

## Comparative *in vitro* assessment of antibacterial activity of prepared propolis ointment against common wound pathogens

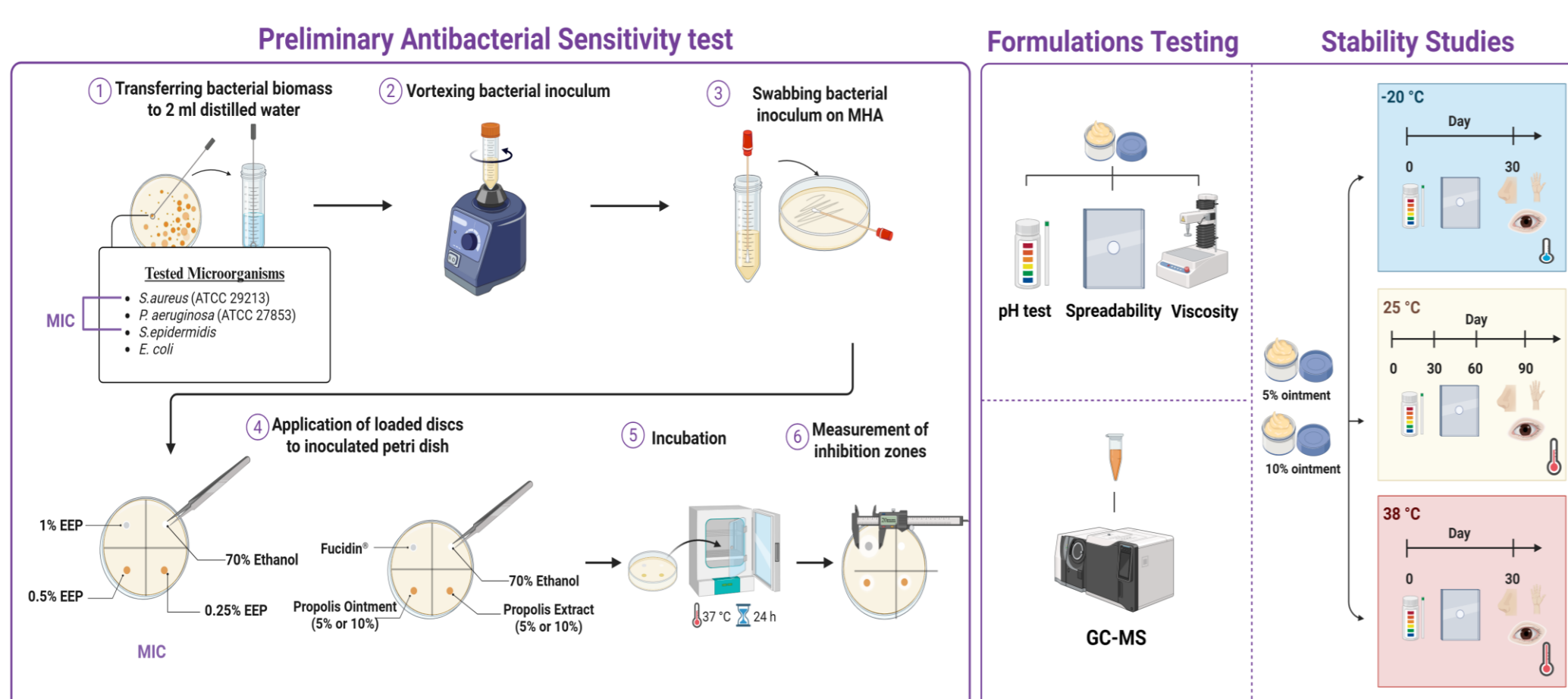
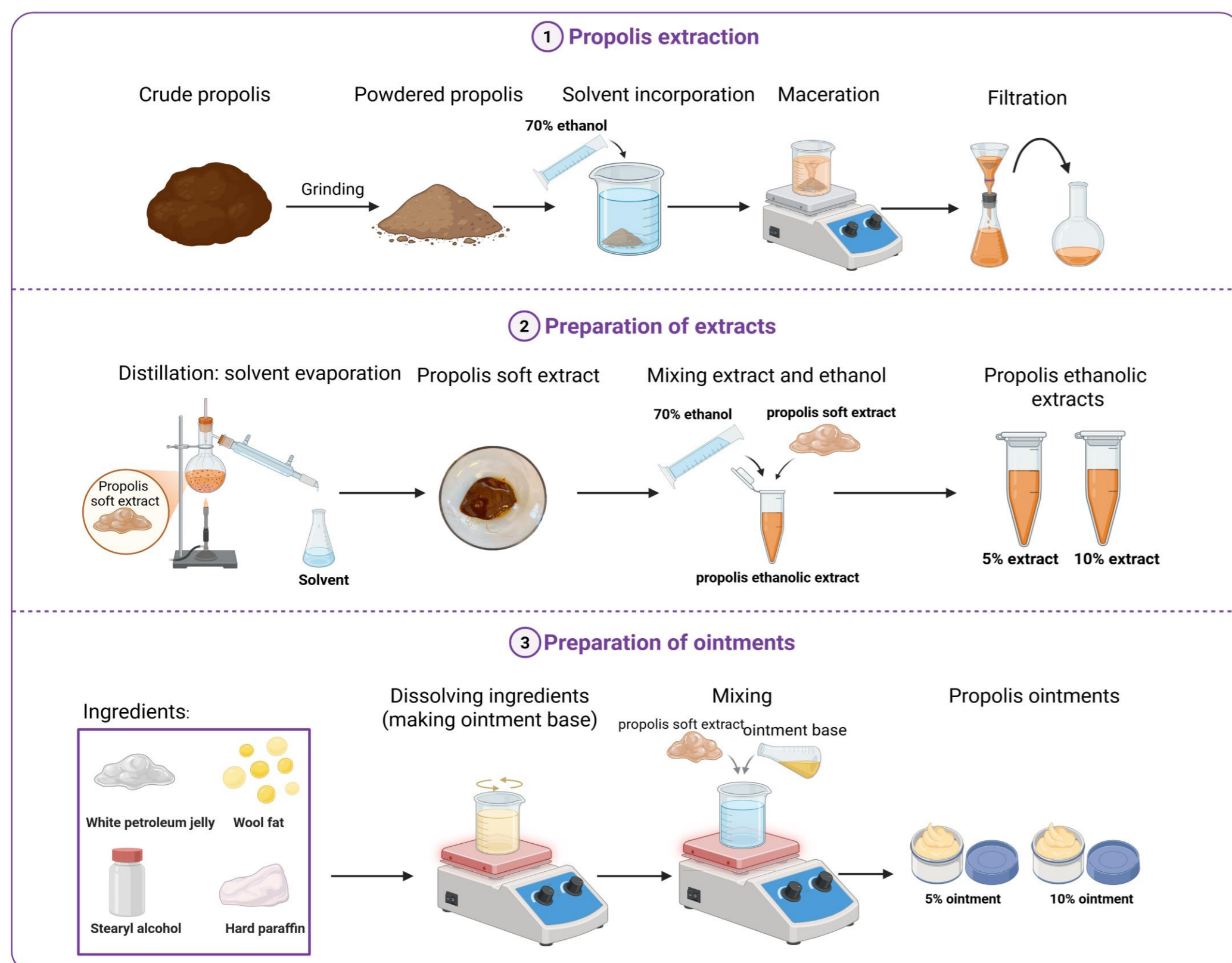
Wed Omar Ayad<sup>1</sup>, Yaqeen Imad Abdulsattar<sup>1</sup>, Mohammed Aslam<sup>1</sup>

<sup>1</sup>Faculty of Pharmacy, Tishk International University, Kurdistan Region, Iraq

