

DISINFECTANT PRE-DIPPING PREPARATIONS FOR DAIRY COWS WITH SILVER-COPPER NANOPARTICLES ADDITION*

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Udder inflammations are one of the most crucial issues in dairy herds. Pathogens involved in inflammation process in cows udder (mastitis) are often resistant for conventional antibiotics. Because of that, scientists are still looking for new solutions in mastitis treatment and prevention. Metal nanoparticles can be one of the most promising agents. Unique properties of nanoparticles and lack of possibility of occurring resistant strains are only some of their best advantages. Moreover, metal nanoparticles are already used in human or veterinary medicine.

The main goal of the experiment was preliminary *in vitro* evaluation of *Staphylococcus aureus* and *Escherichia coli* viability using pre-dipping mixture of commercially available cosmetic substrates and silver-copper (AgCu) nanoparticles addition.

Two experimental mixtures containing common cosmetic substrates and silver- copper nanoparticles addition were prepared. Glass flasks containing only nutrient broth medium (Biomaxima, Poland) for control group (C), experimental groups with 1 ppm nanoparticles addition (Ag, Cu, AgCu), and experimental groups containing mixture of cosmetic substrates and 1 ppm nanoparticles addition (D1, D2) were prepared. Two bacteria species: *S. aureus* and *E. coli* isolated from cow's milk were used in the experiment to estimate pathogens viability, according to control group. Flasks were incubated for 24 hours in 37°C and 5% CO₂. Each group for each pathogen was prepared in three repetitions. Bacteria viability was calculated using absorbance measurement (570 nm) in PrestoBlue test (ThermoFisher, Poland).

Obtained results revealed that viability of *S. aureus* in P1 and P2 was 90,64% and 91,41%. Results for *E. coli* group were P1=48,13% and P2=42,50%. Viability of bacteria cells in flasks with only nanoparticles addition were: 67,35%, 57,38%, 49,90%, respectively for Ag, Cu, AgCu.

Observed changes in *in vitro* experiment suggest that prepared pre-dipping mixtures could be used in mastitis pathogens prevention. However, nanoparticles influence on bacteria viability requires further analysis.

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