The Antimicrobial Activity of Honey

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Introduction

Bacterial infections are very common around the world. To treat these infections doctors prescribe antibiotics. As the amount of bacterial infections increase, so do the amount of antibiotics being prescribed. This increase in antibiotic usage is leading to more and more antibiotic resistance. To help slow antibiotic resistance we wanted to find a substance that could be used to treat infections. Research showed that honey has been shown to help treat infections of the skin, upper respiratory track, and stomach.

Our goal was to test how effective honey really was at treating common bacterial infections.

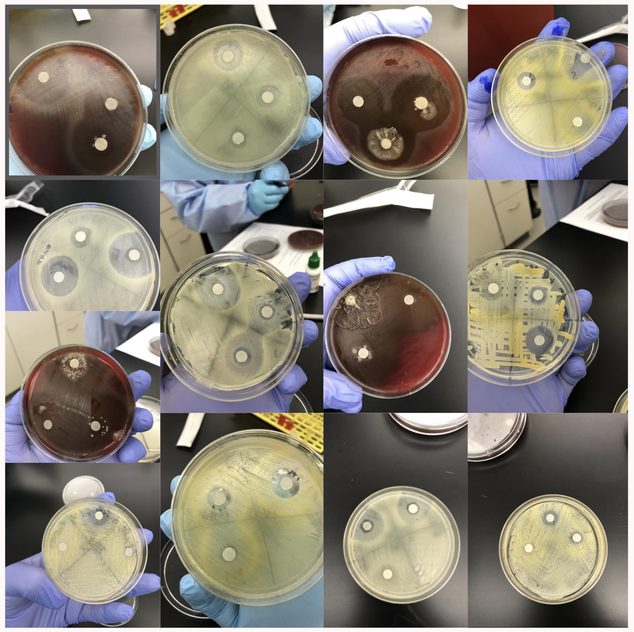
BACTERIA TESTED:

- *Staphylococcus aureus*
- *Streptococcus pyogenes*
- *Escherichia coli*

Honeys TESTED:

- *Colorado*
- *Manuka*
- *Utah*

Figure 1: Zones of inhibition measured in each quadrant for each organism. Controls all measured at zero.



Materials and Methods

First, the organisms were cultured to ensure pure colonies on the appropriate plates. Then, a Kirby Bauer plate assay was conducted by inoculating Mueller-Hinton plates with 0.5 McFarland Standard for each bacterium. For the *Streptococcus pyogenes* blood was added to the Mueller-Hinton plates to assist with growth. Plates were labeled into four quadrants and a prepared filter paper disk saturated in each honey tested were placed onto its corresponding quadrant. A control quadrant was left honey free. After 24-hour incubation, zones of inhibition were measured and recorded. (see figure 1 and tables 2 and 3.)

Table 1: *Staph. aureus* test results

Staphylococcus aureus	Test 1	Test 2	Test 3	Average
Colorado	0mm	0mm	0mm	0mm
Manuka	16mm	11mm	12mm	13mm
Utah	14mm	19mm	16mm	16.3mm

Table 2: *E. coli* test results

Escherichia coli	Test 1	Test 2	Test 3	Average
Colorado	0mm	25mm	10mm	11.7mm
Manuka	9mm	29mm	12mm	16.7mm
Utah	10mm	14mm	19mm	14.3mm

Results

Results show the zone of inhibition measured for each bacteria and honey. Figure 1 includes pictures of the inoculated plates after they have been incubated with honey. Table 1 shows that both Manuka and Utah honey inhibit the growth of staphylococcus aureus. The table shows on average the Utah honey is the most effective at limiting growth. Table 2 demonstrates that both Manuka and Utah honey inhibit the growth of Escherichia coli. The table demonstrates that manuka honey is the most effective at inhibiting growth. Both tables show that the Colorado honey was ineffective at limiting bacterial growth.

DISCUSSION

This project was done to see if honey could be used to help treat infections. Out of all the kinds of honey that were tested, the Manuka and Utah honeys were capable of effectively inhibiting the growth of both types of bacteria. These results tell us that honey is in fact antimicrobial. This can be beneficial to know because antibiotics are being over prescribed, so honey would be a good way to treat minor infections without getting antibiotic resistance. Honey is also a good antimicrobial to use because it is natural and easily accessible all over the world. This means it would be helpful in third world countries that have limited access to antibiotics.

Conclusion

In conclusion, out of all the kinds of honey that were tested, *Staphylococcus aureus* and *Escherichia coli* were effectively inhibited by the Manuka and Utah honeys with a zone of inhibition of about 15 mm. The Colorado honey did inhibit some growth, but not as well as the other honeys. No results were seen with *Streptococcus pyogenes* because it was contaminated during testing. Honey can be used to inhibit the growth of bacteria and treat infections.

References and Acknowledgements

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