

**TITLE:** ANTIMICROBIAL PROPERTIES OF BIOGENIC-SYNTHEZIZED SILVER NANOPARTICLES AGAINST UROPATHOGENIC *PROTEUS MIRABILIS* STRAINS.

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**ABSTRACT:**

Urinary tract infection (UTI) is among the most common infections in both community patients and inpatients in hospital units and is referred to as any inflammatory urothelial response resulting from bacterial invasion of the urinary tract. *Proteus mirabilis* isn't known as an infectious pathogen in healthy people, but its importance increases in cases of catheter associated urinary tract infection, getting a frequency up to 40% of cases. The emergence of resistant bacteria has been attributed to the overuse and misuse of antibiotics, as well as the lack of new drug development and is considered a clinical and public health problem. Monitoring antibiotic resistance pattern plays an important role in the procedure taken for treatment of infections, and it has been found a lack of sensibility of *P. mirabilis* to the most of clinical antibiotic used on UTI treatment. Silver nanoparticles (AgNPs) are the most studied among the metals nanoparticles because of their strong antimicrobial activity and relatively low toxicity for humans. Thus, AgNPs have been considered a powerful ally in combat against resistant bacteria. The aim of this study was the *in vitro* assessment of *P. mirabilis* susceptibility to AgNPs synthesized by *Fusarium oxysporum*. Seventeen samples isolated from patients with UTI at Hospital Universitario da Universidade Estadual de Londrina in 2009 and the standard sample ATCC 7002 were analyzed for assessment of their sensibility profile using disk-diffusion technique with 16 different antibiotics, and for AgNPs MIC determination by broth microdilution. ATCC 7002 was also tested for AgNPs Time-Kill curve, assessing 9 different times (0, 1, 2, 3, 4, 8, 10, 12, and 24 hours). All tests were done as recommended by the Clinical and Laboratory Standards Institute. Fifth five and 27.7% of the samples was resistant to Sulfamethoxazole + Trimethoprim combination and Cefalotin, respectively, both being among the most used antimicrobial agents in UTI situations. Beyond that, 38.9% were Nalidixic Acid (NA) resistant, which is in agreement with other studies, once NA was the first quinolone used against UTI, in 1962. The AgNPs MIC values found was between 125 and 250  $\mu\text{M}$ , and the Time-Kill curve showed that the bactericidal effect takes less than 1 hour to happen with 250  $\mu\text{M}$ . Therefore, we concluded that AgNPs biogenic-synthesized had a great performance against uropathogenic *P. mirabilis* and are a promising antimicrobial agent.

**Keywords:** *Proteus mirabilis*, urinary tract infection, silver nanoparticles.