**Hydrolytic enzyme activity of *Daphnia magna* and implications for rapid toxicity testing**

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*Daphnia magna* is a widely used model organism for aquatic toxicity testing. *D. magna* standard assays for acute toxicity tests target endpoint such as inhibition of mobility. However, use of this endpoint can be somewhat ambiguous and time-consuming.In this study, we investigated the extra- and intracellular hydrolytic enzyme activity of starved *D. magna* after exposure to organic and inorganic toxicants. In vivo enzyme activity was quantified using 15 fluorescent enzyme probes based on methylumbelliferyl fluorophores. Probing of *D. magna* enzyme activity was carried out after short-term (24-48 h) and long-term (21 days) exposure to different metals and organic toxicants including glyphosate (Roundup). Toxicant induced changes in fluorescence were compared to changes in mobility, survival, ATP content, and lipid biomarkers. The results showed that extra- and intracellular hydrolytic enzyme activity was quantifiable as changes in whole body fluorescence of *D. magna*, and as changes in fluorescence of the surrounding water. Juvenile and adult *D. magna* displayed a range of easily detectable enzyme activities including those of aminopeptidases, arylsulfatases, esterases, lipases, glucoside hydrolases, and phosphatases. Roundup was shown to affect hydrolytic target enzymes in *D. magna* including alkaline phosphatase. The results suggest that sublethal endpoints such as in vivo hydrolytic enzyme activity can be used as an index of *D. magna* fitness in bioassays. A combination of enzyme based endpoints and fluorescence measurements may be applied as a simple and rapid quantitative supplement for toxicity tests with *D. magna*.

**Key words:** *Daphnia magna*, enzyme probing, fluorescence, sublethal endpoint