Engineering a Filter through 3-D Printing Capabilities in order to Remove Microplastics from Drinking Water

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After researching an effective alternative for plastic straws due to the extensive amount of microplastic pollution, I became concerned with the possibility of our drinking water supply being contaminated with plastic particles. Because of this unsettling thought, I made three hypotheses for three extensions of my research study. I believe that there is a significant amount of microplastic in our drinking water and that the use of standard household filtration systems will remove portions of this pollutant. Moreover, I believe that Brand A will perform the best out of the standard filtration systems, and that I can design a filtration system that is efficient and comparatively inexpensive. I started this experiment by performing ten trials of vacuum filtration on unfiltered tap water. I then repeated the process with water that had been filtered through four common filtration systems - Brand A, B, C, and D. Lastly, I designed and created a 3-D printed model of a microplastic filtration system, printed it, and tested it with 10 trials of the vacuum filtration. I found that our unfiltered drinking water does contain significant amounts of microplastic. Our standard filtration systems remove fairly small amounts of microplastic, with Brand A performing the best. Similar to Brand A, my filter contained coconut peat as well as cotton in its filtering process. My filter also acted as a double filtration system with 1.6 micron filter paper, and performed best on average. Overall, I was able to conclude that all of my hypotheses were correct and appropriate. In the future with more time and resources, I hopefully can turn this prototype into a product that can be used in low socioeconomic areas with high contamination to provide safer drinking water with less microplastic.

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