210/B

Isolation and morphological characterization of possible Glyphosate degrading bacteria from selected contaminated sites in Sri Lanka

W.H. Kaushalya,[1,2] C.K. Hemachandra,[1*] W.W.P. Rodrigo,[1] W.R.K. Fonzeka,[1] and R. Samarasekera[1]

[1]*Industrial Technology Institute, Colombo*
[2]*Department of Botany, University of Sri Jayewardenepura, Nugegoda*

The use of synthetic pesticides has become an indispensable tool in Sri Lankan agriculture. The extreme usage of Glyphosate herbicide over the past years in the country has led to serious environmental pollution. Bioremediation is considered as the most environmentally sound technology for the environmental clean-up. The present study was aimed at isolation and morphological characterization of the bacterial species that could potentially utilize Glyphosate as their sole source of carbon and energy. Soil samples were obtained from the selected agricultural lands in Dambulla and Rathnapura, which were chronically contaminated over ten years with numerous pesticides including Glyphosate. The enrichment culture technique was used to isolate bacteria from the collected soil samples by providing Glyphosate at the concentration of 50 ppm in the Mineral Salts Medium (MSM) under the incubation temperature of 30^{o}C for two weeks. Based on their differences in colony morphology, five bacterial species (T1W, T1WF, T2Cr, D1O, and D2T) were isolated that could potentially biodegrade Glyphosate. These bacterial isolates were characterized by culturing on both Nutrient Agar medium and on MSM agar enriched with Glyphosate (50 ppm). Gram staining of isolates characterized T1W and D1O as Gram positive short rods, T1WF as Gram positive cocci, T2Cr as Gram negative cocci, and D2T as Gram negative long rods. In conclusion, the isolated bacteria might possess the ability to utilize Glyphosate as the sole carbon source and they might be used in bioremediation of Glyphosate-contaminated environments. However, molecular characterization would be needed for precise identification of the isolates and further studies would be needed to assess the Glyphosate biodegradation capacities of these isolates.

Keywords:Glyphosate, bioremediation, Mineral Salts Medium, morphology, Gram stain

chamini@iti.lk Tel: +94 716311704