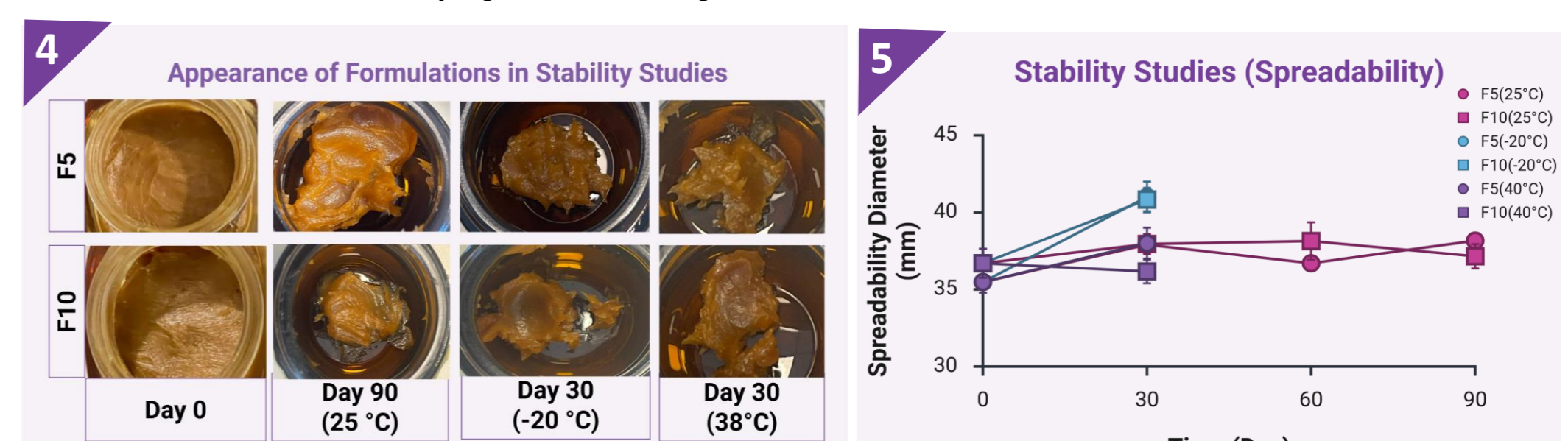
