

## Silver nanoparticle's based plaster for efficient healing of infected wounds

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Human skin is always coated with a variety of microorganisms, some of them are natural microbiota, some pathogenic. Natural microbiota works as additional natural protective barrier against pathogenic microorganisms, which can cause inflammation on skin surface. After injuries due to bad care of wound or weak immune system pathogenic microorganism causes inflammation. Bacteria like methicillin-resistant *Staphylococcus aureus* (MRSA) can cause severe infections with bad prognosis and consequences. Small wounds after injuries can be healed using simple cotton bandages. However, persons with weak immune system need to have additional care for prevention of secondary infection.



Fig.1. Antimicrobial effect of silver np. placed on synthetic silk tray (4x6 mm) against *S. aureus* bacteria on agar surface.

We investigated effectiveness of silver nanoparticles (np.) as antimicrobial agent and possibilities to replace chemical antimicrobial compounds with silver np. Our aim was to suspend silver np on the surface and to test this material as antimicrobial agent.

Two approaches were used in the technology of plaster for efficient healing of infected wounds. The first one included deposition of silver nanoparticles that have been performed using reactive magnetron sputtering of silver target, following by plasma etching. In the second approach silver nanoparticles were chemically synthesized and spin-coated, or spray deposited. The trays were synthetic silk, cotton and cellulose. The samples were evaluated using standard microbiological tests (Fig.1). SEM, EDX and XRD were employed to characterize the samples.

This investigation will help to develop a novel non-antibiotic plaster for the treatment of complicated wounds.