



## Removal of cadmium ion using micellar-enhanced ultrafiltration (MEUF) and activated carbon fiber (ACF) hybrid processes: adsorption isotherm study for micelle onto ACF

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### ABSTRACT

Micellar-enhanced ultrafiltration (MEUF) was applied to remove cadmium ion from wastewater using sodium dodecyl sulfate (SDS) as a micelle in this study. Investigations were carried out on operational parameters such as initial permeate flux, retentate pressure, initial cadmium concentration, pH solution, molecular weight cut-off (MWCO), and molar ratio of cadmium to SDS. Removal efficiency of cadmium increased with increase in retentate pressure, pH solution, and molar ratio of cadmium to SDS and decreased with increase in initial permeate flux. Higher removal efficiency of cadmium was achieved using lower MWCO. In optimized experimental condition, cadmium removal efficiency reached 75% within an hour. With MEUF–ACF hybrid process, removal efficiencies of cadmium and SDS were found to be over 99 and 90%, respectively. Freundlich isotherm equation fitted better with experimental results on adsorption of SDS by ACF than Langmuir isotherm equation. Overall SDS removal efficiency of ACF unit in series was 90%.

*Keywords:* Micellar-enhanced ultrafiltration; Activated carbon fiber; Cadmium; Sodium dodecyl sulfate; Adsorption isotherm

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