

BIOVEXO – Biocontrol of *Xylella* and its vector in olive trees for integrated pest management

Deliverable 5.1 Antimicrobial activity of X-biopesticides on *Xylella in vitro*

Due Date:	26.02.2021
Submission Date:	26.02.2021
Dissemination Level:	Confidential
Lead beneficiary:	CNR
Main contact:	PASQUALE SALDARELLI: pasquale.saldarelli@ipsp.cnr.it

Project acronym: BIOVEXO	Project Number: 887281
Start date of project: 01.05.2020	Project duration: May 2020 – April 2025

Publishable Summary

Olive Quick Decline Syndrome is a new disease that is devastating olive trees in Apulia, Italy. It is caused by the strain De Donno of *Xylella fastidiosa* subspecies *pauca* (XfDD), a bacterium which is efficiently transmitted by the xylem-feeding insect *Philaenus spumarius*. Besides this strain, Europe and the Mediterranean area are facing the introductions of different additional *Xylella fastidiosa* subspecies affecting almonds in Spain and Israel, and ornamentals in France, Portugal and again in Italy. There is an urgent need to find solutions for the control of the bacterium *in planta*. BIOVEXO researchers are engaged in developing a set of biopesticides that should address principles of sustainability and environmental compatibility. A vegetable extract, a by-product from the food industry not suitable for human consumption, and two bacterial beneficial endophytes are under testing in open field conditions. All three products have favorable track records as they have shown antimicrobial activity in diverse pathosystems or against *Xylella*.

A fundamental acquisition for the market exploitation of a biopesticide is the knowledge of its mechanism of action, which can manifest against the target pathogen or by eliciting a plant immune response. The present Deliverable aims at investigating such mechanism for all the three solutions starting from *in vitro* conditions.

Both beneficial endophytes did not antagonize the growth of *Xylella fastidiosa* subspecies *pauca* strain De Donno in a dual-culture assay, in which both bacteria are co-cultivated. Such a result was expected as it was already known that their mechanism of pathogen control relies on the elicitation of a plant immune response. Therefore, such a result did not rule out their testing in the open field conditions. In addition, a further bacterial endophyte, not preliminarily included in BIOVEXO, has been tested and showed *in vitro* antagonistic activity against *Xylella fastidiosa* subspecies *pauca* strain De Donno (Figure 1). Such microorganism will be further investigated in the frame of the Project activities.

Studies show that the vegetable extract efficiently antagonizes the growth of *Xylella fastidiosa* subspecies *pauca* strain De Donno, even at low concentrations (Figure 1).

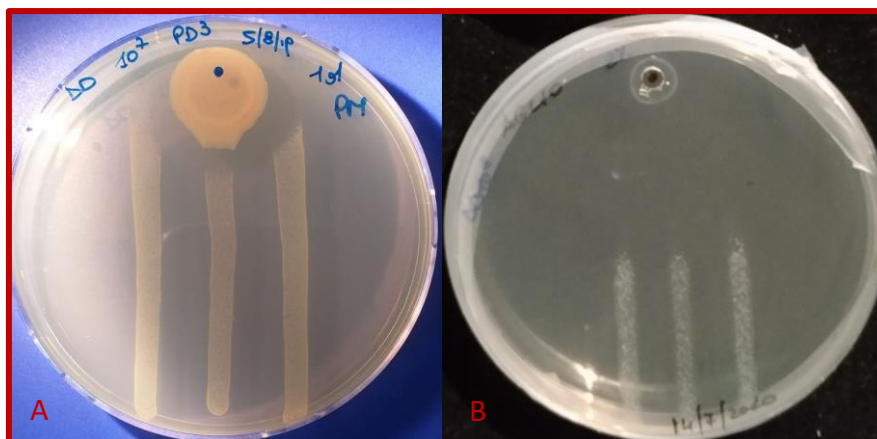


Figure 1. Halo of inhibition of XfDD growth by a bacterial endophyte (A) and a vegetal extract (B)

Deliverable 5.1 Antimicrobial activity of X-biopesticides on *Xylella in vitro*

Deliverable 5.1 contributes to the definition of the *Mode of action of biopesticides on target organisms*, the objective of Work Package 5, a fundamental knowledge to support product development and registration. Such knowledge acquisition will also feed Work Package 2 and 4, to better define conditions for product application in the field and Work Package 3, to optimize the biopesticides formulation and upscaling.