

The selective feeding of Blue Mussels (*Mytilus edulis*) when presented with varying amounts of microplastics

Plastic debris has been found in almost every area of the ocean. Much of these plastic debris usually start off as large floating macroplastics, breaking down into smaller microplastics the buoyant particles remain at the surface and denser particles descend into the water column. Microplastics can be easily ingested by filter feeders, which can subsequently be preyed upon by larger organisms, making microplastics available to a wide variety of marine organisms for consumption. Bivalves, such as *Mytilus edulis* (blue mussels) have been known to consume microplastics taking up plastic fragments 3 μm or larger in diameter. *Mytilus edulis* can selectively feed by increasing pseudo-feces production, selecting between different particles, or decreasing the size of particles consumed to process the encountered materials. To evaluate how the microplastics are processed by bivalves, a feeding protocol was implemented. Mussel pseudo-feces and feces were collected and a digestion protocol using NaOH was used to breakdown the organic matter of the samples and release the microplastics for quantification. All mussels in the microplastic treatments both rejected microplastics in pseudo-feces and egested microplastics as feces. Three of the microplastic treatments showed that there was no significant difference in the microplastics collected between pseudo-feces and feces, while two of the treatments showed a significant difference. Overall, this study suggests that as the concentration of microplastics increases the mussels consume and egest fewer microplastics than are rejected in pseudo-feces. Indicating that mussels fail to identify microplastics as inorganic particles, however at higher concentrations it is possible that the mussels were overwhelmed by the large microplastic amounts and can only reject so many particles at a time.

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