



ISOLATION AND IDENTIFICATION OF EFFECTIVE AND LOW-COST BACTERIA CONSORTIA FOR COD REDUCTION OF LAND FILLS LEACHATE (A GREEN SOLUTION FOR TREAT LAND FILLING LEACHATE)

Wijerathna P.A.K.C.¹ and Pathmalal M.M.^{1,2*}

¹Centre for Water Quality and Algae Research, Department of Zoology,

Faculty of Applied Sciences, University of Sri Jayewardenepura, Sri Lanka

²Faculty of Graduate Studies, University of Sri Jayewardenepura, Sri Lanka pathmalal@sjp.ac.lk

Abstract

The occurrence of high Chemical Oxygen Demand (COD) values in leachate is a potential health risk since it can contaminate ground water sources. The COD refers the amount of oxygen consumed by organic matters when they are oxidizing into inorganic compounds in water. The landfill leachate is one of the most significant types of waste water which contains higher COD levels since the accumulation of pollutants. The present study was focused on isolation and identification of more efficient bacterial consortia to reduce COD in landfill leachate. Samples were collected from Karadiyana control open damp site during November, 2019. In the preliminary study, bacterial isolates from leachate samples were screened to detect the COD reduction potential using 20% diluted sterile leachate sample. Initial and final COD levels were measured daily by closed reflux titrimetric method. Pour plate method and streak plate method was followed to isolate different bacterial colonies and three gram negative bacterial isolates (A, B, C) out of 32 morphologically different bacterial isolates were identified as more efficient bacteria candidates for reduction of COD. Bacterial isolates A, B and C was individually reduced COD levels up to 50.85%, 48.21% and 45.21% respectively within 14 days at room temperature. The bacterial isolates were used to prepare four bacterial consortia (AB, AC, BC, and ABC) which have ability to reduce COD levels in landfill leachate up to 52.8%, 51.2%, 49.3%, 60.1% respectively while control was reduced up to 15.25%. Thus, the results of the present study suggest that the identified bacterial consortia ABC can be used as a potential biological treatment for reduction of high COD levels in landfill leachates

Keywords: Microbial consortia, leachate, COD, biological treatment, bacterial isolates.