

PHD STUDENTS - YOUNG TALENTS WHO CONTRIBUTE TO SPIN-FERT PROJECT.

Currently, two PhD students are involved in the research activities, which have been carried out in the frame of WP2 of the SPIN-FERT project: MSc. Robert Guiu Sans - employed by Eurecat, Tarragona, Spain and MSc. Tugberk Tabak from the University of Twente, located in Enschede, Netherlands.

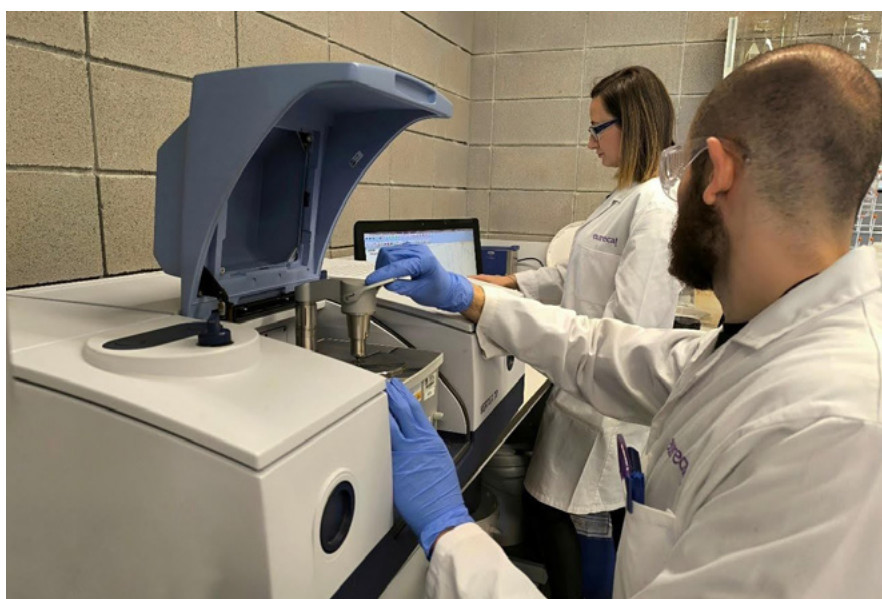


Photo: MSc. Robert Guiu Sans and Dr. Magdalena Olkiewicz,
Facility of Eurecat located in Tarragona, Spain

Robert Guiu Sans is a Spanish researcher who, since October 2024, is employed by the Chemical Technology Unit of Eurecat in Tarragona, Spain, as a Vincente Lopez fellow. Robert received a Bachelor's degree in Chemistry (2023) and a Master's degree in Synthesis, Catalysis and Molecular Design (2024) at the Rovira i Virgili University located in Tarragona. Twice, in 2023 and 2024, he was awarded by the Nicolaus Copernicus University in Torun, Poland, with prestigious grants to participate in an international four-week summer school programme, organised at Ludwik Rydygier Collegium Medicum in Bydgoszcz and the Department of Chemistry in Toruń, Poland, respectively. Since 07/10/2024 he is enrolled in a PhD programme in Nanoscience, Materials and Chemical Engineering at the Rovira i Virgili University, where under co-supervision of Dr. Magdalena Olkiewicz (Eurecat, Spain), Dr. Ricard Garcia Valls (Rovira i Virgili University, Spain) and Dr. Joseph J. Richardson (Royal Melbourne Institute of Technology University, Australia), he investigates novel technologies for microbiots delivery for Spin-Fert project. In particular, his studies are focused on design, fabrication and characterisation of aqueous, gel and granular formulations, as it is shown in Figure 1.

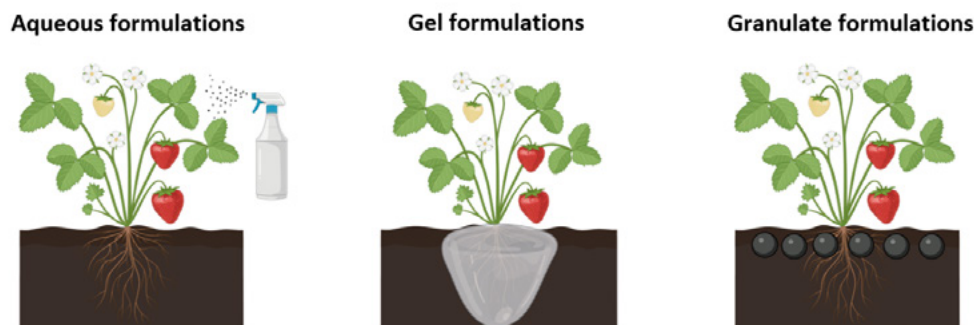


Figure 1. Formulation types which have been developed in the Spin-Fert project.

