

EVALUATION OF OPERATIONAL APPLICABILITY OF LENTIKATS BIOTECHNOLOGY FOR REMOVAL OF NITRATES FROM BRINES FROM ION-EXCHANGE REGENERATION

POSOUZENÍ PROVOZNÍ APLIKOVATELNOSTI BIOTECHNOLOGIE LENTIKATS PRO ODSTRAŇOVÁNÍ DUSIČNANŮ Z ELUÁTŮ Z REGENERACE IONTOMĚNIČOVÝCH KOLON

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Abstract:

This paper summarizes the results of a three-year project focused on the removal of high concentrations of nitrates (up to $10 \text{ g.L}^{-1} \text{ NO}_3^- \sim 2,3 \text{ g.L}^{-1} \text{ N-NO}_3^-$) from brines originating from the regeneration of ion-exchange columns ($20 \text{ g.L}^{-1} \text{ NaCl} + 2 \text{ g.L}^{-1} \text{ Na}_2\text{SO}_4$) using denitrifying bacteria encapsulated in polyvinylalcohol matrix (so called Lentikats Biocatalyst, LB). Upon adaptation, the Biocatalyst is capable of denitrification of brines both in continuous and batch setup with denitrification activities as high as $\sim 1000 \text{ mg N} \cdot \text{hr}^{-1} \cdot \text{kg}^{-1} \text{ LB}$, comparable to applications of this technology for denitrification of municipal wastewaters. Due to a lack of nutrients in brines regular cultivations of the Biocatalyst is necessary in order to maintain a high denitrification activity. A minimum of one year of Biocatalyst's life-time was confirmed during the experiments.

Keywords:

Lentikats Biotechnology, Lentikats Biocatalyst, polyvinylalcohol, denitrification, ion-exchange brines, high-salinity waters treatment