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Feasibility investigation of a novel natural surfactant extracted from Eucalyptus leaves for enhanced oil recovery of carbonates: Experimental study

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After primary and secondary oil production from carbonate reservoirs, approximately 60% oil-in-place remains in the pore space of reservoir rocks. Chemical flooding is one of the promising ways to produce the remained oil. Nowadays, surfactant flooding is a low-cost and a common method generally used to improve oil recovery due to the oil-water Interfacial Tension (IFT) reduction and alteration of the rock wettability to water-wet state, leading to decrease the capillary number. In this study, a novel leaf-derived non-ionic natural surfactant, named Eucalyptus is introduced and the capability of this natural surfactant for IFT reduction and wettability alteration is analyzed. Accordingly, the natural surfactant was derived from Eucalyptus leaves and the effect of natural surfactant solution on the Oil-water IFT and carbonate rock wettability alteration was investigated. The results demonstrated that the addressed natural surfactant significantly reduced IFT value from 35.2 mN/m to 10.5 mN/m (at CMC of 3.5 wt. %) and the contact angle value from 140.6o to 60.2o. As a result, Compared to conventional chemical surfactants, the Eucalyptus natural surfactant had an excellent surface chemical activity and confirmed its performance by laboratory experiments which could be used for EOR applications.

Biography

Ali Akbar Isari is research assistant at shahriari research center, Petroleum University of Technology, Abadan, Iran. He has published more than 10 articles in reputed journals.

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