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INTRODUCTION

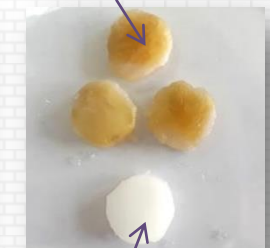
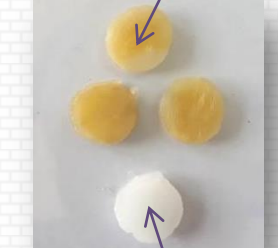
- Hydrogels are excellent **wound dressing materials** that can incorporate and release active antibacterial agents
- Synthetic **polymer poly(vinyl alcohol)** and natural polysaccharide **alginate** can form porous physically-cross linked hydrogel matrices
- Silver nanoparticles (AgNPs)** are a wide-spectrum antibacterial agent that **does not induce bacterial resistance** – replacement for antibiotics

EXPERIMENTAL

- Poly(vinyl alcohol)/alginate hydrogels were cross linked by **freezing-thawing** with two different alginate concentrations (0.5 wt% and 1.0 wt%)
- AgNPs** were loaded inside polymer matrices by **constant-voltage electrochemical reduction**

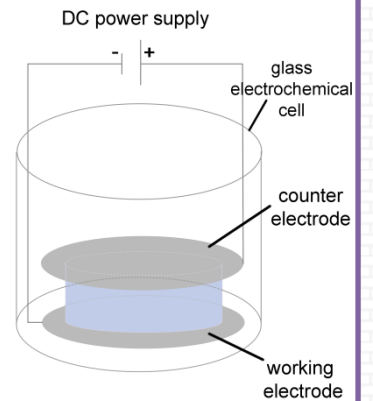
Ag/PVA/0.5%Alg

Ag/PVA/1.0%Alg



PVA/0.5%Alg

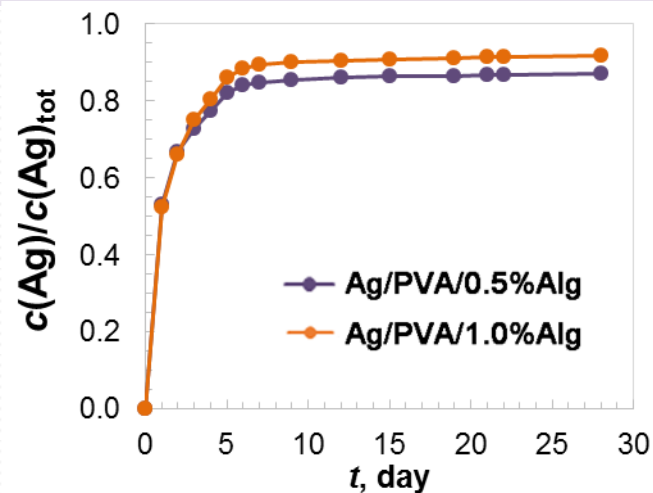
PVA/1.0%Alg



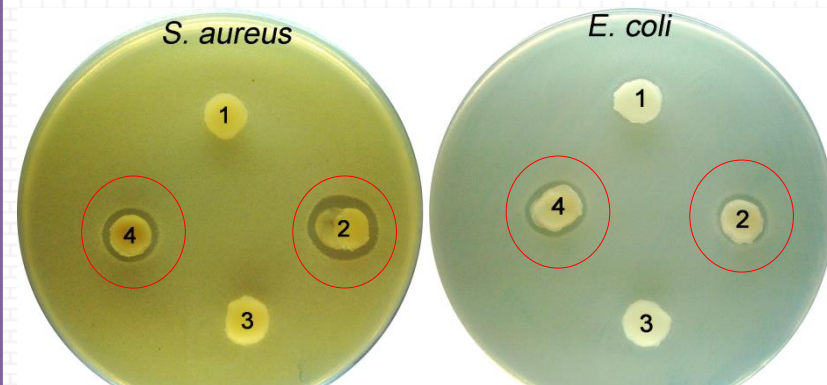
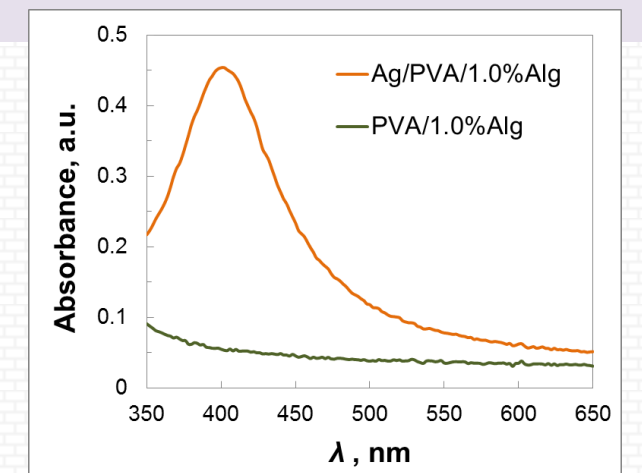
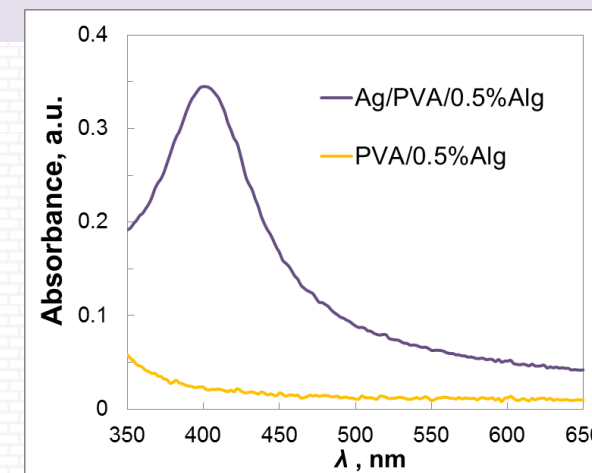
RESULTS AND DISCUSSION

