THE PHYLLOSPHERE MICROBIOTA OF KIWIFRUIT AS A RESERVOIR FOR PGPB AND BIOLOGICAL CONTROL FOR PSA

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PROBLEM AND INTRODUCTION

- *Pseudomonas syringae* pv. *actinidiae* (Psa) is the causal agent of the bacterial canker disease of kiwifruit *(Actinidia chinensis*). The control and mitigation of Psa effects are extremely important for the kiwifruit industry given the aggressiveness and the pandemic distribution of this regulated organism.

- Lack of efficient control methods:
  - Intensifying the use of agrochemicals to reduce crop losses;
  - High costs of current methods with high impact on agro-environment and human health.

- Focus on biotech innovation to provide bio-based solutions towards more sustainable agricultural systems

METHODS

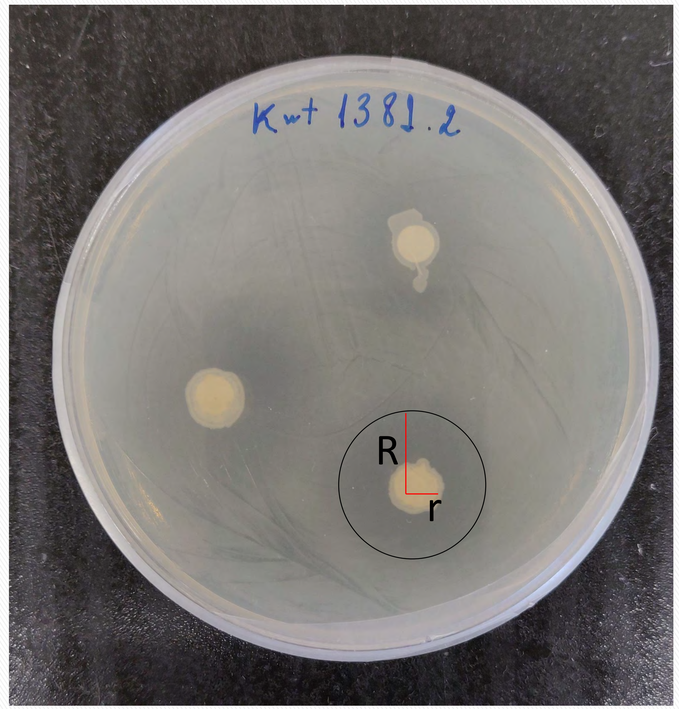
- One hundred and twenty strains of naturally occurring bacteria in kiwifruit orchards were previously isolated and described by the team and clustered in 23 genera

- Determine the ability of each isolate to promote plant growth based on four traits:
  - Ability to solubilize phosphate (Almoneafy et al., 2012);
  - Siderophores production (Schwyn and Neilands, 1987);
  - Ammonia production (Singh et al., 2016);
  - Auxin's production, focus on indole-3 acetic acid (Sarker and Al-Rashid, 2013).

- Antagonist activity
  - Inoculation of potential antagonists (10^8CFU/mL) in the center of the plate and incubation for 48h at 28°C;
  - Spray with solution containing Psa (10^6CFU/mL) on the plate and observe for another 48h at 28°C;
  - Quantification of antagonist activity by calculating the average area of inhibition around the colony – AIA = (R2 * 3.14) - (r2 * 3.14) (Tontou et al., 2016)

RESULTS

Siderophores +	71	116	Ammonia +
		20	
IAA +	90	40	Phosphate +
Negative	4		



Bacillus pumillus

» Among the isolates that produced the phytohormone, the concentration ranged from 0.16 to 153.76 µg.ml^{-1};

> All isolates with IAA production above 100mg were also able to produce siderophores and ammonia. Highlight for two isolates of the genus *Pantoea* that tested positive for all parameters

» *Bacillus pumillus* was able to inhibit the growth of Psa and the calculated AIA reached 228.17mm^2.

DISCUSSION AND CONCLUSION

» Several isolates showed potential to be used as PGPB and their interactions can be studied more deeply to also verify a possible reduction in the intensity of disease symptoms. The use of tailormade bio-based management solutions is an innovative strategy to respond to future challenges related to climate change and the decreasing number of active molecules available by integrating naturally occurring microorganisms adapted to the edaphoclimatic conditions of a given region and crop.

» The use of isolates naturally belonging to the *Actinidia* spp. microbiota is a very efficient strategy that will allow the development and implementation of new microbial pesticides capable of controlling kiwifruit bacterial canker.