ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES SYNTHESIZED USING PLANT EXTRACTS

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Abstract. The aim of the study was to determine the antimicrobial activity of silver nanoparticles synthesized using the oak bark and juniper berry extracts against foodborne pathogenic bacteria. The peaks of localized surface plasmonic resonance in UV-VIS spectrum confirmed biosynthesis of silver nanoparticles synthesized using plant extracts. The antimicrobial activity of silver nanoparticles was determined by the agar diffusion method against the reference strains *Escherichia coli* ATCC 25922, *Bacillus cereus* ATCC 11778, *Listeria monocytogenes* ATCC 19111, *Staphylococcus aureus* ATCC 25923, *Salmonella enterica* subsp. *enterica* serovar *typhimurium* ATCC 13076 cultures and 10 cultures of *Bacillus cereus* isolated from food products. The control samples (10 % of oak bark and juniper berry extracts) did not inhibit the growth of bacteria mentioned above. The silver nanoparticles synthesized using plant extracts exhibited a broad antimicrobial spectrum against tested reference strains and cultures isolated from food products. Gram-positive bacteria were more sensitive to silver nanoparticles than gram-negative bacteria (maximum diameters of inhibition zones were 14.8±0.1 mm and 12.0±0.2 mm, respectively). Silver nanoparticles synthesized using juniper berry extracts showed a higher antimicrobial activity against the foodborne cultures *B. cereus* (diameter of inhibition zones ranged from 14.0±0.1 mm to 14.8±0.1 mm) than against the reference culture *B. cereus* ATCC 11778. Silver nanoparticles synthesized using oak bark extracts demonstrated approximately 1.5 times stronger inhibition to reference culture of *B. cereus* ATCC 11778 than against the cultures of *B. cereus* isolated from food products.

Keywords: silver nanoparticles, plant extracts, antimicrobial activity, pathogenic bacteria.