National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Return seminar: How does superheated steam treatment affect nutritional, functional and rheological behavior of guar germ protein isolates?
Speaker	: Ankan Kheto
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Venue	: CH-306
Date and Time	: 22 Jul 2025 (17.00)
Abstract	: The guar germ protein isolates (GGPI) contained a considerable amount of sulfur-containing and essential amino acids but have not been adequately explored. Superheated steam (SHS) treatment offers the advantage of shorter duration with limited oxidation reaction compared to conventional heating methods. So, the objective of the study was to know the effect of SHS (120, 130, and 140 °C for 5 and 10 min) on the GGPI nutritional, structural, functional, and rheological behavior. Compared to control, an increase in in vitro protein digestibility was found up to 130 °C and negligible effect on essential amino acids. Increased SHS temperature gradually reduced the sulfhydryl and disulfide groups in GGPI samples. However, a noticeable change in carbonyl content was observed after SHS treatment. The SDS-PAGE patterns showed that only higher SHS temperature (140 °C) caused minor variations in band intensity. The SHS treatment increased the non-uniformity of particles but did not cause significant variation in surface hydrophobicity. In secondary structures, β-sheet and α-helix structures were significantly influenced by SHS treatment conditions. Apart from a slight increase in solubility and emulsifying capacity, no noticeable changes in other functional properties were found in SHS-treated GGPI samples. Among all GGPI samples, 120 °C-10 min and 140 °C-5 min samples showed a slight increase in viscosity and frequency-dependent behavior. Conclusively, SHS treatment may be beneficial for modifying protein powder at temperatures ranging from 120 to 130 °C. Keywords: Legume proteins, Superheated steam, Rheology, Functional properties