

MY ENEMY'S ENEMY IS MY FRIEND

RESEARCHERS

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STUDENTS (1ST BACHILLERATO)

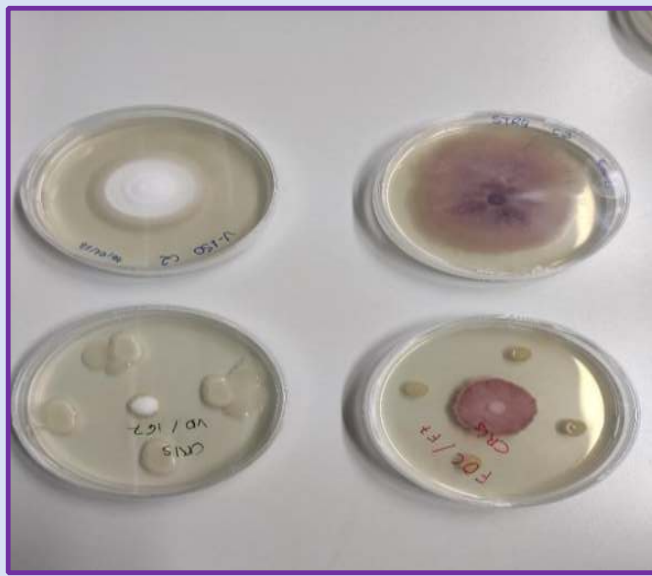
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INTRODUCTION

PLANT PATHOSYSTEM

Within an agroecosystem, the interaction between a plant host and a parasite, which feeds on it, causing a disease.

Olea europaea (plant, olive) and *Verticillium dahliae* (fungus).

Musa acuminata (plant, banana) and *Fusarium oxysporum* f. sp. *ubense* (fungus).

Verticillium Wilt of Olive (VWO)

Fusarium Wilt of Banana (FWB)

The root/rhizosphere of healthy olive plants is an important reservoir of microorganisms displaying biocontrol activity against VWO and FWB.

Different bacterial strains have been used *in vitro* assays and all strains displayed growth inhibition ability against *Verticillium dahliae* and *Fusarium oxysporum* f. sp. *ubense*.

