Microplastics, Anything but a Small Problem: An Investigation Into How Different Sizes of Australia's Most Common Waterway Microplastic, Polyethylene, Affects Daphnia magna's Physiological Functions

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The CSIRO has provided the first-ever global estimate for microplastics on the seafloor, with results suggesting there are 14 million tonnes across our oceans (Natalie Kikken, 2020). Investigations into the potential physical and toxicological consequences that microplastics pose to living organisms is still an emerging field of study, emphasising the importance of studying its consequences on its largest body of victims, marine life. Thus, this investigation aims to expose how the varying sizes of microplastics affect Daphnia Magna's physiological functions; including mortality, swimming speed, and heart rate. The microplastic Polyethylene is used, one of the most common microplastics found in Australia's waterways, in the sizes 425-500um, 600-710um, and 850-1000um. Through utilising the Euromex BioBlue microscope, it was found that the polyethylene microplastics sized 425-500um had the most toxicologically inhibiting effects, significantly impacting mortality and swimming speed, where P= 0.04 and P= 0.02 respectively. It was found that none of the three microplastics had a statistically significant impact on the heart rate of the Daphnia Magna. Subsequently, the findings accentuate the need for further investigation into how the size of microplastics impacts marine life, as they may have larger implications for public health through the role of bioaccumulation and through the consumption of seafood.

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