Effects of subchronic exposure to atrazine on zebrafish (*Danio rerio*)

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Abstract

The aim of this study was to investigate the effects of subchronic exposure to atrazine on fish growth and the development of histopathological changes in selected organs (gill, kidney, liver) in *Danio rerio*. Juvenile growth tests were performed on *D. rerio* according to OECD method No. 215. For 28 days, fish at an initial age of 30 days were exposed to the environmental atrazine concentration commonly detected in Czech rivers (0.3 μg/L) and a range of sublethal concentrations of atrazine (3.0, 30.0 and 90.0 μg/L). The results showed decreasing growth rates and morphological changes in the liver (dystrophic lesions of hepatocytes) at 90.0 μg/L of atrazine. The environmental concentration of atrazine in Czech rivers did not have any effect on fish growth and development of histopathological changes in *D. rerio*. The value of NOEC was 30.0 μg/L and the value of LOEC was 90.0 μg/L.

Key words: Zebrafish, growth test, histopathology, triazine herbicide

Introduction

Atrazine (2-chloro-4-ethylamino-6-isopropylamino-1,3,5-triazine) is one of the most widely used triazine herbicides in the world. Atrazine (molecular weight 251.7) is used for pre- and post-emergence control of annual grass and broad-leaved weeds in maize, sorghum, asparagus, vines, top-fruit, citrus, sugar cane, bananas, coffee, oil palms and grass-land/forestry, the major uses being maize and sorghum. It is used in combination with many other herbicides (Steinberg et al. 1995, Roberts et al. 1998, Alvarez and Fuiman 2005, Zhou et al. 2008). Atrazine is a selective systemic herbicide which acts as a photosynthesis inhibitor. It is absorbed by roots and leaves, is translocated acropetally in the xylem and accumulates in the apical meristems (Roberts et al. 1998).