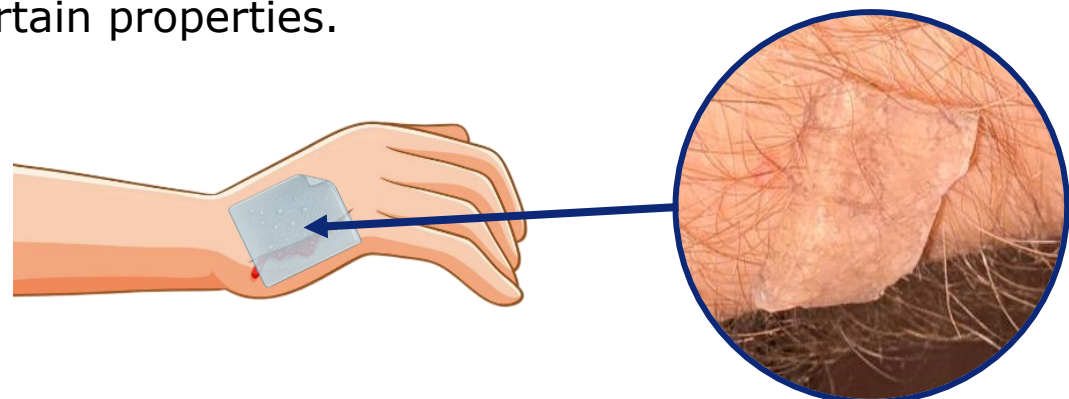


Introduction

Due to the unique set of properties hydrogels are proactively used for wound dressings. The global market of hydrogels amounted to USD 476 million in 2024. These materials effectively absorb exudate from the wound and keep it moist. The use of polysaccharides ensures the required level of biocompatibility, crosslinking improves mechanical characteristics, and various additives impact certain properties.



Materials and Methods

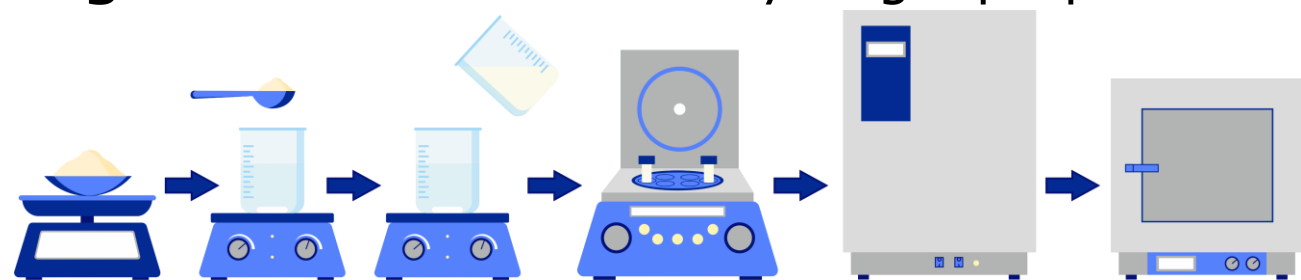
Table 1. The composition of the hydrogel

Component	Molecular weight, kDa	Concentration, %
Carboxymethylcellulose	1000	1,8
Hyaluronic acid	800-1300	0,2
Citric acid	–	10

Table 2. Additives used

Additives	Concentration, %
PCL	0,15
CuO nanoparticles	0,25
ZnO nanoparticles	0,20
Aloe vera (AV)	1,00

Figure 1. The scheme of hydrogel preparation



Results

Figure 2. The adhesion properties

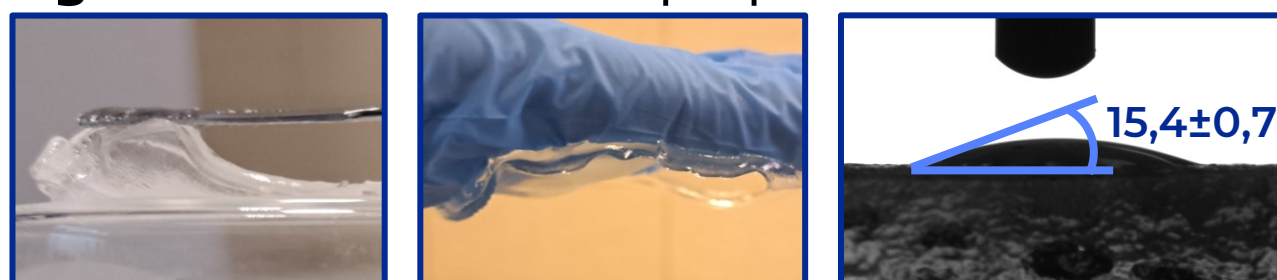


Figure 3. The wetting angle

Conclusion

Hydrogels showed high mechanical, absorption, and stability properties, that makes them suitable for effective wound regeneration as wound dressings. The introduction of additives enhanced the antibacterial properties.

