Nanofiltration membranes for drinking water production - retention of nitrate ions

Ibrahim Musbah\textsuperscript{a}, Delphine Cicéron\textsuperscript{b}, François Garcia\textsuperscript{c}, Abdellah Saboni\textsuperscript{d}, Silvia Alexandrova\textsuperscript{e,\textsuperscript{*}}

\textsuperscript{a}Petroleum Engineering Department, University of Sirte, P.O. Box 674, Sirte, Libya, Tel. +218 91 423 78 74; email: i_musbah@hotmail.com
\textsuperscript{b}LSPC, UCBN—IRIT de Caen, boulevard du Maréchal Juin, 14032 Caen cedex, France, Tel. +33 2 31 56 71 54; email: delphine.ciceron@unicaen.fr
\textsuperscript{c}UMR 1083 SPO, INRA—SupAgro—UIM, place Viala, 34060 Montpellier cedex, France, Tel. +33 4 67 54 86 74; email: francois.garcia@univ-montp1.fr
\textsuperscript{d}SIAME, UPPA—IUT des Pays de l'Adour, boulevard de l'Université, 64000 Pau, France, Tel. +33 5 59 40 71 68; email: abdellah.saboni@univ-pau.fr
\textsuperscript{e}LaTEP, UPPA—ENSGTI, rue Jules Ferry, 64075 Pau cedex, France, Tel. +33 5 59 40 78 35; Fax: +33 5 59 40 78 01; email: silvia.alexandrova@univ-pau.fr

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ABSTRACT

Nowadays, the water resource contamination by nitrates and pesticides is a real problem for drinking water production. Together with conventional methods (active carbon adsorption, ozone oxidation), membrane processes like ultrafiltration, reverse osmosis, and nanofiltration are progressively developing due to their lower cost. This study is focused on the ability of nitrates elimination by two flat sheets of negatively charged nanofiltration membranes: NF and OPMN-K. Experiments were carried out on laboratory equipment in batch circulation at 20°C. Transmembrane pressures were varied between 10 and 25 bars, and the impact on nitrates rejection was characterized. Then, the effects of the nitrate concentration and those of the nitrate salt associated cations (Na\textsuperscript{+}, K\textsuperscript{+}, and Ca\textsuperscript{2+}) on nitrate retention were studied. Moreover, the interactions between mono and divalent ions in nitrate rejection in complex solutions and particularly in synthetic water were also studied. At last, the influence of one typical pesticide metabolite, the desethylatrazine, on nitrates retention was also investigated.

Keywords: Nanofiltration; Nitrate rejection; Ions influence; Pesticide effect; Drinking water

*Corresponding author.

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