

**Effect of imazapyr-based herbicide on vasculogenesis in developing
Java medaka (*Oryzias javanicus*) embryo**

Shahrizad Yusof^{*}, Madihah Ali and Ahmad Ismail

Department of Biology, Faculty of Science, Universiti Putra Malaysia,
43400 UPM Serdang, Selangor, Malaysia.

Abstract

Vasculogenesis, the process of blood vessel formation by a de novo production of endothelial cells during embryogenesis is an important measure to evaluate developmental toxicity. This study evaluated the effect of Imazapyr, a widely used herbicide in agriculture on vasculogenesis in Java medaka embryo. The fish embryos were exposed to five concentrations of Imazapyr-based herbicide (3.0 ppm, 6.0 ppm, 9.0 ppm, 12.0 ppm) and a control under static renewal condition. Prior to the exposure test, normal pattern of vasculogenesis of the fish embryo was recorded using Motic stereomicroscope with Motic 3.0 attached camera. During the exposure period, we observed and recorded the effect of Imazapyr-based herbicide on the primary vascular development (vasculogenesis) of Java medaka embryo throughout the incubation period. The abnormalities found were formation of abnormal patterns of sinus venosus, common cardinal vein and marginal vein, absence of erythrocytes and blood clotting in the veins. Abnormalities in vasculogenesis started to commence in 6.0 ppm Imazapyr-base herbicide and became more pronounced at higher exposure concentrations. The higher the exposure concentrations the earlier the abnormalities in vasculogenesis appeared. Based on the results, Java medaka embryos are suitable as a model organism for testing vasculogenesis impairments due to environmental pollutants. Furthermore, as other medaka fish, Java medaka has the common pattern for the development of the primary vascular system that can represent other vertebrates.

Keywords: *Oryzias javanicus*, test organism, vasculogenesis, environmental pollutant.

*Corresponding author: izad@upm.edu.my