

Hydrogels and how to characterize them



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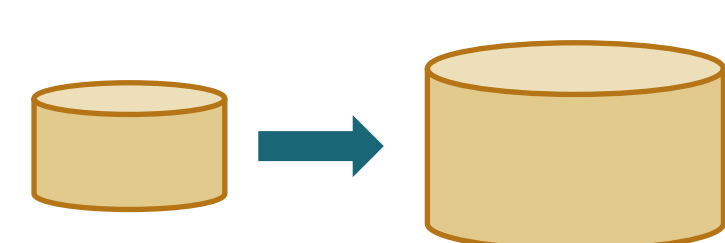
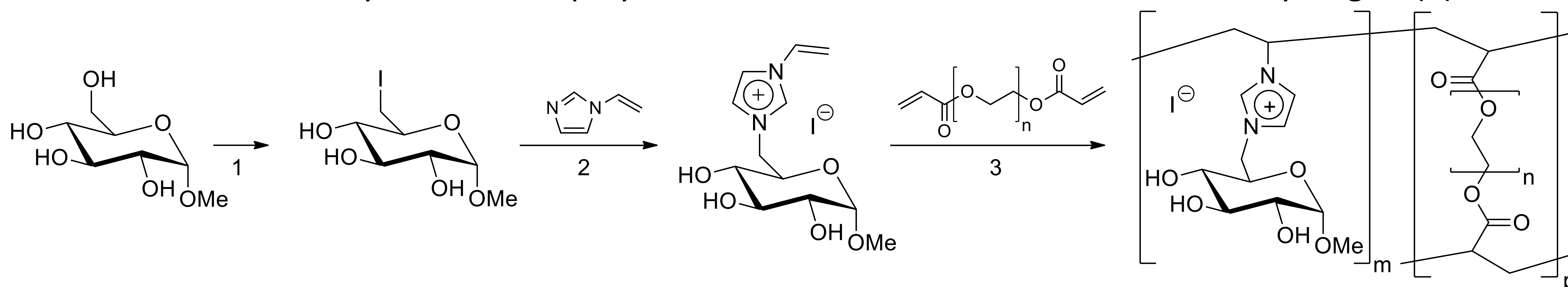
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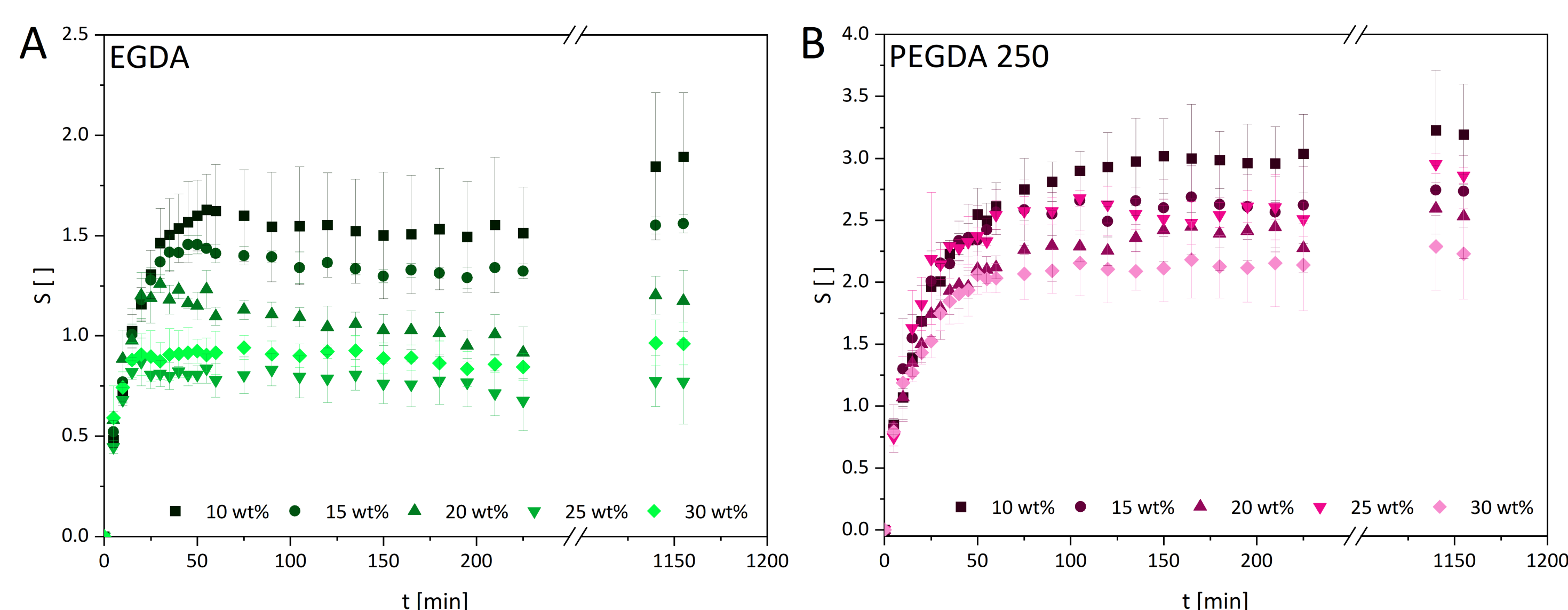


