

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

Sample, Payton

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.

Awards Won:

King Abdulaziz & amp

his Companions Foundation for Giftedness and Creativity: \$1,000 will be awarded to the winner's school.