

Investigating the interactions between microplastics and freshwater bivalves

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Suspension-feeding bivalves interact with microplastics (MP) (< 5mm) in a manner similar to that of the planktonic organisms they typically consume. While extensive research has explored the interaction of marine bivalves with MP, there is a notable gap in knowledge concerning freshwater bivalves. The present study addresses this research gap by investigating the interaction between freshwater bivalves and MP. The eastern elliptio (*Elliptio complanata*), a native North American freshwater bivalve, was exposed to polyester (PET) microfibers of 75 µm, 500 µm, and 1 mm in size (with a width of 15 µm), as well as polystyrene (PS) microspheres of 20 µm, 500 µm, and 1 mm in diameter, in a 2-hour exposure experiment. Collection of biodeposits, pseudofeces (indicative of rejection), and feces (reflecting ingestion) occurred at intervals of 3 hours, 24 hours, and 48 hours. The proportion of MP rejected and egested within the initial 3 hours was also determined. Regardless of the polymer types and shapes, a discernible trend emerged where larger MP were more frequently rejected than smaller MP, indicating a size-based rejection pattern. Furthermore, post-ingestive selection was observed within the bivalves' gut, as smaller MP of both polymer types exhibited an extended retention period in the gut compared to larger MP. Consequently, the size of the plastic particle was the primary factor influencing the ingestion and rejection of MP by *E. complanata*.

Keywords

Microplastics; Bivalves; Freshwater; Environmental pollution