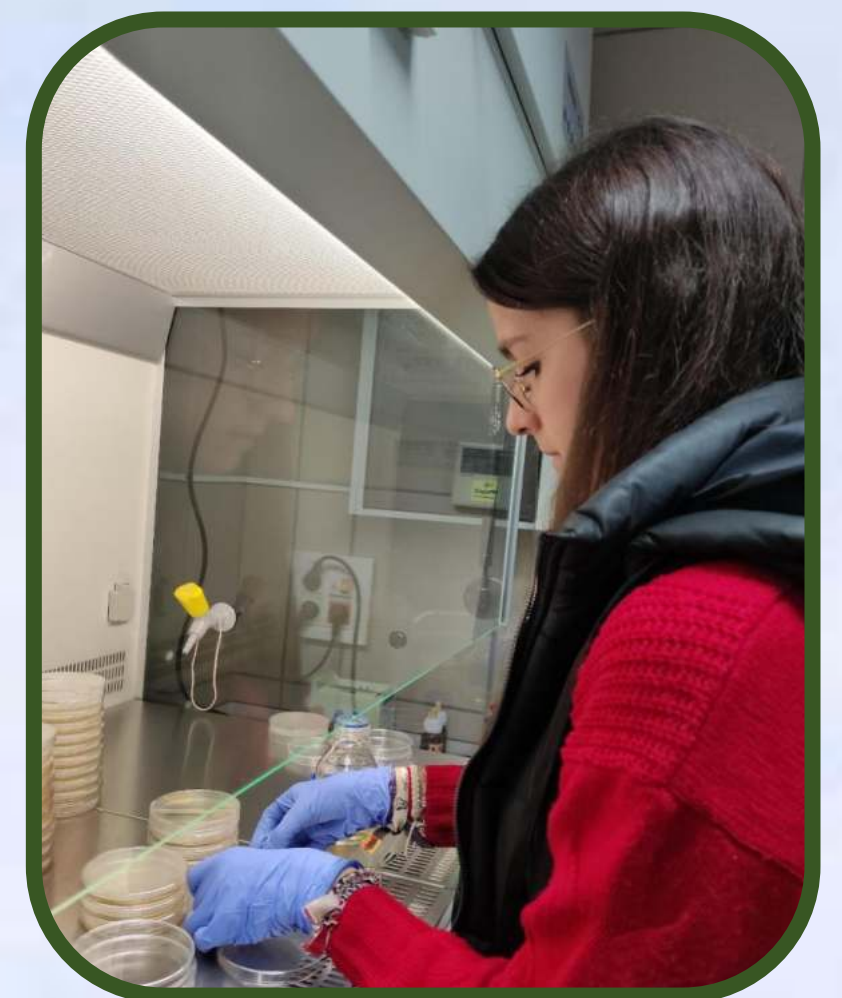
OBJECTIVES

- To compare the *in vitro* efficacy of different bacteria strains in the *Fusarium oxysporum* f. sp. *ubense* and *Verticillium dahliae* growth inhibition
- To observe different degrees of *Fusarium oxysporum* f. sp. *ubense* virulence
- To obtain monoconidial cultures

