

# Development of a Casein-Based Hydrogel Incorporating Apple Peel Extract for Enhanced Chronic Wound Treatment

Ekoh, E.<sup>a,b,\*</sup>; Silva, D.C.<sup>a,b</sup>; Barroso, H.<sup>b</sup>; Salema-Oom M.<sup>b</sup>; Serro, A.P.<sup>a,b</sup>

<sup>a</sup> Centro de Química Estrutural, Institute of Molecular Sciences, Departamento de Engenharia Química, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal.

<sup>b</sup> Egas Moniz Center for Interdisciplinary Research (CiiEM), Egas Moniz School of Health and Science, Caparica, Portugal.

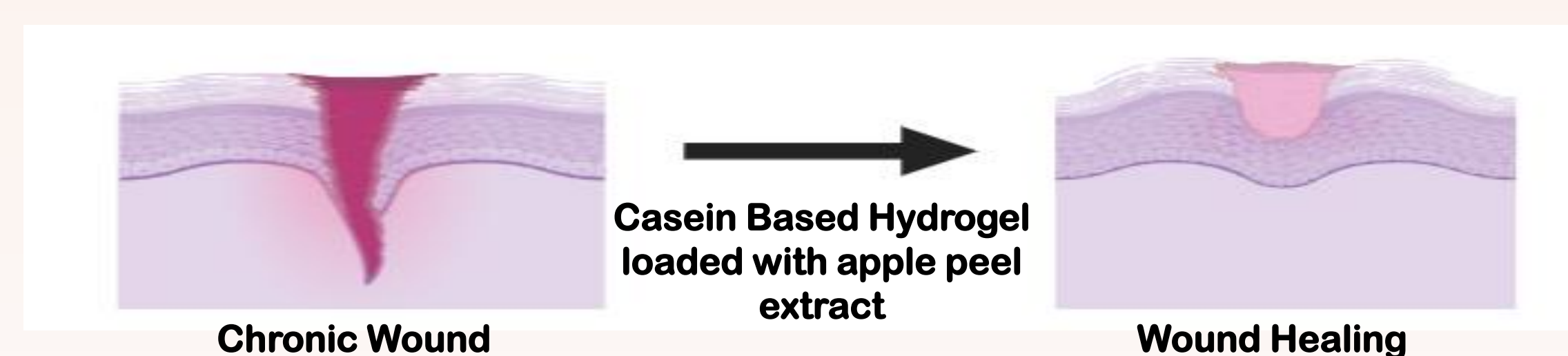
\* E-mail: [elisabeth.ekoh@tecnico.ulisboa.pt](mailto:elisabeth.ekoh@tecnico.ulisboa.pt)

