LANDFILL LEACHATE CLEANING USING MEMBRANE SEPARATION

ODSTRAŇOVÁNÍ PRŮSAKOVÝCH VOD METODAMI MEMBRÁNOVÉ SEPARACE

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Abstract:
This work deals with the application of membrane separation processes for cleaning of landfill leachate. According to literature and the composition of the leachate, reverse osmosis was chosen amongst the other separation processes. Reverse osmosis splits the feed into two separate streams - permeate and concentrate, using a semipermeable membrane. Concentrate contains all components that did not pass through the membrane while permeate is the purified stream and usually consists mainly of the feed solvent. The typical performance factors of the reverse osmosis are high effectivity and good selectivity. The driving force of this process is pressure gradient. Several sets of experiments were performed to determine the optimal working conditions i.e. working pressure and feed pretreatment. The aim of the later experiments was to minimize the amount of the concentrate while keeping the quality of permeate at desired level. The two stage reverse osmosis showed the best results both for contaminant removal and minimization of concentrate volume. The total effectivity for contaminants removal was more than 99% for every contaminant. The final amount of produced concentrate was 20% of the feed volume. In the two stage experiment setting no feed pretreatment was necessary.

Keywords:
waste water treatment, landfill leachate, membrane separation, reverse osmosis, ammoniacal-nitrogen removal