METHODS



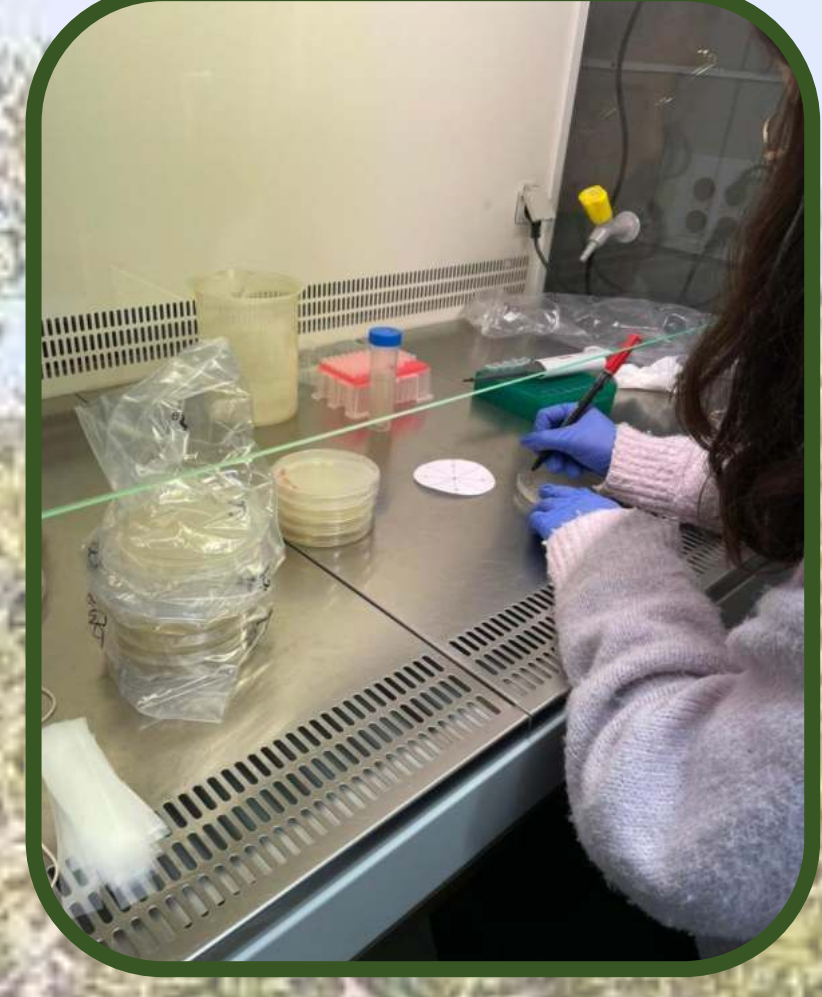
PREPARATION OF CULTURE MEDIA



POURING OF CULTURE MEDIA IN PETRI DISHES



CONIDIA COUNT



FUNGI AND BACTERIA INOCULATION IN PETRI DISHES

RESULTS



Fungal colony radius measurement



Petri dishes with fungi and different bacteria used

1. CONTROL
- 2
- 3
- 4
- 5
- 6

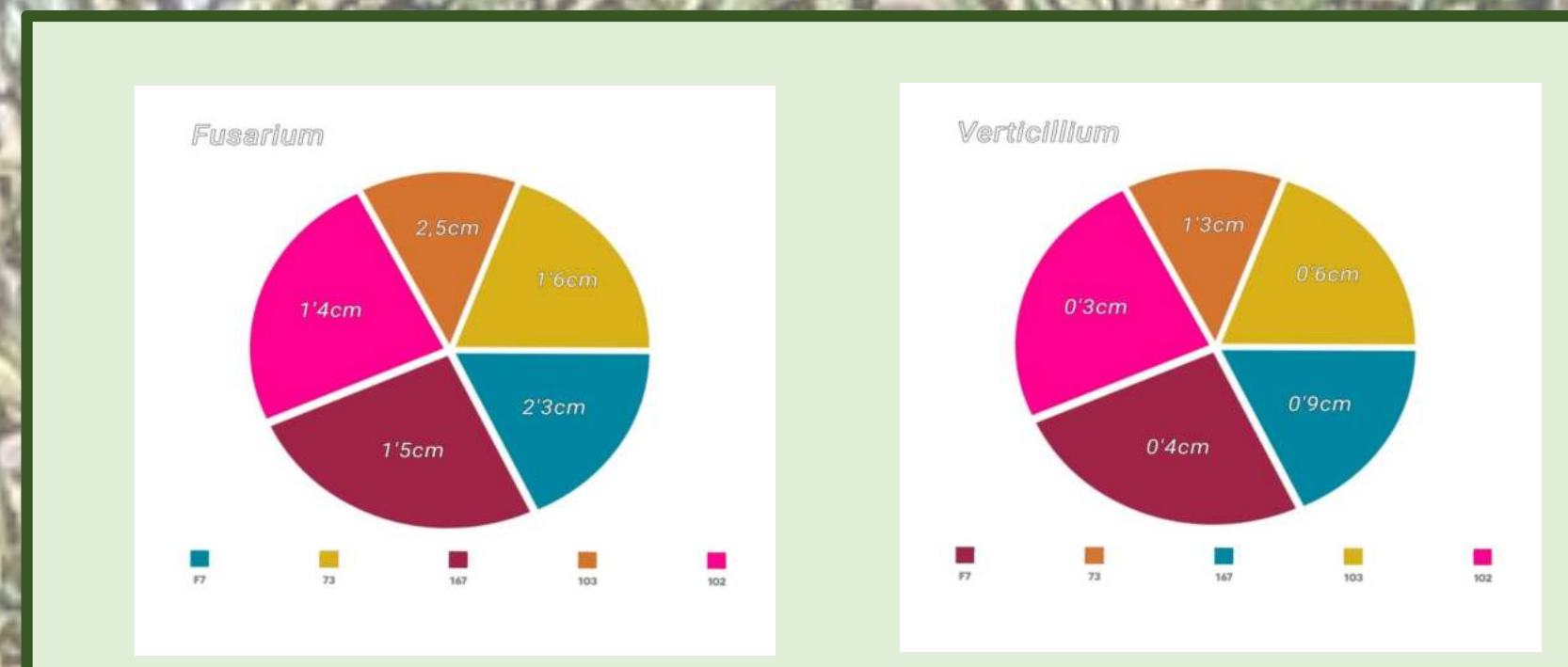
The upper row corresponds to controls and from them and downwards each of the cultures with each bacterium and fungus ordered from the most to the least effective bacterium.

- 1- *Verticillium* on the left and *Fusarium* on the right . Control
- 2- Vd + IAS-B-102 / Foc + IAS-B-102
- 3- Vd + PICF7 / Foc + PIC167
- 4- Vd + IAS-B-103 / Foc + PIC73
- 5- Vd + PIC167 / Foc + PICF7
- 6- Vd + PIC73 / Foc + IAS-B-103



Percentage of efficacy that each bacteria has had against *Fusarium oxysporum* f.sp. *ubense*

Percentage of efficacy that each bacteria has had against *Verticillium dahliae*



Pie Chart 1. Graph with *Fusarium* radius

Pie Chart 2. Graph with *Verticillium* radius

Pie charts 1 and 2 represent the radii of fungal colonies in the presence of each bacterium. Bacteria strains used were PICF7, PIC73, PIC167, IAS-B-103 and IAS-B-102.

