

S2-1.8

Improvement of the Antibacterial Activity of Benzylpenicillin in combination with Green Silver Nanoparticles against *Staphylococcus aureus*

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The antibiotic resistance crisis is one of the most pressing public health issues worldwide. Nanoparticles (NPs) can offer a promising solution, since they have antibacterial properties, and can act as carriers for antibiotics and natural antimicrobial compounds. The purpose of this work was to study the antibacterial activity of silver nanoparticles, which are obtained by “green synthesis” from *O. araratum* extract, against *S. aureus* bacteria, as well as to study their combined action with antibiotic benzylpenicillin. The results show that the antibacterial effect of silver nanoparticles is higher than that of nanoparticles stabilized by the extract on the growth of *S. aureus*. It has been shown that benzylpenicillin can interact with the allosteric site of penicillin-binding protein 2a. It has also been shown that “green” AgNPs, which include phytochemicals of the extract of *O. araratum* can enhance the antibacterial effect of benzylpenicillin synergistically.