

# Antibacterial Activity of Texas Honey Against *Streptococcus oralis*

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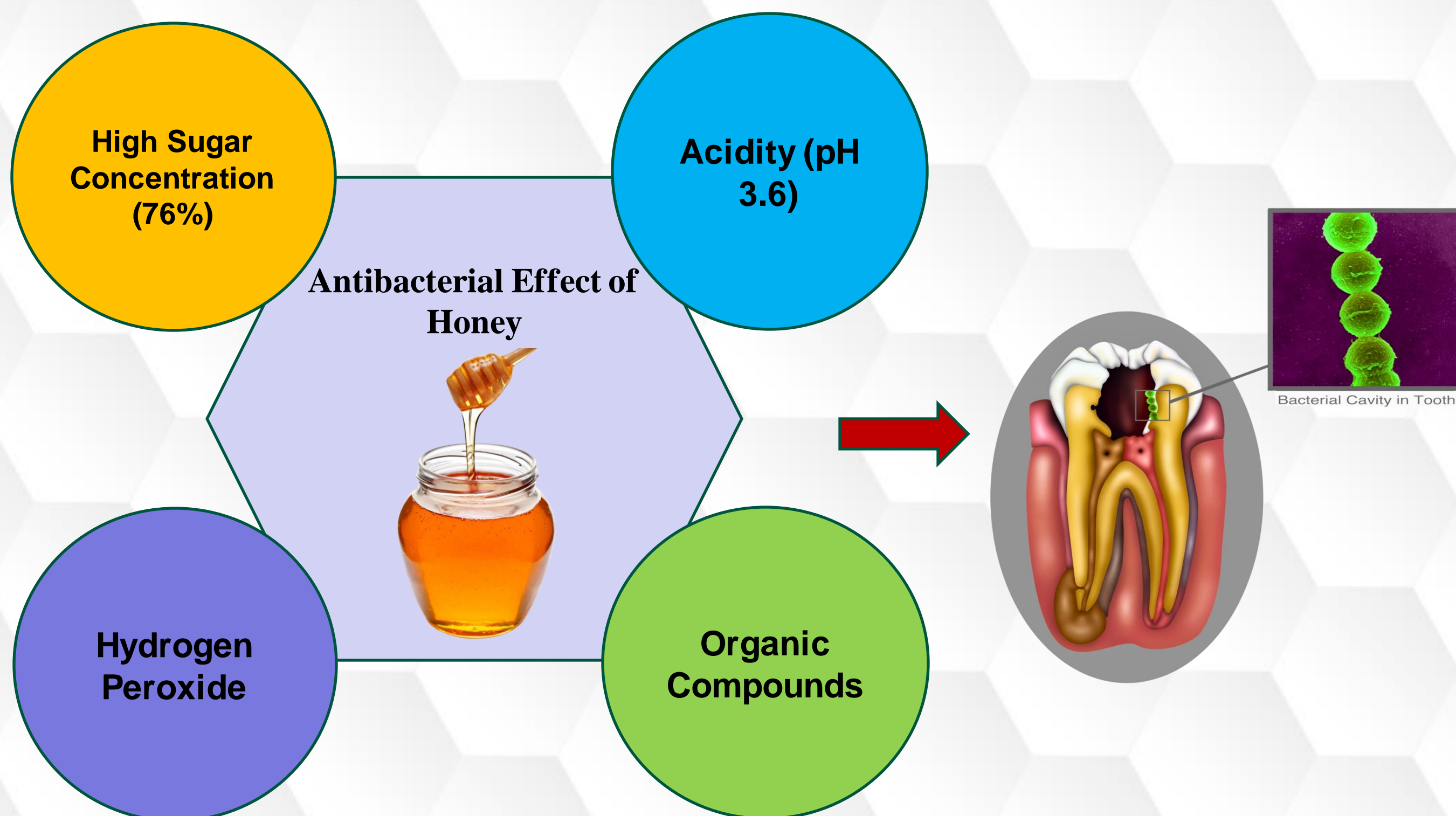
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## Abstract

