



OPTIMIZATION OF BACTERIAL CONSORTIUM FOR REDUCTION OF COD IN SOLID WASTE LEACHATE

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Abstract

Solid waste landfill leachate is considered as one of the highly complex polluted wastewater type varying with the composition of the accumulated pollutants. Therefore the treatment process of the leachate is complicated and expensive. Direct disposal of the untreated leachate to the aquatic environment causes a number of adverse impacts to the ground and surface water quality. Thus, the present study was focus to formulate bacterial consortium to reduce the Chemical Oxygen Demand (COD) of solid waste leachate in efficient and cost effective manner. In the study, the COD of the leachate was measured by the closed reflux method and environmental bacteria were isolated from leachate, solid waste and the soil samples collected from the Karadiyana controlled open dump site, Sri Lanka. Five gram-negative bacterial isolates (A, B, C, D and E) were identified as more potential bacterial genera's to reduce COD. The reduction of COD with the bacterium A, B, C, D and E were 50.85%, 48.21%, 45.21%, 49.6% and 55 % respectively. Following the results of the COD reduction potential by the individual bacteria, bacterial consortium (ABC) was formulated using the promising bacteria isolates of A, B, and C. The bacteria consortium showed 62% reduction of COD within 14 days of time at room temperature (30°C). The COD reduction showed by the bacteria consortium was greater than the application of individual bacteria. More over the prepared bacterium consortium was optimised for metal Co - factors and it was found that the COD degradation was enhanced to 76% with addition of Cu⁺² metal in 0.01 ppm concentration. Further studies are in progress to characterize specific enzymes involve for leachate degradation for industrial perspective.

Keywords: *Bacterial consortium, metal co-factors, Leachate, COD, Biological treatment*