

TITLE: *Helicobacter pylori*: ANTIBIOFILM ACTIVITY OF UNLOADED AND LOADED Ag (I) COORDINATION COMPOUNDS IN THE POLYMERIC NANOPARTICLE

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ABSTRACT

Biofilm formation is a sequential process including bacterial adhesion, cell proliferation, accumulation of extracellular matrix material and dispersion of cells. Biofilm formation is responsible to increase of the resistance to antibacterial agents. *Helicobacter pylori* biofilm is involved in the development of gastric disorders such as peptic ulcer, acute and chronic gastritis, mucosal lymphoid tissue and gastric adenocarcinomas. Approximately half of the world's population is infected with *H. pylori* affecting directly the quality of life. This work aimed to evaluate the antibacterial activity of unloaded and loaded Ag (I) coordination compounds [Ag(PCAPhTSC)₂]NO₃ in a polymeric nanoparticle (nanostructured drug delivery system) against *H. pylori*, based on the minimal inhibitory concentration (MIC) and inhibition of the mature biofilm of *H. pylori* ATCC 43504. The polymeric nanoparticle was prepared by nanoprecipitation, being composed for an aqueous phase of phosphate buffered pH 7.4, polycaprolactone as polymer and poloxamer 407 as surfactant. The MIC was determined by microdilution assay according to the protocol described by CLSI adapted for fastidious bacteria. Biofilm assay was performed with the addition of glass beads to the microplate followed by *H. pylori* suspension (1,2x10⁹ cells/mL) and incubated at 37°C for 3h under 10% CO₂ and humidity. After the pre-adhesion period, the inoculum was removed and 200 µL of the culture medium (Mueller-Hinton Broth supplemented with 50% bovine fetal serum) were added to each microplate well for 72h, with culture medium renewed after 24h and 48h. The unloaded and loaded compound was added after 72h. The microplates were re-incubated for 24h at 37°C under 10% CO₂ and humidity and XTT® reduction assay was performed. The unloaded compound showed MIC of 3.90 µg/mL and the loaded compound improved the antibacterial action with MIC value of 0.78 µg/mL. For biofilm, the unloaded (20xMIC) and loaded (60xMIC) compound presented both 15% cell viability. The unloaded and loaded compounds showed relevant antibacterial activity and the use of nanotechnology can be a promising antibacterial agent to control of *H. pylori*.

Keywords: Biofilm, *Helicobacter pylori*; silver coordination compounds; polymeric nanoparticle

Development Agency: We thank National Council for Scientific and Technological Development, Brazil (Process number: 134170/2018-0); This study was financed in part by the Coordenação de Aperfeiçoamento Pessoal de nível Superior- Brasil (CAPES) – Finance Code 001