The use of honey for medicinal purposes has been dated back to 2600-2200 BCE. Within its medicinal properties, honey offers a source of antiseptic and antimicrobial applications for wounds, ulcers, and to generalize, any site vulnerable to infection via present properties from flavonoids, phenolics, sugars, acidity, and glucose oxidase production of hydrogen peroxide. In this study, *Streptococcus oralis*, a Streptococcus viridian responsible for oral disease and systemic disease, is experimented against honey and its antimicrobial property. The study focuses on a group of local Texas honey and their potency against *S. oralis* using agar well diffusion assay, Minimal Inhibitory Concentration (MIC), and Minimal Bactericidal Concentration (MBC). Groups tested consisted of Texas honey dilution samples, Manuka honey dilutions, 2% and 4% Phenol, and control blanks. Antibacterial activity of local Texas honey averaged 16.59 mm when placed directly in agar well diffusion wells without dilution. For values of MIC, the generalization among honey dilutions was a decrease in transmittance as honey continued to be diluted, however, problems in biofilm developing were a source of error. MBC offered greater coherent results involving an average of a 25% minimal concentration for bactericidal purposes. In comparison to Manuka honey, local Texas honey has the potential to act on sites vulnerable to infection.

## Introduction

In recent years, the development of bee products for use outside of consumption just as food has been growing within the U.S. This development has been eagerly in the medical field within the properties that honey has to offer. In the past, the utilization of honey for its medicinal purposes was well known and it wasn't until the development of antibiotics like penicillin that the usage of honey for wounds, burns, and chronic diseases decreased. One of honey's greatest attributes when it comes to its medical purposes is the preventive care it can offer for oral health. What allows honey to be used as a treatment is its combination of low pH, high concentration of sugars, and low moisture and others that allow it to be used as an efficient antioxidant and antimicrobial substance. In terms of oral health, this study will focus on the bacteria, *Streptococcus oralis*, an initial colonizer in oral disease through creation of biofilm, and the potency of honey to combat the present bacteria.



## Objective

This research aimed to assess the antimicrobial activity of selected local Texas honey against *Streptococcus oralis*, a common pathogen found in dental diseases.

