

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

Deliverable D1.2

Protocol for optimised production of antagonistic bacteria

Due Date:	30/04/2021
Submission Date:	30/04/2021
Dissemination Level:	CONFIDENTIAL (<i>also see next page</i>)
Lead beneficiary:	ACIES
Main contact:	Gregor Kosec, gregor.kosec@aciesbio.com

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

1. Publishable Summary

Biopesticides represent one of the key pillars of plant health protection in sustainable agriculture. Currently, chemical pesticides are predominantly used; however, these products are not environmentally friendly and are not compatible with organic production. However, in order for biopesticides to be competitive with the current methods, their production methods must be thoroughly optimised. Production costs, reproducibility, and reliability must match or at least come close to the current low cost of chemical pesticides. Therefore, there is a pressing need to develop environmentally friendly and profitable methods for biopesticides, upscaled production of the necessary microorganisms in order to reach wide acceptance by the farmers and crop protection companies. Unlike other sectors, such as the agri-food or the pharmaceutical, the agricultural sector is characterised by lower profit margins which means that even more efforts have to be invested into development of extremely cost-efficient production processes.

For this reason, during this activity it was the goal of the industrial partners of BIOVEXO to develop processes for the production of each bacterium using cost-effective and food-grade microorganisms. While this is relatively straightforward for some microbial strains and technologies, less explored species, belonging to genera not often used in commercial fermentation settings, require more effort in careful optimisation of growth conditions. It is often the case that initial experiments on promising new strains with biopesticide potential are carried out in nutritionally rich growth media, routinely used in the R&D environment. Such media are an optimal first choice for laboratory experiments, however, due to the high cost of such media ingredients, they must be replaced by specific industrial media components before technologies can be taken to commercial scale.

Thus, the optimisation of production media and production methods for high-cell density cultivation of bacterial X-biopesticide biocontrol strains with antagonistic activity against *Xylella fastidiosa* has been carried out. The optimised production methods were established and tested for three most promising X-biopesticides. The optimised methods of production are a prerequisite for upscaling the production of X-biopesticides for field tests and for commercial production to enable economically viable production of the X-biopesticides. Using these optimised production protocols. The X-biopesticides were produced and supplied to the test sites, where their effect was tested against *Xylella fastidiosa* on olive trees. The optimisation of the production of X-biopesticides is a prerequisite for successful formulation development in WP3, upscaling of production and for future field trials in the scope of BIOVEXO. In conclusion, the obtained results make possible the generation of microbial biomass in a profitable and competitive way for the agriculture sector. Besides, downstream technologies have been evaluated to improve the stability and viability of the microorganisms in the final product.