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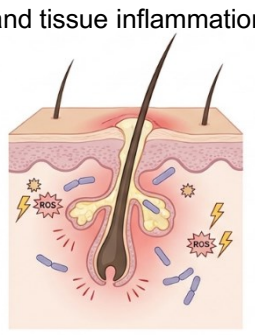
ADA-GEL Scaffolds Containing Cu-MBGNs and Cordia verbenacea for Acne vulgaris Treatment

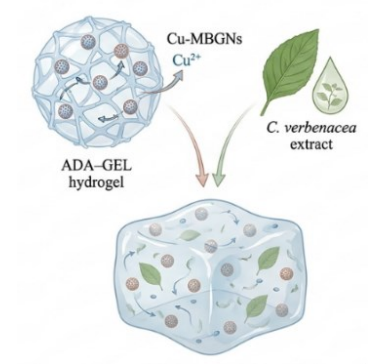
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Introduction

Acne vulgaris is a prevalent inflammatory skin disorder associated with bacterial proliferation, oxidative stress, and tissue inflammation [1]

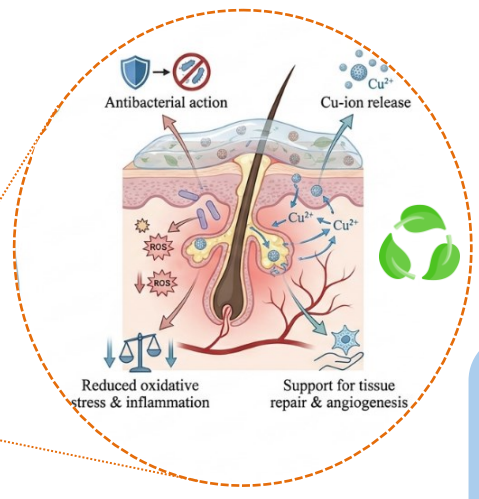




Hydrogels are promising biomaterials due to their biocompatibility and tunable physicochemical properties [2].

Cu-MBGN have demonstrated antibacterial activity and angiogenesis properties [3].



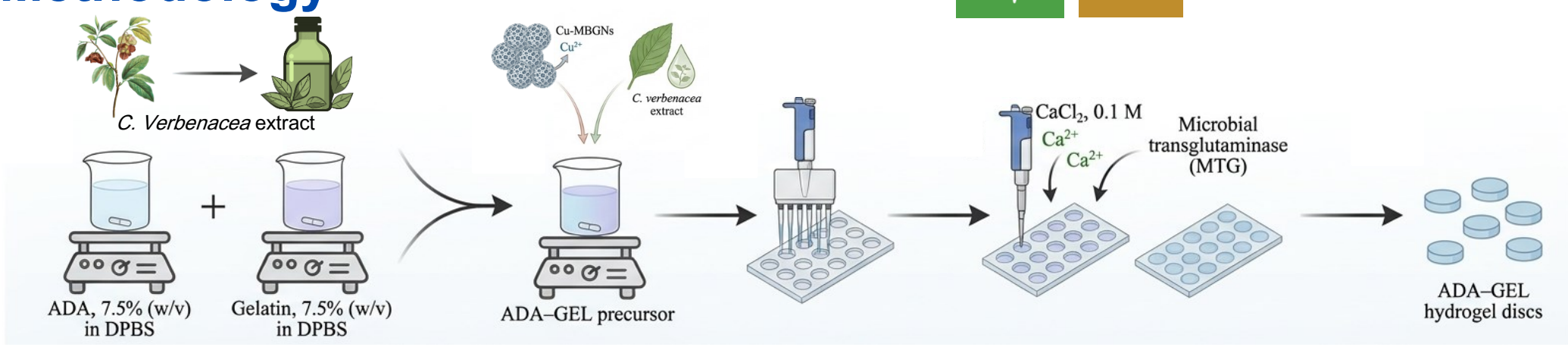


In parallel, *C. verbenacea,* used in Brazilian herbal medicine, presents anti-inflammatory, antioxidant, antimicrobial, and healing properties [4].

Objective

Develop a sustainable and multifunctional cosmetic for acne treatment combining ADA-GEL hydrogels, Cu-MBGNs, and *Cordia verbenacea* extract.

Methodology



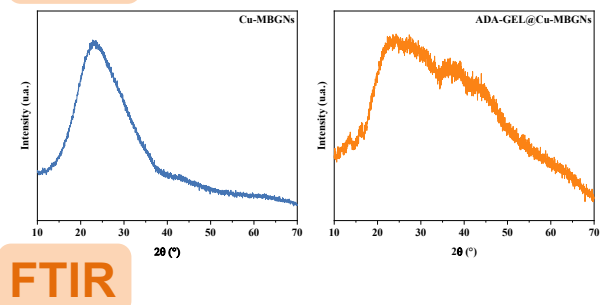
30 min to create a film

60 min to degrade in solution

+ 40% of hydrophobicity

Results and Discussion

XRD



FTIR

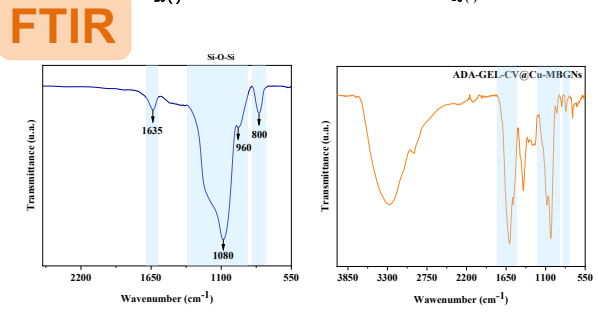


Fig 1. a) XRD patterns and b) ATR-FTIR spectra for Cu-MBGNs.

