

Synergy of Polyacryloyl Hydrazide (PAHz)-Ag NPs on Drying and Re-dispersibility of Pickering Emulsions for Transportation and Storage Applications

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Drying stability of emulsions has potential applications in several industries like medicine, food structuring, paints, and cosmetics. The successful drying of emulsion develops a solid product in which oil droplets are encapsulated (high oil content) to increase shelf life of oil during transportation and storage. However, emulsions stabilized by conventional surfactants are known to show significant oil leakage and damage to solid cell during drying process and therefore, pose major concern for their application related to these areas. Another issue related to these conventional emulsion systems is their re-dispersibility in water which is often required to bring emulsion back in original liquid form depending on the nature of application.

Nanoparticles are better stabilizers and can offer promising solutions for improving the stability of these emulsions for solid and re-dispersible applications. In addition, the use of a hydrophilic carrier high molecular weight compound along with NPs can impart superior stability to solid oil powders and polyacryloyl hydrazide (PAHz) is already known to be a cytocompatible polymer. Therefore, the study reports the formulation of adried and re-dispersible Pickering emulsion, of PAHz and Ag nanoparticles as the stabilizer, exhibiting oil content more than 94% for transportation and storage processes. The experimental investigations to examine the stability of emulsions include results from freeze-drying, contact angle, microscopic, SEM and rheological studies conducted for the different concentrations of PAHz (0.05-0.25 g/ml) and sizes of Ag NPs (10-25 nm). We finally conclude that o/w emulsion stabilized by PAHz-Ag NPs can be a potential alternative to produce stable oil powders or gels for industrial applications.

Biography:

Dr. Tushar Sharma holds post-graduation and doctorate in Petroleum Engineering from IIT (ISM) Dhanbad and IIT Madras, respectively, and currently working as assistant professor in the Department of Petroleum Engineering at Rajiv Gandhi Institute of Petroleum Technology (Institute of National Importance Established under the Act of Parliament) India and He also currently serves as faculty advisor for SPE student chapter at RGIPT India from South Asia and Pacific region. His research is focused on Emulsion/foams, Rock/Fluids Interactions, Rheology of Fluids, and Minimum Miscibility Pressure. He has significant contribution for the research articles in journals and International conferences of repute.