Development of a Filtration System for Simulated Wastewater Treatment to Reduce Microplastic Pollution in a Freshwater Ecosystem

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Objective: To develop and test an effective filters for wastewater treatment plants that will remove mircoplastics from different clothing fabrics. Hypotheses: When treating water containing different microplastics (acrylic, fleece and polyester) with an extra layer of new filtration, I believe the most microplastics will be removed by Filter B because the interlocking design will provide a higher surface area that will more effectively catch microplastics. When different types of treated microplastic effluents are added to the environment euglena, I believe the largest increase in absorbance will occur in the euglena test tubes containing fleece microplastics filtered by filter B because the high surface area will better catch the longer, and lighter plastics, resulting in a healthier freshwater environment. Methods: Water containing microplastics is created by washing different fabrics, it is run through a mock wastewater treatment plant using one of 3 developed filters, microplastics are counted before and after filtration.The effluents are put into the environments of euglena and absorbance is monitored. Results: Filter A removed the most acrylic microplastics, it also saw a large increase in absorbance in the test tubes containing acrylic and fleece effluent. Filter B removed the most fleece microplastics and did not see a decrease in absorbance. Filter C did consistently show that it was reducing the number of microplastics in the effluent. Conclusion: An added layer of filtration to a wastewater treatment plant does remove more microplastics than without extra filtration. When enough of these small pollutants are removed, a healthier freshwater ecosystem is created.

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