

Snails and Fish as Pollution Biomarkers in Lake Manzala and Laboratory C: Laboratory Exposed Snails to Chemical Mixtures

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Abstract : Snails are considered as suitable diagnostic organisms for heavy metal-contaminated sites. *Biomphalaria alexandrina* snails are used in this work as pollution bioindicators after exposure to chemical mixtures consisted of heavy metals (HM); zinc (Zn), copper (Cu) and lead (Pb); and persistent organic pollutants; Decabromodiphenyl ether 98% (D) and Aroclor 1254 (A). The impacts of these tested chemicals, individual and mixtures, on liver and kidney functions, antioxidant enzymes, complete blood picture, and tissue histology were studied. Results showed that Cu was proved to be the highly toxic against snails than Zn and Pb where LC₅₀ values were 1.362, 213.198 and 277.396 ppm, respectively. Also, *B. alexandrina* snails exposed to the mixture of HM (1:1; LC₅₀ Cu, Pb and Zn) showed the highest bioaccumulation of Cu and Zn in their whole tissue, the most significant increase in AST, ALT & ALP activities and the highest significant levels of total protein, albumin and globulin. Results showed significant alterations in CAT activity in snail tissue extracts while snail samples exposed to most experimental tests showed significant increase in GST activity. Snail samples that exposed to HM mixtures showed a significant decrease in total hemocytes count while snail samples that exposed to mixtures containing A & D showed a significant increase in total hemocytes and Hyalinocytes. Histopathological alterations in snail samples exposed to individual HM and their mixtures for 4 weeks showed degeneration, edema, hypertrophy and vacuolation in head-foot muscle, degeneration and necrotic changes in the digestive gland and accumulation in most tested organs. Also, the hermaphrodite gland showed mature ova with irregular shape and reduction in sperm number. In conclusion, the resulted damage and alterations in *B. alexandrina* studied parameters can be used as bioindicators to the presence of pollutants in its habitats.

Keywords : *Biomphalaria*, Zn, Cu, Pb, AST, ALT, ALP, total protein albumin, globulin, CAT, histopathology

Conference Title : ICMEENR 2016 : International Conference on Management of Environmental, Ecological and Natural Resources

Conference Location : London, United Kingdom

Conference Dates : November 24-25, 2016