

Assessment of the oxidative stress and reproductive effects of mono(2-ethylhexyl) phthalate on *Daphnia magna*

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Abstract

Mono(2-ethylhexyl)-phthalate (MEHP) is the metabolite of di(2-ethylhexyl)-phthalate (DEHP), which is widely used in the industry as plasticizers. According to the previous studies, both DEHP and MEHP causes oxidative stress and malfunction of reproductive systems in various organisms. However, little is known about the toxicity of MEHP to aquatic invertebrates such as *Daphnia magna*. We used neonates (< 24 h) and juveniles (5-d-old) for determining LC50 of MEHP. It is interesting to note that LC50 of MEHP on juveniles (68.6 mg/l) was lower than that on neonates (82.3 mg/l) at 48 h. Among biomarkers, the most noticeable change was ROS (Reactive oxygen species) after 24 h of exposure. The trend of SOD (Superoxide dismutase) and GST (Glutathione S-transferase) activities were partly consistent with ROS at 24 h, while CAT (Catalase) and GPx (Glutathione peroxidase) activities did not show significant changes in the treated daphnids. It could be explained by steady GSH/GSSG (redox potential) with the one exception at 6 h. The expression of all antioxidant enzyme genes was upregulated at 24 h. JHE (Juvenile Hormone Esterase) expression was down-regulated and Cht (Chitinase) expression was up-regulated, while Vtg2 (Vitellogenin) expression was altered differently in two-time points. These mRNA expressions could be related to the decreased reproduction observed in the chronic test. Overall, MEHP induced oxidative stress and disrupted reproduction system in *D. magna*.

Keywords: MEHP, Oxidative stress, Reproductive toxicity, *Daphnia magna*

References

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