Evaluation of *Brachybacterium conglomeratum* RUH_1 Mediated Bioremediation of used Lubricant Oil Contaminated Soil using *Allium cepa* Bioassay

M.M. Wijesooriya[1], K. Masakorala[2]* and S.M.K. Widana Gamage[2]
*mas@bot.ruh.ac.lk
[1] Department of Natural Resources, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka
[2] Department of Botany, Faculty of Science, University of Ruhuna, Matara, Sri Lanka

Contamination of soil with Used Lubricant Oil (ULO) has become an emerging environmental threat because of possible negative impacts of ULO on different ecological receptors. Bioremediation has been considered as a green technological approach with a potential to decontaminate ULO contaminated soils. However, bioremediation efficiency and success are species-specific. Further, more toxic compounds might be generated as metabolic intermediates during the biodegradation of ULO. Hence, the reduction of ULO contamination level alone may not be sufficient to assess bioremediation. Therefore, the evaluation of bioremediation by applying bioassay is vitally important. Thus, the aim of the study was to evaluate *Brachybacterium conglomeratum* RUH_1 mediated bioremediation of ULO contaminated soils by applying *Allium cepa* bioassay. Bioremediation was carried out in laboratory-scale microcosms with 1-5% w/w contamination levels of ULO. At the end of 35 days of experimental time, percentage of ULO biodegradation was calculated and the bioremediated soils and unbioremediated soils taken from the control experiment were used for *Allium cepa* bioassay. The percentages of Root Elongation Inhibition (REI) and percentages of Chromosomal Aberration (CA) were calculated after 48 hours of incubation in triplicates per each contamination level (n=3). The biodegradation percentages of *B. conglomeratum* following 35 days at 1-5% w/w contamination levels of ULO were 77.63, 66.0, 55.55, 50.86, and 41.66, respectively. The calculated percentages of REI in control soils at 1-5% w/w contamination levels of ULO were 29.81, 42.79, 71.15, 75.96, and 81.0, respectively and in bioremediated soils were 18.27, 41.83, 43.27, 49.52, and 59.89, respectively. Further, the calculated percentages of CA in control soils were, 2.50, 3.75, 5.0, 6.50, and 7.25 and in bioremediated soils were 1.0, 1.50, 2.25, 3.0, and 3.50, respectively. Thus, the overall results of bioassay showed the contamination level dependent phytotoxicity and genotoxicity. Therefore, results infer the applicability of *Allium cepa* bioassay for the evaluation of B. *conglomeratum* RUH_1 mediated bioremediation of used lubricant oil.

(Faculty of Science, University of Ruhuna (Grant No. RU-SF-RC-2018-09) is gratefully acknowledged for the financial support).

***Keywords*:** *Allium cepa*, Bioremediation, Genotoxicity, Phytotoxicity, Used lubricant oil