

FINAL MASTER PROJECT PROPOSAL



Title

Photodynamic therapy in the treatment of skin-associated infections

Supervisor(s)

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Summary of the project

The TFM Project aims to the production of metal nanoparticles for the treatment of resistant bacteria-associate skin infections. The master's thesis is focused on revitalizing the antibacterial portfolio to develop new effective antimicrobials. Increased antibiotic resistance and decreased antibiotic research and development are important drawbacks to face antibiotic resistant infections. Considering that the antibiotic resistant infections remain as a great challenge to modern medicine, there is an urgent need to develop new effective antimicrobials. Due to their large absorption cross section, metal nanoparticles can be used in photodynamic therapy as photosensitizers, in which light is externally applied to activate the metal nanoparticle to generate reactive oxygen species (ROS) thanks to the presence of tissue oxygen. Nanoparticles with the role of photosensitizers can address the well-known photobleaching effect of conventional organic photosensitizers. Then, herein, it is planned to use metal nanoparticles in the treatment of resistant bacteria-associate skin infections and compare their efficiency with conventional organic photosensitizers (Aminolevulinic acid (ALA), Methylen blue and Indocyanine green) used to fight against infection. The master's thesis is also aimed to encapsulate the common photosensitizers in polymeric nanoparticles in order to enhance the permeation through the skin (increasing the effectiveness of current treatments) and to protect the photosensitizer from degradation.