The Medicinal Effects of Juglone

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The purpose of this project is to test the effects juglone has on bacteria found in the body. If the bacteria are adversely affected, then juglone has an effect external from the soil. The bacteria used were Citrobacter freundii, Enterobacter aerogenes, Escherichia coli, and Micrococcus luteus. 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 was tested for rings of inhibition because of the juglone and also for cell morphology. All four bacteria's displayed rings of inhibition with the higher concentration juglone. Citrobacter freundii showed rings of inhibition of a 1 cm radius after two days. It also displayed cell morphology, morphing from rod-shaped to coccus. Enterbacter aerogenes had rings of inhibition of 0.5 cm radius. E. coli had rings of inhibition of 1 cm radius. Micrococcus luteus had rings of inhibition of 1.2 cm radius. Micrococcus luteus displayed cell morphology, morphing from coccus to rod-shaped. The low concentration of juglone had no effect on the bacteria. Daphnia was then tested for mortality. Five daphnia were placed in 80 mL of water. Daphnia were exposed to the high concentration of juglone for 48 hours. Zero of the daphnia died and continued to reproduce. The hypothesis was supported.

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