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Ion-exchange–ultrafiltration system for surfactants removal from water solutions

Izabela Kowalska

Wroclaw University of Technology, Institute of Environment Protection Engineering, Wybrzeze Wyspianskiego 27, 50-370 Wroclaw, Poland
Tel. +48 (71) 320-3639; Fax +48 (71) 328-2980; email: izabela.kowalska@pwr.wroc.pl

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ABSTRACT

Studies were performed to determine the effectiveness of hybrid system combining ion exchange and ultrafiltration for surfactant separation from water solutions. During the experiments the influence of membrane cut-off, type of ion-exchange resin, resin dose and contact time was evaluated. The results obtained for the hybrid system were also compared with the effectiveness of the single processes, i.e. ultrafiltration and ion exchange. It was found that the combination of ion exchange and ultrafiltration was more effective in surfactant removal than ultrafiltration process alone. In the hybrid system because of the resin presence, the systematic increase in surfactant separation along with the filtration time was noticed. From among the ion-exchange resins tested the most effective was MIEX® one. For the smallest resin dose equal to 5 cm^3/dm^3 the reduction of anionic surfactants from model solution with concentration of 0.25 CMC reached almost 100% for the hybrid process with 30 kDa polyethersulfone membrane. The retention coefficient of anionic surfactant achieved by the ion-exchange–ultrafiltration system with A100 and A200 resins was lower and amounted to 47% and 94% after 60 min of the process, respectively.

Keywords: Surfactant; Detergent; Ultrafiltration; Membrane; Ion exchange; Hybrid process