

**Title:** MORPHOLOGICAL ALTERATIONS CAUSED BY A STATIN IN COMBINATION WITH SILVER NANOPARTICLES IN Methicillin-resistant *Staphylococcus aureus* (MRSA).

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**Abstract:** Antimicrobials are drugs largely used in hospitals, favoring microbial resistance, aggravation patients' infection and increase healthcare costs. By this fact, there is a need for research of new treatment options. Statins are known for their antihyperlipidemic effects and some studies showed antibacterial activity. Silver nanoparticles (AgNP) are interesting as compared to silver ions due to their large size, which, in turn, improves the ability to react with multiple molecules. Previous studies showed that a statin and AgNP showed antibacterial effect against MRSA N315. In this study we evaluated the morphological alterations caused by combination of AgNP produced by *Fusarium oxysporum* with a statin against Methicillin-resistance *Staphylococcus aureus* (MRSA) N315 strain. Images of bacteria under treatment combinations with a statin and AgNP were obtained from Scanning Electron Microscopy (SEM). We observed cells morphology alterations on treatment with AgNP (125µM) after 3 h of incubation, with formation of prominence in the majority cells making them deformed and large amorphous mass on treatment with statin (500µg/mL). Combination statin with AgNP (125µg/mL and 62.5µM respectively) showed similar alterations of each compound at the same field. It is possible to identify the cell prominences and formation of an amorphous mass showing the interaction between both compounds. This study described for the first time the antibacterial effect of statin in combination with AgNP. Our results indicates that the combination as possible alternative for controlling bacterial infection whereas combination results in improved bactericidal effect than either drug used alone. In conclusion, our study showed antibacterial activity between statin and AgNP against MRSA N315. These results suggest the compounds combination is a possible treatment options to bacterial infection.

**Keywords:** Statin; metallic nanoparticles; synergism; antibacterial; multiresistant strains.

**Development agency:** CNPq BIOTEC 402728/2013-0 and CAPES.