriched with Viscozyme-treated bran had similar expansion ratios to refined sorghum flour extrudates, which were higher than those for untreated bran-sorghum extrudate. Sorghum extrudates without bran showed higher values of expansion ratio and low values of bulk density compared to the untreated bran extrudates. The enzyme-treated fibre increased the expansion ratio significantly with low bulk density values compared to untreated bran. Compared to untreated bran extrudates, WSI values in enzyme-treated samples increased, while WAI values decreased. Enzyme treatment of bran reduced particle size and increased soluble dietary fibre to increase expansion. Lower particle size suggests less interference with bubble formation at the die. Viscozyme-treated bran-sorghum composite flour could be used as raw material to produce high-fibre expanded snacks with improved physicochemical and functional properties.

Keywords : extrusion, sorghum bran, decortication, expanded snacks

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