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Zinc and selenium supplementation combats cadmium induced bioaccumulation and oxidative stress in teleostean fish *Oreochromis mossambicus*: The possible detoxification mechanisms

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Cadmium (Cd) is one of the most common non-essential heavy metal causing wide range of toxic effects. The present study examines the detoxification role of zinc (Zn) and selenium (Se) against Cd induced bioaccumulation and oxidative stress in fresh water teleost *Oreochromis mossambicus*. After acclimatization, fish were exposed to sub lethal concentration of Cd ($1/10^{\text{th}}$ of $LC_{50}/48\text{h}$, i.e., 5 ppm) for 7, 15 and 30 days (d) period. 15d Cd exposed fish were later considered as control and were divided into three groups. The first group was subjected to Zn (1 ppm) supplementation, second received only Se (0.5 ppm) and third group of fish were supplemented with combination of both Zn and Se for above said concentrations and tested again for 7, 15 and 30 d time periods. After specific time intervals, liver and kidney tissues were isolated and used for Cd bioaccumulation as well as assay of oxidative stress enzymes like superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione-S-transferase (GST). Lipid peroxidation (LPO) levels were also measured. Bioaccumulation levels significantly increased with increased period of Cd exposure. After supplementation with Zn and Se, bioaccumulation of Cd progressively decreased. A significant elevation in LPO levels with decreased activity of CAT, SOD, GPx and GST were observed during Cd intoxication. However with Zn and/or Se supplementation, a significant reversal in the above oxidative stress enzymes was observed. Our study revealed that the combined supplementation of Zn and Se tends to detoxify the Cd induced alterations in the test tissues better than the other modes of supplementation.

Biography

Asupatri Usha Rani has completed her PhD from Sri Venkateswara University and Post-doctoral studies with award of Research Associate Fellowship from University Grants Commission (UGC) and Council of Scientific and Industrial Research (CSIR), New Delhi. She is a Senior Faculty of the Dept. of Zoology heading the Division of Environmental Biology and an active Researcher. She has published more than 53 research papers in reputed journals and presented her work at several national and international conferences in India and abroad. She is Fellow of the National Environmental Science Academy, New Delhi.

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