INFORMATION ABOUT THE COMPETITION

Position name: post-doc (assistant professor)

Field: Chemical sciences/Chemical Engineering

Discipline: chemical engineering, Environmental biotechnology

Reference no.: AD1/W3/01/2024

Place of work: Wrocław

Type of contract: Temporary

Working time: Full-time

Faculty/Unit/Organizational unit: Faculty of Chemistry/ Wroclaw University of Science and Technology W3/K24, Department of Chemical Process Engineering and Technology

Type of position: assistant professor

Research position profile: R2

Deadline for submitting applications to participate in the competition: by 15th January 2024, until 3.00 pm

Announcement expiration date: 15th January 2024, 3.00 pm

Deadline for the conclusion of the competition: *end of January* 2024

Planned date of employment: 1 st March 2024

Period of employment and remuneration: *c.a.* 2 years, **84 000,00 PLN** gross total/year

Position description:

Wroclaw University of Science and Technology is looking for a candidate for the position of POSTDOC - assistant professor in the project titled: *Mechanism of microbially-mediated transformation of nutrients from agri-food wastes via different scenarios of biofertilizer introduction into the soil system: soil colonization/plant infection*. UMO-2021/42/E/ST10/00379, SONATA BIS.

The project will be conducted by the Laboratory of (bio)process engineering and design team in the Faculty of Chemistry.

Aim of the project

The project aims to understand the nature of the interaction of all components of the modified soil system, which includes plant, soil, and its microbiota This mentioned modification will introduce into the soil, among other things, nutrients in the form of secondary raw materials from the agri-food industry. The research plan also provides the modification of soil microbiota with beneficial microorganisms with plant growth-stimulating properties or the natural ability to increase the absorption of nutrients from a form inaccessible to plants. The project distinguishes two scenarios for modifying the microbiota of the soil system through the ►**strategy of 'infection' of plants**, where the following methods have been distinguished: (i) microbiological seed treatment; (ii) dipping the roots of the cuttings in suspension; (iii) spraying the inflorescence with suspension and a ►**soil inoculation strategy**, where three forms of inoculum are distinguished: (i) suspension of microorganisms; (ii) a microbial lyophilisate; (iii) immobilized microorganisms.

Description of research

The research will focus on assessing the efficiency of the degradation process and bioconversion of waste biomass by soil systems, in which microbiota has been enriched with beneficial microorganisms. The proposed set of microorganisms, with which the soil system will be modified, includes bacteria and fungi with different properties and potential applications. Among them, we can distinguish bacteria/fungi which ►solubilize phosphorus, potassium, and zinc, ►oxidizing, ►hydrolytic and ►keratolytic microorganisms. The effectiveness of the bioconversion processes will be assessed mainly in terms of the ►solubilization of nutrients, ►the stability of microorganisms in the soil system, and ►the morphological properties of the obtained plants and their elemental composition. For this purpose, special bioreactors will be constructed, which will allow the monitoring of all elements of the soil system, mainly ►the growth rate of microorganisms and ►the solubilization of nutrients in real-time. In addition, the planned scope of the research includes ►analysis of the surface of waste streams before and after the solubilization process, ►identification of enzymes, metabolites, and chemicals produced/released into the environment by plant roots and microorganism cells. The main research objective of this project will be to understand the impact of the method used to introduce the microorganism into the plant growth environment (soil system) or the plant itself on the previously mentioned parameters, which is a proposal that has not been studied so far. Ultimately, based on the operational parameters of the tested soil systems obtained in laboratory conditions, the ones with the highest efficiency will be selected and subjected to pot and field tests. In all research on the soil system, the parameters of the obtained model plants will be taken into account, e.g., ►the effectiveness of 'infecting' plants with beneficial microorganisms, but also parameters such as ►the volume of the root ball, ►the mass of the green-part and ►the chlorophyll content. In addition, ►the elemental composition of plant biomass will also be assessed for possible biofortification with nutrients (e.g., Zn). There will be a strong emphasis on safety given the potential presence of undesirable substances introduced into the soil via secondary raw materials.

Reasons for taking up this research topic

The existing homeostatic mechanism, antagonistic interactions between individual species in the soil environment, creates a serious risk of an unsatisfactory level of adaptation of the desired microorganism or a consortium of microorganisms in the soil environment. Being aware of the importance and role played by microorganisms in the soil system, it is necessary to search for new effective ways of introducing beneficial strains into the soil environment, assessing their effectiveness in the context of stabilization, and above all, usefulness in the process of waste bioconversion and nutrient release.

The most important effects expected

The expected effect of this project is the understanding of the nature of the relationship between the various elements of the soil system, which will allow refining the strategy of the effective introduction of microorganisms, new species/strains, into the soil system, adapted to a specific source of plant nutrients. As a result, it is expected to obtain a set of microorganisms forming a stable consortium that, effectively introduced into the soil system, will effectively release nutrients from the agri-food waste matrix, covering the demand for all necessary plant nutrients while using secondary raw materials as part of a circular economy strategy and the circulation of nutrients.

Responsibilities:

The person employed in this position will be responsible for:

~LABORATORY WORK ~

► obtaining infected seeds/plants within scenario I and evaluation of plant infestation strategy;

► obtaining infected substrate/soil for plant growth within scenario II and evaluation of soil inoculation strategy;

► selection of soil microorganisms that control the availability of nutrients/active compounds (bacteria/fungi which solubilize phosphorus, potassium, and zinc, oxidizing microorganisms, hydrolytic and

keratolytic);

► characteristics of the growth of microorganisms under modified growth conditions (introduced secondary raw materials as a source of nutrients);

► assessment of the degree of solubilization / microbiological activation;

► assessment of performance in germination and pot tests;

► researching the identification of microorganisms by PCR;

► assistance in conducting research/experimental works;

► preparation of reagents and materials for field and pot tests;

► sampling in glass-house trials and field research;

~ DESK WORK ~

► writing publications and studies;

► literature studies;

~ TECHNICAL WORK ~

► the preparation of research positions, technical support of research work,

ordering/preparation of chemical reagents;

► keeping records of used reagents following current regulations;

► storing current safety data sheets of used chemical reagents;

► waste management;

Requirements:

The candidate for this position should have strong analytical/microbiological skills and a keen interest in the interpretation of complex data.

