IR/PostDoc Position

"STUDY OF BIOACTIVE PROPERTIES (MICROBIOME) BY METABOLOMIC & DNA NON-TARGET SCREENING OF THE THERMAL WATERS AND AROMATIC PLANTS OF THE POCTEFA TERRITORY ON THE SKIN"

1. CONTEXT – SCIENTIFC FRAMEWORK

This research study will be developed as part of the CARUSO project: "Cooperation and transfer to valorize the natural resources and thermal waters of the POCTEFA territory: development of cosmetic products to improve the microbiota of the skin". Faced with the challenge of promoting economic and social sustainability in rural areas through innovation, the CARUSO project aims to transfer the knowledge generated to local companies (SPAs and Cosmetic Companies), so that they can develop more innovative and sustainable Dermocosmetics that promote the revitalisation of the territory.

The POCTEFA "**CARUSO**" (ref. EFA085/01) which has recently been granted to UPPA (Pau) & UNIZAR (Zaragoza), aims at bringing Metabolome and Microbiome from bio-sourced and local thermal waters and natural product extracts in a new generation of more sustainable cosmetics. The covered territory comprises the bordering regions of Spain, France and Andorra. From these territories emanate numerous thermal springs with well-known therapeutic properties for the skin. However, the microbiota and metabolites present in these thermal waters, as well as their possible effects on skin health or dermal microbiota, are completely unknown. On the other hand, in the POCTEFA territory, some medicinal aromatic plants, such as rockrose, marigold, sage or lemon balm, are commonly used for the production of natural cosmetics due to their beneficial properties for the skin.

The combination of thermal waters with natural plant extracts can be an innovative strategy for the development of new sustainable and ecological cosmetics, with new therapeutic targets that improve the health of the skin and its dermal microbiota.

The results will be communicated in international open access scientific journals and at national and international congresses. The dissemination of the results will be carried out through social networks, radio or dissemination conferences, through informative articles, press releases, interviews or talks, organized as part of the communication and dissemination plan of the CARUSO project.

2. MISSION – MAIN ACTIVITIES & MISSIONS

Given the interest in the use of thermal waters and medicinal aromatic plant extracts for the generation of natural and innovative cosmetics, the general objective of this project is to evaluate the bioactive properties of several thermal waters and natural plant extracts from the POCTEFA territory, as well as the combination of both, on the health of the skin. The specific objectives are the following:

1. Characterize the microbiota and metabolites present in the thermal waters.
2. Evaluate the effects of thermal waters on skin health.
3. Study the effects of various aromatic/medicinal plants on skin health.
4. Determine the combinations of thermal waters with natural plant extracts that are most effective in improving skin health.

3. POSITION AND ASSIGNMENTS

The position has its focus on the characterization and the valorization of local resources. The successful candidate will contribute to the tasks and methodology proposed to meet the specific objectives are as follows:

Objective 1. Characterize the microbiota and metabolites present in thermal waters.
1.1. Collection of samples of thermal waters. *Methodology:* Water samples will be collected from 2 Spanish spas and 6 French spas, at 4 different points and at 4 different times of the year and in triplicate.
1.2. Characterization of the microbiota of thermal waters. *Methodology:* Metagenomic studies and bioinformatic analysis to determine the microbial diversity and composition.
1.3. Characterization of metabolites in thermal waters. *Methodology:* Non-Target Screening by UHPLC-timsTOF HRMS and ICPMultiQuadMSMS, Metabolomic, Lipidomic "in silico" Database, with the synergy between Machine Learning and Artificial Intelligence for big data analysis to determine the metabolites and elements fingerprint.

