



RESEARCH GROUP

Knowledge Area

- Bacteriology
- Biological control
- Biotechnology
- Microbiology
- Molecular Biology of microorganisms

Collaborations

- Cooperation research projects
- On demand research projects
- Technological assistance
- Technical consulting

Technology available for licensing

Plant-associated bacteria

Biological control and bioremediation



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Plant Bacteriology Team: biotechnological applications, BACPLANT

Plant bacteriology deals with plant-bacteria interactions that may be beneficial or harmful. In the latter, diagnosis, characterization and the study of pathogen biology can contribute to the development of measures to prevent and/or control plant bacteriosis.

The research activity of the **R+D Team BACPLANT** focuses on the study of **plant-associated bacteria and their biotechnological applications**. The team is led by Dr. Elena González Biosca and belong to the Microbiology and Ecology Dpt. of the Faculty of Biological Sciences at the University of Valencia.



Research lines

- **Characterization and diagnosis, and conventional and molecular identification of plant pathogenic bacteria***: molecular characterization and epidemiology.
- **Survival strategies of plant pathogenic bacteria in different environments***: survival under oligotrophic conditions, viable but not culturable (VBNC) state and inducing factors, reservoirs and transmission ways. Recovery of bacteria from the VBNC state. Gene expression and obtaining of bacterial mutants of interest.
- **Biotechnological applications of environmental microorganisms***: isolation and characterization of microorganisms of biotechnological interest: producers of antimicrobial compounds, siderophores or other molecules, degraders and bacteriophages. Biological control of plant bacteriosis.
- **Lichen bacteriology and biotechnological applications**: isolation and characterization of lichen-associated bacteria: diversity, contribution to the lichen symbiosis and biotechnological applications.

* *Laboratory authorized to work with quarantine plant pathogenic bacteria (biosafety level 2).*

Application fields: most of them related to biotechnology, mainly in the following sectors: agriculture, agrifood, health, pharmacy and medicine, and industrial technology (cosmetics, textil, chemicals ...).

Services to companies and other entities

Technical advice and counselling

- Diagnosis and molecular detection of plant pathogenic bacteria (PCR, pathogenicity assays in plant material).
- Procedures for handling plant pathogenic bacteria in conditions of biological containment level 2.
- Survival strategies of plant pathogenic bacteria in natural environments (morphological changes and other adaptations, VBNC state).
- Control of plant bacteriosis by biocontrol agents (antagonistic bacteria, bacteriophages).
- Improvement of bacteria recovery from different environmental samples (VBNC cells, lichen extracts).
- Biotechnological characterization of new environmental microorganisms and their potential applications in industrial sectors.
- Identification of new bacterial species.

Products:

- Obtaining of lichen extracts and their use to improve the recovery of lichen-associated microorganisms (patent application P2014311971).
- Procedure for the prevention and/or biological control of bacterial wilt caused by *Ralstonia solanacearum* by the use of bacteriophages and their compositions (patent application P201530730).



OTRI oficina de transferència de resultats d'investigació

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Documento NO Confidencial

Singular resources

- Laboratory authorized to work with quarantine plant pathogenic bacteria under biosafety level 2, with biological safety cabinet type II for handling these bacteria and plant growth chamber for conducting plant inoculations with these quarantine pathogens.

OTHER INFORMATION OF INTEREST

The team has participated in **European projects**: "Fate, activity and threat of *Ralstonia solanacearum*, the causal agent of potato brown rot, in European soils, rhizospheres and water systems. FAIR 5-CT97-3632" and "Impact of three selected biotechnological strategies for potato pathogen control on the indigenous soil microbiota QLK3-CT-2000-01598". Also in the **COST**

Actions (European Cooperation in Science and Technology), with the actions "Multidisciplinary approaches for sustainable pome fruit production-pome fruit health. COST Action 3758", "Combining traditional and advanced strategies for plant protection in pome fruit growing. COST Action 864" and "Bacterial diseases of stone fruits and nuts. COST Action 873". In the same way, the group has taken part in two projects funded by the international private entity "Horticulture Innovation Australia Limited", entitled "Investigations on the survival of *Erwinia amylovora* in mature apple fruit calyces" and "Identification of the transfer pathway for *Erwinia amylovora* on fruits".



Horticulture Australia



Among the numerous recent **national projects** where the group has participated, it can be included the project "*Trebouxia* sp. TR9 genome as a model green alga symbiont: characterization, structural and metabolic potential. Implications of coexistence with other symbionts in lichen thalli and stand plants" of the **Research Program of Excellence PROMETEO** of the Generalitat Valenciana, and "Viability tests for the use of bacteriophage lytic activity in irrigation water against the phytopathogenic bacterium *Ralstonia solanacearum*" from the **Valoritza i Transfereix Program** of the University of Valencia.

The results of the research team activity have resulted in several book chapters and numerous **publications** in international journals such as *Applied and Environmental Microbiology*, *FEMS Microbiology and Ecology*, *Journal of Applied Microbiology*, *Microbiology SGM*, *Phytopathology* and *PLoS ONE*.

The BACPLANT Team achieved in 2006 the **First Accesit IX Award SEF-Phytoma** to the oral communication: "Characterization of *Ralstonia solanacearum* lytic phages isolated from river water: potential use in biocontrol", presented at the XIII Congress of the Spanish Society of Phytopathology, and also **collaborates with public and private institutions for the development of research projects**, as the Instituto Valenciano de Investigaciones Agrarias (IVIA), the AINIA Technological Centre, University of North Carolina at Charlotte, the Biotechnology and Plant Genomic Centre of the Polytechnic University of Madrid or the Jaume I University of Castellón.



Contact



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