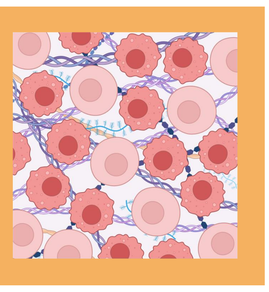
AGAROSE-GELATIN SCAFFOLD AS EXTRACELLULAR MATRIX MODEL

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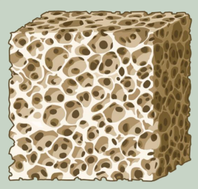
AIM OF THE WORK

The fabrication of a composite scaffold based on agarose, gelatin, and bioactive glass aims to recapitulate the structural and biochemical properties of the **native extracellular matrix (ECM) in vitro**.



INTRODUCTION

Agarose provides a mechanically tunable hydrogel backbone mimicking the compressive behavior of glycosaminoglycans, while **gelatin** — a collagen-derived biopolymer — contributes bioactive **RGD sequences** that promote cell adhesion.

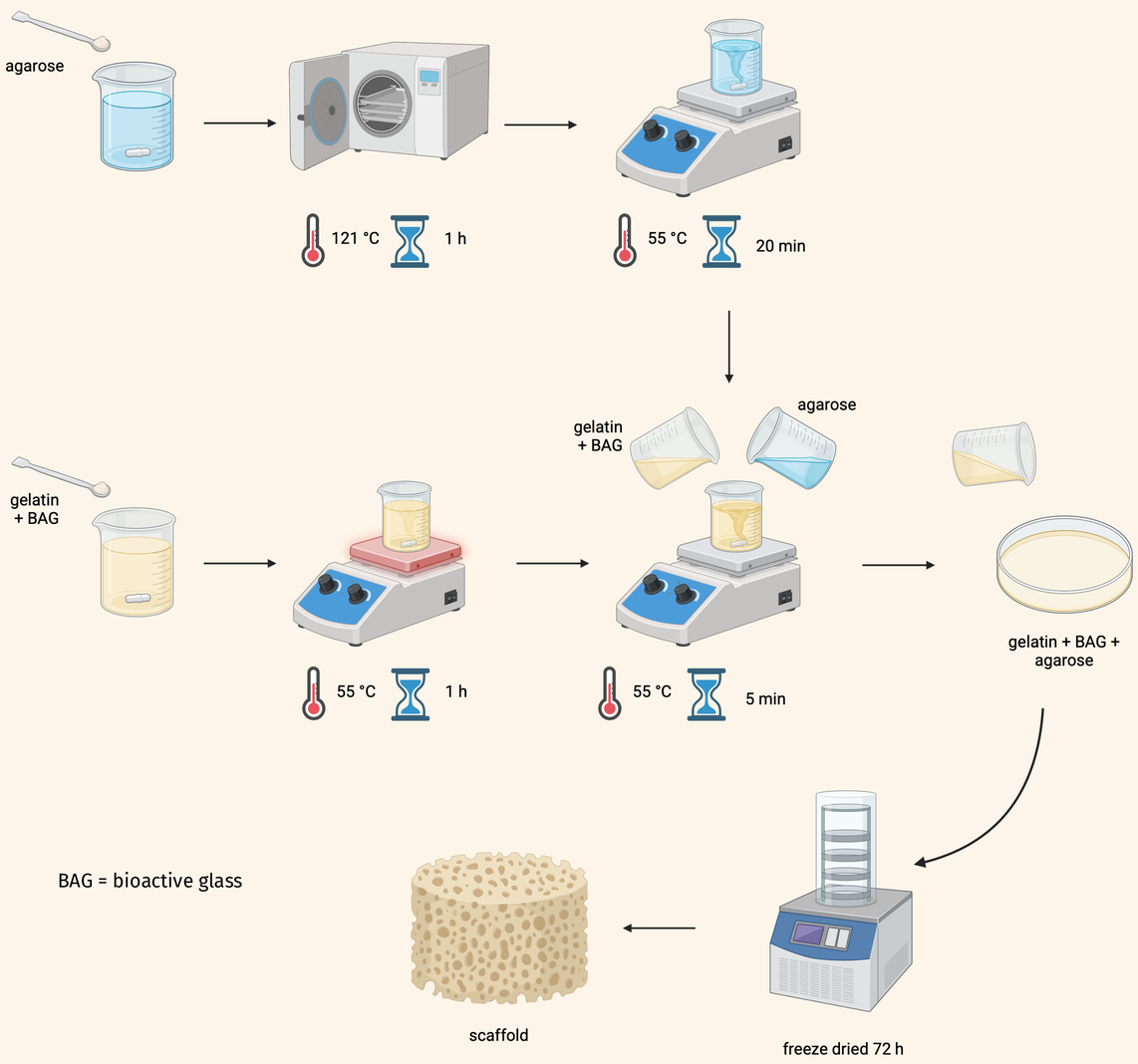


The incorporation of **bioactive glass** introduces an inorganic phase that enhances mechanical stiffness and supports ion-mediated bioactivity (Si^{4+}, Ca^{2+}, PO_4^{3-}).



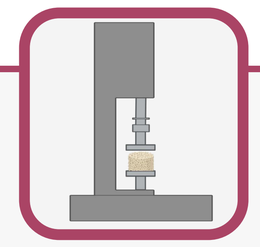
The resulting three-dimensional construct serves as a **biomimetic platform** for studying cell-matrix interactions, mechanotransduction, and tissue-specific remodeling processes under controlled in vitro conditions