Objective 2. Study the extracts of various local aromatic/medicinal plants.
2.1. Collection of sample extracts. *Methodology:* Water samples will be collected from 2 Spanish spas and 6 French spas, at 4 different points and at 4 different times of the year and in triplicate.
2.2. Characterization of the active components relative to the effects of natural extracts from aromatic/medicinal plants on skin. Methodology: The biological effects of 8-10 natural extracts from 4 different plants (rockrose, lemon balm, marigold and sage) previously selected will be evaluated. The correlation between clinic study with a molecular identification of the involved key molecules with an adequate data mining will be made on cells mode in parallel than timsTOF-HRMS screening

Objective 3. Determine the combinations of thermal waters with natural plant extracts that are most effective in improving skin health.
3.1. Evaluation of the synergistic effects of natural extracts of aromatic/medicinal plants and thermal waters on the skin. Methodology: The 4 thermal waters and the 2 natural plant

extracts with the best bioactivity on the skin will be selected and each thermal water will be combined with 1 or 2 of the selected natural extracts to evaluate the synergistic effects. Thus, the 8 possible combinations will be tested in the same cellular models and with the same tests as described in task 2.2, a total of 63 tests per combination.

WORKING POSITION

The chosen candidate will be working with an inter-disciplinary supervisory team (IPREM-UPPA in collaboration with UNIZAR and French and Spanish Industrial Partners)

Hosting Laboratories:

IPREM, UMR CNRS 5254, Université de Pau et des Pays de l'Adour, Pau, Nouvelle-Aquitaine, France. IPREM is a joint Research Unit CNRS/UPPA (UMR 5254) in France. IPREM has an extensive and highly competitive research program that comprises the development of fundamental knowledge in physical- chemistry, analytical chemistry and synthesis of functional/bio-inspired materials, in relation to conversion and electrochemical/chemical storage of renewable energies. IPREM has also long experience in microbial ecology developing omics approaches characterizing microbial diversity in natural and experimental systems, particularly in aquatic areas.

CARUSO research project is locally led by Dr. Cristiana Cravo Laureau (UPPA) and Dr Hugues Preud'homme (CNRS) .

Localisation adresses:

IPREM – UMR 5254, 2 avenue du Président Angot 64053 Pau cedex, FRANCE

Starting period:

Spring / Fall 2024 (June to October 2024)

Duration of the contract:

18 months

Gross salary range:

2900-3150€/month

APPLICANT'S PROFILE

Priority will be given to candidates holding a PhD degree in Biology, BioChemistry or Analytical Chemistry as major. The candidate should be interested in the biomolecule's characterization, mass spectrometry, bioinformatic, statistics and DNA sequencing of natural products, microorganisms, cell extracts or waters.

Extensive experience in experimental research in molecular and biomolecular chemistry, structure-activity relationships, characterization of unknow metabolites is desirable.

The applicant must be proficient in spoken and written English. French knowledge would be desirable, but non-mandatory.

The ranking will also accord weight to the candidates' assessed competence in their ability to interact and communicate effectively in a multi-disciplinary and multi-national research environment.

APPLICATION – EVALUATION CRITERIA

Candidates will first be selected based on their application file (***Dead line 3rd May 2024***). Those selected after this first step, will then be interviewed, by visioconference (Teams; Zoom) by Dr C. Cravo-Laureau & Dr H. Preud'homme. Application files will be evaluated based on the following criteria:

- Appropriate education and work/research in related fields.
- English language proficiency
- Candidate's ability to present her/his work and results
- Candidate's motivation, knowledge, scientific maturity, and curiosity.
- Emphasis will also be placed on personal skills.
- Work experience in a laboratory – or likewise; previously achieved research work (reports, publications).

Selections will be made regardless of gender, nationality, religion, ethnicity, and cultural background.

Application will include: *(in a single pdf file)*

- CV
- Cover letter
- Master's degree grade transcripts and ranking
- 2 Reference letters
- Contact details of at least two people, from you work environment, who can be contacted for further reference

APPLY FOR THIS JOB

Send your application (CV, motivation letter, 2 reference together with copy of the candidate's PhD thesis diploma) with the title "CARUSO – Research Engineer application" to the following addresses: cristiana.cravo-laureau@univ-pau.fr ; hugues.preudhomme@univ-pau.fr