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Enzyme-Treated Fibre Enhances Expansion of Extruded Sorghum Snacks

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Abstract

Background and Objectives: Regular consumption of grains containing fibre can lessen the incidence of some diet related non-communicable diseases for example heart, promote blood glucose control, and help with long-term weight management. The use of whole grain or fibre in food applications is limited due to techno-functional and sensory constraints. It interferes with extrudate expansion by causing bubble formation to collapse during extrusion. The study determines the effects of adding Viscozyme®-treated sorghum brans on the properties of extruded sorghum snacks with the aim of producing high-fibre expanded snacks with acceptable quality.

Methods: Sorghum endosperm flour [by decortication]with and without sorghum bran, and with enzyme-treated sorghum bran at 5% (w/w) were extruded under high shear conditions as 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 towards the die using a twin-screw extruder. The physical properties (expansion ratio, bulk density, and colour profile) and functional properties (water absorption index [WAI], water solubility index [WSI]) of extrudate were determined.

Findings: Sorghum extrudates without bran showed higher values of expansion ratio and low values of bulk density compared to the 5% 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.

Conclusion: Enzyme treatment of sorghum bran before extrusion cooking increase expansion ratio and is potential technology to produce high fibre sorghum snack for health benefits.

Significance: high fibre snacks with good properties will promote consumer acceptability and consumption of healthy snack.