

Poster 36

MDA effects on morphophysiology and reproduction of *Daphnia magna* – preliminary data

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Abstract

Background: Psychoactive substances and their metabolites are considered emergent contaminants, raising environmental concerns due to the continuous input into aquatic ecosystems [1]. MDA (3,4-methylenedioxyamphetamine) is a pharmacologically active substance that represents the major metabolite of 3,4-methylenedioxymethamphetamine (MDMA); MDA may be present in MDMA preparations or occur as an illegal psychoactive substance [2]. Considering the possible implementation of MDMA-assisted psychotherapy along with the increased recreational interest in MDA, the presence of MDA in aquatic ecosystems is expected to increase as well as its effects on non-target organisms, including invertebrates [1,3]. Since the ecotoxicological impact of MDA remains unknown, studying its toxic effects on an environmentally relevant organism is most important. **Objective:** This work aimed to assess the effects of possible MDA-induced toxicity on *Daphnia magna* through the evaluation of morphophysiological and reproductive endpoints. **Methods:** Neonates (<24 hours) were exposed to three concentrations of MDA (0.1, 1 and 10 mg/L) for 9 days. Exposures and control were performed with 5 replicates with 20 organisms each. On days 3 and 9, morphophysiological endpoints (body size, heart size and area, and heart rate) and reproductive endpoints (number of ovigerous daphnia and fertility) were determined. In parallel, a standard 21-d reproduction assay was conducted (MDA concentrations: 0, 0.10, 0.18, 0.32, 0.56, 1.00, 1.79 mg/L). **Results:** Morphophysiological endpoints increased with MDA concentration on the third and ninth day of exposure. An increase in the number of ovigerous daphnia and fecundity was found at 10 mg/L of MDA. In the 21-d assay, MDA caused a significant reduction in fecundity, body size and rate of increase from 0.18 mg/L upwards. **Conclusions:** Data are suggestive of some adverse influence of MDA on the analyzed endpoints. Nevertheless, other toxicity biomarkers should be evaluated to obtain insight on a mechanistic explanation for the observed effects.

Keywords: MDA; ecotoxicity; *Daphnia magna*; morphophysiology; reproduction

Acknowledgments

This work is financially supported by national funds through the FCT/MCTES (PIDDAC), under the project PTDC/CTA-AMB/6686/2020 (ENANTIOTOX) and supported UIDB/04033/2020 (CITAB).

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