Hydrogels are 3D polymer networks, which can absorb water without losing their shape. Hydrogels in this work are based on methyl- α -D-glycopyranoside. In the first step, an Appel reaction was used to bind iodine to the C-6 position of the sugar (1). In the second step, the iodine was substituted by vinylimidazole (2). In the third step, the double bond of the vinylimidazole is polymerized with various crosslinkers to form hydrogels (3).



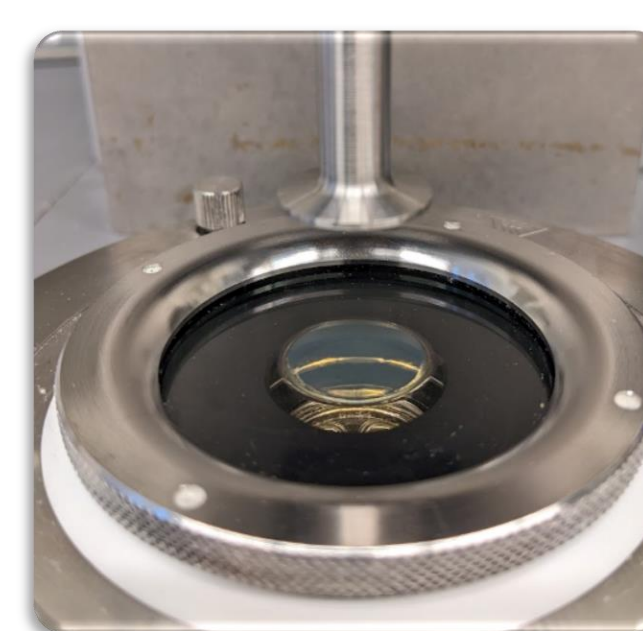
Swelling

$$S = \frac{w_t - w_0}{w_0}$$

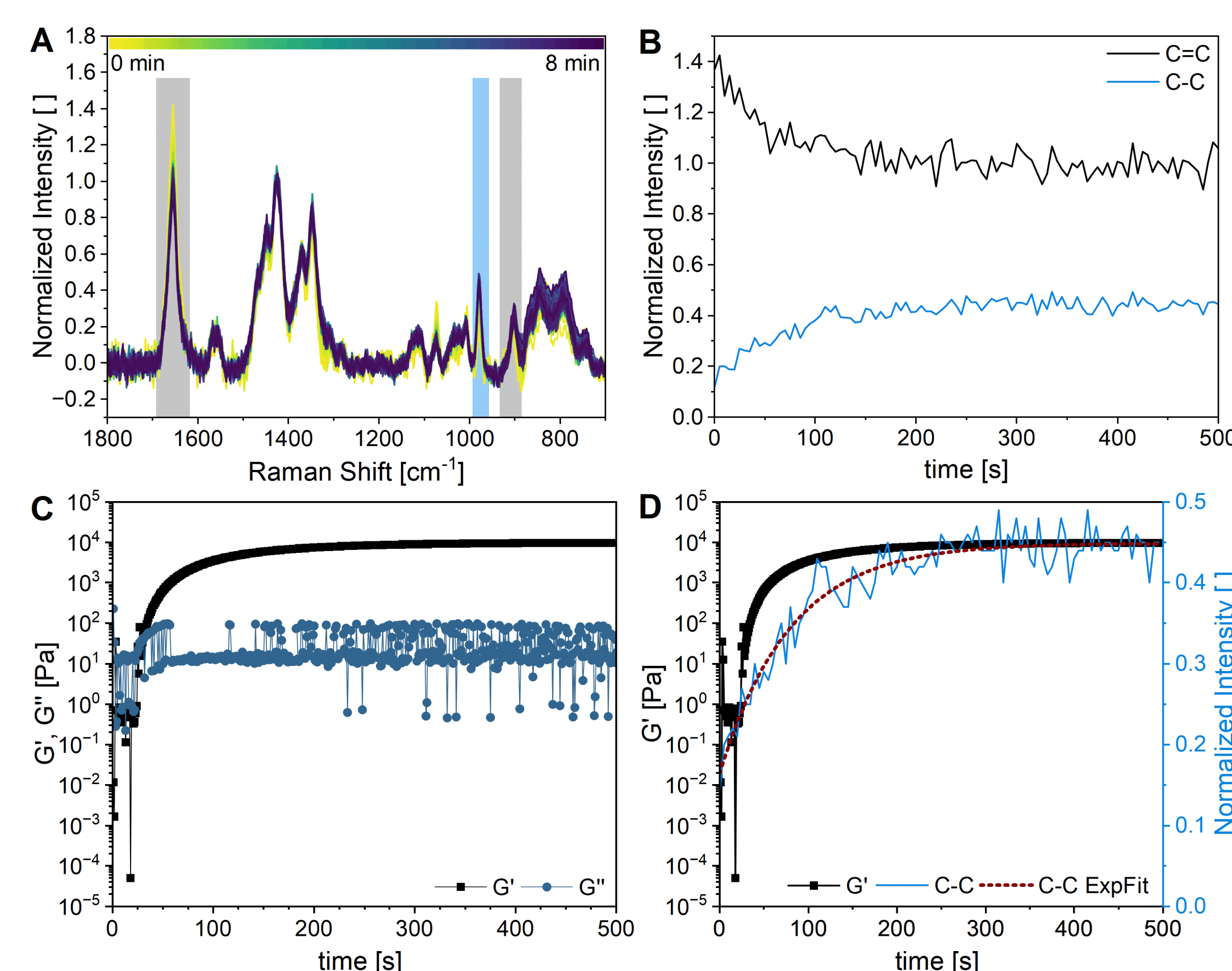


Swelling of hydrogels with different concentrations of Ethylene glycol diacrylate (EGDA) und PolyEGDA 250 as crosslinker.

