Engineer Internship / Master 2

Characterisation of the antibacterial properties of bio-based materials

Organisation

Duration : 5/6 months from February/March 2025 (Remuneration according to current rates)
***Location* : Laboratoire Génie des Procédés pour la Bioraffinerie, les Matériaux Bio-sourcés et l'Impression Fonctionnelle (LGP2)** – Campus Universitaire de Grenoble

Context

The use of materials derived from plant biomass (cellulose, lignin) for high-value-added applications, such as biomedical or food packaging, is an important part of our laboratory's activities. Characterising the antibacterial properties of these materials is essential. Within our research unit, a class 2 (L2) microbiology laboratory is available and has already enabled us to set up protocols for characterising antibacterial properties in previous projects[1–3]. Current research projects also require antimicrobial characterisation. These include the Polka project, which aims to formulate antibacterial nanoparticles based on lignin, and the Napkins project, one of whose objectives is to formulate super-absorbent, bio-based polymers for use in menstrual protection.

In order to characterise these materials and understand their antibacterial activities, in particular that of lignin, the trainee will have to base him/herself on the protocols already established within LGP2 and will have to be a driving force in the development of techniques.

Objectives

The trainee will be responsible for the following tasks:

- Carrying out protocols for characterising antibacterial properties in L2 using existing methods (zone of inhibition, release, determination of M.I.C., etc.).

- Proposing new measurement protocols in line with a literature review and in discussion with the researchers involved in the projects concerned.

- Proposing and implementing management procedures for the L2 laboratory.

Desired profile

Master 2/ Final year of engineering school specialising in microbiology, biology and/or biochemistry. Previous experience in a class 2 laboratory would be appreciated. Good autonomy and organisational skills are required, as well as a keen interest in experimental and multidisciplinary research. A good level of written and spoken English is essential.

Contacts

This project will be supervised by:

- Bastien MICHEL (MCF): bastien.michel@grenoble-inp.fr

- Cécile SILLARD (Dr.): cecile.sillard@grenoble-inp.fr

Please send your CV and covering letter before 15 November 2024.

1. Michel, B. *et al.* Drug release and antimicrobial property of Cellulose Nanofibril/β-Cyclodextrin/Sulfadiazine films. *Cellulose* **30**, 4387–4400 (2023).
2. Durand, H. *et al.* Pure cellulose nanofibrils membranes loaded with ciprofloxacin for drug release and antibacterial activity. *Cellulose* **27**, 7037–7052 (2020).
3. Spieser, H. *et al.* Cellulose nanofibrils and silver nanowires active coatings for the development of antibacterial packaging surfaces. *Carbohydr. Polym.* **240**, 116305 (2020).