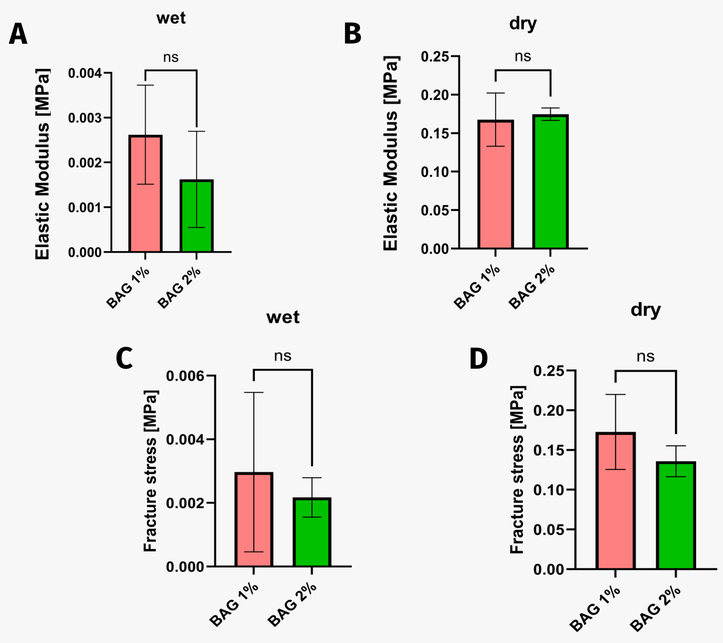
SAMPLE PREPARATION



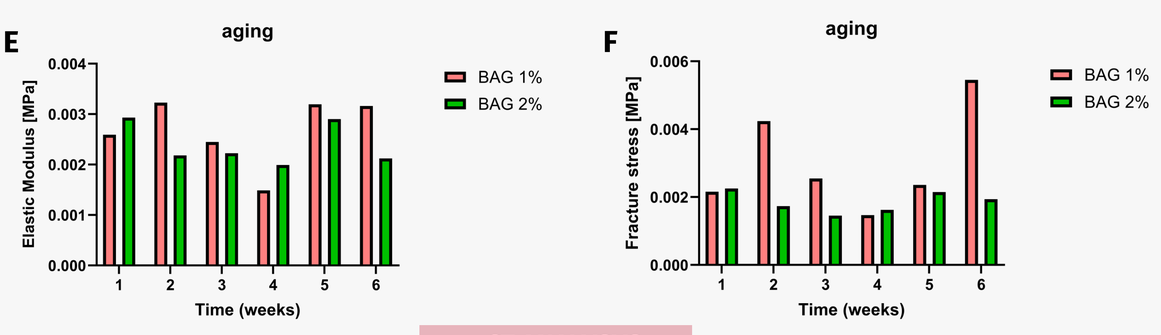
RESULTS

SCAFFOLD MECHANICAL CHARACTERIZATION

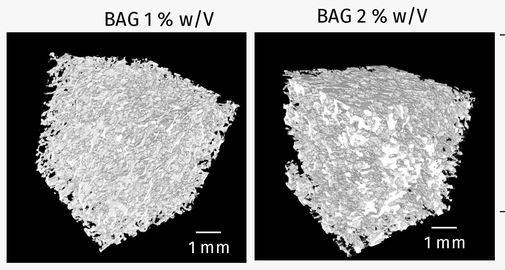




No significant differences were detected in either **Elastic Modulus** or **Fracture Stress** between the two experimental groups, suggesting that the tested variables do not compromise the mechanical integrity of the material.



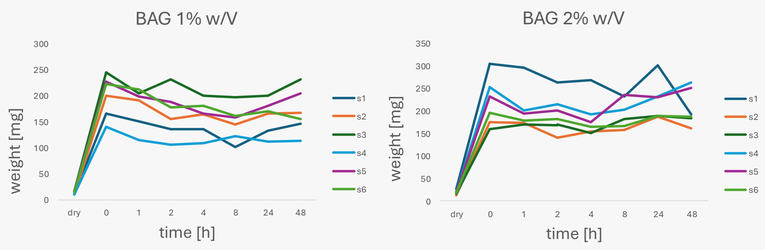
µCT ANALYSYS



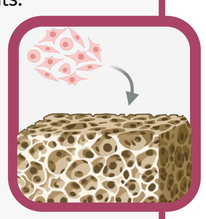
Sample	Porosity	Tb. Th. (µm)	Tb. Sp. (µm)	Conn. D ($µm^{-3}$)
BAG 1% w/V	86,33 ± 0,89	37,69 ± 1,83	141,40 ± 45, 80	$5{,}84e^{-7} \pm 7{,}59627e^{-8}$
