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Nanofiltration removal of pharmaceutically active compounds

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ABSTRACT

Capability of nanofiltration membranes (NF) to remove pharmaceutical active compounds from wastewater streams was investigated. Sulfamethoxazole, diclofenac sodium, hydrochlorothiazide, 4-acetamidoantipyrine, nicotine and ranitinide hydrochloride were selected as model compounds since they are widely produced as pharmaceutical agents. Two commercially available polyamide nanofiltration membranes (NF-90 and NF-270 from Dow FilmTec) were tested. Solute retention by NF-90 membrane was very high in all cases (over 95%), whereas NF-270 retention systematically appeared lower ranging from 75% (nicotine) to 95% (ranitidine hydrochloride). Temporal evolution of flux decline was also investigated. The influence of physicochemical properties of both membrane and solutes on membrane performance was analyzed to explore the main solute-membrane interactions that determine the solute transfer across the membrane. The influence of operation pressure on NF-90 and NF-270 rejection was also studied.

Keywords: Nanofiltration; Pharmaceutical; Water treatment; Sulfamethoxazole; Diclofenac; Hydrochlorothiazide; 4-Acetamidoautipyrine; Nictoine; Ranitidine

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