HEMATOLOGICAL AND BEHAVIORAL PARAMETERS IN CARP (Cyprinus carpio) EXPOSED TO AZADIRACHTIN, A NEEM-DERIVED BIOPESTICIDE

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Biopesticides are increasingly accepted by farmers owing to the current trend for organic production that uses fewer agrochemicals. One of the most promising natural compounds is azadirachtin (Aza), which is extracted from the neem tree (Azadirachta indica A. Juss) (Meliaceae). Although this compound is apparently safe, there is evidence that it may have deleterious effects on fish. Hematological and behavioral tests are grouped into a set of parameters that may predict potential toxicity of chemical compounds. Here, we investigate the effects of Aza in the commercial formulation Neenmax™, on carp (Cyprinus carpio) by defining \( LC_{50} \) (96h), and testing hematological and behavioral parameters. In our study, \( LC_{50} \) was estimated at 80 µL/L. The carp were exposed at 20, 40, and 60 µL/L of Aza, values based respectively on 25, 50, and 75% of \( LC_{50} \). Hematological parameters, such as hematocrit, hemoglobin, hematimetrics index, and red cell distribution were decreased at 60 µL/L Aza exposure. At 60 µL/L Aza promoted significant changes in parameters as increase in the distance traveled and absolute turn angle. In addition, the same concentration decreased the time spent immobile and the number of immobile episodes. In conclusion, we demonstrated that acute Aza exposure at 60 µL/L may be toxic for carp. The analysis of hematological parameters suggested that exposure to 60 µL/L of Aza caused anemia in carp. Overall, swimming activity was impaired owing to the increased locomotion of animal exposed to 60 µL/L of Aza. These results are relevant to the search for a safe concentration of Aza that does not influence the fitness of aquatic biota.

Keywords: behavior; biopesticides; fish.

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