

**TITLE:** ANTIBIOFILM ACTIVITY OF SILVER NANOPARTICLES ON ISOLATES OF *Aeromonas* spp.

**AUTHORS:** FREIRE, N.B.; PIRES, L.C.S.R.; OLIVEIRA, S.A.S.; OLIVEIRA, H.P.; COSTA, M.M.

**INSTITUTION:** UNIVERSIDADE FEDERAL DO VALE DO SÃO FRANCISCO, Campus Ciências Agrárias, PETROLINA, PE (RODOVIA BR 407, KM 12 LOTE 543 - PROJETO DE IRRIGAÇÃO NILO COELHO - S/N C1, CEP 56300-000, PETROLINA – PE, BRAZIL)

**ABSTRACT:**

In aquaculture, bacteria of the genus *Aeromonas* are opportunistic, being considered one of the main agents that cause considerable economic losses in the cultivation. The indiscriminate use of antimicrobials has provided a selection of multiresistant strains, a situation that can be aggravated by the formation of biofilms, in which the resistance of the microorganisms increases to unfavorable environmental conditions. In this way, silver nanoparticles (AgNPs) stand out as an innovative alternative, low-cost and efficient alternative against diseases caused by bacteria. In this context, the aim of this study was to evaluate the antimicrobial activity of AgNPs and the interference in the formation of the biofilm of *Aeromonas* spp. obtained from tilapia (*Oreochromis niloticus*) and pacamas (*Lophiosilurus alexandri*) with and without clinical symptoms, using silver nitrate (AgNO<sub>3</sub>) (biocide) as a control. The AgNPs were chemically synthesized using trisodium citrate as a reducing agent and characterized by ultraviolet-visible spectrophotometry (UV-Vis). The antimicrobial activity was performed against 43 isolates by broth microdilution method, obtaining the minimum bactericidal concentration (CBM). The interference of the biofilm in formation and in the consolidated was performed according to the protocol of staining with gentian violet in 28 strains carrying the *fla* gene, besides the characterization of this structure of resistance by scanning electron microscopy (MEV). In the CBM test, the AgNPs weren't able to inactivate the growth of the isolates, whereas the silver nitrate obtained efficiency in different concentrations. The AgNPs were effective in decreasing the formation of biofilm, where the isolates went from strong to weak biofilm forming agents, as well as acting on the consolidated biofilm in all tested isolates. In the MEV the added samples of the AgNPs solution presented a discrete cellular disaggregation. In general, new tests should be performed to improve the action of silver nanoparticles, combining them with other compounds so that, besides showing antibiofilm action, may present antimicrobial potential, since antimicrobial therapies for *Aeromonas* spp. are very limited.

**Keywords:** biofilm, *fla* gene, nanotechnology, silver nitrate

**Development Agency:** Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)