TITLE: SYNTHESIS, CHARACTERIZATION AND ANTIBIOFILM ACTIVITY OF BIOGENIC SILVER NANOPARTICLES AGAINST ENTEROAGGREGATIVE *Escherichia coli* AND CARBAPENEM-RESISTANT *Klebsiella pneumoniae*

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ABSTRACT:

Antimicrobial resistance in bacteria is serious public health problem that affects hospital settings, community and environment. Antimicrobial-resistant pathogenic bacteria challenge hospital infection control as they prolong hospitalization time, cause hospital outbreaks, raise economic costs for health care and, cause high mortality due to therapeutic failures. Research and development of alternative antimicrobial strategies are necessary, and nanotechnology is promising field for synthesizing these drugs. The objective of this study was to synthesize biogenic silver nanoparticles (bioAgNP) and to evaluate their antibiofilm activity against two highly biofilm-forming bacterial strains (carbapenemase-producing *Klebsiella pneumoniae* – KPC and Enteroaggregative *Escherichia coli* – EAEC O42). The bioAgNP were synthesized after ionic silver reduction by *Fusarium oxysporum*, diameter (118,57 nm) and zeta potential (-40.5 mV) were determined by Zetasizer, then they were tested against biofilm formation and pre-established biofilm. Bacteria were placed to form biofilm together different concentrations of bioAgNP, and adhered total bacterial biomass was quantified using crystal violet (570 nm) after 24 h treatment, and also metabolic activity of biofilm was evaluated by MTT. Established biofilm was treated with different concentrations of bioAgNP for 24 h, and metabolic activity of sessile cells was determined by MTT. BioAgNP (1,44 μM) inhibited EAEC O42 biofilm formation by reducing 63.79% of total microbial biomass and 27.05% of metabolic activity, compared to untreated control; but did not inhibit KPC biofilm formation. Silver nanoparticles had activity against established biofilm. Metabolic activity of EAEC sessile cells reduction ranged from 98.3%, 66,73% in response to bioAgNP (46.25 – 740 μM). For KPC, bioAgNP (11.56 – 740 μM) caused reduction in metabolic activity of sessile cells in range from 52.92 to 98.22%. Results showed that bioAgNP have antibiofilm action against EAEC e KPC and may be used for controlling of infections caused by such microorganisms.

Keywords: *Fusarium oxysporum*, biofilm, antibacterial resistance

Agency: Coordenação de Aperfeiçoamento de Pessoal de Nível Superior