

# PROCEDURE FOR OBTAINING MATERIALS BASED ON SILVER NANOPARTICLES WITH ANTIBACTERIAL ACTIVITY

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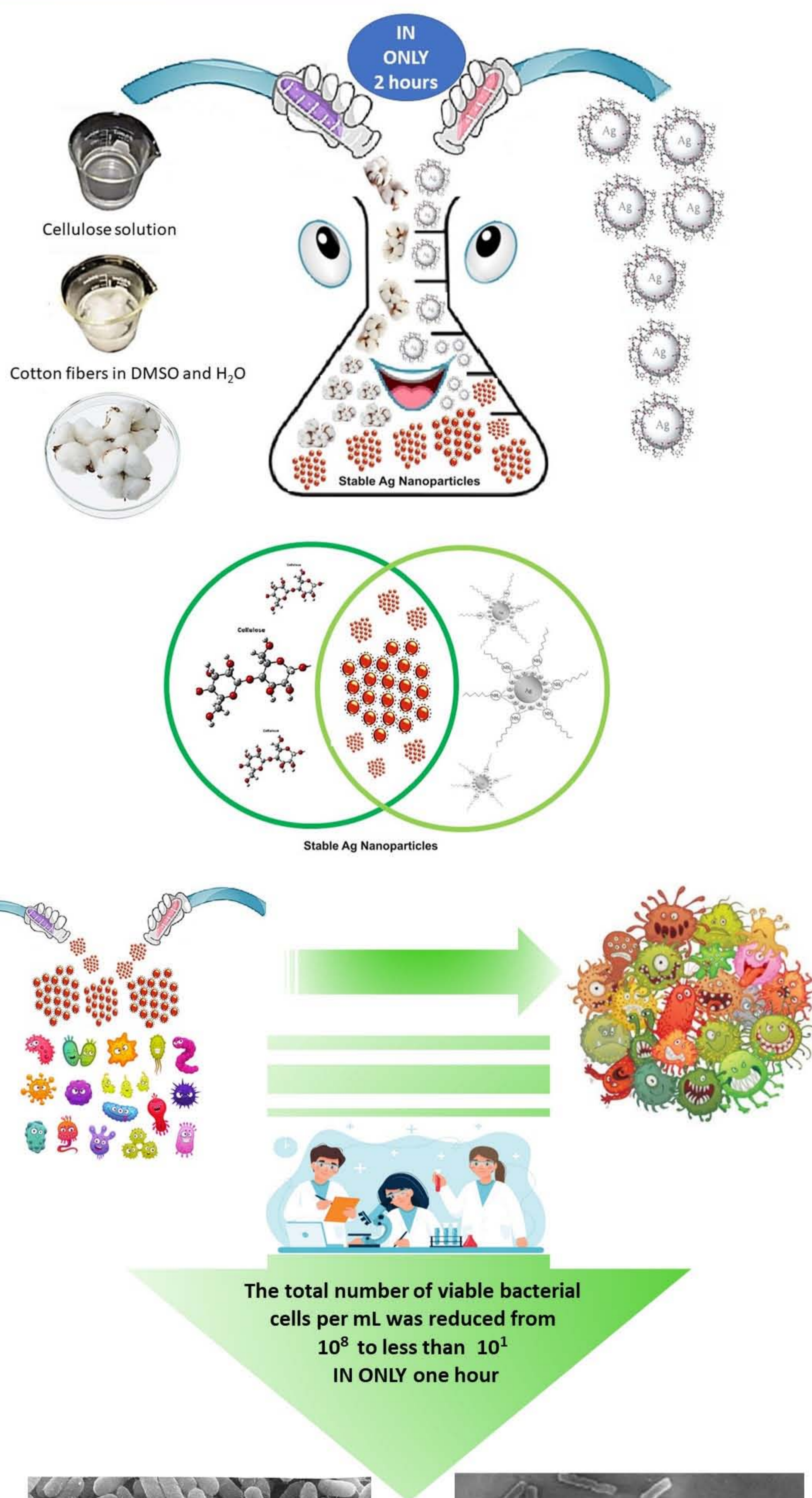
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The invention relates to nanotechnologies and medicine, in particular to the process of obtaining materials based on silver nanoparticles stabilized with cellulose derivatives and the evaluation of the antimicrobial potential against acid-alcohol-resistant bacteria, Gram positive (+), Gram negative (-) bacteria.

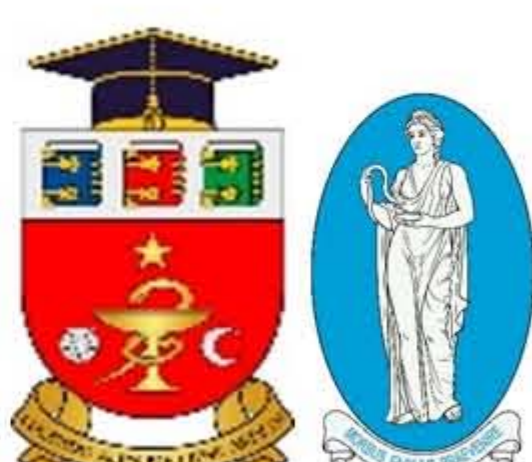
The essence of the invention. Process for obtaining materials based on silver nanoparticles with antibacterial activity against both acid-alcohol-resistant bacteria and Gram (+) and Gram (-) bacteria, which consists in mixing for two hours, a solution of cellulose derivative of 1% concentration with a 0.01M silver nitrate solution, using double-distilled water or dimethylsulfoxide as solvents for the preparation of the solutions, at room temperature.