BAG 2% w/V	74,28 ± 0,69	64,54 ± 1,07	116,53 ± 55,19	$5{,}84e^{-7} \pm 7{,}59627e^{-8}$

* Tb. Th (trabecular thickness, Tb. Sp (trabecular space), Conn. D. (Connectivity Density.

SWELLING EVALUATION

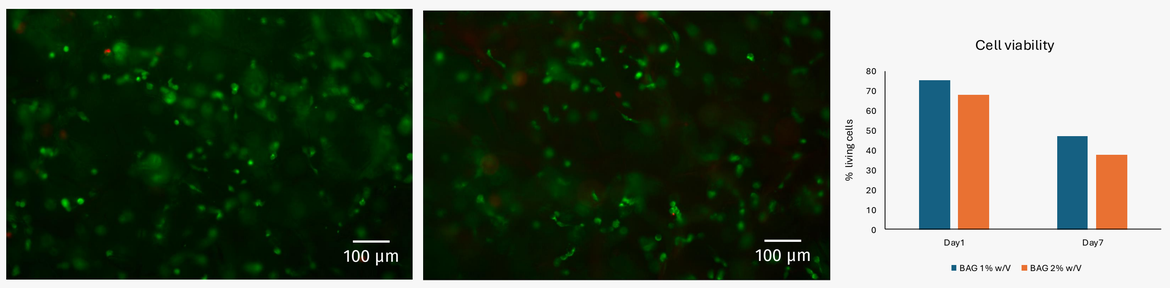


The swelling data demonstrated a **stable behavior over time**, with no significant variation observed across the monitored time points.



CELL SEEDING AND VIABILITY

BAG 1% w/V —— 1 day after seeding —— BAG 2% w/V



CONCLUSIONS

Scaffolds based on agarose, gelatin, and bioactive glass were successfully developed as ***in vitro* models of the extracellular matrix**, providing a **promising platform** for investigating the influence of composition on matrix properties and behavior