Biosorption and bioaccumulation of some heavy metals by deinococcus radiodurans isolated from soil in basra governorate - Iraq

ABSTRACT

The bacterium Deinococcus radiodurans has been isolated from soil. On the basis of morphological, biochemical, 16S rRNA gene sequencing and phylogeny analysis revealed that, the isolates were authentically identified as D. radiodurans. D. radiodurans showed significant resistance to high concentrations of Pb and Cd, but it was more tolerant to Cd than Pb. Minimum inhibitory concentration was 400 mgl-1 for Pb, while it was 600 mgl-1 for Cd. The potent bacterium has the optimal bioaccumulation capacity differ according to metal type, concentration, and contact time. In bioaccumulation experiment, the results showed the highest increase in accumulation of Pb in the concentration 50 mgl-1 at 6 h of incubation (0.33 mgg-1), while the lowest accumulation was in concentration 5 mgl-1 (0.029 mgg1) at 2h of incubation. For Cd the results showed maximum accumulation at 24h for concentration 100 mgl-1 then decreased at 48 h. The results of biosorption experiment showed that D. radiodurans has a good ability to absorption both Pb and Cd in considering to the metals concentrations and times. This which can be clarified from the elevated percentage of Pb absorption (63.46%) in concentration 50 mgl-1 and during 2h. For biosorption of Cd the was decreased with the increasing time and the high biosorption noticed during 2h at concentration 50 mgl-1 (31.23%).

Keyword: Deinococcus radiodurans; Heavy metals; Minimum inhibitory concentration; Bioaccumulation; Biosorption