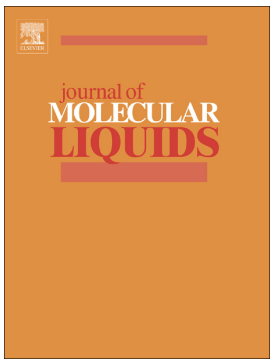

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Novel cationic surfactants based on waste frying oil for cleaning water surface from petroleum films: Synthesis, antimicrobial and surface properties

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Abstract

A novel series of environmentally friendly cationic surfactants were synthesized by reaction of mixed fatty acids, extracted from waste frying oil (WFO) as a low-cost raw material, and *N,N*-Dimethyl-1,3-propanediamine with high yield products. The synthesized fatty amides were reacted with different alkyl halides and dimethyl sulphate to form the desired cationic surfactants. The acquired compounds were elucidated via different spectroscopic tools as IR, ^{1}H and ^{13}C NMR spectra. Surface properties including critical micelle concentration, effectiveness, maximum surface excess, minimum surface area…. etc. were investigated. Also, thermodynamic parameters including free energy of adsorption (ΔG^{0}_{ads}) and micellization (ΔG^{o}_{mic}) were calculated. The petroleum capacities of synthesized compounds were evaluated in the diluted and solid form with waters varying in salinity. The results showed that the synthesized compounds have good surface properties, high tendency to be adsorbed at the surface than micellized and high