TEM

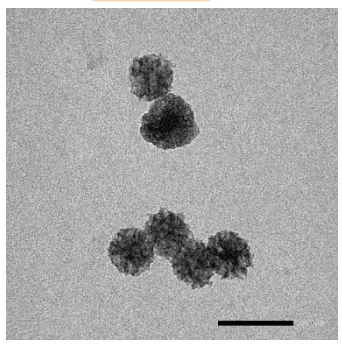


Fig 3. Cu-MBGNs

SEM

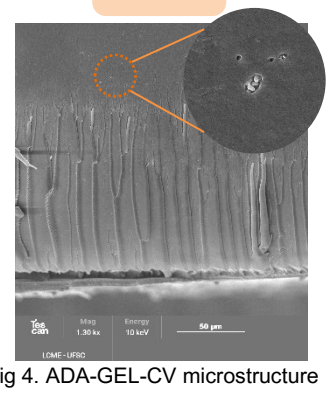


Fig 4. ADA-GEL-CV microstructure

Nano bioactive glass with mesoporous structure.
Strong adhesion between hydrogel and Cu-MBGNs.
Presence of channels from the surface to the center of the sample

Swelling/Degradation

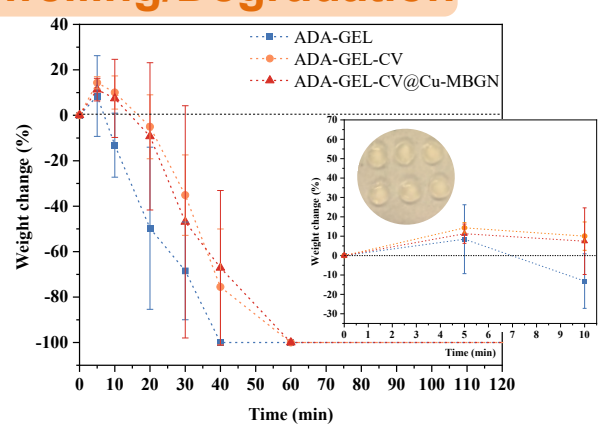


Fig 7. Weight change as function of time for ADA-GEL films.

In the first 10 min, the hydrogel swell ~ 25%.
Between 30 min and 1 h, the samples lose mass.

Bioactivity

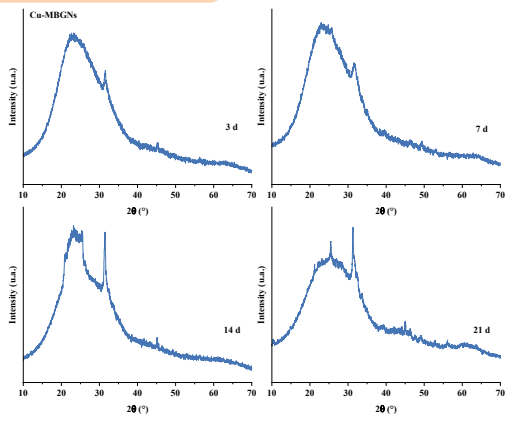


Fig 2. a) XRD patterns after immersion in SBF solution.

Gelation time

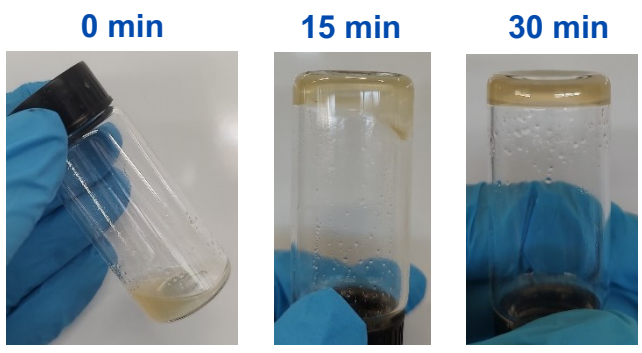


Fig 5. Gelation time of ADA-GEL, ADA-GEL-CV, and ADA-GEL-CV@Cu-MBGNs.

Water Contact Angle

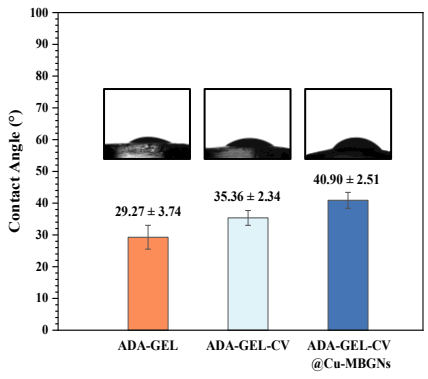


Fig 6. Water contact angle for ADA-GEL films.

Contact angle indicated modified hydrophilicity after incorporation of Cu-MBGNs and C. verbenacea extract.

Conclusions

- ADA-GEL films containing Cu-MBGNs and C. verbenacea extract were successfully fabricated.
- DRX and FTIR analysis revealed the glass network of Cu-MBGNs and hydroxyapatite (HAp) formation in SBF solution confirms the bioactivity of the Cu-MBGNs.
- The addition of *C. verbenacea* and Cu-MBGNs increased the film's hydrophobicity in 40% , which may help retain the skin's natural moisture during treatment.
- Film degradation (60 min) matches recommended wear skin masks timelines, demonstrating promising cosmetic application.

References

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Acknowledgements

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