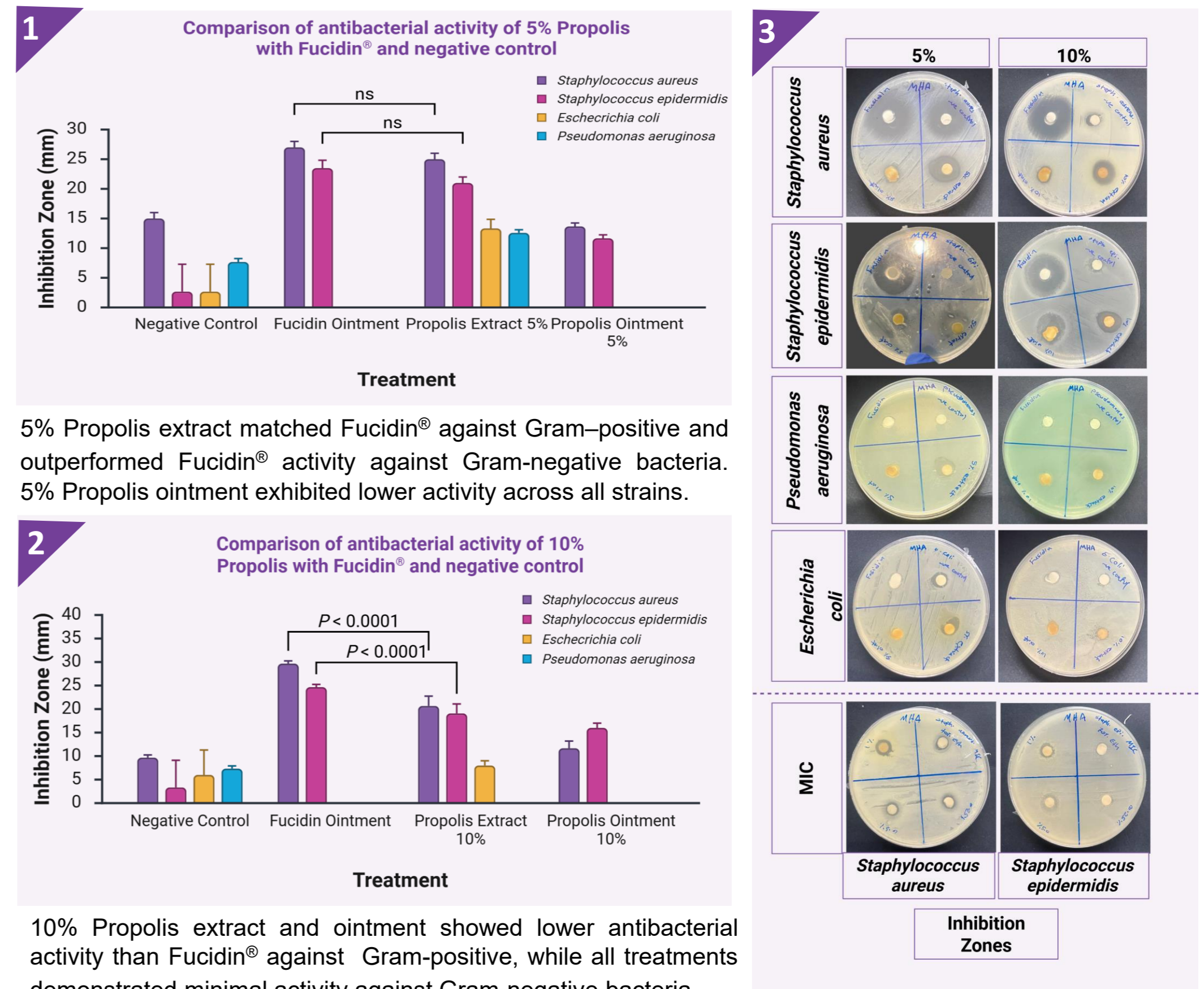
### INTRODUCTION & AIM

