

Poster 65

Butylone effects on swimming behaviour and biochemical parameters on *Daphnia magna*

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Abstract

Background: Psychoactive substances (e.g. cathinones) may be detected in environmental samples, posing risks to wildlife and human health [1, 2]. Butylone (BTL) is a chiral synthetic cathinone available as a racemate [1]. Nevertheless, both human metabolism and biodegradation at wastewater treatment plants may be enantioselective causing changes in its enantiomeric fraction (EF) [2]. Therefore, enantiomers may exhibit different toxicity effects on non-target aquatic organisms, like daphnia [3]. **Objective:** This study aimed to assess the sub-chronic effects on *Daphnia magna* exposed to BTL (racemate and single enantiomers) focusing on swimming behaviour and biochemical parameters. **Methods:** Daphnids (<24h) were exposed to concentrations of 0.10, 1.0, or 10 µg L⁻¹ of *rac*-BTL or 0.10, or 1.0 µg L⁻¹ of each BTL enantiomer for 9 days (5 replicates per concentration and a control). On day 5, several swimming parameters were determined and on day 9, daphnids were collected for evaluation of biochemical parameters. **Results:** No significant changes were observed in swimming parameters in organisms exposed to *rac*-BTL. However, organisms exposed to (*S*)-BTL at 0.10 µg L⁻¹ showed a significant increase in total distance. Regarding oxidative stress, *rac*-BTL increased tiobarbituric acid reactive species levels at 10 µg L⁻¹, and an increase in reactive oxygen species levels was found after exposure to (*S*)-BTL at 1.0 µg L⁻¹. A decrease in catalase activity at 0.10 µg L⁻¹ was observed in the organisms exposed to *rac*-BTL whereas no changes were observed for single enantiomers. The activity of acetylcholinesterase showed a significant decrease at all concentrations of *rac*-BTL whereas an increase was found after exposure to (*R*)-BTL at 0.10 µg L⁻¹. **Conclusions:** This study demonstrates that exposure to BTL may cause enantioselective toxicity effects on *D. magna* related to swimming parameters, oxidative stress, and enzymatic activity. To understand better the toxicity and mechanisms caused by BTL exposure in *D. magna*, future studies are ongoing.

Keywords: ecotoxicity; psychoactive drugs; daphnia; enantioselectivity; biomarkers

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