Analysis of plant growth promotion and induction of stress resistance bacterial inoculants for olive crops

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Some plant-associated bacteria are able to promote plant growth (PGP) through different mechanisms (nutrient supply, synthesis of phytohormones and induction of resistance to biotic and abiotic stress). The development of bacterial bioinoculants can increase the efficiency and productivity of crops (Dias *et al*., 2022), reducing the costs and the environmental impact compared to chemical fertilizers. These bioinoculants can also increase the resilience of crops to stress, being specially interesting for olive crops, due to its relevance in the countries of the Mediterranean basin and the hrydric stress they are exposed.

With this objective, a collection of 75 isolates was evaluated, including isolates of rhizosphere and endosphere of olive leaves, as well as endophytic strains from other plants with potential PGP available in our laboratory. There ability to mobilize nutrients and produce phytohormones, their resistance to abiotic stresses (temperature, salinity and water stress) and there ability to inhibit phytopathogenic fungi was analysed. Based on these data, it selected the best 24 bacterial strains were selected for further analyses, which were identified at the species level based on the sequence of its 16S RNA ribosomal gene.

In parallel, an analysis of the bacterial populations of 1104 rhizospheres of diferent crops, (155 belonging to olive trees) was performed. Taxa with an abundance significantly higher in this crop than in the rest were identified. Considering the taxa significantly associated with olive cultivation and the strains with the greatest potential to induce stress resistance, 10 strains were selected to be tested on olive seedlings under greenhouse conditions, showing that several strains were capable of significantly improve the development of this plant.

Future analyzes will include the development of microbial consortia and the analysis of their capacity to induce the resistance of the olive tree to biotic and abiotic stresses.

References: Dias, Mª.C., Araújo, M., Silva, S. & Santos, C. (2022). Sustainable Olive Culture under Climate Change: The Potencial of Biostimulants. *Horticulturae* 8, 1048. https://doi.org/10.3390/horticulturae8111048

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