References

Maiti, S., Maji, B., & Yadav, H. (2024). Progress on green crosslinking of polysaccharide hydrogels for drug delivery and tissue engineering applications. Carbohydrate polymers, 326, 121584.

Results

Figure 4. The FTIR results

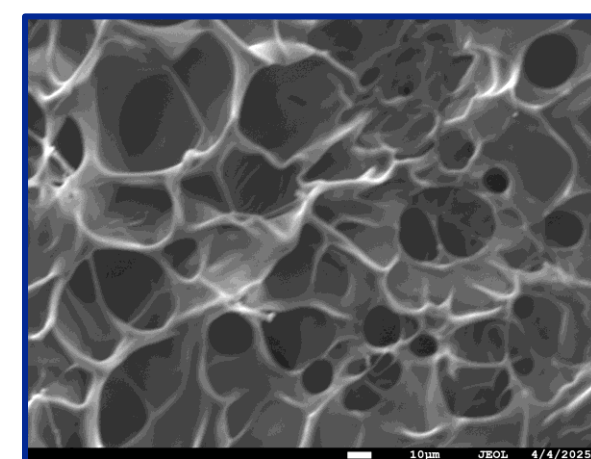
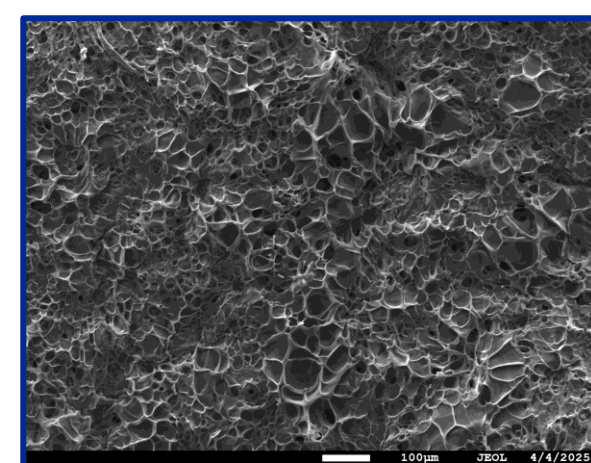
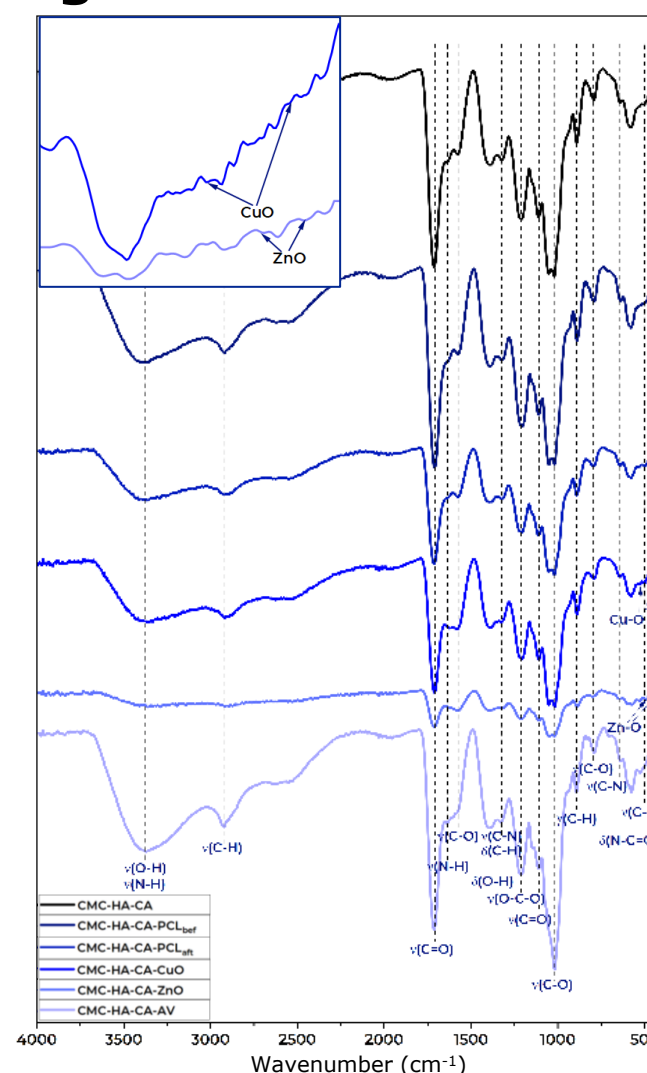


