

Cationic Surfactants Influence on the Fouling Phenomenon Control in Ultrafiltration of Latex Contaminated Water and Wastewater

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Abstract : The goal of the present study was to minimize the ultrafiltration fouling of latex effluent using Cetyltrimethyl ammonium bromide (CTAB) as a cationic surfactant. Hydrophilic Polysulfone and Ultrafilic flat heterogeneous membranes, with MWCO of 60,000 and 100,000, respectively, as well as hydrophobic Polyvinylidene Difluoride with MWCO of 100,000, were used under a constant flow rate and cross-flow mode in ultrafiltration of latex solution. In addition, a Polycarbonate flat membrane with uniform pore size of 0.05 μm was also used. The effect of CTAB on the latex particle size distribution was investigated at different concentrations, various treatment times, and diverse agitation duration. The effects of CTAB on the zeta potential of latex particles and membrane surfaces were also investigated. The results obtained indicated that the particle size distribution of treated latex effluent showed noticeable shifts in the peaks toward a larger size range due to the aggregation of particles. As a consequence, the mass of fouling contributing to pore blocking and the irreversible fouling were significantly reduced. The optimum results occurred with the addition of CTAB at the critical micelle concentration of 0.36 g/L for 10 minutes with minimal agitation. Higher stirring rate had a negative effect on membrane fouling minimization.

Keywords : cationic surfactant, latex particles, membrane fouling, ultrafiltration, zeta potential

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