

Ammonia removal from aquaculture wastewater by high flux and high rejection polysulfone/cellulose acetate blend membrane

ABSTRACT

Polysulfone (PSf)/cellulose acetate (CA) blend membranes with different compositions (100/0, 90/10, 85/15, 80/20, 75/25 and 70/30) were prepared and characterized for removal of low concentration ammonia (1–10 mg/L) from aquaculture wastewater. The performance of prepared membranes in terms of pure water flux and ammonia removal percentage was analyzed by different experimental variables such as blend membrane compositions, ammonia concentration in feed tank (1, 5 and 10 mg/L) and membrane thickness (80 and 100 μm). The permeability of prepared membranes was examined by pure water flux measurement in feed pressure range of 1–3 bar. The contact angle measurement indicates that the hydrophilicity of PSf/ CA blend membranes is enhanced by increasing the CA concentration in the casting solution. This increment improves the pure water flux of blend membranes. The ammonia removal by PSf/CA 80/20 (80 μm) was 79%, 99% and 92% from feed solutions containing 1, 5 and 10 mg/L of ammonia, respectively. The ammonia removal from feed solution containing 1 mg/L of ammonia is improved from 79 to 95% (at 2 bar feed pressure) by increasing the thickness of PSf/CA (80/20) membrane from 80 to 100 μm .

Keyword: Blend membrane; Polysulfone; Cellulose acetate; Ammonia removal; Aquaculture wastewater