Figure 5. SEM images of the surface

Figure 7. Swelling Ratio

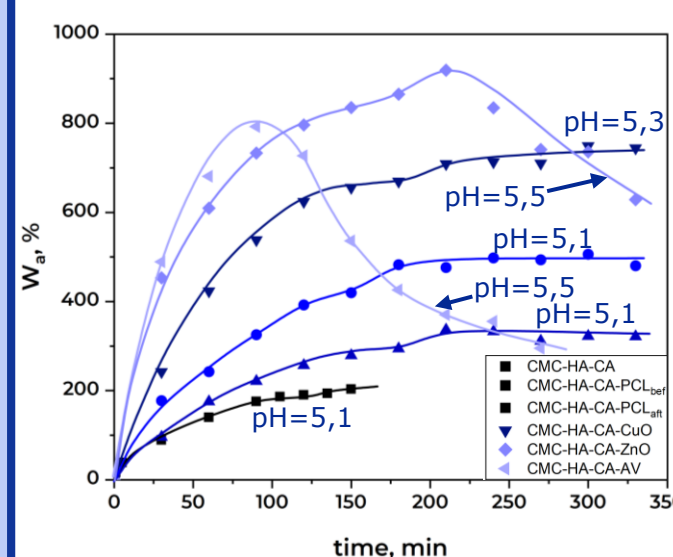


Figure 8. Stress-strain curve

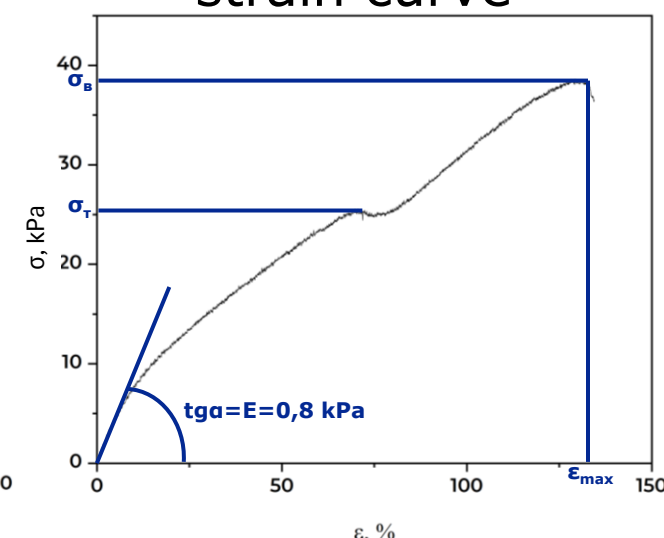


Figure 6. Degradation in model solutions: a – isotonic solution, b – TRIS-buffer

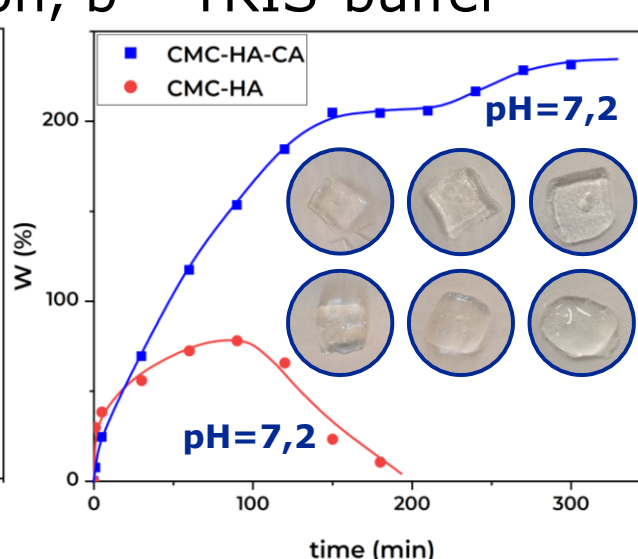
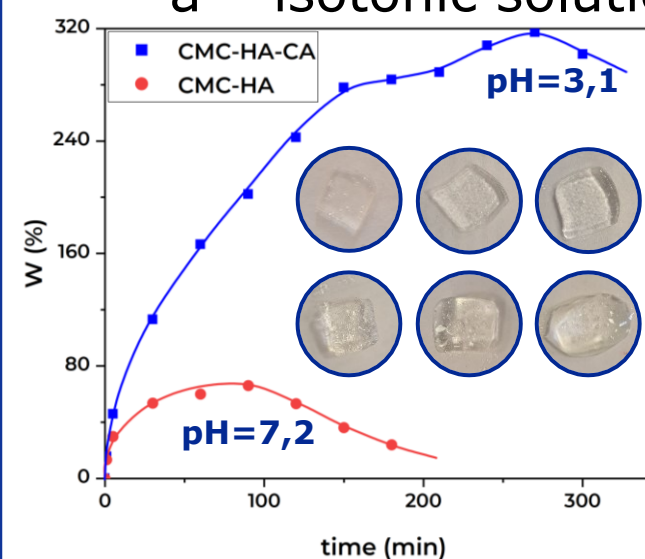
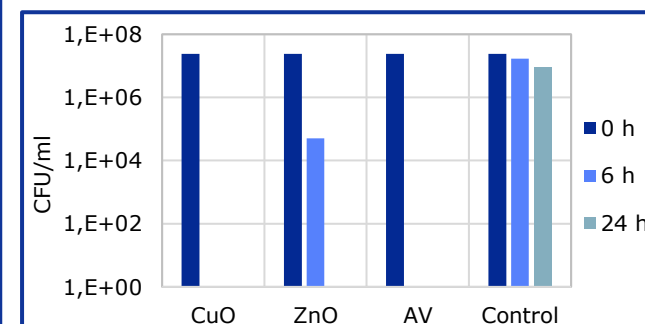
