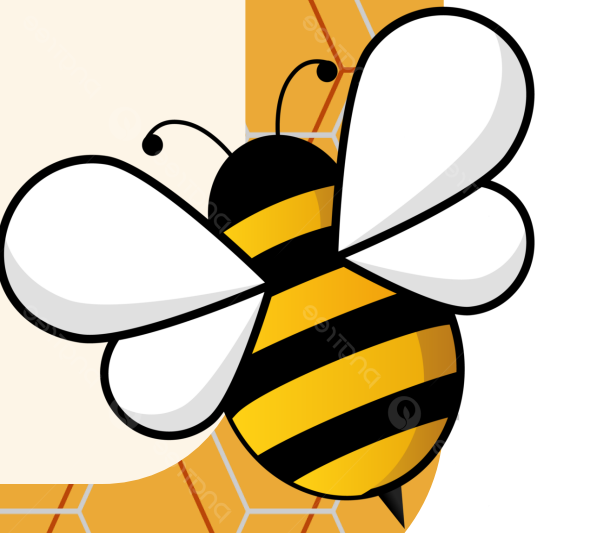




The Effects of Medicinal Honey on the Biofilm of *Acinetobacter baumannii*



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Abstract

Nosocomial or hospital acquired infections (HIA) affect over 100 million patients worldwide, leading to longer hospital stays, higher mortality rates, and increased financial burdens. Honey has long been used for wound healing due to its medicinal and antimicrobial properties. Its high sugar content, low water activity, and low pH make it suitable for application on open wounds without hindering healing. *Acinetobacter baumannii*, a common cause of HIA, forms highly drug-resistant biofilms, complicating treatment. The proposed hypothesis suggests that coating common plastic hospital equipment with honey could inhibit the growth of *Acinetobacter baumannii*, thus preventing infection acquisition and spread.

Background

Acinetobacter baumannii (*A. baumannii*) is a highly multi-drug resistant pathogen that is quickly emerging in the healthcare world. Its impact on patients are severe and known treatments are extremely limited.

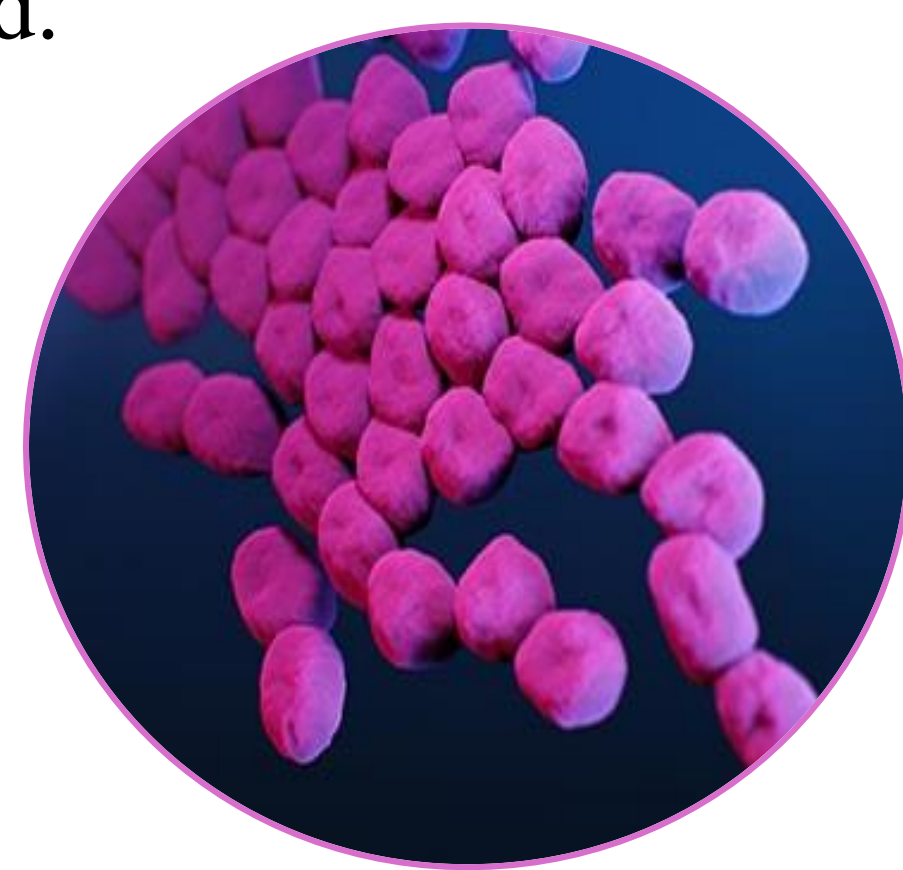


Figure 1: *A. baumannii* up close from *Acinetobacter in Healthcare Settings*, 2019. CDC.

