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Elucidating the mechanisms of ultrafiltration for wastewater treatment in the presence of surface active molecules and aggregates

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Elucidating the mechanisms of ultrafiltration for wastewater treatment in the presence of surface active molecules and aggregates: Ultrafiltration (UF) is a pressure-driven process that removes emulsified oils, metal hydroxides, colloids, emulsions, dispersed material and suspended solids from waste water and other solutions. Surfactants are also invariably present in these waste waters, or added intentionally. In this study, methylene blue (MB), a dye widely employed in textile, paper and chemical industries, was chosen as the model contaminant. Surfactants selected were anionic sodium dodecyl sulfate (SDS), cationic hexadecyltrimethyl ammonium bromide (CTAB) and non-ionic ethoxylated octylphenol (TX-100). Surface tension, size, charge, ultraviolet-visible spectroscopy and contact angle measurements were conducted to investigate dye-surfactant interactions. Cellulose nitrate filters were employed to determine the effect of these interactions in filtration efficiency. It was aimed to elucidate the effects of the surface active agents on the mechanism and efficiency of ultrafiltration. In general, surfactants decreased the efficiency of MB removal. In the absence of surfactants, the removal efficiency is high, due to the attachment of MB on the negatively charged cellulose nitrate filter. The presence of surfactants in the monomer range had a significant effect on the filtration depending on their charge. In the micellar range, on the other hand, the filtration efficiencies were low for all the surfactants. The interaction between filter surface and the surfactants molecules were found to be as important as those between the filter surface and the contaminant.

Biography

Aybike Nil Olcay has completed her MSc from Izmir Institute of Technology and she continued her Doctoral studies with Prof. Dr. Mehmet Polat at Izmir Institute of Technology.

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