
How threatened planarians can be when ingesting contaminated prey with microplastics?

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Abstract

Microplastics (size < 5 mm) represent a global threat to freshwaters, as they are among the major sinks of these contaminants sourced on inland anthropogenic activities. The number of studies in these environments remains scarce compared to marine environments, and little is known about the potential trophic transfer and the consequent effects on freshwater predators, particularly those with extracorporeal digestion. Thus, this work aimed to evaluate the behavioural and physiological responses of the planarian *Girardia tigrina* after consuming contaminated prey - *Chironomus riparius* 4th instar larvae previously exposed to microplastics of Polyurethane (PU-MPs; 7-9 μm in size; polymer applied in building & construction and transportation sectors). Firstly, larvae (< 48 h) were exposed to 0 (control condition) and 375 mg PU-MPs/kg for 10 days (a concentration that did not affect larvae growth, despite the hyperactivity observed in contaminated prey). After 10 days, larvae (n=15) from PU-MP and control conditions were collected, rinsed, and fed to planarians for (3h). After the feeding period, planarians' locomotion and regeneration were evaluated. Planarians consumed 20% more contaminated prey than uncontaminated prey, probably related to larvae' higher locomotion behaviour (also more appetitive to the predator). After feeding activity, no significant changes in planarians' locomotion were observed, but a slight delay in the regeneration of the auricula (up to 1.5 days) was recorded for planarians that fed on contaminated prey. Histological analysis revealed the planarians' uptake of a limited number of PU-MPs. Although results reveal sub-lethal effects on planarians after consuming contaminated prey with PU-MPs, it does not rule out eventual long-term effects (i.e., reproduction/fitness).

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