## INTRODUCTION

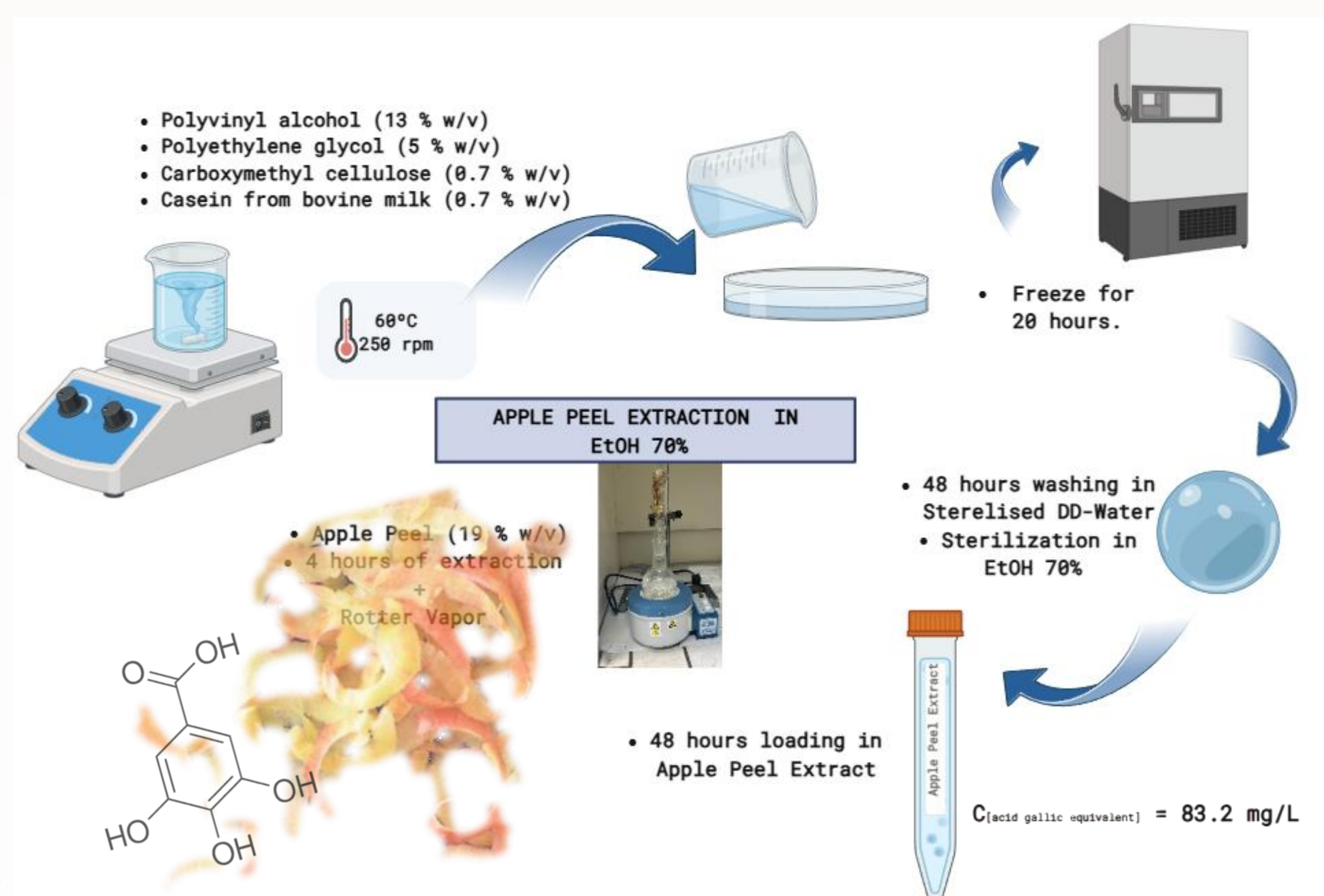
Chronic wounds pose a major clinical challenge due to delayed healing and high infection risk, significantly affecting patient outcomes and healthcare resources. Innovative strategies are essential to support tissue regeneration. Natural materials offer a promising, biocompatible approach for developing advanced wound dressings.

## GOAL

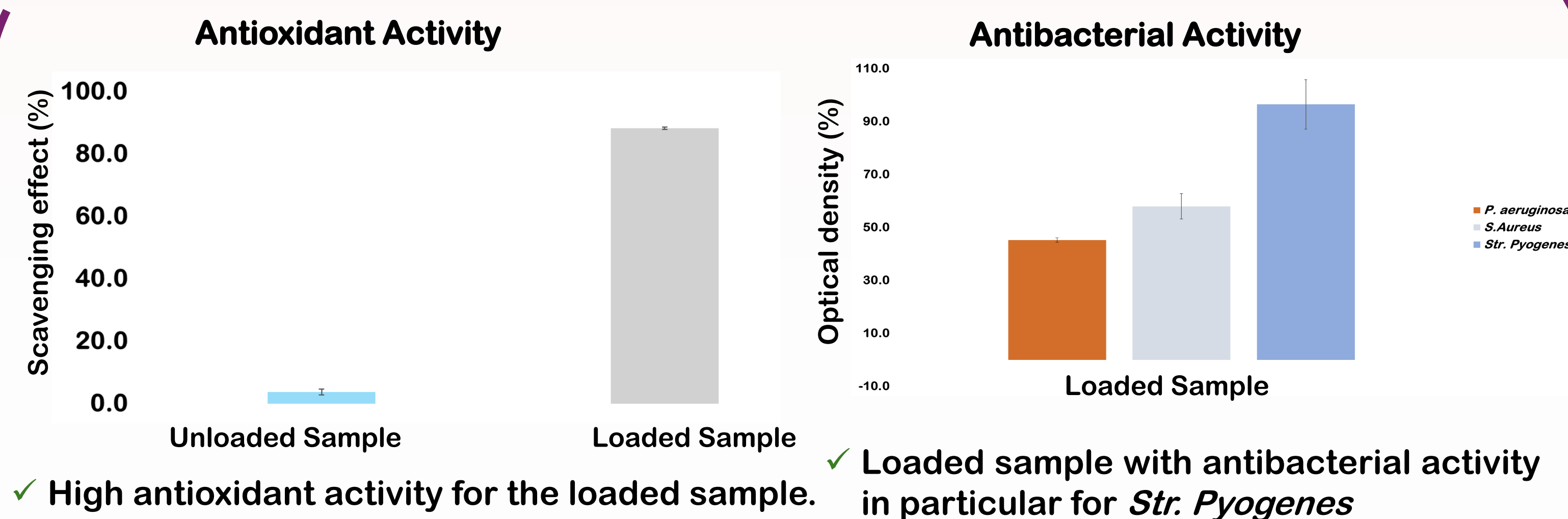
This work aims to investigate the potential application of casein from bovine milk and apple peel extract in the development of bioactive wound dressings for chronic wound management.



