Hemotoxic effects of some herbicides on juvenile of Nile tilapia Oreochromis niloticus

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Abstract:

Abstract Recently, the residues of some common and widely used herbicides (acetochlor, bispyribac-sodium, bentazon, bensulfuronmethyl, halosulfuron-methyl, and quinclorac) were detected in the surface water, soil, sediments, and fish tissues as the agricultural drainage problems. In this study, juveniles of Nile tilapia Oreochromis niloticus were exposed to sub-lethal concentrations of these herbicides as 2.625, 0.800, 36.00, 2.50, 1.275, and 11.250 mg/l for acetochlor, bispyribac-sodium, bentazon, bensulfuronmethyl, halosulfuron-methyl, and quinclorac respectively for 96 h. Some hemato-biochemical parameters were evaluated. In comparison with the control group, sub-lethal concentrations of all tested herbicides induced alterations in the shape of erythrocytes. Also, in all tested herbicides, hematological parameters of exposed fish exhibited a significant decrease in red blood cell count except bentazon. However, all tested herbicides showed an insignificant reduction in mean corpuscular hemoglobin concentration and total white blood cells except bensulfuron-methyl. For biochemical parameters, most tested herbicides induced a significant increase in levels of cholesterol, albumin, globulin, albumin/globulin ratio, activity of alkaline phosphatase (ALP), alanine aminotransferase (ALT), aspartate aminotransferase (AST), and total plasma protein (only with acetochlor), urea, and creatinine (except bentazon and halosulfuron-methyl that exhibited non-significant decrease in creatinine level) compared with the control. In conclusion, the fish blood profiles can be used as good biomarkers for laboratory study to assess the toxicity of the tested rice herbicides at a sub-acute level especially acetochlor on O. niloticus.

Keywords:

Keywords Oreochromis niloticus . Herbicides . Hematological . Biochemical . Pollution

Published In:

Environmental Science and Pollution Research , https://doi.org/10.1007/s11356-019-06280-x , NULL