

Heavy metal induced toxicity of the Indian green frog, *Euphlyctis hexadactylus* (Ranidae), in the Bellanwila-Attidiya sanctuary

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Amphibians are reported to serve as decisive indicators of ecosystem health. A previous investigation of a polluted urban wetland, Bellanwila-Attidiya sanctuary in the Western province revealed contamination of water and frog tissue with heavy metals Cd, Cu, Zn and Pb. These findings in conjunction with the global amphibian crisis provided the impetus for a study to evaluate toxic effects of selected heavy metals on *Euphlyctis hexadactylus* in the Bellanwila-Attidiya sanctuary. Naturally exposed frogs, from this site were compared with their healthy counterparts from the reference site at the catchment of Labugama reservoir. Standard methodology assessed toxicity based on frog erythrocyte morphometry, histopathology of major organs and serum biomarkers of hepatic and of nephro toxicity.

Erythrocyte morphometry measured mean cell volume (MCV), mean nuclear volume (MNV), aspect ratio and nucleo-cytoplasmic ratio. The exposed versus healthy *E. hexadactylus* reported discrepancies in all these tested parameters; particularly, MCV of exposed animals ($179.0 \pm 32.58 \mu\text{m}^3$) was significantly lower ($P= 0.0001$) than that of reference animals ($200.79 \pm 35.96 \mu\text{m}^3$). Histopathological assessment showed pronounced disturbances in tissue development; severe bile secretion, hemorrhages and sinusoidal dilations of liver, distortion of alveolar sacs in the lungs, damaged Bowman's capsules in the kidney and damaged glandular cells of the skin epidermis. Liver injuries observed were clearly explained by increased activity of serum hepatic marker enzymes, aspartate transaminase, alanine transaminase and gamma glutamyl transferase, indicating cellular leakage and loss of functional integrity of frog hepatocyte membrane in the polluted site. Reduced total protein and albumin levels suggested hepatic dysfunction. Significantly elevated levels of urea ($P = 0.033$) and higher creatinine in blood indicated renal dysfunction.

Thus, as evidenced in this study erythrocyte morphometry, developmental alterations in major organs and serum biomarkers of *E. hexadactylus*, may be used as indicators of heavy metal pollution of aquatic amphibians.

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