

TITLE: BIO-NANOPARTICLES LOADED WITH BACTERIAL ELICITORS TO IMPROVE PLANT ADAPTATION TO WATER LIMITING CONDITIONS (DROUGHT AND SALINITY).

ACRONYM: BIONANO

Start date: July 1st, 2023.

End date: June 30th, 2025.

CANDIDATE: Dr. Svitlana Arslan

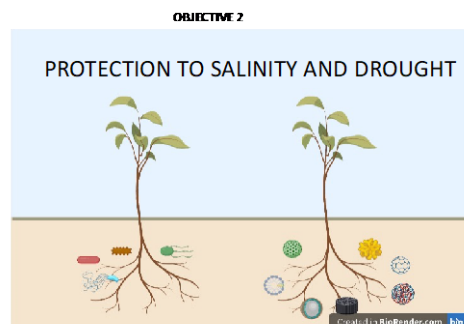
Summary of the project

The aim of the present project is **to demonstrate if biosynthesized NPs based on Plant Growth Promoting Bacteria (PGPB) able to trigger plant mechanisms for adaptation to abiotic stress are more efficient than the bacteria itself**. This will represent a **great advance** for science as synergistic effects between the nanoparticles and the bacteria, beyond the benefits of each individual element, are expected. Furthermore, if successful, **the main deliverable of this project will be a safe and effective method to increase yields in agriculture under harsh conditions**; and it will contribute to **lower chemical inputs and water use** under non-stressing conditions.

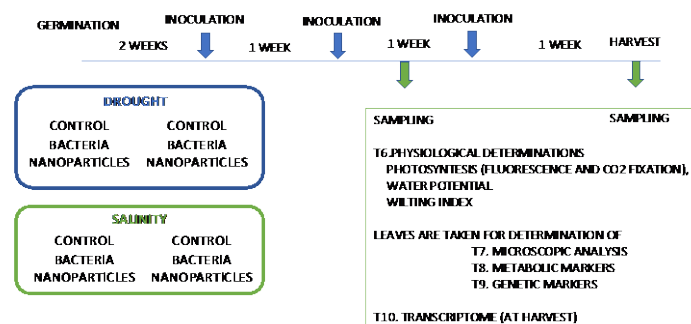
To test our hypothesis, the proposal presents **two specific objectives**.

Objective 1. Development of bio-nanoparticles. Three different strains with a validated effect to trigger plant adaptation to water stress will be used. Several conditions that may affect NP synthesis (pH, temperature, length of bacterial incubation, silver concentration) will be tested, NPs characterized (TEM, SEM, FTIR etc.), to define the best conditions to obtain NPs. In order to test their potential efficiency in biological system, the antimicrobial potential will be evaluated, as well as effects on seed germination and in vitro plant growth.

Objective 2. Evaluation of nanoparticles potential to stimulate plant adaptation to drought and salinity as compared to the traditional way to deliver PGPB to plants.



T5. EXPERIMENTAL SET UP



Public engagement activities

Outreach activities:

- European Researcher's night 2024: Nanoparticles: green synthesis or bacterial synthesis?

Communication activities:

University website News:

- ["Ukrainian talent in our laboratories"](#)

Other activities

Supervision of students:

Maria Carrera Calbacho, Degree in Pharmacy. Final Degree Project "Green synthesis of Nanoparticles based on bacterial metabolites from *Pseudomonas* strain Z9.3 and evaluation of the antimicrobial potential".