Atomic absorption spectroscopy:

- Initial burst silver release** is favorable for efficient inhibition of bacterial growth
- Ag/PVA/1.0%Alg** hydrogel released silver faster and retained lower amount (~8%) after 28 days



- UV-visible spectroscopy** confirmed incorporation of AgNPs in both hydrogels after the electrochemical synthesis
- Higher concentration of AgNPs** was present in the **Ag/PVA/1.0%Alg** hydrogel



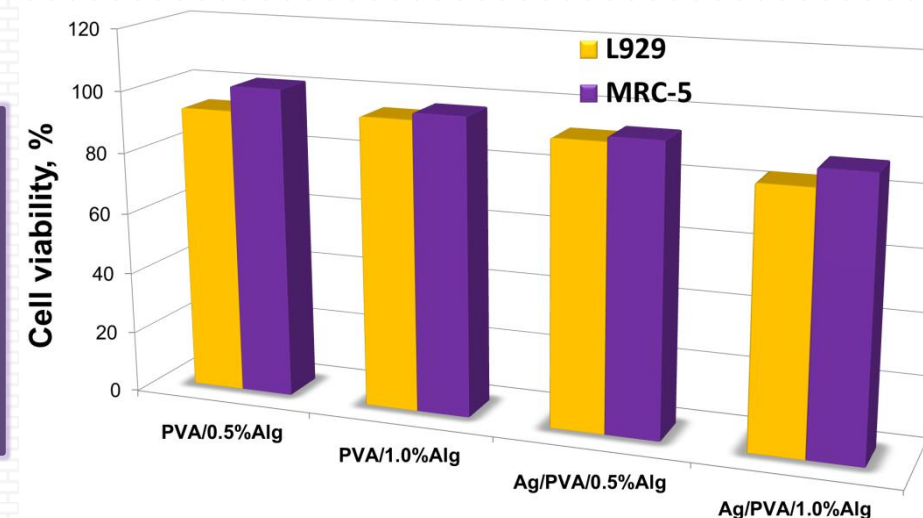
1- PVA/0.5%Alg

2- Ag/PVA/0.5%Alg

3- PVA/1.0%Alg

4- Ag/PVA/1.0%Alg

- Agar-diffusion test** confirmed strong antibacterial activity of both **Ag/PVA/0.5%Alg** and **Ag/PVA/1.0%Alg** hydrogels against **Staphylococcus aureus** TL and **Escherichia coli** ATCC25922 bacterial strains



- MTT test** proved that the synthesized hydrogels were **non-cytotoxic** towards **MRC-5** and **L929** cell lines
- Cell viability** was always higher than **80-90 %**

CONCLUSIONS

- Burst silver release** profiles are very convenient for **wound dressing applications**
- AgNP-embedded hydrogels exhibited **strong antibacterial activity** against **S. aureus** and **E. coli**
- In vitro** characterization confirmed applicability as **antibacterial wound dressings**

REFERENCES

- [1] K. Nešović, A. Janković, T. Radetić, M. Vukašinić-Sekulić, V. Kojić, Lj. Živković, A. Perić-Grujić, K.Y. Rhee, V. Mišković-Stanković, *European Polymer Journal* 121 (2019) 109257.
- [2] Katarina Nešović, Ana Janković, Vesna Kojić, Maja Vukašinić-Sekulić, Aleksandra Perić-Grujić, Kyong Yop Rhee, Vesna Mišković-Stanković, *Composites Part B: Engineering* 154 (2018) 175–185

ACKNOWLEDGEMENTS

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