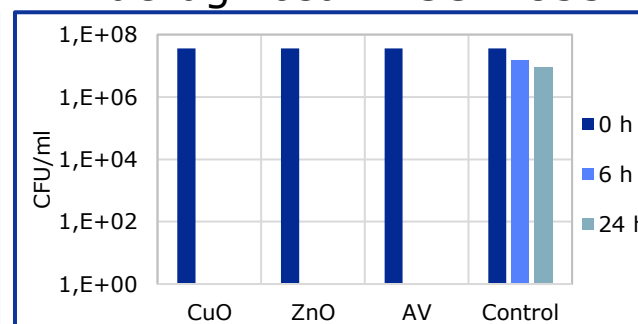


Figure 9. Antibacterial properties

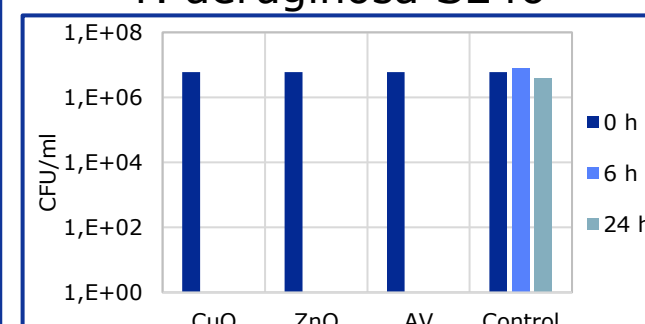
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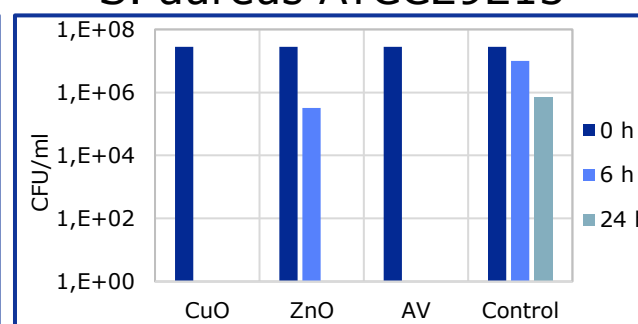
P. aeruginosa ATCC27853



P. aeruginosa S246



S. aureus ATCC29213



The work was carried out with the financial support of the Russian Science Foundation (Agreement No. 25-19-00458).