Assessing Environmental Toxicity Across Varied Habitats Through Daphnia magna Analysis

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Environmental toxicity in the soil is a glaring issue due to its detrimental impacts on surrounding ecosystems, human health, and the economy. My investigation studied the toxicity levels of sediment from various habitats using Daphnia Magna, an organism sensitive to environmental toxicity. My independent variables were the sediment locations: Industrial, Nature, Fertilized, as well as a Control Group (no sediment). My dependent variable was the number of Daphnia Magna deaths that occurred after 24 hours. My hypothesis was that the Daphnia Magna samples living in the Industrial sediment would have the highest number of population deaths. Conversely, the Daphnia Magna samples living in the Nature sediment would have the lowest number of population deaths. 30 Daphnia Magna were distributed into 12 beakers with 200 mL of spring water. In 9 beakers, there was a 0.1 g/mL concentration of each sediment (3 trials per sediment). Following 24 hours, the number of live Daphnia were counted and subtracted from 30 to obtain the number of Daphnia Magna deaths. The major findings were that the Industrial group had the greatest number of Daphnia Magna deaths. The Nature sample had the second highest, and the Fertilized samples had the lowest amongst the sediment groups. The control group had the lowest average number of deaths overall. The One-Way ANOVA test displayed significance within my data, and the t-Test with Equal Variances with a Bonferroni Adjustment determined significance only between the Industrial Group and the Control. To conclude, my hypothesis was partially supported. Future works would include testing the toxicity of more habitats, utilizing different organisms, differentiating sediment composition and properties, and finally, extending testing periods.

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