## SAMPLES PRODUCTION



## THERAPEUTICAL PROPERTIES



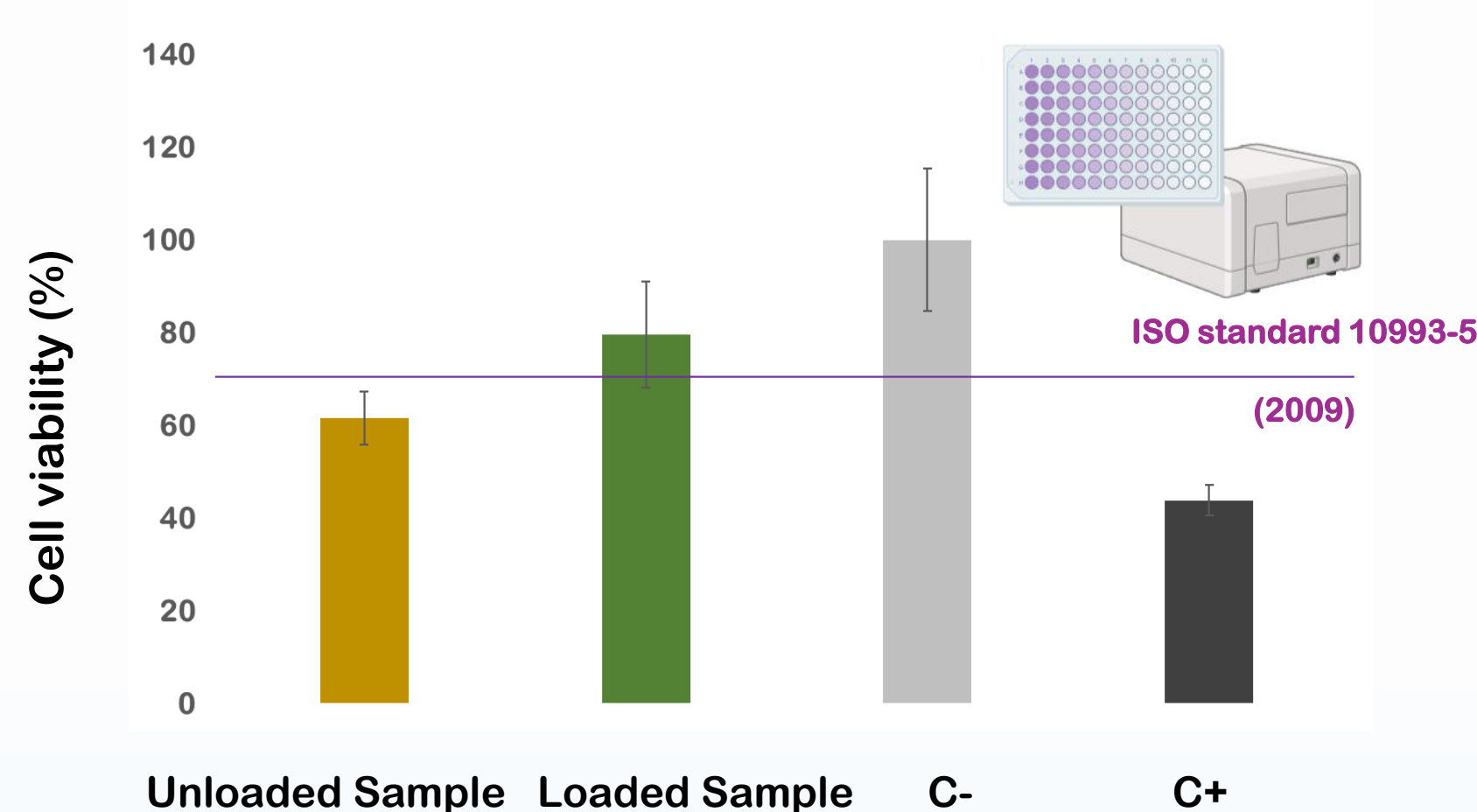
## PHYSICAL PROPERTIES

|                                |             |
|--------------------------------|-------------|
| Contact Angle (°)              | 46.2 ± 1.6  |
| Swelling Ratio (%)             | 298.0 ± 8.5 |
| Water Content (%)              | 83.0 ± 3.1  |
| Young Modulus (MPa)            | 0.07 ± 0.01 |
| Maximum Force of adhesion (mN) | 2.98 ± 0.04 |

✓ Suitable physical properties for wound dressing application.

