Università degli Studi di Napoli Federico II

PhD in Biotechnology - 36th cycle

Dr. Caterina D'Angelo

Biofilm of Polar marine bacteria as a biotechnological tool

Tutor(s): Ermenegilda Parrilli

Department: Department of Chemical Sciences - University of Naples "Federico II"

SSD: CHIM/11

Microbial biofilm is a significant health and economic problem in a wide range of environmental, industrial, and medical areas[1].
This complex structure protects from potential stressors, including the lack of water, high or low pH, or the presence of substances toxic to microorganisms such as antibiotics, antimicrobials or heavy metals. Thus in biofilm cells show much greater resistance to environmental challenges and biofilm microbial infections are difficult to eradicate[2].
Therefore, new biofilm control strategies are emerging that have as main objective the use of natural anti-biofilm compounds.
Polar marine bacteria, an untapped reservoir of biodiversity, can synthesize a broad range of bioactive compounds, including anti-biofilm molecules[3-4]. In this PhD project will explore the ability of Polar bacteria to produced anti-adhesive compound/s, molecules able to interfere with the attachment phase of biofilm on abiotic surfaces, to create new anti-biofilm coated material. In detail, the active molecules will be purified and characterized, then a suitable coating strategy will be developed based on the chemical nature of purified compounds.
Generally, biofilm research is more focused on the control of biofilm formation but in recent times, microbial biofilm has received increased attention in biotechnological applications[5-6].
Among other biofilm applications, bacterial biofilms have recently emerged as an interesting approach for the expression of recombinant proteins[7-8]. In this contest, this project aims to evaluate the recombinant protein production in Antarctic bacteria biofilms. In particular, a system to produce recombinant proteins in *Pseudoalteromonas haloplanktis* TAC125 biofilm will be set up, this bacterium is a non-conventional system for recombinant production of "difficult" proteins at low temperature[9].

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