

Preparation and characterization of polysulfone / zeolite mixed matrix membranes for removal of low concentration ammonia from aquaculture wastewater

ABSTRACT

Removal of low-concentration ammonia (1-10 ppm) from aquaculture wastewater was investigated via polysulfone (PSf)/zeolite mixed matrix membrane. PSf/zeolite mixed matrix membranes with different weight ratios (90/10, 80/20, 70/30 and 60/40 wt.%) were prepared and characterized. Results indicate that PSf/zeolite (80/20) was the most efficient membrane for removal of low-concentration ammonia. The ammonia elimination by PSf/zeolite (80/20) from aqueous solution for 10, 7, 5, 3 and 1 ppm of ammonia was 100%, 99%, 98.8%, 96% and 95% respectively. The recorded results revealed that pure water flux declined in higher loading of zeolite in the membrane matrix due to surface pore blockage caused by zeolite particles. On the other hand, ammonia elimination from water was decreased in higher contents of zeolite because of formation of cavities and macrovoids in the membrane substructure.

Keyword: Ammonia removal; Aquaculture wastewater; Mixed matrix membrane; Polysulfone; Zeolite