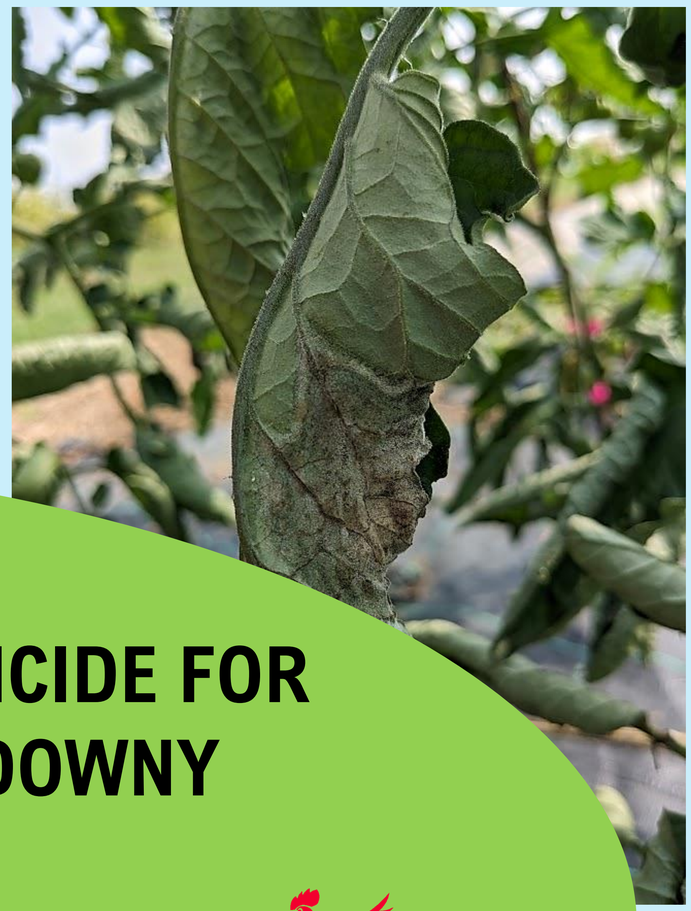
-- A well-known issue --



DEVELOPMENT OF AN INNOVATIVE BACTERIAL BIOFUNGICIDE FOR CONTROLLING LATE BLIGHT AND DOWNY MILDEW :

THE AQUABIO START-UP PROJECT

Wallonie

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A new bacterium from an unusual origin

- Cellulolytic enzyme production
- Extensive vegetal colonization
- Plant defenses induction
- (Antibiosis)

Promising potential for controlling oomycete plant pathogens, including *Phytophthora infestans* on tomato as a model

-- An original solution with multifaceted mechanisms --

The AQUABIO start-up project focuses on the development of a novel bacterial species that has never been used in biocontrol. This bacterium shows promising potential as a biofungicide for controlling oomycete plant pathogens, including *Pythium aphanidermatum* as a model for root diseases and *Phytophthora infestans* as a model for foliar diseases. The primary objectives of the research were to elucidate the bacterium's mechanisms of action and evaluate its efficacy. The results highlight the bacterium's multifaceted mechanisms, including cellulolytic enzyme production, extensive root surface colonization, and induction of plant defenses, offering over 80% protection against tomato late blight—an unprecedented level of efficacy in biocontrol agents. In addition to its impressive efficacy against oomycetes, the bacterium also targets other pathogens, such as *Alternaria* early blight on tomato leaf, broadening its application potential. Moreover, the bacterium's ability to colonize plant roots ensures prolonged protection.

Production trials demonstrated the feasibility of cultivating the bacterium at large scale, while formulation development focused on an innovative process that bypasses the costly freeze-drying step typically required for storage.

Imaging of lettuce tissues	Corresponding bacterial footprint
	

The bacterium colonizes tomato roots for over 35 days after soil application at sowing, enabling long-term pathogen control through plant defense elicitation.

Detached leaf essay to control *P. infestans* of tomato plant

Treatment modality	Percentage of lesion reduction
D-1 before treatment at $1x10^{10}$ cfu/ml	100 %
D-3 before treatment at $1x10^{8}$ cfu/ml	42,5 %

Average protection indices against tomato late blight from two plant trials under controlled conditions, depending on the site of application

At sowing	Leaf (D-1)	Soil (D-7)	At sowing and Soil
80,3 %	61,8 %	69,6 %	79,2 %

Production trials and medium optimization

Ongoing field trials will further validate the agent's effectiveness under practical conditions, with results expected to support its commercial adoption. The project's outcomes underscore the technical and commercial viability of the biofungicide as a competitive, eco-friendly alternative to conventional fungicides, providing a solution to the growing demand for sustainable agricultural practices.