The Effects of Juglone on Waterborne Bacteria

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The purpose of this project is to test the effects Juglone has on bacteria found in water as well as the body. If the bacteria are adversely affected, then Juglone has an effect external from the soil. Pure Juglone solution was made with sterilized water (0.05 grams per 100 mL of water and 0.05 grams and 1000 mL of water). Pure Juglone has a pH of 5. The bacteria used were Escherichia coli, Micrococcus luteus, Citrobacter freundii, and Enterobacter aerogenes. The H1 states that if Juglone is introduced to the bacteria, then the growth will be inhibited. Conversely, the H2 states that the growth will be stimulated when introduced to the harmful bacteria. The null states that no change will occur when adding the Juglone. The bacterium was tested for rings of inhibition. All four bacteria's displayed rings of inhibition with the higher concentration Juglone. E. coli had rings of inhibition of 1.1 cm radius. Micrococcus luteus had rings of inhibition of 1.3 cm radius. Citrobacter freundii showed rings of inhibition of a .9 cm radius after two days. Enterobacter aerogenes had rings of inhibition of 0.6 cm radius. The low concentration of Juglone had little to no effect on the bacteria. Daphnia magna was then tested for mortality. Ten Daphnia magna were placed in 80 mL of water. Daphnia magna were exposed to the high concentration of Juglone for 48 hours. Zero of the daphnia died and, in fact, reproduced. Bacteria was introduced to water. The contaminated water was then filtered. The results indicated juglone can be effectively used to inhibit bacteria growth in water.

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