## Materials and Methods

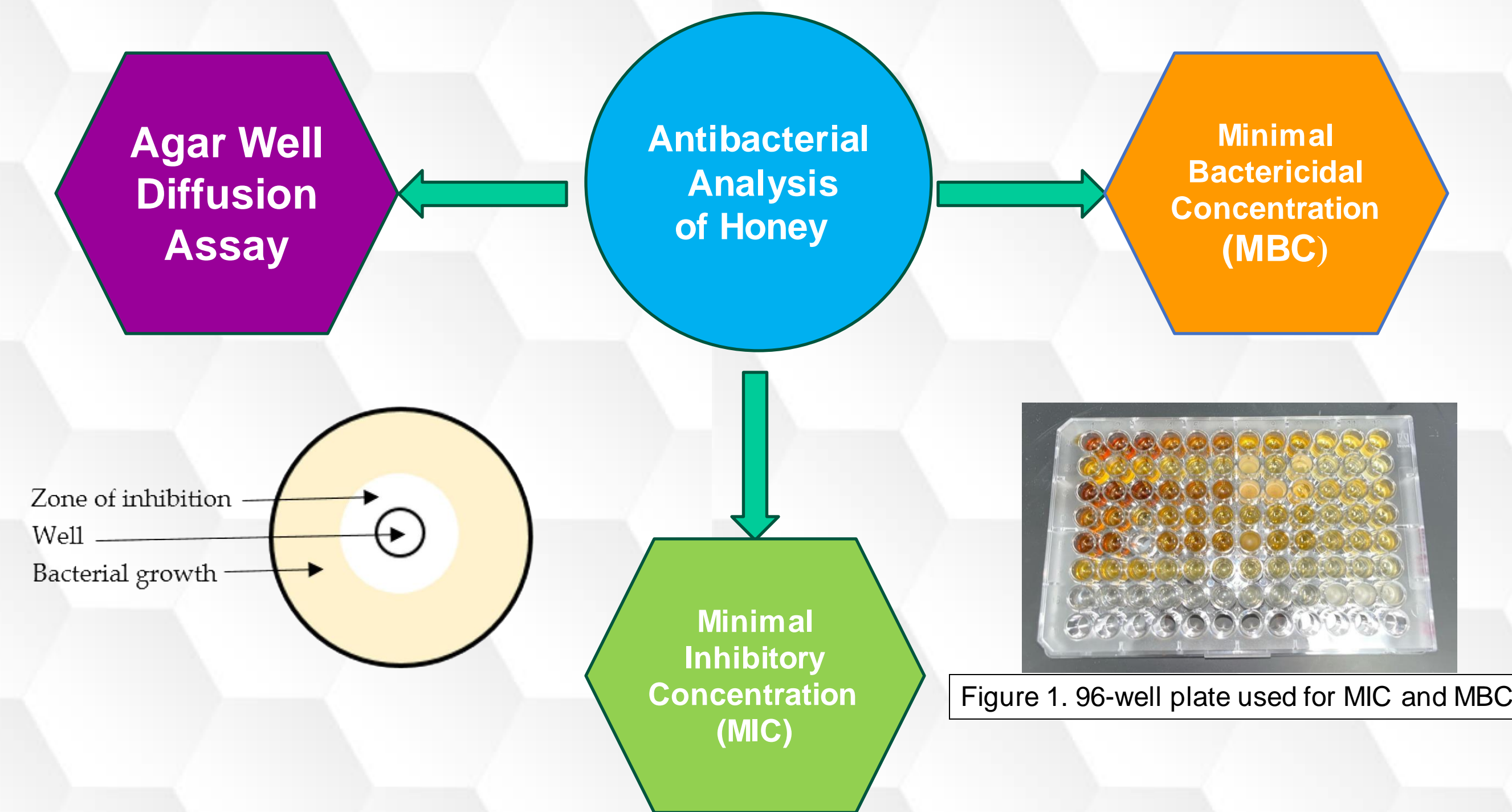


Figure 1. 96-well plate used for MIC and MBC

Sample Name	Sample Location
23H-6	Timberwood Park, TX
23H-29	Helotes, TX
23H-30	Pipe Creek, TX
23H-48	New Braunfels, TX
23H-50	New Braunfels, TX
23H-74	Spring Branch, TX
23H-91	Blanco, TX
23H-101	Austin, TX
23H-108	Huntsville, TX
23H-114	Bear Creek, TX
NJ.9	New Jersey, USA
PA.5	Pennsylvania, USA
M-237	Manuka- 573 + MGO
M-240	Manuka- 15 + UMF
M-251	Manuka- 820 + MGO

## Results

The TX honey and Manuka honey samples presented **mild, moderate to strong** antimicrobial activity against *Streptococcus oralis* tested in this study.

