

Functionalized silver nanoparticles for antimicrobial and antifungal protection

Abstract

The purpose of the thesis consisted of functionalizing AgNPs for antimicrobial and antifungal protections applied on various natural stone structures. AgNPs synthesized through various synthesis routes were characterized and analyzed for their antibacterial and antifungal properties. Based on the results obtained, those AgNPs which exhibited specific properties for their attachment to natural stone substrates were selected. The protection steps of the natural stone substrates were carried out in the presence of multiple coupling agents with the aim of optimizing the type of coupling agent, depending on the substrate to which it was applied. The use of multiple concentrations of AgNPs aimed to optimize their function depending on the coupling agents and substrates to which they were applied. Analysis of antibiofilm activity on *B. subtilis* conducted on laboratory samples as well as outdoors for 3 months led to a decrease in biofilm adhesion in the presence of AgNPs, regardless of the concentrations of NPs used.