A study of microplastics that is included in the rivers and coast of the Izu Peninsula

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The reseach of microplastics of Nirayama Highschool

Taking over the research of our seniors, we aimed to establish a method for collecting microplastics that could be used by high school students, and to investigate the extent of microplastics in the seas and rivers around the Izu Peninsula.

The experimental procedure is as follows. First, 500 L of water is collected, filtered, dried, and added to a potassium hydroxide solution. After 2 days, sodium iodide solution is added and the overflow method is performed, and the supernatant is collected. The collected supernatant is filtered, dried, and observed using a microscope and blue light.

Experimental results and discussion. Many small microplastics were discovered in Kano River, Ganyudo and Numazu Port. The percentage of small microplastics was higher in Ganyudo than in Kano River. It is thought that the microplastics are being scraped off while flowing through the river. In addition, the number of microplastics was higher in Ganyudo and Numazu Port, which are located at the mouth of the Kano River. The main reason for this is thought to be that microplastics contained in the three rivers that flow into the Kano River, the Daiba, Raikou, and Kise Rivers, flowed into the Kano River.

Next, the Kakita River. Since the Kakita River is fed by a spring, we thought that there would be no microplastics collected in the middle reaches.

However, the collection results showed that there were more microplastics in the middle reaches, but small amounts were also collected in the lower reaches.

The reason why microplastics were discovered in the Kakita River is that there are culvert channels as well as clear channels around the Kakita River, which causes domestic wastewater to flow into the Kakita River. There is a water purification facility upstream of the water sampling point in the middle of the river, and we thought that a small amount of microplastics remaining there were discovered this time. In order to improve the detection accuracy of microplastics, we tried fluorescence observation with blue light and observation with a polarizing microscope. The sample was stained with Nile-Red and fluorescence was observed. As a result, fluorescence was observed in polypropylene and polyethylene. In addition, when the shrimp shells and bark were dyed with Nile Red, it was found that they were not stained with Nile Red. A polarizing microscope showed a difference in polarization between plastic and shrimp shells and bark. From this, it is considered that the detection accuracy of microplastics can be improved by observation with a fluorescence and polarizing microscope.

The reseach of microplastics of Shimoda Highschool

We have studied a method for analyzing microplastics in a short time without using expensive potassium iodide. Sampling was performed mainly on microplastics on the Izu Peninsula.

Sampling was performed at two locations on the Shirahama coast, and comparisons were made before and after the typhoon at the same location. Specific gravity separation using sodium chloride was performed, and the type of plastic was detected using a self-made hydrometer.

When sand was collected on the Shirahama coast and the composition of the plastic pieces was confirmed, the sand on the Shirahama coast had a very high polypropylene content, followed by polystyrene contained in Styrofoam. We compared the differences between the two sampling points, but

no significant difference was detected in the composition or number of plastics. When the number of microplastics was compared between before the typhoon approached and on the day when the typhoon approached, there was a 14-fold difference in the number. The sand was collected from the high tide line so that it would not be affected by anything other than weather conditions. As the approaching typhoon increased the amount of microplastic detected, it was found that strong winds increased the amount of microplastic carried to the coast. Due to the color and shape of the MP, there were many relatively large pieces of green and blue plastic pieces, some of which were thought to be related to marine leisure. We thought that our research would lead to environmental protection on the Izu Peninsula because of the lack of MP data on the Izu Peninsula. In this study, we succeeded in discriminating the type of plastic by a new method. In the future, we will explore ways to reduce polypropylene, which was the most common on the Shirahama coast. We also want to compare the proportion of plastic contained in seawater and the proportion of plastic contained in sand.

Keywords: Izu Peninsula, Micro Plastics, Shirahama coast, Kano river