Dotted lines represent the strong susceptibility of bacteria

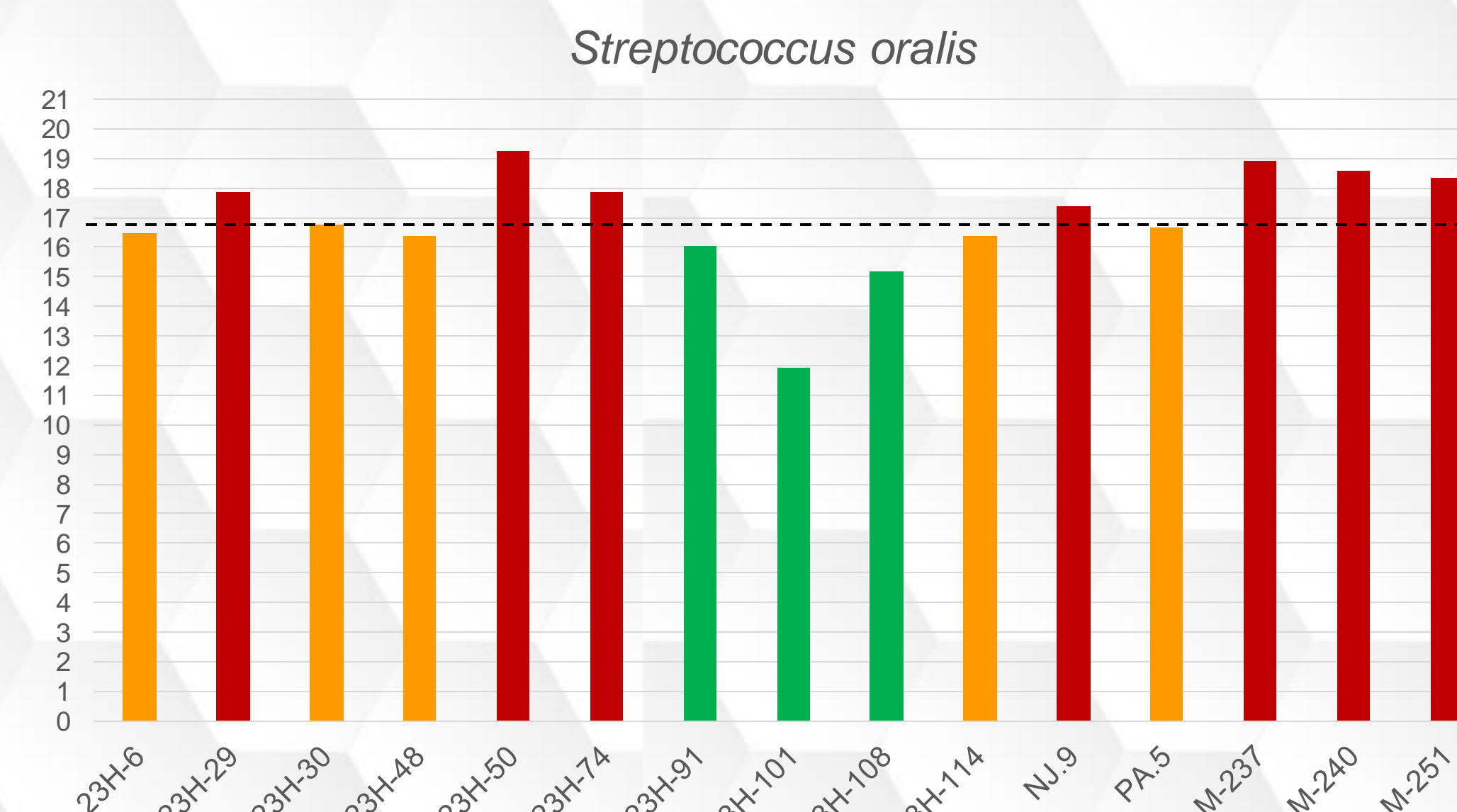
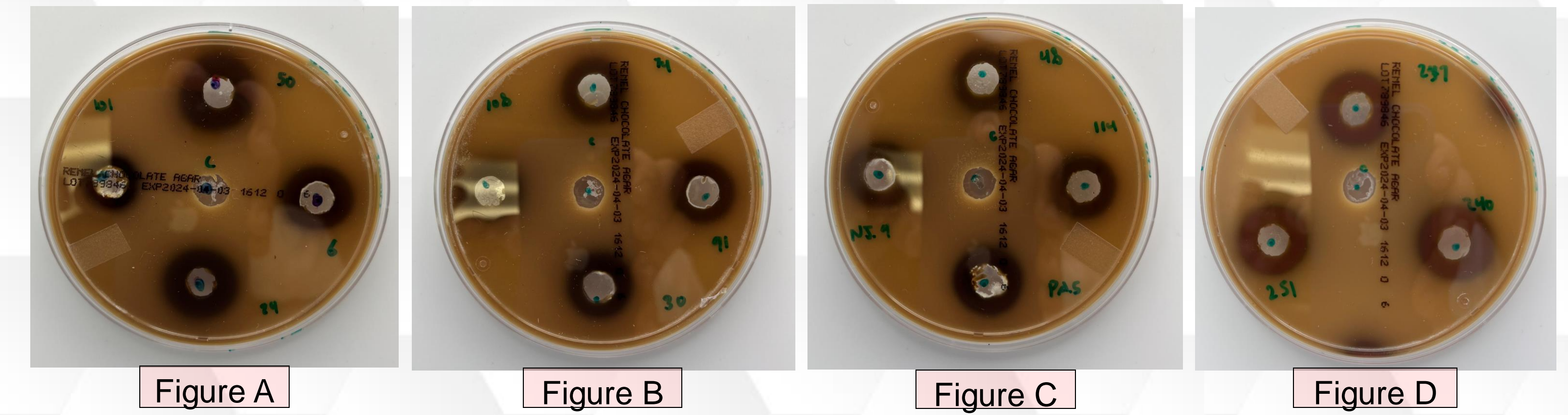


