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Title: Protein Dispersibility Index and Trypsin Inhibitor Activity of Extruded Blends of Acha/Aoybean: A Response Surface Analysis

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Abstract: The effect of extrusion variables on the protein dispersibility index and tyrrpsin inhibitor activity of blends of acha and soybean were studied using response surface analysis. Soybean flour was mixed with acha flour at 0, 12.5, 25, 37.5 and 50% levels of substitution. Moisture content of the mixtures was adjusted to 15, 20, 25, 30 and 35%. Extrusion was carried out in a single screw Brabender extruder by adjusting the screw speed from 90 to 120, 150, 180 and 210 rpm and barrel temperature from 100 to 125, 150, 175 and 200°C following a 4-variable central composite rotatable response surface design. Protein dispersibility index and trypsin inhibitor activity of raw and extruded blends were evaluated. Raw acha, soybean flour and raw acha/soybean flour blends had PDI of 86.84, 91.84 and 74.27%, respectively compared to extrudate PDI which ranged from 3.77-8.70%. Blending decreased the protein dispersibility index of the raw flours while extrusion cooking significantly improved the protein dispersibility. For TIA, the results showed that TIA of extrudates ranged from 4.0-46.1 units, compared to the raw samples (64.5 units for raw soybean). The results showed that extrusion cooking reduced TIA by about (70.33-97.40%) with feed moisture and barrel temperature exerting the greatest influence on extrudate TIA. The decrease in TIA corresponded to increased protein dispersibility of extrudate samples.

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