What is more, a person employed in this position should have the following competencies:

► fluent English writing and speaking abilities, enabling reading/writing instructions/publications and communication with international partners;

► Ph.D. degree, biotechnology, environmental microbiology, or related studies;

► experience in an international environment (for example, Erasmus program);

► at least eight publications published in journals from the Philadelphia list

► Hirsh factor> 5

<u>Specific Requirements</u>

► willing to publish obtained results;

► focus on the effect;

► experience working in sterile conditions with microorganisms;
► documented experience of working in a microbiology laboratory
► knowledge of microbiological processes;
► knowledge of instrumental and classical analytical techniques;
► familiarity with simple analytical equipment (pH meters, conductivity meters, scales, spectrophotometers) - ability to calibrate laboratory equipment;
► familiar with analytical technique ICP, and identification of microorganism by PCR;
► knowledge of MS Office package;
► hands-on experience with Statistica or equivalent would be appreciated;

We offer:

- *stable employment at the prestigious University,*
- *possibilities of career development,*
- *work in the creative team.*

Development prospects:

- *Scientific development – University offers its employees the possibility to participate in various scientific projects and activities to improve their skills and gain experience in their chosen fields, including cooperation with other research centres and business partners.*

- *Education – Wrocław University of Science and Technology offers the employees possibility to teach students and participate in dedicated training programmes.*
- *International cooperation – Wrocław University of Science and Technology participates in a number of programs focused on the international exchange of the Staff.*

Required documents:

1. Application for entering the competition addressed to the Rector
2. Short biography
3. Questionnaire for the person applying for employment
4. A copy of the document confirming obtaining the academic degree or a copy of the diploma of graduation
5. Self-report containing information about achievements in the field of research activity, teaching experience and organizational activity
6. List of publications
7. List and description of scientific internships
8. Statement on having read the information regarding the processing of personal data
9. Statement on meeting the requirements set out in Art. 113 of the Act of July 20, 2018. Law on higher education and science
10. Declaration of the candidate that in the case of winning the competition, Wrocław University of Science and Technology will be the primary place of employment*

*If a competition is won by a person who is employed under an employment relationship with another employer conducting the following activities: research, research and teaching, research and development, implementation (except for cases specified in Article 125(3) of the Act), and the employment is not expired by the date of employment at the Wrocław University of Science and Technology as the primary place of work, this person, in accordance with art. 125 sec. 1 of the Act, taking into account art. 125 sec. 2 of the Act, is obliged to obtain the Rector's consent for additional employment under an employment relationship with another employer after employing at Wrocław University of Science and Technology. If the competition is won by a person who conducts business activity, the requirement of art. 125 sec. 7 of the Act should be met.

Application documents in Polish or English should be sent:
- by traditional mail to the correspondence address Politechnika Wrocławska, Wydział Chemiczny, ul. C.K. Norwida 4/6, 50-373, Wrocław, sekretariat p. 131 or
- by e-mail to the following e-mail address agnieszka.saeid@pwr.edu.pl by 15.01.2024, **until** 3.00 pm

In the title of the message, please indicate the reference number: AD1/W3/01/2024.

Applications of persons sending their documents without indicating a specific reference number and sent after the deadline for submission will not be considered.
All information on the course of the competition is provided by the e-mail address agnieszka.saeid@pwr.edu.pl.
The date of receipt of the documents is decisive. The date of receipt of application documents is considered to be 3.00 pm on the day indicated in the information about the competition. Receipt of the documents from the candidate will be confirmed by the assistant/HR assistant via e-mail to the address indicated in the application.

Candidates' applications will be evaluated by the Competition Committee. After the competition procedure is closed, the applications of persons who have not been accepted for work will be returned, provided that they were sent by traditional mail. People interested in having their documents back will be able to pick them up within 6 months after the competition procedure is closed, against acknowledgment of receipt.

LINK ENG:
https://pwr.edu.pl/fcp/gGBUKOQtTKlQhbx08SlkTUhZeUTgtCgg9ACFDC0RBSnVBG1gnBVcoFW8SETZKHg/1/public/2023/docs/zw_3_2023_zw18_-z1_eng.pdf

The University stipulates that the competition may not be concluded.

Public documents:
The consolidated text of the Regulations for conducting open competitions for the position of an academic teacher and other necessary documents can be found here:
LINK PL, EN: https://wch.pwr.edu.pl/pracownicy/konkursy

Recruitments and competitions conducted by Wrocław University of Science and Technology are open, carried out in accordance with clear and transparent rules based on clear and unambiguous criteria of substantive evaluation, taking into account a diverse professional career. Wrocław University of Science and Technology conducts recruitment procedures in accordance with the guidelines of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers and the Open, Transparent and Merit-based Recruitment Policy (OTM-R) at Wrocław University of Science and Technology.

Recruitments and competitions conducted by Wrocław University of Technology and Science are conducted taking into account the policy of equal opportunities in accordance with the “Equality plan for Wrocław University of Science and Technology for the period 2022–2024”
LINK PL: https://rowna.pwr.edu.pl/aktualnosci/plan-rownosci-dla-pwr-11.html
LINK EN: https://rowna.pwr.edu.pl/en/