In situ Rheo-RAMAN-spectroscopy

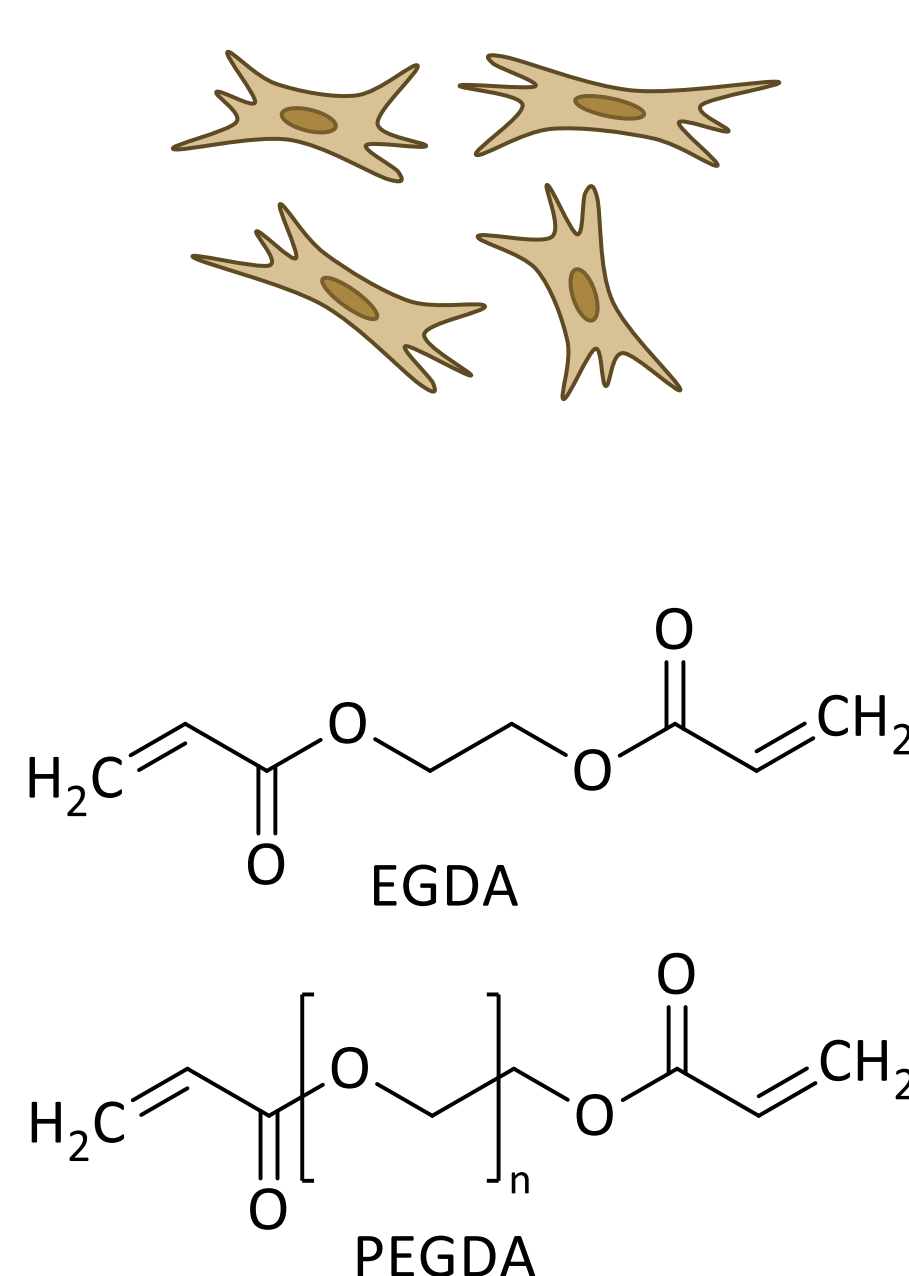
