

## **Utilization of Pigeon Pea Milling Waste By-product as a Protein Source**

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### **Abstract**

The work addresses the environmental concerns attributed to the large amount of biodegradable agricultural by-products through measures for its utilization. India is one of the largest producers of pigeon pea in the world and the seeds are widely consumed as dehulled splits. The waste by-product obtained during pigeon pea seed processing includes seed powder, broken seed and seed coat. This underutilized by-product (20% protein content) has a great potential as a valuable protein source. The protein extractability studies at different pH conditions exhibited maximum extractability at both acidic and alkaline conditions. The protein concentrate (PC) prepared by alkali extraction had a protein content of 68% whereas the PC prepared under acidic conditions exhibited 85% protein content, which was used for further studies. In vitro digestibility studies of pigeon pea protein concentrate was investigated for its usefulness for human consumption. The Degree of Hydrolysis (DH) of PC increased during the in-vitro pepsin-pancreatin digestion. The DH reached 21% by 1hr pepsin digestion and subsequent 2hr pancreatic digestion increased the DH to 50%. Pepsinolysis of PC was performed to investigate the applicability of the hydrolysate. SDS-PAGE pattern reveals the partial digestibility of protein concentrate by pepsin. Pepsin hydrolysed PC exhibited antioxidant activity which on heating resulted in the formation of a gel. The gelling ability of pigeon pea PC could be exploited as a protein-based carrier system. This suggests the applicability of pepsin hydrolysate as a functional food material. The food-based materials can be used as drug/nutraceutical carriers which would be safe for human consumption compared to synthetic materials. The utilization of this agricultural by-product as a protein source would indirectly solve

the environmental problems caused by the dispersion of agricultural by-products.