

Amino Acid Profile, Protein Digestibility, Antioxidant and Functional Properties of Protein Concentrate of Local Varieties (Kwandala, Yardass, Jeep, and Jamila) of Rice Brands from Nigeria

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Abstract : There is growing interest in the use of rice bran protein in food formulation due to its hypoallergenic protein, high nutritional value and health promoting potentials. For the first time, the amino acid profile, protein digestibility, antioxidant, and functional properties of protein concentrate from some local varieties of rice bran from Nigeria were studied for possible food applications. Protein concentrates were prepared from rice bran and analysed using standard methods. Results showed that protein content of Kwandala, Yardass, Jeep, and Jamila were 69.24%, 69.97%, 68.73%, and 71.62%, respectively while total essential amino acid were 52.71, 53.03, 51.86, and 55.75g/100g protein, respectively. In vitro protein digestibility of protein concentrate from Kwandala, Yardass, Jeep and Jamila were 90.70%, 91.39%, 90.57% and 91.63% respectively. DPPH radical inhibition of protein from Kwandala, Yardass, Jeep, and Jamila were 48.15%, 48.90%, 47.56%, and 53.29%, respectively while ferric reducing ability power were 0.52, 0.55, 0.47 and 0.67mmol TE per gram, respectively. Protein concentrate from Jamila had higher onset (92.57oC) and denaturation temperature (102.13oC), and enthalpy (0.72J/g) than Jeep (91.46oC, 101.76oC, and 0.68J/g, respectively), Kwandala (90.32oC, 100.54oC and 0.57J/g, respectively), and Yardass (88.94oC, 99.45oC, and 0.51J/g, respectively). In vitro digestibility of protein from Kwandala, Yardas, Jeep, and Jamila were 90.70%, 91.39%, 90.57% and 91.63% respectively. Oil absorption capacity of Kwandala, Yardass, Jeep, and Jamila were 3.61, 3.73, 3.40, and 4.23g oil/g sample respectively, while water absorption capacity were 4.19, 4.32, 3.55 and 4.48g water/g sample, respectively. Protein concentrates had low bulk density (0.37-0.43g/ml). Protein concentrate from Jamila rice bran had the highest foam capacity (37.25%), followed by Yardass (34.20%), Kwandala (30.14%) and Jeep (28.90%). Protein concentrates showed low emulsifying and gelling capacities. In conclusion, protein concentrate prepared from these local rice bran varieties could serve as functional ingredients in food formulations and for enriching low protein foods.

Keywords : rice bran protein, amino acid profile, protein digestibility, antioxidant and functional properties

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