A Novel Approach to Bio-Friendly Microplastic Extraction with Ascidians

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Microplastic pollution in water is now recognized as a devastating problem by many organizations, such as the National Oceanic and Atmospheric Administration, with recent studies estimating that the average American consumes around 52,000 of these plastic, toxic particles a year. A successful solution for the extraction of microplastics from oceans must be feasible to be implemented on a large scale and bio-friendly to not further disrupt the environment. To this end, the efficacy of using filter feeders (Ascidians) as biofilters to reduce microplastic pollution was explored. The efficacy of this filtration method was evaluated by adding ascidians to saltwater tanks contaminated with microplastics (experimental group) and comparing the water's plastic concentration over time against a control. Water samples were then systematically tested with a fluorescence-activating microscope and fluorescent scanner; the samples from the experimental group demonstrated a 24.7% (29.64mg) reduction in microplastics within the first day and a 94.7% (113.64mg) decrease by day 4. The control group showed negligible deviation in microplastic concentration, so it is concluded that the Ascidians filtered microplastics from water through their natural feeding and respiratory process. It is extrapolated that a 1m x 1m x 1m cage of Ascidians would filter approximately 300g of microplastics every day. With a very quick reproduction cycle of 2 days, Ascidians can be mass-produced via aquaculture. This research demonstrates that microplastic filtration with filter feeders is an effective and feasible option for extracting microplastics from polluted water.

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