Poster

Smart bactericides, design, synthesis and characterization.

Cortés Sánchez, María Dolores (*), Merkling, Patrick Jacques (*), y Zaderenko Partida, Ana Paula (*)

(*) Universidad Pablo de Olavide, Seville, Spain

Tutor académico: Merkling, Patrick Jacques

Keywords: nanoparticle, silver, Bactericide, tannic acid.

ABSTRACT

Preventing microbial resistance to antibiotics is one of the most important challenges of our times, because multiresistant microorganisms are increasingly being reported. An approach based on silver nanoparticles is promising, given that this type of particles has been proven to exhibit antimicrobial activity. In addition, green strategies would be desirable, in which harmful chemicals are replaced by natural products to generate nanoparticles. Specifically, tannic acid (a phenolic metabolite present in many plants) has been used in addition to silver, and Coppo E et al. (2014) report their antimicrobial effects against various types of bacteria, including Escherichia coli (bacteria used in the model). Several synthesis methods have been previously described in combination with characterization by Raman spectroscopy (Dadosh 2009; Cao et al. 2014). However, we have found out that it is essential that the tannic acid solution used in the synthesis is neutralized before adding it to the silver solution to obtain the desired nanoparticles in a green synthesis. We have characterized our nanoparticles by UV-Vis spectrophotometry, and measured their hydrodynamic size and electrostatic stability by dynamic light scattering, which revealed an average size of 10-12 nm and a Zeta potential below -30mV. We have measured the antimicrobial activity using the minimum inhibitory concentration method, which, according to our preliminary results, indicate that said nanoparticles have a high antibacterial power against *E.coli Dh5-α* at low concentrations of the order of (15-20) µg of nanoparticles/ml. Our goals are to further adjust the range of concentrations and determine what would be the optimum concentration to ensure permanent antibacterial activity. With all the aforementioned, it can be stated that this type of nanoparticles is a very interesting proposal for the challenge of microbial resistance to antibiotics.

REFERENCES

Coppo E, Marchese A (2014) Antibacterial activity of polyphenols. Curr Pharm Biotechnol 15:380–390

Dadosh T (2009) Synthesis of uniform silver nanoparticles with a controllable size. Mater Lett 63:2236–2238

Cao Y, Zheng R, Ji X, Liu H, Xie R, Yang W (2014) Syntheses and characterization of nearly monodispersed, size-tunable silver nanoparticles over a wide size range of 7–200 nm by tannic acid reduction. Langmuir 30:3876–3882