

عنوان مقاله:

Study of the performance of bench-scale electro-membranes bioreactor in leachate treatment

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خلاصه مقاله:

In the present study, the integration of the electrochemical process with a membrane bioreactor was used as a new technology for leachate treatment. In the electro-membrane bioreactor (EMBR), aluminum electrodes were used as anodes and cathodes. The EMBR was operated at a current density of 0.5 mA/cm^2 and a solids retention time of 90 days to remove common contaminants such as ammonia-nitrogen ($\text{NH}_3\text{-N}$), chemical oxygen demand (COD), phosphate ($\text{PO}_4^{3-}\text{-P}$), and ultraviolet absorbance at 254 nm (UV_{254}). The maximum removal efficiencies of COD and $\text{NH}_3\text{-N}$ were above 98%. The average removal efficiency of $\text{PO}_4^{3-}\text{-P}$ by the EMBR system was 93%, which was significant compared to previous studies. The removal rate of humic substances based on UV_{254} was provided at approximately 96.95%. The trans-membrane pressure rate was acceptable for 80 days in the EMBR, which could be related to sludge size improvement and filtration resistance through the occurrence of electrocoagulation, electrophoresis, and electroosmosis mechanisms. The mean removal efficiencies in the EMBR were 90, 91.25, 96, and 87.5 % for chromium (Cr), cadmium (Cd), zinc (Zn), and iron (Fe), respectively. The slight change of mixed liquor-suspended solids (MLSS) in the leachate treatment reactor showed that the microorganisms in the new EMBR system had high adaptation. Based on the results, the EMBR is a promising technology to improve leachate treatment performance due to its excellent removal efficiency of common contaminants, metal removal, and reducing fouling.

کلمات کلیدی:

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