

Antibacterial activity of silver nanoparticles with a compound from *Chromobacterium violaceum* against *Staphylococcus aureus*

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Abstract

Actually, there are many agents antimicrobials developed and in developing for inhibit resistant pathogens, sometimes these pathogens have become too resistant that many of the drugs usually used in treatment of clinical diseases no longer have work against them. One of major problems is the infection caused by *Staphylococcus aureus*, especially when is resistance to methicillin (MRSA). Nevertheless, the methods employed for making of compounds designed for this purpose have become very difficult and more complex due to use of chemical and physical procedures. In recent times, biosynthesis using microorganisms has been the best choose contributing with a reduced cost, non-toxic and even ecological. Silver nanoparticles were used in this study whereas their application as antimicrobial agent has yielded positive result as it inhibits the growth of bacteria. In view of this knowledge, this research was designed to explore the antibacterial potential associating silver nanoparticles and a purple compound extracted from *Chromobacterium violaceum* against *S. aureus* including MRSA strains. *S. aureus* ATCC 29213 and MRSA strain N315 were tested by determining the Minimum Inhibitory Concentration (MIC) for each compound, and then they were tested the association between them through a concentration gradient and noted the reduction of the MICs in the interaction. *S. aureus* strains showed sensitivity to violacein with MICs of 0.62 to 200 µM and the MIC for silver nanoparticles was 250 µM. The interaction of these compounds was observed with a decrease in MIC, characterized as aditism and synergism between them. The discovery and testing new antibiotics are important in the treatment and prevention of infections caused by multiresistant bacteria represents a new therapeutic approach.

Keywords: silver nanoparticle, violacein, *S. aureus*, synergism, antibacterial.