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## Functionalized PVA/silica nanofibers as antibacterial wound cover

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The study deals with functionalization of poly (vinyl alcohol)/silica nanofibers to optimize the manufacturing process and to ensure long-term antibacterial activity of the nanofibers. Preparation of poly (vinyl alcohol)-silica nanofibers with antibacterial activity via electrospinning is described and analyzed. Additives (3-mercaptopropyl) trimethoxysilane and cetyltrimethylammonium dibromide were added to the mixture to modify prepared nanofibers properties. The relationships among mixture compounds, how the prepared nanofibers structure and properties are influenced by initial solvent modification and by thermal stabilization temperature are discussed. The nanofibers are modified by two methods to acquire antibacterial activity: (1) surface functionalization of the nanofibers by silver and copper nanoparticles; (2) modification of initial sol by antiseptic additive. Silver ions and nanosilver are able to kill a wide range of bacteria including those which are resistant to antibiotics. CTAB contains the cetrimonium cation which is an effective antiseptic agent against bacteria and fungi. The both modification methods ensure significant antibacterial activity of inorganic-organic nanofibers, which was proven by in-vitro antibacterial tests. The antibacterial activity of the samples is caused by CTAB and silver nanoparticles application. It was verified that copper nanoparticles do not affect negatively the antibacterial activity. Copper nanoparticles' effect is assumed to support the cell proliferation in the next phase of material testing. This novel material shows a big potential for wound dressing applications.

### Biography

Ivana Veverková is a PhD student and Junior Researcher at the Technical University of Liberec, Faculty of Health Studies. Her research is focused on applicability of nanofibers in biomedicine, especially for regenerative medicine.

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