



COMBINED EFFECT OF COPPER, MERCURY AND CADMIUM INDUCED BIOACCUMULATION IN THE SELECTED TISSUES OF TWO AQUATIC ORGANISMS

D.Kumar Babu, J.Obaiah, P.Sudhakar Reddy*, G.Bhavani and A.Usha Rani,
Division of Environmental Biology, Department of Zoology,
Sri Venkateswara University,
Tirupati – 517 502, Andhra Pradesh. E-mail: aur_svu9@yahoo.co.in

*. National TsingHau University, Hsinchu, Taiwan

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Abstract :

Heavy metals are intrinsic, natural constituents of our environment. They are generally present in small amounts in natural aquatic environment. Apart from the natural sources, several anthropogenic factors also contribute to metal concentrations in the environment. Anthropogenic activity can result in greatly increased levels of metals mainly copper (Cu), mercury (Hg) and cadmium (Cd) in the environment. Fishes, crabs and shrimps are the main aquatic organisms in the food chain which may often accumulate large amounts of certain metals. Hence, an attempt is made to study the bioaccumulation of such combinations of metals in two different aquatic organisms like fish, *Oreochromis mossambicus* (Tilapia) and crab, *Oziotelphusa senex senex* under the combined effect of three heavy metals.

The test animals were exposed to sub lethal concentrations of Cu, Hg and Cd for fishes it was 0.6ppm, 0.12ppm and 5ppm and for crabs 2.8ppm, 0.17ppm and 0.4ppm respectively for selected time intervals of 7, 15 and 30 days (d) long sojourn. After the specific time intervals the animals were sacrificed and the tissues like liver, muscle and hepatopancreas were isolated. 50mg of each tissue was weighed and acid digested overnight in 3:2 nitric acid : perchloric acid mixture. It was then subjected to evaporation. The residue was dissolved in 5ml of double distilled water and 1ml was withdrawn for metal accumulation by Atomic Absorption Spectrophotometer (Schimadzu AA 6300).

Results revealed a significant increase in accumulation of three metals in all the selected tissues of test animals when compared with control animals. Maximum accumulation was observed in 30d Cu exposed fish liver ($26.05 \pm 1.08 \mu\text{g} / \text{g}$) followed by 30d Cu exposed crab hepatopancreas ($18.86 \pm 1.02 \mu\text{g} / \text{g}$) and minimum level of accumulation was found in 30d Hg exposed fish and crab muscle ($2.42 \pm 0.09 \mu\text{g} / \text{g}$ and $2.58 \pm 0.19 \mu\text{g} / \text{g}$ respectively).

Introduction :

Heavy metals are recognized as one of the most hazardous environmental pollutants and they are toxic to many living organisms. Environmental exposure to heavy metals has been reported to cause disease in humans and other animals. Accumulation of heavy metals in freshwater

ecosystems is of global importance. Fish, crab and shrimps are the main aquatic organisms in the food chain which may often accumulate large amounts of certain metals (Agoes Soegianto, 2008). Bioaccumulation is often a good integrative indicator of the chemical exposures of an organism in polluted ecosystems (Phillips, 1994; Samuel, 2005). Bioaccumulation

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