

Evaluation of nanoemulsions in the cleaning of polymeric resins

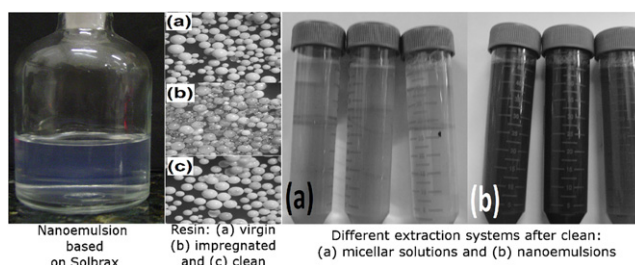
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HIGHLIGHTS

- ▶ Polymeric resins are adsorbent materials used in the treatment of oily water.
- ▶ But they need regeneration when they reach saturation.
- ▶ The nanoemulsions present characteristics to be utilized as regenerating fluids.
- ▶ We produced stable nanoemulsions based on Solbrax by the high-energy method.
- ▶ These were used in the regeneration of a polymeric resin microporous.

GRAPHICAL ABSTRACT



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ABSTRACT

The development of nanotechnology has opened the way for applications in a wide range of fields. Nanoemulsions have attracted great interest because the properties of emulsions are enhanced as the interfacial film approaches equilibrium when formed by droplets of nanometric sizes. In the present study, Solbrax/water/polyoxyethylene nanoemulsions were produced by high-energy emulsification in a high-pressure homogenizer. The droplets of the stable nanoemulsions had diameter size in the range of 7–30 nm. These nanoemulsions were used in cleaning of a microporous polymer resin, which can be used to treat oily water. This resin was contaminated with different crude oils. In all cases, the nanoemulsions presented cleaning efficiency above of 90%.

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1. Introduction

The growing demand for systems to treat industrial wastewater before discharge so that it complies with environmental legislation, according to which the total oil and grease (TOG) concentration

must be lower than 29 ppm, has prompted the search for new materials with ultrafiltration and adsorbent properties, such as membranes and polymer resins [1,2].

These new materials have been quite successful, but they need regeneration when they reach saturation, because disposing of them after each saturation cycle makes the process costly and environmentally unfeasible [3–6].

An example of systems that use this type of material is the system for treatment of oily water developed by the Macromolecules

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