



**CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY**

Name(s) Hannah O. Cevalco	Project Number J1603
Project Title Honey, I Found a Cure! Nature's Antibiotic	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this experiment is to determine if the antimicrobial properties of honey can combat bacteria to the same extent as a common antibiotic, Kanamycin. I studied the efficacy of three honeys, with a specific emphasis on Manuka honey, and determined their effectiveness against a non pathogenic strain of E. coli by measuring their zones of inhibition.</p> <p>Methods/Materials Fifteen petri dishes with pre-poured Mueller Hinton agar were labeled. A layer of liquid E. Coli was then spread on the surface of the agar using a cotton tip applicator. Five wells were cut in each petri dish and the bottom of each well was plugged with 100µl of liquid agar that was then allowed to cool. Three concentrations of honey were prepared using a w/v dilution. The concentrations for Manuka, Suebee, and CA Wildflower were 50%, 25%, and 12.5%. 100µl of each concentration were dispensed into individual wells with 5 replicate trials for each concentration for a total of 15 petri dishes. The antibiotic (Kanamycin) was diluted at concentrations of .005%, .0025%, and .00125% and dispensed into its appropriate wells. The plates were then incubated for 24 hours at 32 degrees Celsius. Photographs were taken after 24 hours and 7days and the width of the zones was measured digitally.</p> <p>Results As expected, Manuka honey produced significant results compared to Kanamycin but the CA Wildflower and Suebee honeys were surprisingly ineffective, producing fungi/bacteria in and around their individual wells. The results were statistically analyzed and the standard error was found for each treatment/concentration that produced a zone of inhibition. The Manuka honey at a 50% w/v concentration had an average zone width of 3.5mm while the .005% concentration of Kanamycin had an average of 3.9mm. This indicates that Manuka honey contains a key synergist responsible for its antibacterial properties that other honeys do not. With a 95% confidence interval, I can say that Manuka Honey and Kanamycin produced significant results.</p> <p>Conclusions/Discussion Based on the data collected from this experiment it can be concluded that Manuka honey is comparable to a standard antibiotic in terms of its effectiveness in killing a non pathogenic strain of E. coli. This significant discovery may lead the medical community to rethink their over usage of antibiotics when something as simple and powerful as Manuka honey may be the answer.</p>	
Summary Statement I compared the antibacterial properties of Manuka honey to a general antibiotic, Kanamycin.	
Help Received Mother and teacher reviewed written work. Performed experiment at Stanford under the supervision of graduate student, Ken Hu.	