Examining the Effect of a Simulation of Varied Microplastic Types on Rhizophora mangle

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Microplastics are more prevalent than before and pose an emerging threat to aquatic biodiversity. The purpose of this study was to examine how three common types of plastics can affect the growth, root length, and development of aerial prop roots in Rhizophora mangle. I first ground each type and placed 250 mg into a simulation apparatus. Then, I divided Rhizophora mangle saplings into four containers filled with freshwater and added the respective simulated microplastics into each bin. Group 1-polystyrene, Group 2-polypropylene, Group 3-high-density polyethylene, and Group 4-control. I took measurements initially and after 1 and 2 weeks. The average daily growth rate was analyzed in each group. Data was analyzed using a single-factor ANOVA test. Group 1 had the greatest impact on overall growth/height (0.0941 cm/day), followed by Group 2 (0.0952 cm/day). SS=0.00346, n=3/group, $p<0.05$. Next, Group 1 had the greatest impact on root length (0.473 cm/day), followed by Group 3 (0.515 cm/day). SS=0.0825, n=3/group, $p<0.05$. Finally, Group 3 had the greatest impact on the development of aerial prop roots (0.823 cm/day), followed by Group 1 (0.867 cm/day). SS=0.0192, n=3/group, $p<0.05$. The water of Group 1 also contained algal growth, suggesting the potential decay of plant material. This study showed that the effect of microplastics on Rhizophora mangle was statistically significant, and the data partially supported my hypothesis that Group 1, followed by Group 3, would cause the most profound reduction in growth. Future studies can utilize other mangrove species or examine the buildup of toxic chemicals.

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