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Departmental Seminar

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Seminar Title : Return Seminar-Optimization and Characterization of Detoxified Cassava (*Manihot Esculenta L.*) Leaf Protein Isolate by Alkaline Extraction-Isoelectric Precipitation

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Venue : CH 306

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Abstract : Background: The cassava leaves contain an extraordinary amount of the protein. However, their consumption is hindered by the presence of major toxicant (cyanide) and antinutrient (tannin). This study aimed to extract the protein with minimal toxicant and antinutrient, emphasizing higher yield and a favourable amino acid profile. Methods: The cassava leaves were screened based on growth stages, protein content, and toxicant and antinutrients levels. The protein extraction was optimised through alkaline extraction-acidic precipitation process via response surface methodology, considering parameters such as time, temperature, solvent:solute and pH. Several detoxification methods were used and optimized to reduce cyanide and tannins under their permissible limits without severe protein alterations. A comprehensive analysis encompassed between detoxified and controlled protein isolate concerning various characteristics. Results: The matured Shree Jaya cassava leaves demonstrated lower cyanide and tannins with higher protein content. Optimal extraction conditions-114 min time, 46°C temperature, 23.5mL/g solvent:solute and pH 11.0 yielded maximum protein content (21.83 g/100g dm), extraction yield (18.31%), and protein recovery yield (69%). Optimized detoxification analysed as pounding leaves into a paste, subsequent drying at 40°C, and multiple washing, resulting reduced cyanide and tannins by 85% and 69%, respectively, with 9.7% reduction in protein content. The detoxified protein isolate showed better amino acid scores, suitable secondary structures, and stronger thermal behaviours than the controlled one. Functionally, latter protein exhibited superior properties across all pH conditions. Conclusions: The study advocates for cassava leaf protein extraction as viable alternative source of plant proteins. Detoxification enhances bioavailability, and reduces toxicity, presenting it as comparable to commercial plant proteins in terms of amino acid scores and functionality. Keywords: Cassava leaf, Alternative plant protein, Cyanide, Amino acid score, Functionality