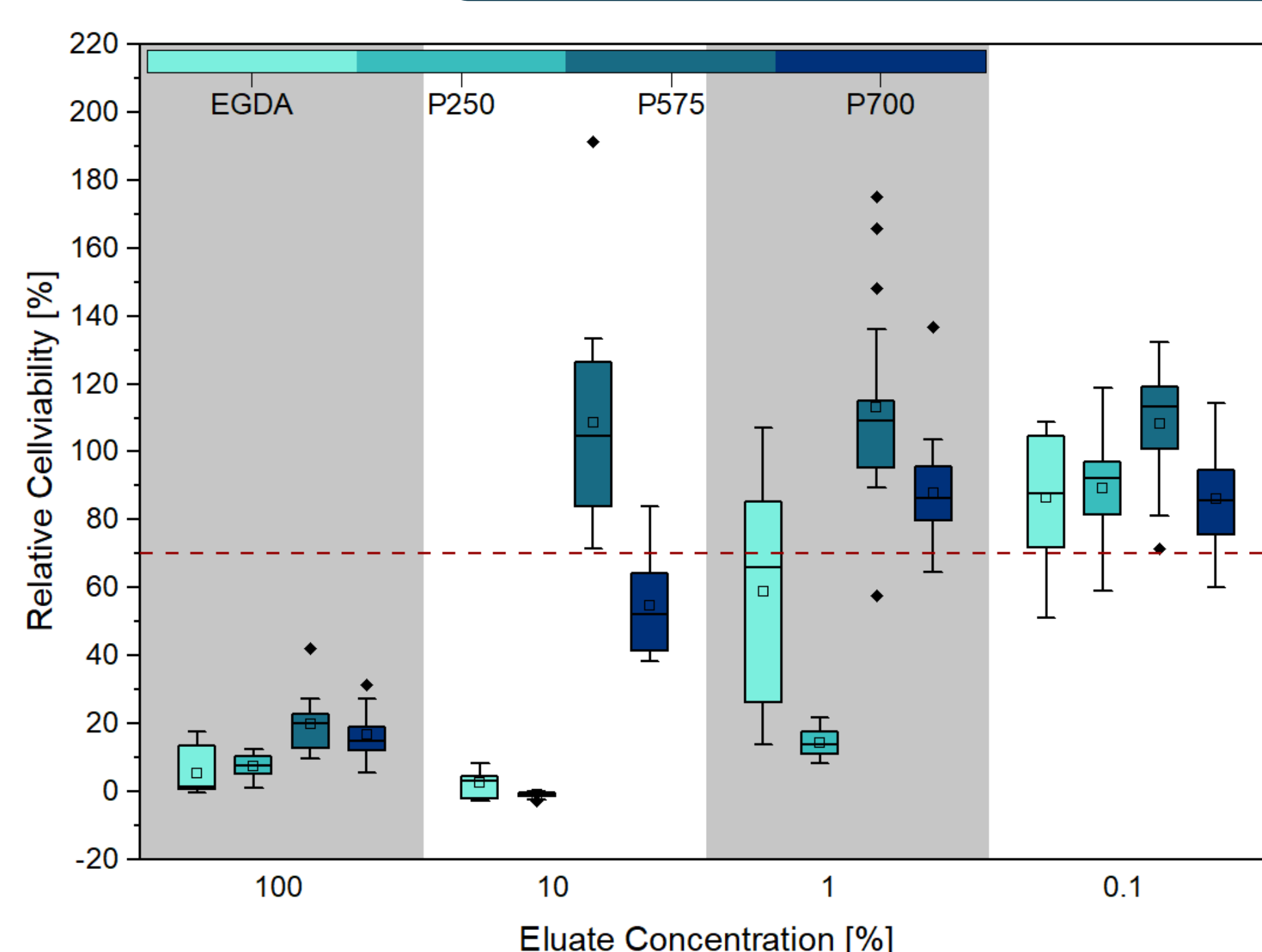


