

William Tornel

BIO 299

Faculty Advisor: Dr. Joanna Vondrasek

Honey is an organic substance, rich with antioxidants, that has been used as a homeopathic remedy to treat conditions such as diabetic ulcers, eczema, and throat infections. Manuka honey, derived from the nectar of *Leptospermum scoparium* flowers, is especially regarded for its healing properties when compared to other kinds of honey. This study focuses on the effects that Manuka honey has on the growth of the bacterium *Escherichia coli*. A combination of honey and lime was tested to see if this traditional home remedy has any impact on the inhibition of growth for the bacterial culture. It was predicted that Manuka honey would inhibit microbial growth more than the corn syrup control, and the honey and lime mixture would inhibit more than the honey alone. Bacterial cultures of *E. coli* were grown in nutrient agar plates and exposed to different experimental groups via paper disk diffusion. The results showed that the average zone of inhibition for the Manuka honey was larger than that of the control group ($t=4.848$, $df=12$, $p=.0004$). Additionally, the zones of inhibition for the lime mixtures were found to be smaller in size (3.5cm and 2.9cm) compared to the average zone of the controls (4.2cm and 3.55cm, respectively). In conclusion, Manuka honey does contain some intrinsic antimicrobial properties but adding lime did not amplify these qualities.

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CHM 299

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The objective of this experiment was to measure the caffeine content in different types of coffee beans. Caffeine was measured from light, medium, and dark roast coffee beans obtained from a regular supermarket. The brands used were India for light roast coffee, Peru for medium roast coffee, and MN Mud for dark roast coffee. This process was performed by adding MgO to ground and sieved coffee bean powder and heating the mixture for 20 min at 90 °C. These solutions were analyzed using reverse-phase HPLC. The results from HPLC analysis found no significant difference between the caffeine content of dark, medium, or light roast beans. Report of compared mass % caffeine between HPLC and UV analysis found no significant difference in caffeine concentrations, and therefore the null hypothesis could not be rejected. The obtained results may be due to different types of errors that could be made during the experiment.