



Isolation, Screening and Identification of Bacteria for Bioremediation of Landfill Leachate under Temperate Conditions of Kashmir Himalayas

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ABSTRACT

The land filling of municipal solid waste results in generation of highly toxic leachate that has significant impacts on different components of environment. Various processes are available for treatment of landfill leachate, however bioremediation is considered as the environmental friendly technology. In this context the present study was undertaken with the following objectives 1) To analyze physicochemical characteristics of landfill leachate. 2) Isolation and identification of bacteria from the leachate. 3) Screening of isolated bacteria for treatment of leachate. The leachate was analyzed for various physicochemical parameters viz. pH (7.5 ± 0.25), biological oxygen demand (BOD), chemical oxygen demand (COD), total nitrogen and total phosphorus. The results of the study showed higher nutrient levels with BOD having values of 7300 ± 750 mg/l, COD 12250 ± 1200 mg/l, total nitrogen 1143 ± 119 mg/l and total phosphorus 12.40 ± 0.98 mg/l. For the isolation of bacteria serial dilution spread plate method was employed and a total of 5 morphologically different bacteria were isolated on nutrient agar media at pH of 7.5 and temperature of 15° C after 48 hours. The different isolates were labelled as LF1, LF2, LF3, LF4 and LF5. The screening of isolated bacteria for treatment of leachate was carried out. The leachate was taken in a 6 flasks containing minimum salt medium, 20% leachate and 5% (w/v) of bacterial pellet. The flasks were placed in an incubator shaker at 15°c and 200rpm. After inoculation the samples were analyzed for various physicochemical parameters after every 24 hours. The flask inoculated with the isolate LF2 showed maximum reduction in colour of leachate and was selected for analysis of different parameters after treatment. It was found that 70%, 78%, 60% and 80% reductions were achieved in BOD, COD, total nitrogen and total phosphorus respectively after 72 hours. On the basis morphological characteristics the isolates LF1 & LF3 were identified as *Pseudomonas sp.* while as the isolates LF2 & LF4 were Gram +, *Bacillus sp* and the isolate LF5 was identified as *Staphylococcus sp.* It was concluded that the isolate LF2 represented a promising approach in bioremediation of landfill leachate under in-vitro conditions.

Keywords: *Bacillus sp.*, *Biological Oxygen Demand*, *Bioremediation*, *Leachate*, *Physicochemical*