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OPTIMIZING THE NANOFILTRATION OPERATING CONDITIONS AS POST TREATMENT STEP IN THE GROUNDWATER DENITRIFICATION PROCESS

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Abstract

Two types of nanofiltration membranes had been used to study the influence of cross flow velocity on the membrane filtration of denitrification effluent (NF270 and NF90). Filtration had been conducted at constant transmembrane pressure of 5 bar and variable cross flow velocity (0.03, 0.06, 0.15 and 0.39 ms⁻¹). The obtained normal flux was 0.47, 0.58, 0.59 and 0.77 for NF270 membranes and 0.35, 0.38, 0.41 and 0.39 for NF90 membranes, the increase in cross flow velocity had enhanced flux performance of NF270 membranes more than NF90. The structure of the accumulated particles on the membrane surface had changed with each increment in the cross flow velocity, the accumulated particle count had decreased on the following percentages 35.65, 43.54 and 56.62% for NF270 and 34.85, 40.10 and 46.71% for NF90 membranes. The achieved active biomass concentrations was 4.65E+07, 1.96E+07, 1.70E+07 and 1.29E+07 ng.m⁻³ on the NF270 membranes and 7.78E+07, 4.41E+07, 3.74E+07 and 3.54E+07 on NF90. The cross flow velocity higher than 0.06 ms⁻¹ had minor influence on the bioparticles removal rate comparatively to non bioparticles.

Key words: denitrification, membrane, normal flux, particles size distribution, bioparticles

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