Plastic Pollution's Effect on Aquatic Organisms

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The goal of this research was to determine how exposure to plastics affected the overall health of aquatic organisms. Plastics are the main source of aquatic pollution and are known to leach toxic chemicals, some of which were added as plasticizers. A focus was placed on the effects of decomposition of plastics from a biological standpoint due to exposure to possible leachates. The hypothesis was that if plastics are degraded, leachates may be released, thereby affecting an organism’s overall health. In this experiment, common plastics including polyethylene terephthalate, low density polyethylene, and expanded polystyrene foam were degraded in various ways to simulate natural environmental conditions. The aquatic invertebrate Daphnia magna was exposed to these degraded plastics. The heart rate, population growth or decline, and rate of development were monitored to determine how the organisms’ health was affected. The hypothesis was supported, and the presence of plastics caused a change in the heart rate, growth, and reproduction of the organisms compared to an unexposed control. On average, the Daphnia magna exposed to polyethylene terephthalate had an elevated heart rate and faster population growth, possibly because of stress and endocrine disruption caused by leachates released during degradation. Daphnia magna exposed to polystyrene foam experienced a drop in heart rate as well as an irregular heartbeat and swimming pattern. Overall, the degradation methods that had the most effect on the Daphnia magna's heart rates and population were various degrees of heating.

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