Aqueous formulations are based on artificial humic acids developed in the project by Hymify (Germany) and microorganisms developed/multiplied by the following project partners: Intermag (Poland), Inhort (Poland), Graz University of Technology (Austria), and NIAB (UK). This formulation has been tested in foliar and soil applications, while the gel formulation and granulates will be tested only in soil applications. The gels are based on biodegradable polymers and encapsulated microorganisms developed by the research team from the University of Twente, while the granules contain biochar obtained from Caviro, humic acids from Humify and microorganisms provided by previously mentioned project partners. All developed formulations will be tested in greenhouses and in fields by Spin-fert partners in Italy, Poland and France.

Tugberk Tabak joined the Sustainable Polymer Chemistry group at the University of Twente in February 2025. He earned his Bachelor's and Master's degrees in Chemistry from Istanbul Technical University. He is currently pursuing his PhD under the joint supervision of Prof. Dr. Frederik R. Wurm and Asst. Prof. Hubert Gojzewski. His doctoral research focused on the development of layer-by-layer encapsulation strategies for microorganisms within the framework of the Spin-Fert project.

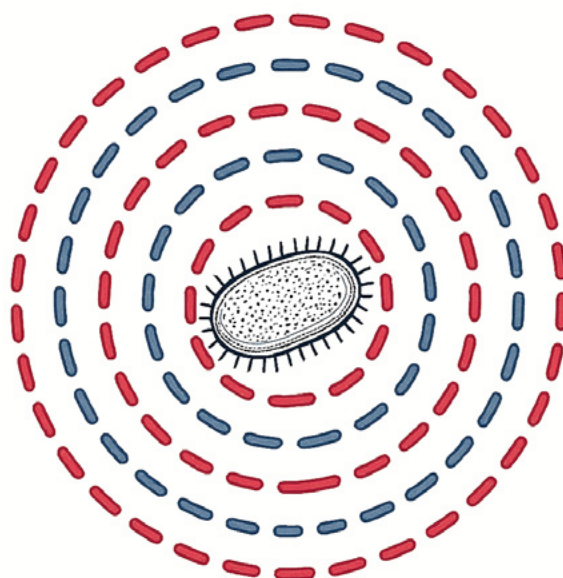


Figure 2. : Illustration of a microorganism surrounded by protective layers formed through the layer-by-layer encapsulation

Layer-by-layer encapsulation is covering the microorganisms with multiple thin layers of bio-based materials such as Lignin and Humic Acid. Each layer sticks to the one before it, forming a protective shell around the microorganism. This multiple-layered coating protects the microorganisms from harsh conditions. This process can also be described as giving high-tech armour to microorganisms to do their job better. These encapsulated microorganisms will be incorporated into various formulations developed by EURECAT. The formulations will be tested on plants to evaluate their impact on soil health and overall plant performance.

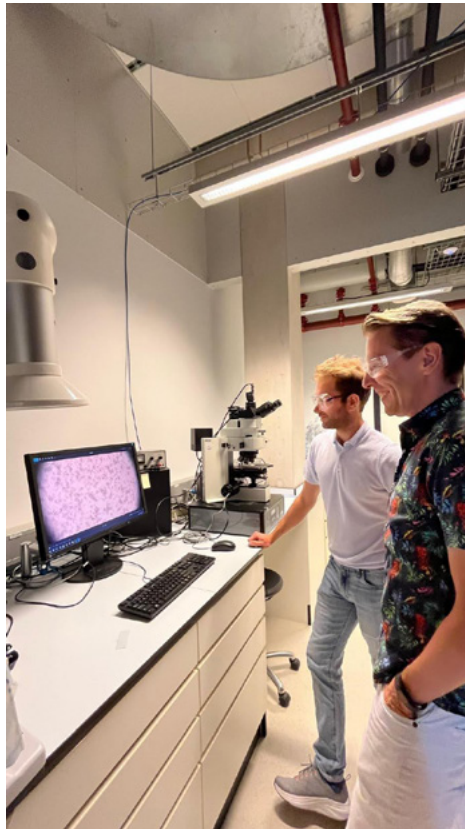


Foto: Tugberg Tabak (left) and Frederik Wurm (right) assessing an emulsion formulation of lignin micro-particles.