**Design of biobased polymers for development of sustainable biocontrol**

**IPREM University of Pau, France**

| Name of the hosting institution in France | CNRS University of Pau & Pays Adour |
| Name of the host laboratory / research team | IPREM Institute of research on Materials and Environment |
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**Internship offer**

| Topic of the internship (title) | Design of biobased polymers for development of sustainable biocontrol formulations |
| Proposed dates of the internship | Start 01/06/2022 | End 30/11/2022 |

**Scientific and academic objectives of the internship:**

**Context of the project**

More than 1 million tons of vines, shoots and vine roots are under-exploited or even destroyed each year in France. This vine grape biomass is now accumulating as a waste on the plots due to unrewarding management methods (grinding, composting, etc.). However, the vine represents a major interest for obtaining polyphenols, molecules with high added-value present in all parts of the vine. Academic investigations showed that certain vine polyphenols exhibit interesting antifungal properties in crop protection (biocontrol), but also beneficial properties for human health, already used in cosmetics and nutraceuticals.

The ERDG project funded by ADEME (French Environment and Energy Management Agency) benefits from the synergistic relationship within a project consortium structured around 4 industrial partners present on world markets and laboratories from the French National Center of Scientific Research (CNRS):

- An industrial partner is in charge of the extraction of polyphenols from the vine shoots, roots and vines supplied by another industrial partner.
- An industrial partner will transform the co-products of the extraction into biochar and will validate its agronomic performance.
- 4 laboratories of CNRS will perform the following tasks:
  - Purification of mixtures of biobased organic molecules extracted from vine roots (IC2MP laboratory)
  - Biocontrol tests on crops (EBI laboratory)
  - Synthesis of biopolymers (IPREM laboratory)
  - Formulation of biobased polyphenols (CRPP laboratory)
- 2 industrial partners will carry out tests of these molecules under controlled conditions on a larger scale and then in the field.

**Objective of the internship**

The objective of the internship will be to participate in the development of biosourced polymers essential to the formulation of polyphenols. The first step will be to synthesize monomers from an identified biomass. This first step requires skills in organic chemistry, purification and the use of analytical methods such as 1H and 13C NMR. The second step will consist in synthesizing copolymers in collaboration with the doctoral student involved in the collaborative project. Interactions will take place with the CRPP laboratory and the other academic and industrial partners of the project to assess the effectiveness of biosourced polymers as an ingredient in the formulation of polyphenols and the absence of toxicity.

**Industrial partner**

| Name | Belchim + Exinnov + Mercier + Florentaise |
| Role of the industrial partner in the internship project | Partner of a collaborative research. End-user to test formulation |

**Expected profile of applicant**

| Level of study | Master |
| Discipline | Organic chemistry and/or polymer chemistry |
| Prerequisite knowledge, qualities and skills | Master in organic chemistry or material science. Additional knowledge in polymer science would be welcome. |
| Other specific eligibility criteria | Master 1 or Master 2 |