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Exposure of scorpionfish (*Scorpaena guttata*) to cadmium: biochemical effects of chronic exposure

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ABSTRACT

Scorpionfish (*Scorpaena guttata*) were exposed to sublethal levels of cadmium in seawater (10 and 20 mg/l) for 4 wk. Measurements of enzyme activities were conducted in order to examine the relationship between toxic effects and the subcellular distribution of Cd, Cu and Zn. Liver, kidney, intestine and gill tissue were analyzed for the activity of the enzymes alkaline phosphatase, succinate dehydrogenase, glyceraldehyde phosphate dehydrogenase and Cu-Zn-superoxide dismutase (SOD).

Exposure to Cd resulted in the inhibition of only Cu-Zn-SOD activity in the intestine. The activity of SOD was reduced sixfold in intestines at the 20-mg Cd/l exposure level. Intestine SOD activity was also correlated positively with concentration of Cu in the high-molecular-weight fraction of the cytosol (ENZ). The sulfhydryl-containing enzymes glyceraldehyde phosphate dehydrogenase and succinate dehydrogenase were not affected by Cd exposure, suggesting that the amounts of Cd found in the ENZ pool after the exposures examined here were insufficient to have a direct impact on enzyme activities. The mechanism of reduction of SOD activity in these fish appeared to be related instead to Cd-induced alterations of Cu and/or Zn metabolism.

Keywords: Cadmium; Scorpionfish; Enzyme activity; Toxicity

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