

Impact of silver nanoparticles synthesized by green method and microemulsion loaded with the nanoparticles on the development of cress

Natalia E. Sedyakina, Nataliya B. Feldman, Oksana I. Gudkova, Alexandr L. Rozofarov, Vladimir N. Kuryakov and Sergey V. Lutsenko

Mycosynthesis of silver nanoparticles

Biomass of crushed mycelium of the fungus *Inonotus obliquus* (0.5 g) was mixed with heated water (100 ml, 45 °C) and incubated for 1 h under magnetic stirring, followed by filtration through Whatman filter paper No 1. AgNO₃ was added to 50 ml of the extract with vigorous stirring to a final concentration of 2 mM and the solution was incubated at 20°C for 72 h in the dark under magnetic stirring. The reaction was monitored using spectrophotometry. Particle size and zeta potential of the particles were determined using a NANOTRAC WAVE II analyzer (Microtrac, USA).

Antibacterial and antifungal test

The antimicrobial and antifungal effects of the formulations were assessed using agar-well diffusion method. *Escherichia coli* ATCC 8739 (VKPM B-11419) and *Fusarium sporotrichioides* T11 VKPM F-902 from the collection of the First Sechenov Moscow State Medical University were used in this experiment. The susceptibilities of the test organisms to the undiluted as well as 2-, 4- and 8-fold diluted silver nanoparticles, unloaded microemulsion and the microemulsion loaded with silver nanoparticles were determined by measuring the diameter of inhibition zone. Agarised LB (Luria-Bertani) culture medium was used for the *E. coli* cultivation, and Saburo medium was used for the *F. sporotrichioides* one. A suspension of test cultures (0.1 ml) was established on LB and Saburo agar plates and evenly spread out on Petri dishes using a Drigalsky spatula to obtain the ‘lawn’ growth. Then, the seeding dishes were incubated for 2 h at 37°C for *E. coli* and for 1 h at 27°C for *F. sporotrichioides*. After the incubation, wells with a diameter of 8 mm were made in the nutrient medium and 250 µl test samples were introduced into them. Petri dishes with the test strain of *E. coli* were incubated for 24 h at 37°C. The dishes with a test strain of *F. sporotrichioides* were incubated for 72 h at 27°C. After incubation, the agar plates were examined for the presence of inhibition zones around the wells and the degree of sensitivity was evaluated. Each experiment was carried out three times. The values of the relative standard deviation did not exceed 10%.

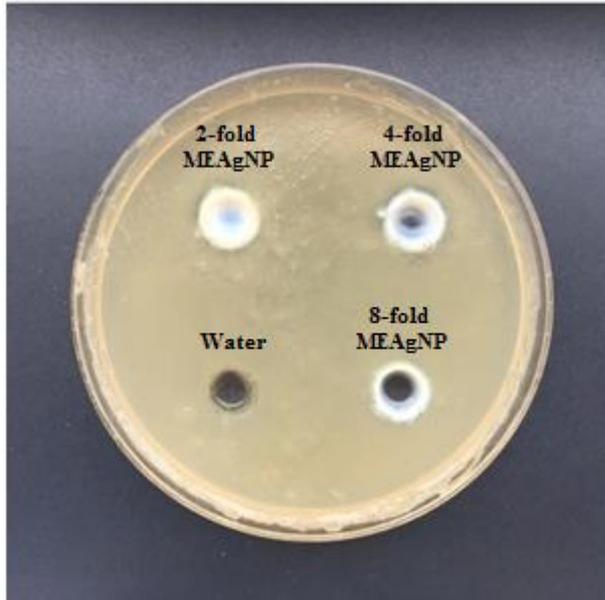


Figure S1 Antibacterial activity of undiluted AgNPs-loaded microemulsion and 2-, 4- and 8-fold dilutions of MEAgNPs against *E. coli* ATCC 8739.

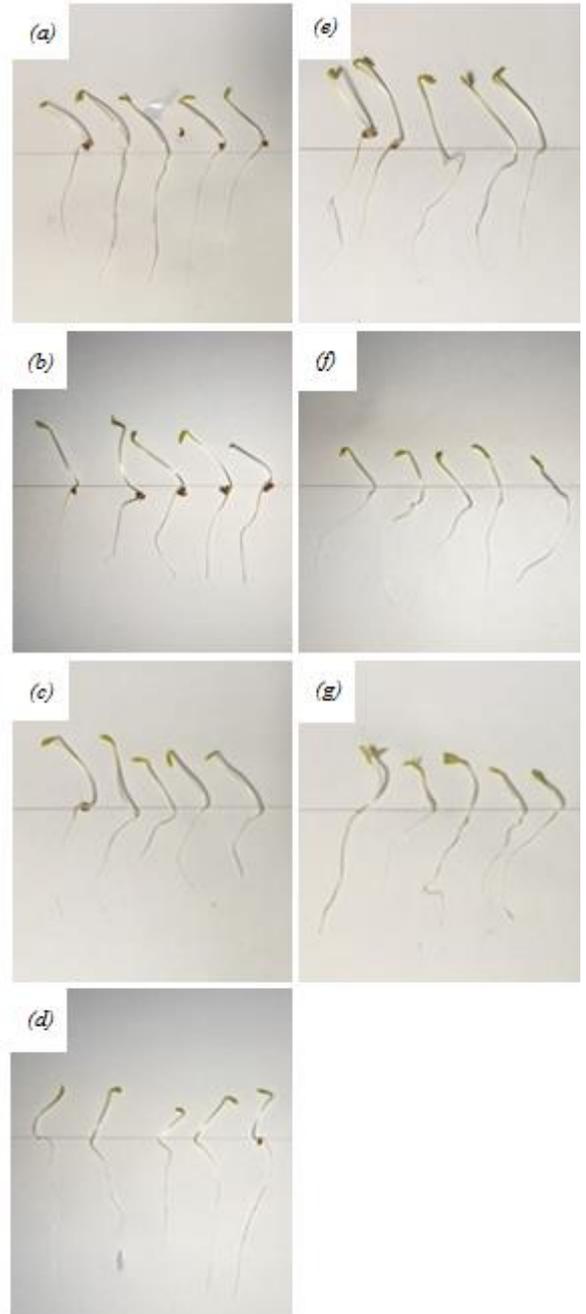


Figure S2 *Lepidium sativum* seedlings after 7 days of germination.