



Сојуз на хемичарите и технолозите на Македонија
Society of Chemists and Technologists of Macedonia

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BOOK of ABSTRACTS

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POL P-3

ANTIMICROBIAL COMPOSITE POLYMERS AS POTENTIAL AGENTS IN CHRONIC WOUND HEALING

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Biofilm-forming bacteria are recognized as a major impediment to wound healing. The aim of this study was to improve design of the formulations used for care of biofilm-infected wounds. Since lignins and lignin-derived compounds are known to have antibacterial properties especially efficient against biofilm-forming pathogens, the gel and membrane type of materials of enzymatically synthesized lignin model compound, dehydrogenative polymer of coniferyl alcohol (DHP) with alginate (Alg) and bacterial cellulose (BC) synthesized by culture *Komagataeibacter intermedius* IMBG180, were composed. The hydrogels were tested on Gram-negative *P. aeruginosa* (ATCC 27853) and *S. typhimurium* (ATCC 13311), Gram-positive bacteria *L. monocytogenes* (NCTC 7973) and *S. aureus* (ATCC 6538), as well as *S. aureus* #1*, *S. aureus* #2*, *P. aeruginosa** and *Serratia* sp.* clinical human isolates obtained from patients' wounds. DHP-Alg showed activity against all of the tested bacteria with minimal inhibitory concentrations (MICs) of 0.002–0.45 mg/mL and minimal bactericidal concentrations (MBCs) of 0.004–0.90 mg/mL. *L. monocytogenes* was the most susceptible. DHP-BC exhibited antibacterial activity on all tested bacteria, with exception of *P. aeruginosa* and *S. aureus* #1*. MICs and MBCs were in range of 0.22–0.42 mg/mL and 0.22–0.88 mg/mL, respectively. DHP-Alg gel and DHP-BC membranes, after initial release in the first hour of 34% and 19.26% of DHP, respectively, allowed the slow and continuous release of DHP in PBS solution. After 24 hours the amount of released antimicrobial substance from DHP-Alg and DHP-BC were 42.13% and 46.2%, respectively. Based on all obtained results, both hydrogels have the potential to be used in medical treatments as antibacterial agents.

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Keywords: lignin model polymer, bacterial cellulose, antimicrobial activity, wound healing.

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