



Removal of nitrates from processing wastewater by cryoconcentration combined with biological denitrification

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ABSTRACT

In this study, the treatment of wastewater with a high nitrate content was investigated using the method of cryoconcentration on a pilot scale. The initial nitrate concentration in the treated wastewater was at 1,500 mg N/l. During 40 h of cryoconcentration of the wastewater, 176.6 kg of ice was produced, corresponding to a total process efficiency of 4.42 kg/h of ice. The crystallization temperature decreased from -0.5 to -9°C during the process. The final concentration of nitrates in the concentrated product was at 37 g N/l, and the conductivity was at 158 mS/cm. The conductivity of the water obtained by melting the ice ranged from 0.98 to 1.4 mS/cm. Concentrates with initial nitrate concentrations of 3, 6, and 9 g N/l were then subjected to microbial denitrification. The values of the specific nitrate reduction rates ranged from 43.1 to 49 mg N/gVSS h.

Keywords: Cryoconcentration; Denitrification; Nitrates

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