Microplastic on our plate, also in our shops…

Van Cauwenberghe Lisbeth, Michiel Claessens and Colin R. Janssen

Laboratory of Environmental Toxicology and Aquatic Ecology, Ghent University, Jozef Plateaustraat 22, B-9000 Ghent, Belgium
E-mail: Lisbeth.VanCauwenberghe@UGent.be

Microplastics are present throughout the marine environment, and ingestion of these small (<1 mm) plastic particles has been demonstrated repeatedly in a laboratory setting for a wide array of marine (invertebrate) organisms. However, as the exposure concentrations of microplastics in these types of experiments are much higher (over a thousand times higher) than any reported field concentration, it is difficult to assess the relevance of these results for natural environments. Therefore, we assessed the presence of microplastics in two bivalve species living in natural conditions: both field collected and cultured individuals of *Mytilus edulis*, and farmed *Crassostrea gigas* were investigated.

Part of the organisms (all field collected *M. edulis* (N=30), and half of the cultured *M. edulis* (N=36) and *C. gigas* (N=10)) were subjected to a gut depuration to allow them to clear their gut. The other organisms were analysed for microplastics without prior treatment. To examine microplastic presence in the animals, the soft tissues were acid digested using HNO_3.

Small numbers of microplastics were recovered from the tissue of the species under investigation. In field collected *M. edulis* the average microplastic load (post-depuration) was 0.20 ± 0.30 particles per gram of soft tissue. In cultured *M. edulis* microplastic load (pre-depuration) was 0.36 ± 0.07 particles per gram of soft tissue. After the depuration period, only 0.24 ± 0.07 particles g^{-1} were encountered. The same trend was observed in *C. gigas*: without depuration on average 0.47 ± 0.16 particles g^{-1} were present in the animals, while microplastic concentrations decreased to an average of 0.35 ± 0.05 particles per gram soft tissue after depuration. It is not surprising that the microplastic load of cultured animals resembles that of field collected animals since they are cultured in natural conditions. As a result these filter feeding organisms are exposed to any pollutant present in the seawater, including microplastics, in the same way as their wild counterparts.

Although it is now established that mussels and oysters contain microplastics, this is the fist report so far on microplastics in foodstuffs. Currently, only a preliminary dietary exposure could be estimated. The hazard posed by microplastics needs to be established through in-depth toxicological studies. Due to a lack of dedicated studies, the complexity of estimating particle toxicity hinders a comprehensive assessment of the hazards associated with microplastics. Estimations of the potential risks for human health posed by microplastics in food stuffs is not possible.