Honey has been a focal point of medical research for a considerable amount of time, and many medical products have come from it (i.e. honey gauze dressing or honey ointment). Although there are multiple variants, the most common type of honey used in a medical setting is Manuka honey. Due to its high antimicrobial properties, it is often used for burn and wound treatment. The idea is to use antimicrobial affects of honey and apply them to prevent HIA.

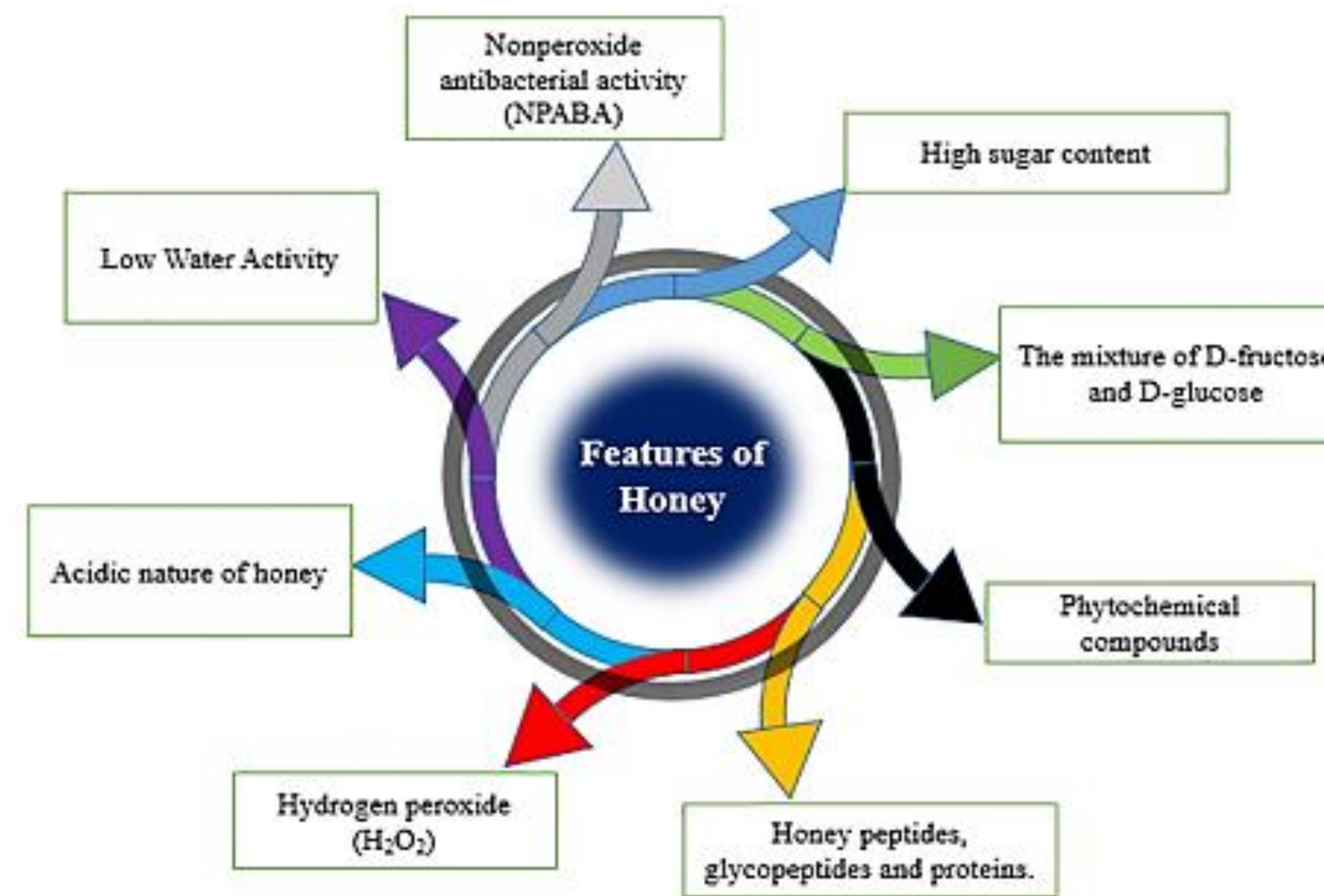


Figure 2: Properties of honey in relation to medical needs from "Almasaudi, S. (2021). *The antibacterial activities of honey*. Saudi Journal of Biological Sciences, 28, 2188-2196."

Hypothesis

If we test various types of honey and apply them to plastic tubing, we will find Manuka honey will have the best properties and the biofilm formation of *A. baumannii* will be reduced, thus proving honey can be used for to prevent HIA.

Methods

The first step is to chose the kinds of honey to test. Different honeys have better medicinal properties than others. The tested honey is not the same as honey commonly found on the shelves at the local market. The most common two are typical medical grade honey and Manuka honey.