Combination of rheology and RAMAN- spectroscopy



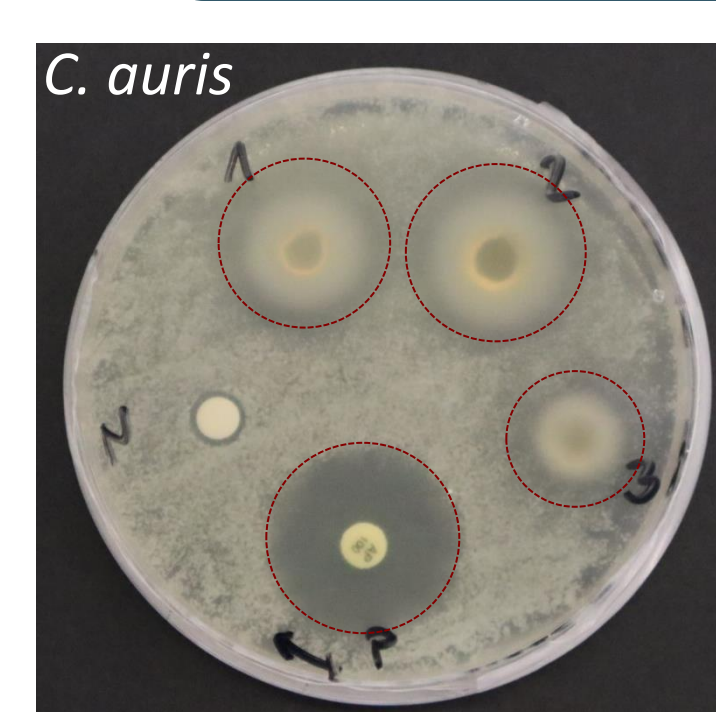
Characterization techniques

Biocompatibility

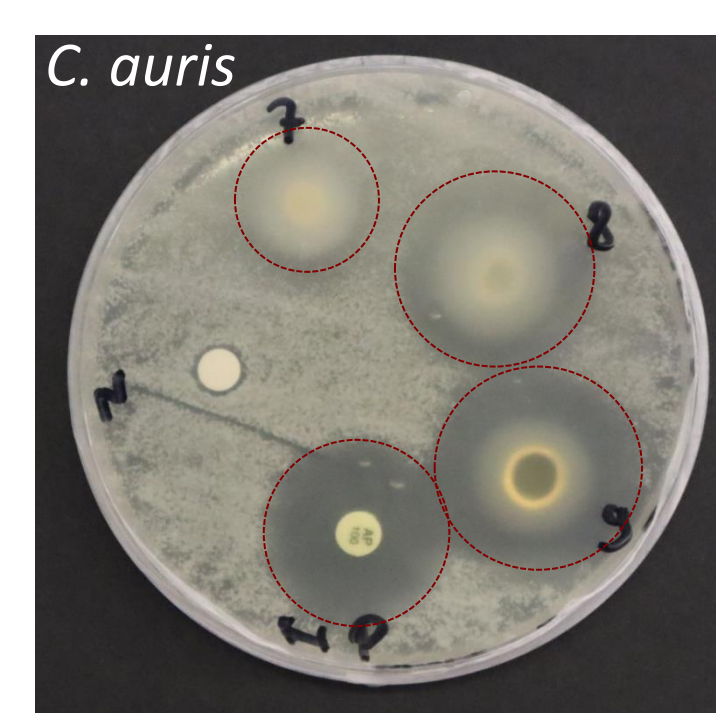


In vitro biocompatibility of hydrogel eluates in different concentrations to L929 mouse fibroblasts.

