Microplastic Presence in Jamaica Bay’s Oysters and Water Columns
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ABSTRACT

For decades, the abundance of microplastics in marine environments has been greatly underestimated. Microplastics classify as plastic particles that are less than 5mm in diameter, primarily derived from polyethylene, polypropylene and other polymers. Within the last 76 years, plastic debris have exponentially increased due to a combination of industrial organizations abusing the inexpensive properties of plastics, the lifespan, and the abundance of the single-use product. Such particles not only have the potential to directly and negatively affect the well being of marine biota, but also have ability to indirectly impact humans through the process of biomagnification and bioaccumulation. Through the experimental testing of Jamaica Bay’s oysters and waters, plastic particles were located in both variables. Such plastics consisted of fragments, film, clothing fibers, lines, nurdles, foam, and pellets. These results indicate that microplastics are being consumed by oysters and are, in fact, located in Jamaica Bay’s waters.

METHODS

1. Sample Collection
2. Wet sieving
4. Density separation
5. Microscopic Examination
6. Gravimetric Analysis

RESULTS

1. Oyster Collections:
   - Oysters located in Jamaica Bay’s oysters are consuming microplastics.
   - One prediction is that this is due to a misinterpretation. The diet of an oyster primarily consists of phytoplankton (or commonly known as microplankton) and zooplankton. The average phytoplankton size grows to 0.09mm. Zooplankton ranges from 0.56mm to 1mm. Microplastics classify as particles that are less than 5mm. Both phytoplankton and zooplankton are <5mm. Thus, it is possible that oysters are mistaking the microscopic plastic particles for plankton. Furthermore, if plankton is small enough to pass through the stomach linings, then the microplastics will be able to as well.

2. Water Column:
   - As presented in the data table, microplastics are present in Jamaica Bay’s waters.
   - Before rainfall, only 446 microplastics were present, the majority consisting of clothing lines and fibers.
   - After rainfall, 996 microplastics were counted. These plastics were much more diverse, spanning from line to film.
   - Combined Sewer Overflows are responsible for run off water, domestic sewage, and industrial wastewater. Certain sewers allow for the direct discharge from the street to oceans and other bodies of water. The direct release of polluted water allows plastics to enter waterways, due to the lack of proper screening. If the concentration of plastics increases during or after rainfall, then it can be concluded that CSOs are responsible for the plastic presence.

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LITERATURE CITED

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