Afterwards, we would culture our media and combine the *A. baumannii* and the honey we are testing and pipette it into a cuvette. Using a spectrometer, we would use check the absorbency of the sample. If there is less light passing through, we can infer that that specific honey is less effective at inhibiting the growth of biofilm.

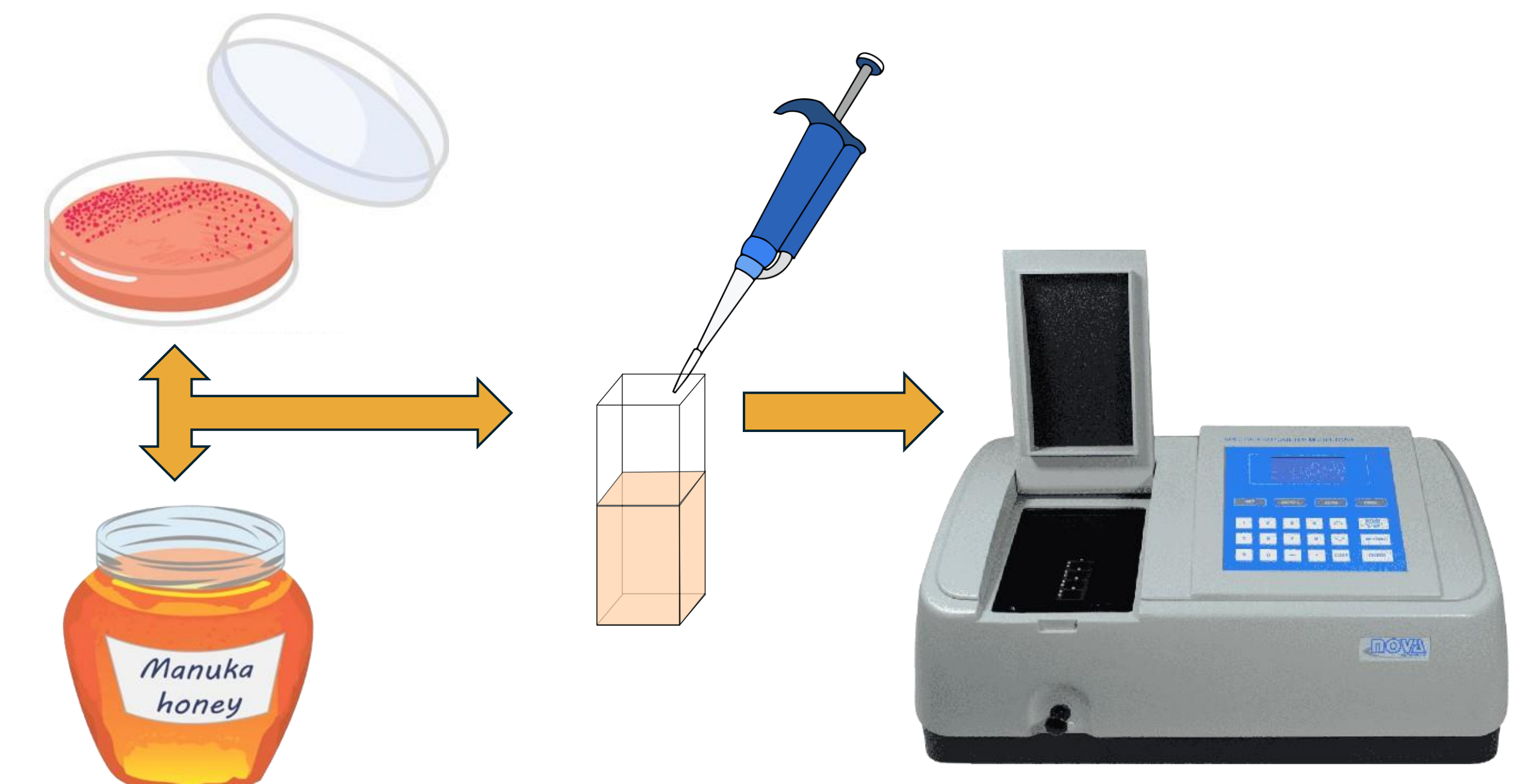


Figure 3: Small and brief depiction of process of absorbency test for Manuka honey.

Impact

If our hypothesis ends up correct, the results can be applied to further testing to determine of the effects differ based on location of infection. The purposed concept can put healthcare one step further to prevent HIA and saving more lives.

Citations

- Almasaudi, S. (2021). The antibacterial activities of Honey. Saudi Journal of Biological Sciences, 28(4), 2188–2196. <https://doi.org/10.1016/j.sjbs.2020.10.017>
- Maragakis, L. L., & Perl, T. M. (2008). Antimicrobial resistance: *Acinetobacter baumannii*: epidemiology, antimicrobial resistance, and treatment options. *Clinical Infectious Diseases*, 46(8), 1254–1263. <https://doi.org/10.1086/529198>
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