BACKGROUND

Consistent reports on bacteria resistance to most or even all available antibacterial drugs, are evidence that serious infections, readily treatable until recently, are becoming a major issue [1]. Moreover, increased tolerance of bacteria against antibiotic comes also from biofilms [1, 2]. An urgent need to fight biofilm formation exists and may be attained through the discovery of new active molecules and new pharmaceutical delivery systems [2, 3].


OBJECTIVES

With this work we intend to explore the potential of different antimicrobial compounds biosynthesized in our lab when incorporated into drug delivery systems, like solid lipid nanoparticles (SLN) and polymeric nanoparticles (PN), intended for the development of new approaches to fight bacterial biofilms.
PROJECT DESCRIPTION

To accomplish the MSc thesis aim several tasks will be performed:

1) Literature review

2) Biosynthesis, isolation and purification of novel antimicrobial compounds
   Yeast and bacteria will be used as producing microorganisms. Antimicrobial compounds production will be produced in larger scale and their purification will be performed (automated flash chromatography).

3) Incorporation of the antimicrobial compounds into polymeric nanoparticles
   Purified novel antimicrobial compounds will be incorporated into different solid lipid nanoparticles (SLN) or polymeric nanoparticles (PN) formulations.

4) Assessment of antimicrobial and antibiofilm activity
   Antimicrobial and antibiofilm activity will be evaluated under static and dynamic conditions though different methodologies. Biofilm staining, fluorescence and microscopy methods will be used.

5) Biocompatibility of the different nanoparticles systems
   Biocompatibility of the formulations will be evaluated towards Human cell lines.

6) Thesis writing

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