
Impact of plastic-associated biofilms on primary consumer *Physa acuta*

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Résumé

Plastics are emerging pollutants that threatens the environment and human health on a global scale. Around 80% of plastic waste accumulates in the environment where it fragments, spreads and leach chemical additives to all ecosystems. However, despite more than a decade of scientific interest, the environmental effects of plastics are still not fully understood. Particularly, freshwater ecosystems represent less than 15% of scientific publications and rarely target the effects of plastics on the lower level of the trophic network like microbial communities in streams. Yet, those communities can develop on plastic materials in a biofilm called the plastisphere that is a food source for their primary consumers, the grazers. Primary consumers are the intermediate trophic level between biofilm and other benthic organisms, and they are known to be pertinent indicators of changes in their food source and perturbations of their environment. However, there is a lack of knowledge of plastics effects on the biofilm-consumer relationship. We hypothesized that the grazing activity depends on the nature of the biofilm substrate. Then, we expect to observe more consumption, excretion and less ecotoxicological effects in gastropods feeding on biofilm grown on an inert control material than in gastropods feeding on plastics grown biofilms. To test these hypotheses, we studied the effects of different plastic-associated biofilms on the freshwater gastropod *Physa acuta*, a worldwide distributed generalist species which is generally the main grazer when it is present in the food web. We combined the field incubation of an inert control and four plastic materials chosen for their distinct polymer types and uses - reflecting their contrasted chemical compositions - and a laboratory exposure of the gastropods to the developed biofilms. We measured individually (1) the consumption and excretion of the biofilm and (2) the ecotoxicological effects on growth and reproduction. Preliminary results show that plastic-associated biofilms (1) are different from the control biofilms and (2) influence the snail phenotype by reducing both the feeding activity and the growth rate, suggesting that plastisphere may impact the fitness of grazers and ultimately the transfer of energy in aquatic food webs.

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Mots-Clés: plastic pollution, microbial communities, biofilms, freshwater, trophic networks, ecotoxicology