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Tc reduction by bacteria from soda lake

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One of the problematic types of LRW are alkaline wastes generated in some types of spent nuclear fuel reprocessing. Environmental friendly biological techniques of LRW treatment are not widespread because of its extremely high salt contents and alkalinity usually not suitable for organisms. The aim of this work was to explore the use of microorganisms from extremely alkaline habitat to process liquid alkaline radioactive waste. This involved a search of promising microbial cultures from extremely alkaline lakes of the Kulunda steppe, which composition is close to alkaline wastes. The lake sediments with medium (44-85 g/L) and extremely high (300-400 g/L) salt content were selected for investigations; the microbial associations, which capable to reduce radionuclides were received. Experiments on reduction of technetium and uranyl acetate + pertechnetate were performed. The bacteria present in the sediments and sludge of soda lakes reduced pertechnetate ions in both experiments with high salinity (2.3 M - 84% technetium reduced) and in experiment with a lower salinity (0.8 M - 86% technetium reduced) wherein uranium had no competitive effect on the recovery of technetium - in experiments with 1) technetium and 2) with technetium + uranyl acetate reduced approx. 84% of pertechnetate. When using the mixed sludge from lower salt content lake the amount of reduced technetium was lower compared to the high salinity - 55-60%. This work was supported by RFBR grant 15-05-08919

Summary

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