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Micellar enhanced ultrafiltration (MEUF) of methylene blue
with carboxylate surfactants

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Abstract:

Alkylethoxy carboxylates $C_iE_jCH_2COOH$ of variable alkyl chain length and a different number of ethyleneoxide units (RLM45 and RO90) are investigated as alternative surfactants to the classical anionic sodium dodecyl sulfate (SDS) in micellar enhanced ultrafiltration (MEUF) of dissolved methylene blue (MB) model dye. After adjustment of pH to 7, where the alkylethoxy carboxylates are in their anionic form and bind MB via electrostatic interactions, a removal efficiency of about 95% was obtained for a 1 g L^{-1} RLM45 solution applying a 10 kDa cellulose membrane. The performance of RLM45 is comparable to SDS, but it is not influenced by the precipitation reaction that is the major reason for the good performance of SDS below its CMC. To investigate the size effect of the micelles, the molecular weight cut-off (MWCO) of the membranes was varied. For the 5 kDa and 10 kDa membranes, the MB removal for SDS is almost quantitative and slightly higher as for the alkylethoxy carboxylates. With increasing MWCO, the MB removal efficiency for SDS strongly

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