The proposed protocol is a simple and inexpensive method for producing AgNPs that employs natural biopolymers (cellulose derivatives) avoiding the use of potentially harmful reducing agents, such as sodium borohydride ( $\text{NaBH}_4$ ) and hydroxylamine hydrochloride as well as a capping/surfactant agent, and may have benefits in both technology and medicine. The synthesized AgNPs using cellulose derivatives proved to have excellent antimicrobial activity.

The results suggest a fairly good activity against all tested bacteria.



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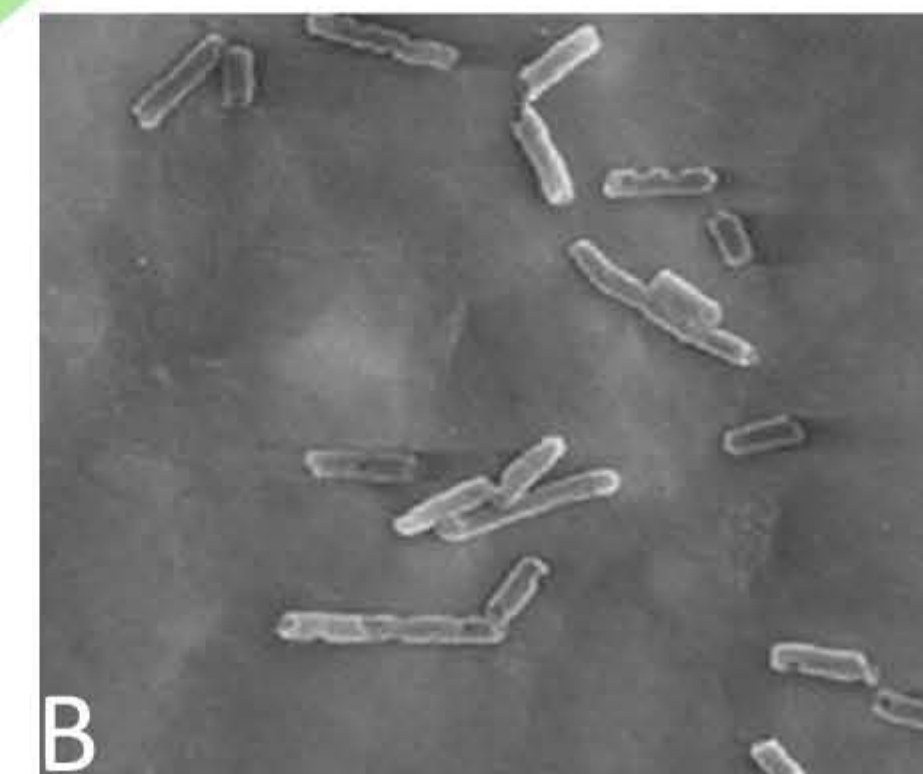
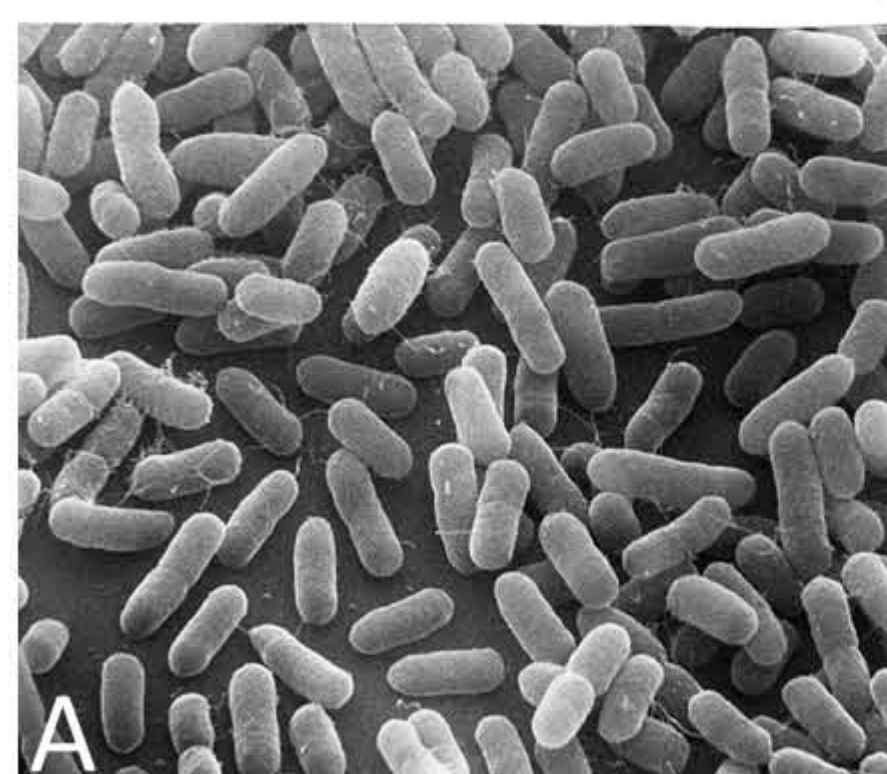


Figure 1. Visualization of the effects of AgNPs on *Escherichia coli* using advanced Scanning Electron Microscopy; (A) SEM micrographs of *E. coli* without treatment, cells are well-defined; and (B) *E. coli* after AgNPs treatment showing altered shape with membrane damage caused by AgNPs.