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WATER ABSORPTION CAPACITY AND SWELLING INDEX OF PROTEIN ISOLATE FROM BROWN AFRICAN YAM BEAN (SPHENOSTYLIS STENOCARPA) AS INFLUENCED BY PH

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Abstract:

Introduction/Objective: Legumes such as African yam bean (AYB) are important economical protein source for populations where animal proteins are limited. AYB, a protein-rich (19-29%) underutilized pulse grown in Nigeria can become a viable protein source when processed into value-added products. Study aims to assess the efficacy of AYB protein isolate as a functional ingredient in food formulations.

Methods: AYB seeds (brown; white-eye; 0.25 g; smooth testa; firmly attached cotyledon) were dehulled and processed into protein isolate. Effect of pH (4.5-14) on swelling index (SI) and water absorption capacity (WAC) of isolate was examined using standard methods. SI was calculated as ratio of volume occupied by isolate after and before swelling. WAC was measured with volume noted and weight multiplied by density of water (1 g/mL), and expressed as weight of water absorbed per 1 g sample.

Results: Data showed that AYB isolate (90.6% protein, 0.0% fat, 3.0% ash, 6.0% moisture, 0.4% carbohydrate) had improved swelling index (2.7) and water absorption capacity (4.8 g/mL) properties at pH 6.0. Enhanced SI show strong intra-molecular bonding requiring pH alteration to cause relaxation.

Conclusion/Significance: Swelling index and water absorption properties of AYB protein isolate compared favorably with those of widely available tropical legumes. Successful modification of processing conditions for AYB isolate can yield products with target functionality and improved nutrient profile. African yam bean protein isolate can serve as functional ingredient in composite flour and baked products, and for use in nutrition intervention programs.

Keywords: African yam bean; Protein isolate; Functional properties; pH effect