TITLE: SUBINHIBITORY CONCENTRATION OF BIOGENIC SILVER NANOPARTICLES ON MOTILITY ACTIVITY IN *PSEUDOMONAS AERUGINOSA* CLINICAL ISOLATES

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ABSTRACT

The excessive use of antimicrobials has resulted in increasing bacterial resistance, especially of *Pseudomonas aeruginosa*, capable to express several virulence factors, representing a risk to the environment and health. Because of that, there has been an increase in research on metal nanoparticles for their potential antimicrobial activity. The aim of this study was to evaluate the inhibitory effect of biogenic- *Fusarium oxysporum* silver nanoparticles and the activity of subinhibitory concentrations on motilities in *P. aeruginosa* clinical isolates. Five isolated from cystic fibrosis patients (CF) and five isolated from non-cystic fibrosis (non-CF) were selected for analysis of swarming, swimming and twitching motilities with and without silver nanoparticles (Bio-AgNP). Inhibitory minimum bactericidal concentrations were determined by the broth microdilution method. For swarming and swimming motility the bacterial suspensions were inoculated on agar surface and the motility zone was measured after incubation at 30ºC /24h. For twitching motility, inoculation was performed to the bottom of the plate, with incubation at 37ºC/24h, followed by 2% violet crystal petri dish staining for 2h. All isolates were tested in triplicate on three different occasions. Results were analyzed by R Studio software using Student's t-test and p values <0.05 were considered statistically significant. For swarming, five (50.0%) *P. aeruginosa* non-CF isolates showed significant increase ($p<0.05$) in mean diameter after treatment with subinhibitory concentrations of Bio-AgNP. The mean swarming was 27.8 mm for isolates without treatment and 35.3 mm after Bio-AgNP. Swimming and twitching results also showed increased expression of this virulences factors after treatment in five isolates (50.0%, two CF isolates and three non-CF isolates). All isolates tested for twitching maintained categorization equal to the untreated group. The results showed that biogenic silver nanoparticles at subinhibitory concentrations increased the motility expression of many isolates, which may suggest a response to the unfavorable environment escape by the compound. Complementary research about the biogenic silver nanoparticles should be carried out, aiming at a better understanding of the action of this compound, as well as possible intrinsic factors such as size, shape and synthesis of nanoparticles that can interfere with its effectiveness.

Keywords: metal nanoparticles, *Pseudomonas* infections, subinhibitory concentration, virulence factors

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