ID 196

Isolation of Glyphosate-tolerant and Degrading Bacteria from Agricultural Fields for Future Soil Bioremediation Studies

EWDHT Eththiligoda[1,2#] and AMKCB Aththanayake[2]

[1]School of Applied Sciences, Edinburgh Napier University, Edinburgh, Scotland, United Kingdom
[2]Spectrum Institute of Science and Technology, Colombo 06, Sri Lanka

[#]e20helanie@mysist.com

Abstract

Agricultural soil contamination caused due to immense use of pesticides in agricultural fields has evolved into a global health and environmental hazard. A number of microorganisms are able to survive under extreme conditions in the presence of acquired tolerance due to the prolonged exposure to contaminants by utilising pesticides and their metabolites as the source of carbon, nitrogen or phosphorus. The aim of the current study was to isolate glyphosate- tolerant and degrading bacteria from glyphosate-contaminated soil collected from an agricultural field in Sabaragamuwa province, Sri Lanka that can be applied for soil remediation aspects. Two bacterial strains isolated from glyphosate-contaminated soil were analysed spectrophotometrically for 96 hrs. by measuring the bacterial growth at 600 nm with the use of biotic control with no pesticide and by measuring the pesticide concentration at the absorbance maxima of glyphosate with abiotic control containing uninoculated Nutrient Broth supplemented with glyphosate, in order to evaluate the dose- response and pesticide degrading ability respectively. The two isolated strains, namely *Arthrobacter* sp. and *Bacillus* sp. survived in the presence of different glyphosate concentrations (0 mg/L - 100 mg/L) with glyphosate-degrading potentials. The *Arthrobacter* sp. indicated the highest percentage of glyphosate degradation of 93.84% followed by *Bacillus* sp. with 76.37% during 96 hrs. Moreover, statistical analysis of the study disclosed that glyphosate degradation percentages between the two strains were not significantly different ($p > 0.05$). However, both strains indicated a statistical significance ($p < 0.05$) in degradation percentage compared to the abiotic control, thus indicating the potential of using both strains for future bioremediation studies.

Keywords: *Arthrobacter sp., Bacillus sp., Bioremediation, Degradation, Glyphosate*