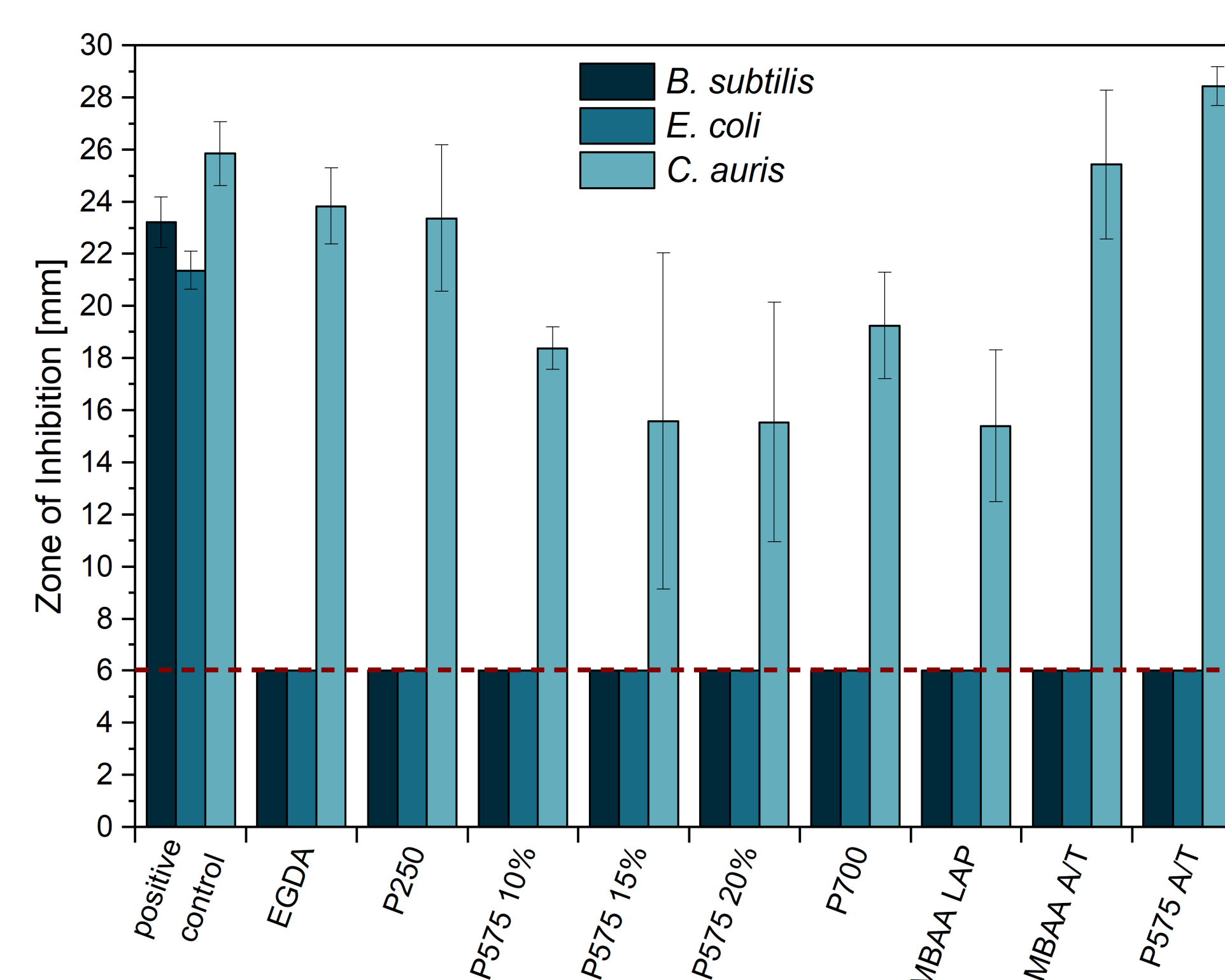
Antimicrobial Activity



1 EGDA, 2 PEGDA 250, 3 PEGDA 575



7 MBAA LAP, 8 MBAA A/T, 9 PEGDA 575 A/T



Antimicrobial activity of hydrogels against *Bacillus subtilis*, *Escherichia coli* K12 and *Candida auris* WT (yeast).

Literature:

- [1] **S. Lambrecht**, A. Villinger, S. Jopp, *IUCRdata* **2022**, 7, x220265.
 [2] **S. Lambrecht**, H. Schröter, H. Pohle, S. Jopp, *ACS Omega* **2024**, 9, 5418-5428.
 [3] **S. Lambrecht**, M. Biermann, S. Kara, S. Jopp, J. Meyer, *Mater. Adv.* **2024**, 5, 6957-6966.
 [4] **S. Lambrecht**, A. Gazizova, S. Kara, J. Meyer, S. Jopp, *RSC Adv.* **2024**, 14, 30719-30731.

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