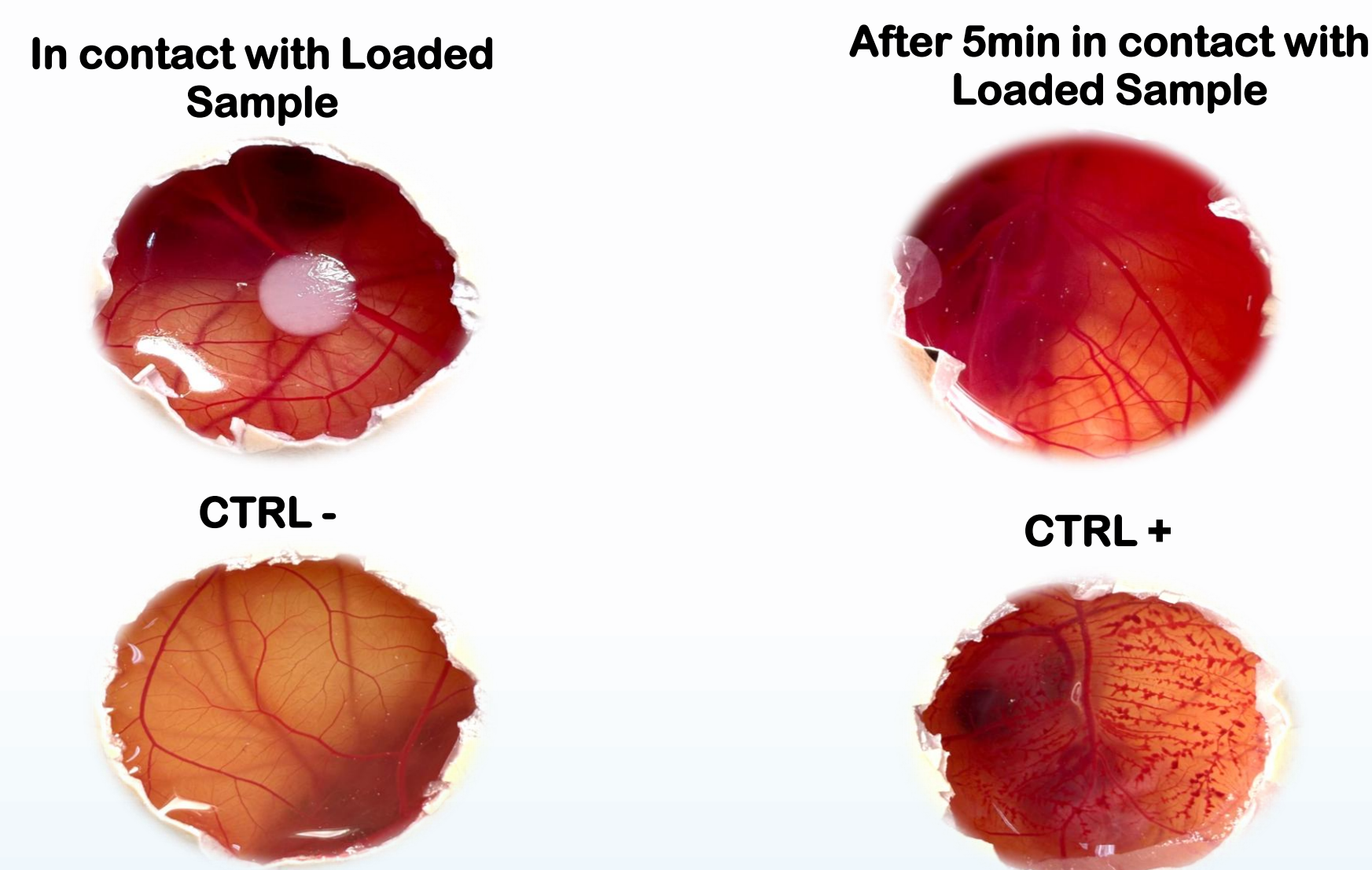
## BIOCOMPATIBILITY

### MTT Assays



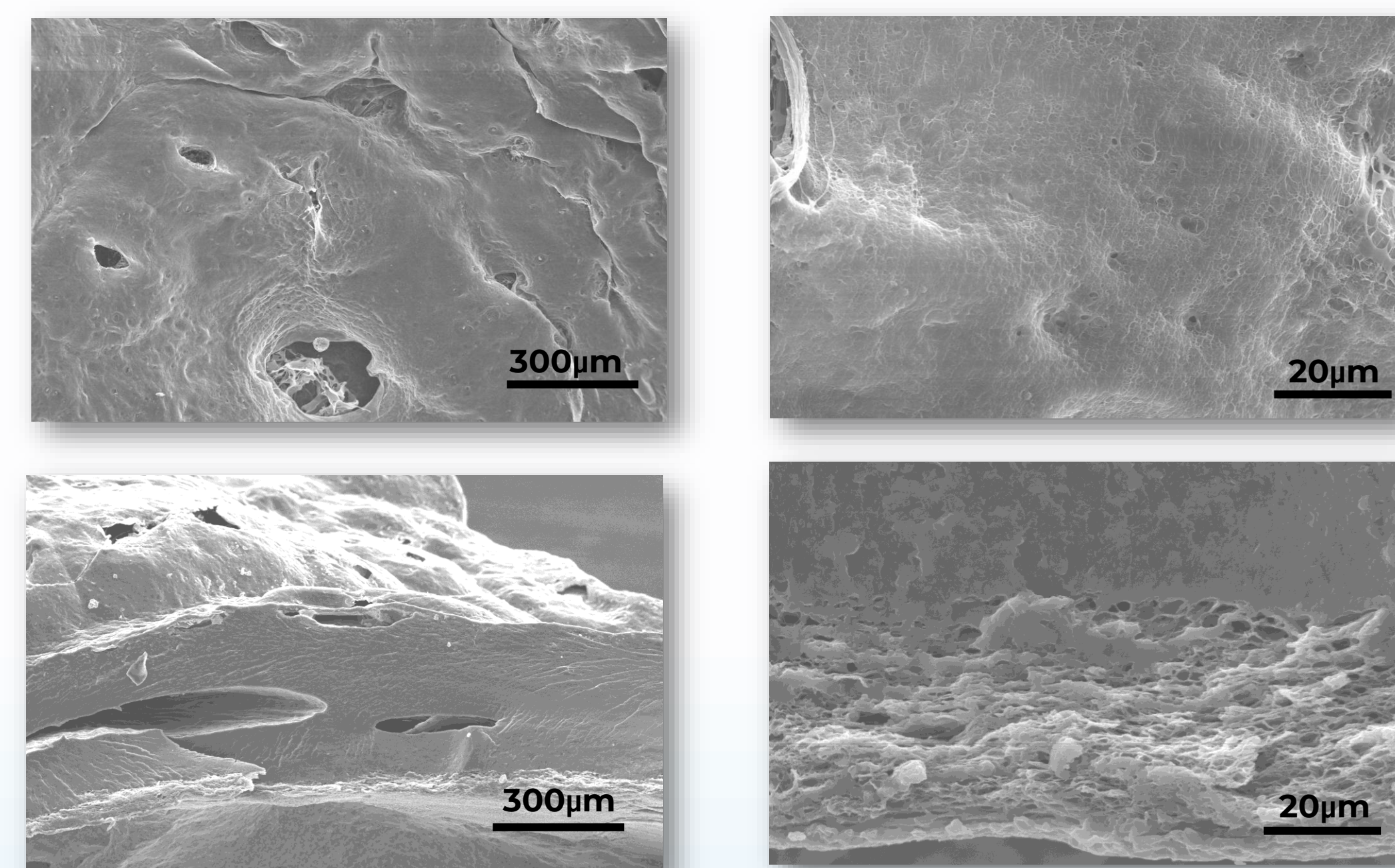
✓ Cell viability > 70 % for loaded Sample

### HET-CAM



✓ No irritability signs

## MORPHOLOGY



✓ Porous structure

## CONCLUSION

The hydrogels produced showed suitable properties to be used in wound dressings. The loading with apple peel extract confers them a significant therapeutic potential, namely antioxidant activity and antimicrobial activity. They revealed to be non-cytotoxic and non-irritable, being promising candidates for the treatment of chronic wounds.

## REFERENCES

- [1] Kolahreez D., Ghasemi-Mobarakeh L., Quartinello F. *Biomacromolecules* 25(2) 2024, 25, 700–714.  
[2] Denis M.C., Furtos A., Dudonné S., et al. 8(1) *PLoS One* (2013) e53725.

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SCAN ME