

Biofilm Is Facilitator for Microplastic Ingestion in Green Mussel *Perna Viridis*

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Abstract : After being released into the ocean, microplastics (MPs) are quickly colonized by microbes. The biofilm that forms on MPs alters their characteristics and perplexes users, including filter-feeders, some of whom choose to eat MPs that have biofilm. It has been proposed that filter feeders like mussels and other bivalves could serve as bioindicators of MP pollution. Mussels are considered selective feeders with particle sorting capability. Two sizes (27-32 μm and 90-106 μm), shapes (microspheres and microfibers), and types (polyethylene, polystyrene and polyester) of MPs were available for the green mussel, *Perna viridis*, at three concentrations (100 P/ml, 1000 P/ml and 10,000 P/ml). These MPs were incubated in the sea for 0, 3 or 14 days for biofilm development. The presence of the biofilm significantly affected the ingestion of MPs, and the mussels preferred MPs with biofilm, with a higher preference observed for biofilm with a longer incubation period. Additionally, the ingestion rate varied with the interaction between the concentration, size and form of MPs. The findings are discussed in relation to the possibility that mussels serve as MP bioindicators.

Keywords : marine microplastics, biofilm, bioindicator, green mussel *perna viridis*

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