

Demulsification of a water-in-crude oil emulsion with a corn oil based-demulsifier using the response surface methodology: modelling and optimization

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ABSTRACT

In this study, the Sany-glass test was used to evaluate the performance of a new surfactant prepared from corn oil as a demulsifier for crude oil emulsions. Central composite design (CCD), based on the response surface methodology (RSM), was used to investigate the effect of four variables, including demulsifier dosage, water content, temperature, and pH, on the efficiency of water removal from the emulsion. Besides, analysis of variance was applied to examine the precision of the CCD mathematical model. The results indicate that demulsifier dose and emulsion pH are two significant parameters determining demulsification. The maximum separation efficiency of 96% was attained at an alkaline pH and with 3500 ppm demulsifier. According to the RSM analysis, the optimal values for the input variables were 40% water content, 3500 ppm demulsifier, 60 °C, and pH 8.

KEYWORDS

Demulsifier; Response surface method; Dehydration efficiency; Central composite design; Analysis of variance; Corn oil

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