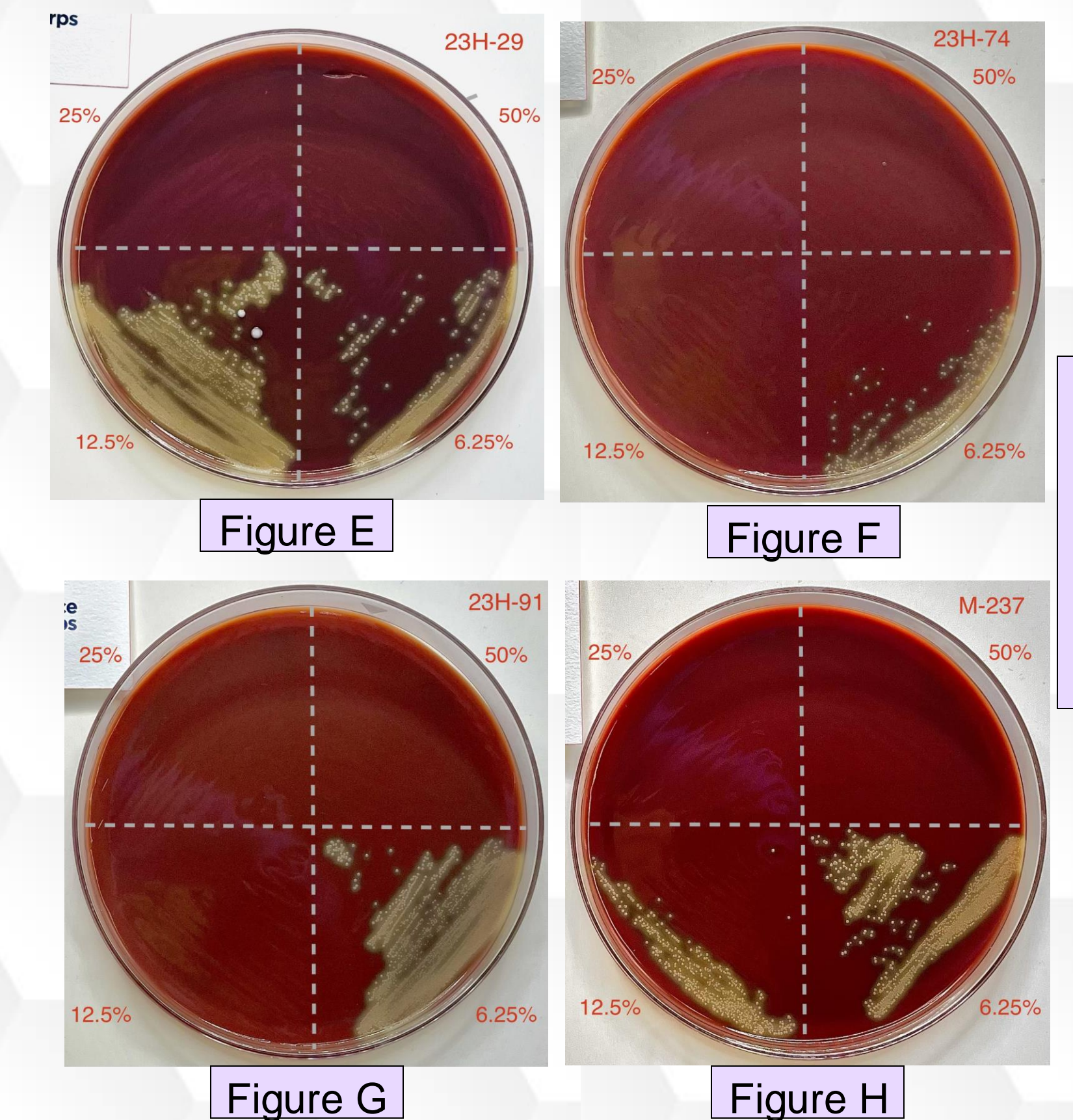
Figure 2. Graph showing zone of inhibition of honey samples against *Streptococcus oralis*

## Results



**Zone of Inhibition Results**  
 Figure A: 23H-50, 23H-6, 23H-29, 23H-101  
 Figure B: 23H-74, 23H-91, 23H-30, 23H-108  
 Figure C: 23H-48, 23H-114, PA.5, NJ.9  
 Figure D: M-237, M-240, M-251  
 (clockwise order)

MBC Results	
Samples	MBC (%)
23H-29	25%
23H-48	25%
23H-50	50%
23H-74	12.50%
23H-91	12.50%
237	25%



**MBC Results**  
 Figure E: 23H-29  
 Figure F: 23H-74  
 Figure G: 23H-91  
 Figure H: M-237

## Conclusions

TX Honeys present:

- Strong antimicrobial potential against *Streptococcus oralis*
- All samples have bactericidal activity against *Streptococcus oralis*
- Superior activity seen for zone of inhibition in Texas honey sample 23H-50 for treatment of *Streptococcus oralis*
- Texas honey samples 23H-74 and 23H-91 showed lowest minimum bactericidal concentration at 12.5%

## References

- Agbagwa, O. E., & Frank-Peterside, N. (2010). Effect of raw commercial honeys from Nigeria on selected pathogenic bacteria. *African Journal of Microbiology Research*, 4(16), 1801-1803.
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## Acknowledgements



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**INVESTING IN AMERICA**

All honey sample donors and beekeeper associations