Computer-Aided Investigation of the Influence of Microplastics on Paramecia

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Microorganisms are essential to our environment because of their importance to many ecosystems. As a result of improper disposal, a wide variety of substances pollute the environment, including water, which is the habitat of many microorganisms. The consequences are often unknown. The aim of this project is to develop a method for toxicity testing of chemicals by analyzing the movement of aquatic microbes. To accomplish this, a microscope was modified and motorized so that the organisms could be tracked over a long period of time and their movements could be stored and examined. A self-written program was used to analyze the collected data and confirm its statistical significance. To test and verify the method, Paramecium caudatum was incubated with various concentrations of 250 nm polystyrene particles and examined with the microscope. Since the organisms are observable over a long period of time, several characteristics of life, such as movement or digestion, can be studied. Our experiment concluded that the microplastic had a significant inhibitory effect on the movement speed of the paramecia. In summary, our method allows comparing the behavior of exposed subjects and that of the control group to ultimately make statements about the consequences of the tested substances and whether they are toxic or not.

Awards Won:
China Association for Science and Technology (CAST): Award of $1,200
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