

**Biomarkers of sublethal stress in a terrestrial isopod *Porcellio scaber*  
(Isopoda, Crustacea): power and limitations**

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Biomarkers, by definition indicate disturbed health of individuals and consequently the state of the environment. The application of biomarkers in natural systems and also in laboratory toxicity studies is limited due to the variability of biochemical and subcellular biomarkers and inadequate data on links with higher-level effects. The aim of the study was to identify the source of biomarker variability and to study toxic effects by linking biochemical biomarkers to histological and physiological endpoints. Isopods (*Porcellio scaber*) were dietary exposed to sub-lethal concentrations of cadmium and organophosphorous pesticides diazinon under controlled laboratory conditions. During the exposure we recorded the feeding rate, weight of animals and mortality. The biochemical variables investigated in whole animal samples were glutathione-S-transferase (GST), glutathione reductase (GR), glutathione peroxidase (GPx) and acetylcholine esterase (AChE) activities. In the digestive glands (hepatopancreas), lipid, glycogen and protein contents were determined. On serial sections of the hepatopancreas, histological parameters were assessed (epithelial thickness, distribution and estimation of the content of lipid droplets). So far, the results show two major potential sources of biomarker variability, namely the moult and digestive cycles. Also, the correlation between the target enzyme inhibition and physiological function of the organism is significant. The results show that combinations of biomarkers provide a holistic approach to study the sublethal effects, general health and survival potential of organisms under stress.

*Keywords: biomarkers, stress enzymes, toxicity, cadmium, diazinon, terrestrial isopod, Porcellio scaber, Crustacea*