Marine Pollution Caused by Microplastics

Huang Jing Ting
Contemporary Art + Anthropology

Introduction

Human society produced about 1.5 million tons of plastic in 1950, and it has reached 359 million tons in 2018. The disposal of plastic waste is currently causing a lot of trouble to people. Due to the nature of plastic that is not easy to be decomposed naturally, coupled with improper waste management methods, plastic waste can enter the natural environment through various channels. Plastics entering the ocean gradually become microplastics through physical and chemical reactions, and the ecological crisis caused by marine microplastics is becoming increasingly serious. These particles not only pollute the environment and endanger marine ecology, but also have the opportunity to be swallowed by marine organisms and enter the food chain, eventually threatening human health and causing major harm.

Microplastics refer to fine particles, which are defined by the European Food Safety Authority as irregularly shaped plastic mixtures with a size between 0.1 micron and 5 mm. Microplastics contain toxic compounds, are not easy to decompose, and will remain in the ocean for a long time. Moreover, they are small in size and are easily eaten by fish and shellfish and cannot be excreted, causing intestinal deformation and poisoning. Because microplastics are difficult to digest and decompose, they will continue to accumulate in the food chain and may eventually be ingested by humans. If toxins accumulate in the human body, they will affect the immune system and nervous system, reproductive ability, and even cause cancer.

Methodology

1 Sampling of seawater and microplastics
Microplastics in seawater are sampled with plankton collection nets, and microplastics in seawater surface are collected by stern dragging. After the samples are collected on the deck, the seaweed, dead branches and large garbage are screened out with a 5 mm standard screen, and then sealed and stored in glass bottles. Sampling of water bodies in the sea area collects about 400 liters of seawater at each point. Seawater samples are first filtered through glass fiber filter paper to collect suspended solids in seawater. After filtration, the clarified liquid passes through the foam to absorb the dissolved POPs in seawater for further analysis and inspection.

2 Plastic sample processing and identification
The samples were sieved with a sieve, and the suspected microplastic particles on the filter paper were picked out with a dissecting microscope. Then observe and count all suspected microplastic samples with a dissecting microscope, and then analyze the composition of microplastics.

Proposed Outcomes

This study is expected to analyze the composition of sea water and microplastics, and to explain and discuss the results. The water body in the sea can reflect the pollution situation. Comparing the seawater with the pollution situation, if the amount of seawater is directly proportional to the microplastic content, it means that the marine plastic pollution is more serious. The more microplastics detected in different locations, the more widespread the presence of microplastics in the ocean.

Although many animal experiments, especially on marine fish and mice, have shown the possible harm of plastic particles, there is no obvious evidence in human studies that plastic particles will cause obvious harm to the human body. The reason is that the amount of plastic particles inhaled by humans every day is too small, and the reasons for the damage caused by the different properties of plastic particles are too complicated. And long-term cumulative observation experiments are required, so it is difficult to prove the exact harm to humans, which is not discussed in this study.

Conclusion

Microplastics have invaded the human environment, and it is difficult for people to avoid them by choosing food or products, because we do not know whether these foods have been contaminated by microplastics. Recycling resources may not be able to effectively control the flow of a large amount of plastic waste into the ocean. Because even though the government has implemented relevant measures to strengthen the effectiveness of resource recycling, there is still a large amount of garbage that has not been recycled. It is important to recycle resources, but a more effective way is to avoid the use of plastic products at the source and reduce the generation of plastic waste through the implementation of green consumption. For example, use reusable bags and cups when consuming, and do not use disposable tableware for delivery or takeaway food. Through small actions in daily life, we can make a huge difference to the global environment.

References

Tiseo, I. (2021). Annual Production of Plastics Worldwide from 1950 to 2020. Retrieved from https://www.statista.com/statistics/282732/global-production-ofplastics-since-1950/ (Jun 21, 2021)
Hidalgo-Ruz, V., Gutow, L., Thompson, R.C., Thiel, M. (2012). Microplastics in the Marine Environment: A Review of the Methods Used for Identification and Quantification. Environ. Sci. Technol 46 (6) : 3060–3075.