Short Article

Environmental Toxicology 2018: Toxicity response of aquatic bioindicators exposed to water polluted with glyphosate

Cristina A. Villamar

ABSTRACT

Herbicides based on glyphosate (C3H8NO5P / CAS 1071-83-6) have been used (actually close to 150 million kg/year) since 1974 on crop soils to eliminate invasive plant species. Sources water can be reached by this herbicide through runoff, leaching and direct exposure of the water receiving body by aerial application. On aquatic environmental, the glyphosate has been found at concentrations up to 4.0 µg/L. Despite the glyphosate has been designed to be lethal in plants (inhibition of the shikimato pathway), the presence of surfactants from commercial formulations and metabolites formation (e.g. aminomethylphosphonic acid or AMPA) by biodegradation could change its toxicity on organisms aquatic. The aim of this work was the ecotoxicological evaluation of freshwater and marine water polluted with glyphosate on Daphnia magna, Emerita analoga and Tisbe longicornis. The methodology used the exposition the aquatic organisms to GLIFOPAC (480 g/L of active ingredient) at concentrations between 0.5 and 4.8 g/L of active ingredient. The acute toxicity of D. magna (48 h-LC50). E. analoga (48 h-LC50) and T. longicornis (96 h-LC50) were studied. Moreover, chromatographic analysis of freshwater and marine water polluted with glyphosate was evaluated. Results demonstrated that acute toxicity reported values for D. magna, E. analoga and T. longicornis of 27.4, 806.4 and 19.4 mg/L, respectively. Chromatographic analysis described around 45 substances of the GLIFOPAC composition such as structures from the surfactants (aliphatics chain with esther/ether group), metabolites (AMPA) and other substances (glucofuranose, glucopyranoside, galactopyranose). Preliminary assessments showed differences in the glyphosate composition within the freshwater and marine water, which may influence the toxicity in each aquatic environment

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Universidad Santiago de Chile, Chile;

Correspondence: Cristina A. Villamar Universidad Santiago de Chile, Chile

Received: December 07, 2021, Accepted: December 22, 2021, Published: December 28, 2021