



Post doc position in molecular microbiology- 2 years

Chassis strain engineering for heterologous production of cyclic lipopeptides (CLiPs)

A post-doctoral position is available from September 2023 in the Laboratory of Résistance Induite et Bioprotection des Plantes (RIBP) at the university of Reims Champagne Ardenne (<https://www.univ-reims.fr/ribp/resistance-induite-et-bio-protection-des-plantes-usc-inrae-1488/accueil-ribp/accueil.22581,37851.html>).

The selected candidates will work on the HeteroCLiPs project, a multidisciplinary innovative project contributing to plant health.

Project description

Grapevines play a crucial role in the world, and particularly in France, as they are the foundation of viticulture, a significant sector of agriculture with high economic importance (<http://www.oiv.int/>). Like other crops, grapevine suffers from the attack of a large range of pests and pathogens, which affect the plant health at every growth stage, leading to alarming consequence on yield and fruit quality. Among diseases affecting the grapevine, downy mildew and gray mold diseases, respectively caused by *Plasmopara viticola* and *Botrytis cinerea*, are the most damaging to viticulture worldwide. Control of grapevine diseases using classical pesticides raises serious concerns about food safety, environmental quality and pesticide resistance, which have dictated the need for alternative pest management techniques to answer a sustainable agriculture. Therefore, opportunities to reduce the crop losses and improving the productivity and yield using biological control agents and their metabolites are of great interest.

Cyclic lipopeptides (CLiPs) constitute a unique and major class of microbial amphiphilic secondary metabolites. Most of the structural and functional diversity relies on CLiPs produced by 3 main bacterial genera *Bacillus*, *Pseudomonas* and *Burkholderia*. CLiPs are nonribosomally synthesized by modular mega-enzymes so-called NonRibosomal Peptide Synthetases (NRPSs) that are encoded by large biosynthetic gene clusters (BGCs) spanning over dozens of kb in the genomes. They constitute a goldmine of active molecules with diverse applications, mainly as biocontrol agents. The CLiPs are generally poorly produced by native strains. Moreover, they may be co-produced as mixtures of 2 or 3 CLiPs structurally different. The aim of HETEROCLIPS is to unlock technological barriers to make possible the production of discrete CLiPs, with amounts and purity compatible with the needs to analyse their structure and to test their activities for applications in biocontrol. To reach this goal, a heterologous production strategy will be used to generate few generic chassis bacterial strains belonging to key genera, allowing the production of a broad range of structurally diverse CLiPs.

Requirements:

The applicant must have a Ph.D. degree in microbiology and a strong track record of accomplishment in the following fields: molecular microbiology and bioinformatic. Applicants with experience working with heterologous expression, bacterial transformation, mutant construction, cloning technology using Gibson assembly, TAR cloning, or Cas9-Assisted Targeting of CHromosome segments (CATCH) are highly encouraged to apply. We are looking for highly motivated and enthusiastic scientists. Excellent writing and communication skills are important. The ability to be a team player and interact with several research groups is a must. The qualified candidate will benefit from having access to bacterial collection of CLiPs, access to novel tools, working with a dynamic and multidisciplinary group in a highly collaborative and stimulating environment, and access to state-of-the-art laboratories.

How to Apply:

Interested applicants should submit a letter of interest, curriculum vitae, and three references letters to Prof. Essaid Ait Barka (ea.barka@univ-reims.fr) and Dr. Qassim ESMAEEL(qassim.esmaeel@univ-reims.fr).