

Demulsification of Triton X-100, Low-Sulfur Wax Residue (LSWR), Sorbitan monooleate (Span 83) and Sodium Dodecyl Sulfate (SDS)-Stabilized petroleum emulsions with a microwave separation method

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ABSTRACT

The formation of emulsions during oil production and processing is a costly problem both in terms of chemicals used and production losses. For economic and operational reasons, it is necessary to separate the water completely from crude oils before transporting or refining them. Experimental data are presented to show the influences of Triton X-100, lowsulfur wax residue (LSWR), sorbitan monooleate (Span 83) and sodium dodecyl sulfate (SDS) on the stability and microwave demulsification of petroleum emulsions. It was found that emulsion stability was related to several parameters including the surfactant concentration, water-to-oil phase ratio (10–90%), temperature and agitation speed. Based on this study, a possible emulsion-minimization approach utilizing microwave irradiation is suggested, which could be implemented in refineries. Compared with conventional heating the use of microwave heating can significantly enhance the demulsification rate, reaching over 90 v/v% for the emulsions studied in this work.

KEYWORDS:

Microwave; surfactant; demulsification; waterin-oil emulsion (w/o); separation.

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