

6<sup>th</sup> Global Summit on  
**Polymer Chemistry**  
October 10-11,2022 | Webinar

Volume: 11

## **Optimized conversion of waste cooking oil into ecofriendly bio-based polymeric surfactant- A solution for enhanced oil recovery and green fuel compatibility**

**Kamaldeep Sharma**

Department of Energy Technology, Aalborg University, Denmark

**W**aste cooking oil (WCO) is generally considered a global waste but with prospective for secondary use such as fuels or chemicals. In the present work, functionalizing of WCO to polymeric surfactants through a cleaner approach with high emulsification ability for enhanced oil recovery (EOR) of fossil crude and enhanced biocrudes solubility in petroleum crudes is proposed. The influence of synthesis conditions (temperature, time and concentration of reactants) on intermediates and the resulting polymeric surfactants was investigated. Products were characterized by UV-Vis, <sup>1</sup>H NMR, FT-IR, and DLS technique, and particle stability and Zeta potential were evaluated. The results showed the high stability of the fossil crude-surfactant-brine emulsion. The affinity of the polymeric surfactant for EOR under Danish reservoir was also investigated. It was observed that the IFT of brine-surfactant emulsion (31.35 dynes/cm) was reduced to almost half compared to neat saline water (68.82 dynes/cm), and that the viscosity of fossil crude oil in presence of polymeric surfactant was significantly decreased. Finally, the polymeric surfactant was employed to assess compatibility of hydrothermal liquefaction (HTL) and pyrolysis biocrudes with fossil refinery streams with an aim to promote their integration into existing refinery. Consequently, the correlation between compatibility and molecular structure was drawn based on the experimental investigation on miscibility studies. The results obtained during the phase behaviour and IFT studies showed the high emulsification ability of functionalized polymeric surfactant for the enhanced crude oil recovery at reservoir conditions. In conclusion, the study introduces the concept of reusing WCO as an ecofriendly polymeric surfactant for EOR and green fuel compatibility enhancer.

### **Biography**

Kamaldeep Sharma is working as an Assistant professor in the Department of Energy Technology, Aalborg University, Denmark..

ksh@et.aau.dk