272/D

Isolation of microorganisms from an effluent sample having tolerance to different metal ions

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Effluent samples were collected from a textile dyeing industry which uses many chemicals for dyeing process. Initially, the effluents were analyzed to check for the presence of microorganisms that can survive under these conditions and the extra chromosomal elements of these microorganisms were investigated using standard procedures. The microorganisms were classified using gram staining procedure and microscopic observations. The effluents were screened for possible metal contaminants using Atomic Absorption Spectrometry. The tolerance limits of the microorganisms for different metal ions were determined. Finally, the metal ion remediation efficiency of the microorganisms was determined.

Plasmids containing nine bacterial strains which can survive in the presence of metal ions were successfully isolated from the effluents. Among them, the metal ion tolerance ability of the G strain is
0.02- 4.0 ppm concentrations of Cu^{2+} ion and 0.40 ppm to more than 10.0 ppm concentrations of Zn^{2+} ion. The bioremediation ability of G and P strains for Cu^{2+} and Zn^{2+} ions showed 1.1 ppm to 0.5 ppm decrease in concentration of Zn^{2+} and 1.1 ppm to 0.6 ppm decrease in concentration of Cu^{2+} during three days time period.

Strain No.	Collected site	Classification	Plasmid size (kb)	Morphology of colonies	Tolerable Metal ion
D_2	Oxygenation process	Gram positive, Rods	4	Orange coloured, large	Cu^{2+} , Zn^{2+} , Pb^{2+} , Cd^{2+}
G		Gram positive, Coccus	6, 4	White coloured, small	Cu^{2+} , Zn^{2+}
H		Gram Negative, Filamentous	3	White coloured, large	Cu^{2+} , Zn^{2+}
K, L, M, O, P	Biological treatment process	Gram positive, Rods	3	Yellow coloured, large	Cu^{2+} , Zn^{2+}
N		Gram Negative, Filamentous	3	Yellow coloured, large	Cu^{2+} , Zn^{2+}

Table 1: Characters identified in isolated bacterial strains

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