National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Return seminar: Synergistic Enhancement of Emulgel Properties Using Plant Protein and Saponin
Speaker	: Srijita Banerjee
Supervisor	: 2910
Venue	: CH-306
Date and Time	: 27 Mar 2025 (17.10)
Abstract	: Oil-in-water (O/W) emulsions in food products can reduce the high intake of solid fats and hence can be used as a fat substitute. It is also used for the enhancement of textural attributes of food products, encapsulation and control release of the bioactives. However, emulgels fabricated solely by protein shows less stability against environmental factors like pH and temperature and is more prone to lipid oxidation. This study explores the development of deccan hemp seed protein-based emulgels stabilized with fenugreek seed saponin, focusing on improving stability, functionality, and resistance to environmental factors like pH and temperature. Deccan hemp seed protein is used to develop the emulgel with an oil to aqueous phase ratio of 70:30 where fenugreek seed saponin (0.5% and 1%) is used as a co-surfactant to stabilize the emulgel. The higher storage modulus value over loss modulus confirmed the gel property of the emulsion gel. The addition of saponin in the emulgel at higher concentration (1%) enhanced the zeta potential (-52.59 mV) and reduced droplet size (2.85 μm), facilitating greater protein adsorption at the oil-water interface by lowering interfacial tension. The morphology (CLSM) of the emulgel showed a reduction in coalescence and flocculation of the oil droplets due to the incorporation of the saponin. Also, saponin as co-surfactant enhanced the stability of the emulsion gel against different pH and temperature and reduced lipid oxidation. For a 30 days storage study, the saponin co-stabilized emulgel retained better quality as compared to solely protein-based emulsion. The results demonstrate that saponin significantly enhances the emulsion gel's properties, including reduced droplet size, improved zeta potential, and extended storage stability, making it suitable for applications such as bioactive delivery, fat replacement, and direct consumption. Overall, saponin worked as an excellent co-surfactant for the development of deccan hemp seed protein-based emulsion gel.