

**Physicochemical and Functional Properties of Protein Isolate from Ackee
(*Blighia sapida*) Seed**

Dr. O'Neil Falloon

ABSTRACT

The seeds of the ackee (*Blighia sapida*) fruit are a major industrial waste in the ackee canning industry. Ackee seeds contain hypoglycin toxins but are a potential source of protein. The study seeks to investigate the physicochemical and functional properties of ackee seed protein isolate. Protein was isolated from ackee seed defatted flour using a 50 mM sodium borate buffer as the extracting solution and ethanol (75% w/v) as the precipitating agent. The protein isolate was vacuum-dried (30-33°C, 48 h, 20-24 inch Hg) and milled into a powder.

The purity of the ackee seed protein isolate was $75.71 \pm 1.36\%$ (wb), and the principal amino acids were glutamic acid, arginine, glycine and aspartic acid. The isolate comprised low molecular weight proteins and total hypoglycin was within regulatory limits. Water and oil absorption capacities of the ackee protein isolate were 1.88 ± 0.13 and 1.22 ± 0.06 (g oil/g isolate) respectively. Solubility ranged from 72.84% (g protein/100 g protein in isolate) to 91.99% and was highest at strong acidic and alkaline pH values. Solubility increased with ionic strength. Emulsion capacity of the protein ranged from 25.71% to 58.06% and was highest at pH 2.0, 3.0, 6.0 and 7.5. The emulsions formed were relatively stable within the pH range 2.0 to 7.5. Foaming capacity and stability of ackee seed protein were relatively high, and increased as ionic strength increased. Both foaming properties were highest at pH 2.0, 3.0 and 4.5. In comparison to a commercial soybean protein isolate, the ackee seed protein was more soluble and had better foaming and emulsification properties.

The high solubility, emulsification and foaming properties of ackee seed protein isolate, particularly at acidic pH values, make it suitable for use as foaming, stabilising and fortifying agent in acidic foods such as fruit juices, beverages and yoghurts.

Keywords: Ackee seed, protein, functional properties.