

Screening of three phenol-degrading bacteria for bioremoval of copper

ABSTRACT

Aim: Potential microbial isolates for bioremoval of copper were collected from phenolic and heavy metal-contaminated soils and screened in copper-containing medium for determining the maximum tolerance level for copper. **Methodology:** Bioremoval of copper was assessed using sodium diethyl dithiocarbamate assay. Physical and cultural conditions influencing copper bioremoval such as initial concentration, biomass dosage (inoculum volume), temperature and pH were optimised via one-factor-at-a-time. **Results:** The highest maximum tolerance level was displayed by *Serratia* sp. AQ5-03 at 600 mg l⁻¹, while for *Alcaligenes* sp. AQ5-02 and *Pseudomonas* sp. AQ5-04 it was 500 mg l⁻¹. The highest bioremoval for *Alcaligenes* sp. AQ5-02, *Serratia* sp. AQ5-03 and *Pseudomonas* sp. AQ5-04 was achieved at 20, 50 and 75 mg l⁻¹, respectively. The optimum biomass dosage (inoculum volume) for both *Serratia* sp. AQ5-03 and *Pseudomonas* sp. AQ5-04 were 15%, whereas it was 10% for *Alcaligenes* sp. AQ5-02. The results also revealed that maximum bioremoval was achieved at pH 6 at an optimum temperature of 20°C for both *Alcaligenes* sp. AQ5-02 and *Pseudomonas* sp. AQ5-04, while *Serratia* sp. AQ5-03 showed optimum removal at pH 7 and at 30°C temperature. The maximum bioremoval efficiency for *Alcaligenes* sp. AQ5-02, *Serratia* sp. AQ5-03 and *Pseudomonas* sp. AQ5-04 were found to be 62, 57 and 70%, respectively. **Interpretation:** The results indicate that *Alcaligenes* sp. AQ5-02, *Serratia* sp. AQ5-03, *Pseudomonas* sp. AQ5-04 can be utilised as bioremoval agent since it possessed the highest bioremoval efficiency for copper remediation.