Development of antimicrobial materials for the agriculture and agri-food sector

Record number : OPR-1217

Overview

RESEARCH DIRECTION

Ilaria Rubino, Professeure - Department of Chemical and Biotechnological Engineering

INFORMATION

ilaria.rubino@usherbrooke.ca

ADMINISTRATIVE UNIT(S)

Faculté de génie
Département de génie chimique et de génie biotechnologique

LEVEL(S)

3e cycle

LOCATION(S)

Campus de Sherbrooke

Project Description

THE PROJECT

Plant diseases can significantly affect crop yield, with severe repercussions on food security and the economy. Traditional pesticides and control methods pose risks of environmental contamination, effects on human health, effects on crop yield, and pathogens developing resistance. Biopesticides are promising alternatives; in particular, bacteriophages (phages, i.e. bacteria-infecting viruses) and antimicrobial peptides (AMPs) have potential as biocontrol agents. However, several technical challenges exist, namely to ensure stability and effectiveness of the developed products. Thus, this project aims to develop phage- and AMP-based sprayable formulations for the control of plant bacteria. This project will generate viable alternatives to traditional pesticides, with less impact on the environment and plant yield, as well as formulations applicable to biocontrol strategies in other fields.

ROLE OF THE STUDENT

During your program, you will:
- Develop formulations according to technical specifications
- Characterize the formulations and their performance
- Validate the formulations in a plant model
- Analyze and interpret the results
- Collaborate with research partners (Agriculture and Agri-Food Canada)
- Publish peer-reviewed articles and present at conferences
- Mentor undergraduate and MSc students

PROFILE OF THE CANDIDATE

- To be eligible for the position, candidates need to hold an MSc (or equivalent) degree in bioengineering, chemical engineering, material engineering or similar discipline by the start of the project.
- To succeed in this position, candidates will be motivated, proactive in learning new techniques, independent and curious, with a good capacity to collaborate with team members and adapt to an interdisciplinary and international environment.
- Experience in the following topics would be an additional asset, but not a requirement: formulations/encapsulation systems (development, characterization), biology (bacteria cultures, phages, AMPs, biological assays).

THE RESEARCH GROUP ENVIRONMENT
- The project will be conducted under the supervision of Dr. Ilaria Rubino (Department of Chemical and Biotechnological Engineering, Université de Sherbrooke), who specializes in antimicrobial materials, and the co-supervision of a researcher at Agriculture and Agri-Food Canada, who specializes in plant diseases and biopesticides.
- The project will be mainly carried out in the laboratory of Dr. Rubino as well as in the laboratories of the Department of Chemical and Biotechnological Engineering, located at the Faculty of Engineering of the Université de Sherbrooke. You will have access to all necessary equipment and a desk. Part of the project may be conducted at the collaborator's lab facilities at Agriculture and Agri-Food Canada.
- The work environment in Dr. Rubino's group aims to provide opportunities for consolidation of your research skills and training to become an independent researcher. The interpretations and ideas of all group members are taken into consideration and greatly encouraged. You will be invited to share your questions and results during weekly meetings.
- You will have the opportunity to interact with the technicians of the Department of Chemical and Biotechnological Engineering, as well as collaborators at Agriculture and Agri-Food Canada.
- You will plan your research work, ensuring a flexible work schedule; depending on administrative procedures, the project will start between August 2025 and January 2026.
- You will have access to teaching, research outreach and professional development opportunities.
- This position is funded; you will also be encouraged to apply for scholarships.

TO APPLY
Please email the following documents to Dr. Rubino (ilaria.rubino@usherbrooke.ca):
- CV
- Brief motivation letter
- Transcripts (undergraduate and MSc; unofficial transcripts accepted)
- MSc thesis (if available)

If you have any questions, do not hesitate to contact Dr. Rubino. We look forward to receiving your application and welcoming a talented PhD student in our dynamic and collaborative research group.

Discipline(s) by sector

Sciences naturelles et génie

Génie biomédical et génie biochimique, Génie chimique, Génie des matériaux et génie métallurgique

Funding offered

Yes

Partner(s)

Agriculture et Agroalimentaire Canada