Analysis of the Extent of Microplastic Contamination Through the Study of Beach Sand

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Microplastic pollution was initially identified in 2004 as an issue that originated in the 1960's. Microplastics are defined as plastics that are five millimeters or less in size, and the growing amounts of microplastics continue to threaten the environment. This study examined the quantity of microplastics in beach sand from various locations, both domestic and international, in order to provide insight into the gravity of the microplastic contamination situation. Beach sand was tested for microplastic particles by placing 1 gram of dried sand on a watch glass plate and then adding 2 mL of Nile Red, which is a dye that stains plastics. Nile Red fluoresces at 549 nm, so in order to visualize the microplastics I used a blue light through an orange filter. Images were then acquired using a Galaxy S22 phone and imported into Image J software to allow for quantification. My analysis of three independent samples for each location revealed several key findings, including the observation that sand from Puerto Rico contained the highest amount of contamination with an average of approximately 879 microplastic particles per 1 gram of sand. In contrast, the location with the lowest particles per gram of sand was in Cape Cod, Massachusetts where an average of approximately 0.33 microplastics per gram was observed. This data reveals that all sand samples have some degree of microplastic contamination, however, there is a large variation depending on the location. Overall, this study demonstrates the importance of using beach sand as a measure of microplastic contamination from regions that have until now remained unstudied.

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