- Propolis, often referred to as “bee glue,” is a natural resinous substance produced by honeybees that exhibits notable antibacterial, antifungal, antiviral, and anti-inflammatory properties.
- Extensive research has investigated the antimicrobial activity of Propolis; however, only limited studies have directly compared its efficacy with standard antibiotics.
- The composition and activity of Propolis vary greatly by region, influencing its biological effects. Studies have shown that Middle Eastern Propolis possesses stronger antibacterial activity than samples from other regions. Yet, there remains a clear gap in comparative research linking regional Propolis efficacy to conventional antibiotics.
- Given the growing concern of antibiotic resistance and the need for safer natural alternatives, this study aimed to develop and evaluate Iraqi Propolis-based extracts and ointments against common wound pathogens (*Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa*, and *Escherichia coli*), and to compare their antibacterial performance with Fucidin<sup>®</sup> ointment (Fusidic acid) to better define the therapeutic potential of Iraqi Propolis.
- Ultimately, this research contributes to antibiotic stewardship efforts and supports the exploration of Propolis as a promising candidate for future antimicrobial development.

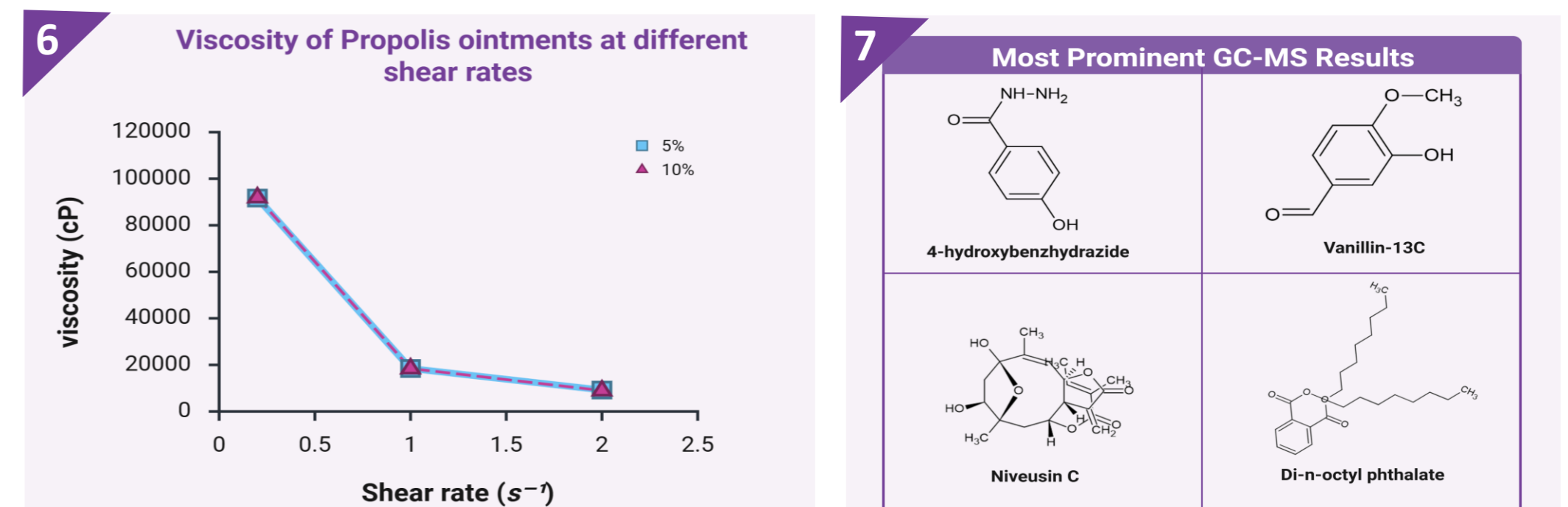
### METHOD



### RESULTS & DISCUSSION



All physical properties were preserved, and no formulation breakdown was observed. Spreadability of formulations remained stable at 25 °C and 40 °C. slight increase observed at -20 °C.



Both 5% and 10% Propolis ointment exhibited pseudoplastic shear thinning viscosity. Volatile compounds identified by GC-MS with the highest concentration.

### CONCLUSION

Iraqi propolis demonstrated potent antibacterial activity, matching Fucidin<sup>®</sup> against Gram-positive and surpassing it against Gram-negative bacteria highlighting its strong potential as a natural alternative to conventional antibiotics. With future standardization, it could become a reliable and sustainable therapeutic option. Although the prepared ointment showed slightly lower activity, its excellent stability makes it a valuable base for further optimization. Overall, Iraqi propolis stands out as a promising candidate in developing new antimicrobial formulations.

### FUTURE WORK / REFERENCES

Future research should focus on formulation optimization, *in vivo* testing and HPLC analysis.

#### References:

- Arhewoh M.I. et al. (2023). Evaluation of antimicrobial activity of propolis ointment against *S. aureus*. *Nig. J. Pharm. Res.*, 18(2).
- Mohamed W.A.S. et al. (2020). GC-MS evaluation and bioactivity of *Tetragona apicalis* propolis extract. *Evid.-Based Complement. Altern. Med.*, 2020.
- Poblega K. et al. (2019). Antimicrobial activity of propolis extracts via different extraction methods. *J. Food Sci. Technol.*, 56(12).
- Przybyłek I., Karpiński T.M. (2019). Antibacterial properties of propolis. *Molecules*, 24(11).