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### **Phytotoxicity assessment of Profenofos based commercial insecticide using *Allium cepa* bioassay**

G.A.M.S. Gunarathna and C.K. Hemachandra\*

*Industrial Technology Institute, 363, Bauddhaloka Mawatha, Colombo 07*

*Allium cepa* bioassay is an efficient test system for the assessment of toxicity/ cytogenotoxicity of environmental contaminants including pesticides. The present study is aimed to assess phytotoxic effects of the Profenofos based commercial insecticide, Polycron Profenofos™ (PP™), using the *A. cepa* bioassay. *A. cepa* bulbs (n=5) were exposed to a range of concentrations (viz., 0.5, 1, 3, 5, 10, 20, 30, 60, 90 mgL<sup>-1</sup>) of PP and aged tap water (control) for 7 days, and the root growth inhibition assay was used to determine the general toxicity. A significant (P<0.05) root growth retardation (13.2% – 93.8%) was obtained in all exposure concentrations compared with the controls and the retardation was concentration dependent. The root growth based effective concentration 50 (EC<sub>50</sub>) was 25.8 mgL<sup>-1</sup> as determined by the USEPA TRAP programme. Cytotoxic and genotoxic impacts of the insecticide was also assessed by exposing root tip cells of the *A. cepa* bulbs (n=5) to 25.8 mgL<sup>-1</sup> (EC<sub>50</sub>) of PP™ for 48 hrs. A parallel negative (aged aerated tap water) and a positive (10 mgL<sup>-1</sup> K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>) control was used. Suppression of the mitotic index (MI) and the occurrence of nuclear abnormalities (NA) were considered as the end points for cytotoxicity whereas occurrence of total chromosomal abnormalities (CA), including both clastogenic and aneugenic abnormalities, together with the micronuclei (MN), were considered as the end points for genotoxicity. A significantly higher (P<0.05) suppression of MI (35%) and occurrences of NA (32%) was observed in the root tip cells of the *A. cepa* bulbs exposed to PP™ compared with the negative control, signifying higher cytotoxic potentials of the tested formulation. Further, a significantly higher occurrence (P<0.05) of total CA (30%) and MN (6.4%) was observed in the root tip cells exposed to PP in comparison with the controls, reflecting a higher potential to cause genotoxic effects. However, the MI suppression, occurrence of NA, CA, and MN in the root tip cells of the *A. cepa* bulbs exposed to PP™, was not significantly different from the positive control. This study provides scientific evidence for the higher potential of PP™ to pose considerable phytotoxic impacts on the exposed flora.

Keywords: *A. cepa* bioassay, Phytotoxicity, Profenofos

chamini.hemachandra@gmail.com

+94 0702582002/ +94 0716311704