

Antimikrobna aktivnost i citotoksičnost nanočestica na bazi srebra *in situ* sintetisanih na pamučnoj tkanini primenom ekstrakta lista oraha

Ana G. Krkobabić¹, Darka D. Marković², Aleksandar G. Kovačević¹, Tatjana R. Ilić-Tomić³, Vanja M. Tadić⁴, Maja M. Radetić¹

¹Univerzitet u Beogradu – Tehnološko-metalurški fakultet, Beograd, Srbija

²Univerzitet u Beogradu – Inovacioni centar Tehnološko-metalurškog fakulteta, Beograd, Srbija

³Univerzitet u Beogradu – Institut za molekularnu genetiku i genetsko inženjerstvo, Beograd, Srbija

⁴Institut za proučavanje lekovitog bilja „Dr Josif Pančić“, Beograd, Srbija

U ovom radu je ispitana mogućnost *in situ* sinteze nanočestica na bazi srebra primenom ekstrakta lista oraha, na pamučnoj tkanini prethodno modifikovanoj limunskom kiselinom. Tokom sinteze su formirane sferne nanočestice prečnika oko 60 nm, koje su ravnomerno raspoređene po površini pamučnih vlakana. Prisustvo nanočestica na bazi srebra je obezbedilo odličnu antimikrobnu aktivnost prema bakterijama *Staphylococcus aureus* i *Escherichia coli*, kao i kvascu *Candida albicans*. Tekstilni nanokompozitni materijal nije citotoksičan prema ćelijama zdravih keratinocita kože (HaCaT linija) i zdravih fibroblasta (MRC-5 linija), što omogućava njegovu bezbednu primenu za medicinske potrebe.

Antimicrobial activity and cytotoxicity of silver-based nanoparticles *in situ* synthesized on cotton fabric using walnut leaf extract

Ana G. Krkobabić¹, Darka D. Marković², Aleksandar G. Kovačević¹, Tatjana R. Ilić-Tomić³, Vanja M. Tadić⁴, Maja M. Radetić¹

¹University of Belgrade, Faculty of Technology and Metallurgy, Belgrade, Serbia

²University of Belgrade, Innovation Centre of the Faculty of Technology and Metallurgy, Belgrade, Serbia

³University of Belgrade, Institute of Molecular Genetics and Genetic Engineering, Belgrade, Serbia

⁴Institute for Medical Plant Research „Dr Josif Pančić“, Belgrade, Serbia

This study discusses the possibility to utilize walnut leaf extract for *in situ* synthesis of silver-based nanoparticles on cotton fabric previously modified with citric acid. Synthesized spherical nanoparticles with an average diameter of 60 nm were evenly distributed over the surface of cotton fibers. The presence of silver-based nanoparticles provided excellent antimicrobial activity against bacteria *Staphylococcus aureus* and *Escherichia coli*, and yeast *Candida albicans*. The textile nanocomposite did not show any cytotoxicity towards healthy skin keratinocytes cells (HaCaT line) and healthy fibroblast cells (MRC-5 line). Thus, it could be considered as a safe for potential medical applications.