

Microplastic Flotation: A Novel Method to Analyze and Remove Microplastics

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The ocean receives a large amount of pollution each year with plastics accounting for eighty percent. Plastics break down from sun, wind, and water exposure and cause microplastic pollution. Microplastics are defined as plastics that are under five millimeters in size. There is a large knowledge gap regarding microplastics in sand with the majority of microplastic research focusing on soil and water. Sand is essential to daily life; it is the third most used natural resource after air and water. To address microplastic pollution, I created a method to optimize quantification of microplastics in sand and then developed a novel technique to effectively remove them. Using Nile Red staining and ImageJ analysis, I was able to quantify microplastics in sand from various locations. Analysis of five independent trials from five locations across the United States revealed key findings, including the observation that sand from Ventura, California contained the highest amount of contamination (561 microplastics per 5 grams of sand). In contrast, the location with the lowest pollution was in John Bond Town, North Carolina with an average of 48 microplastics per 5 grams. I quantified the microplastics in the sand samples and removed up to 98% of them. This data reveals that all sand samples have microplastic contamination and the method that I developed can remove a significant amount of this contaminant. Overall, this study demonstrates the importance of using beach sand as a measure of microplastic contamination from regions that have previously remained under studied.

Awards Won:

National Oceanic and Atmospheric Administration - NOAA: Judges' Award