CONCLUSIONS

- 1) Among the tested bacteria, the most efficient *in vitro* assay against *Verticillium dahliae* and against *Fusarium oxysporum* f. sp. *ubense* has been *Pseudomonas chlororaphis* IAS-B-102.
- 2) Among the tested bacteria, the least efficient *in vitro* inhibition assay of the fungus *Verticillium dahliae* was *Paenibacillus polymyxa* (PIC73) and the least effective against the fungus *Fusarium oxysporum* f. sp. *ubense* has been *Serratia marcescens* (IAS-B-103).

FINAL CONCLUSIONS

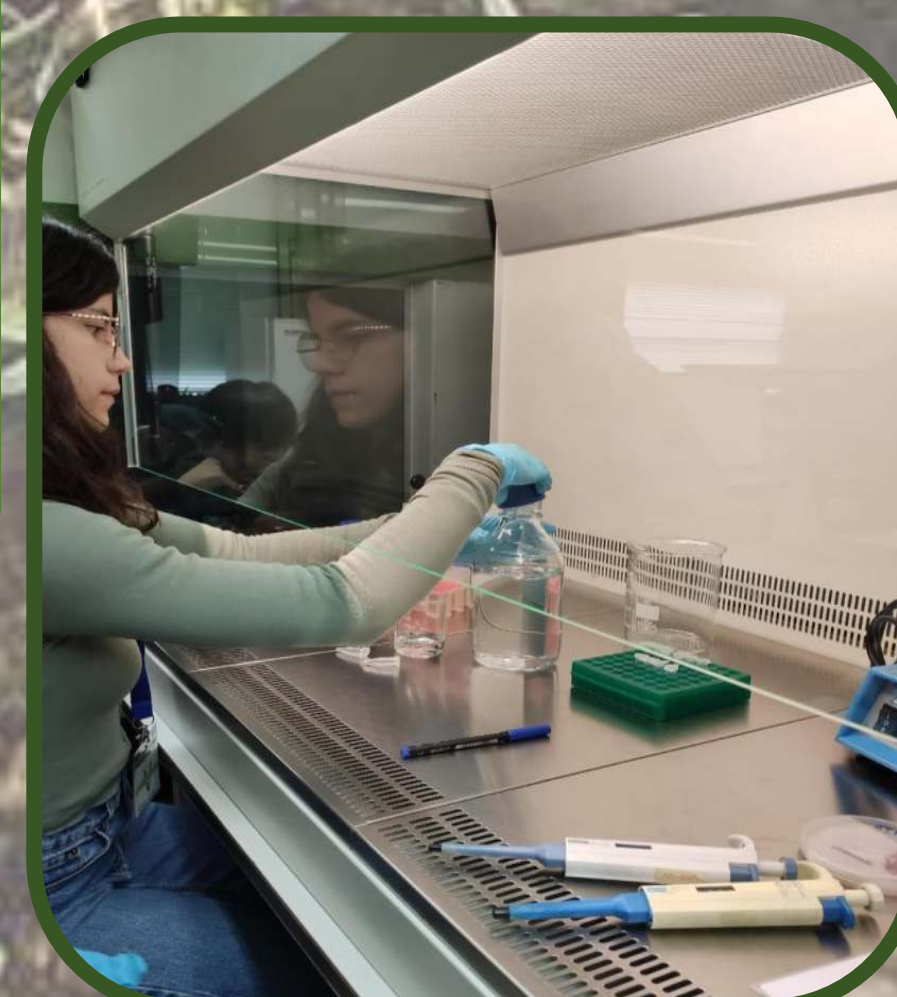
- According to these results, *Pseudomonas chlororaphis* IAS-B-102 rhizobacteria would be the most promising candidate to combat Verticillium wilt of Olive and Fusarium Wilt of Banana.
- This approach of biological control of pathogens through the use of rhizobacteria can contribute substantially to the development of sustainable agriculture. Therefore, rhizobacteria offer an ecological alternative to control the pathogen attack and/or improve a certain crop.

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- To our parents and families



OBSERVATION OF THE SIZES OF THE COLONIES AND CALCULATION OF THE PERCENTAGE OF INHIBITION



PREPARATION OF THE DILUTIONS



SPREADING OF FUSARIUM TO OBTAIN MONOCONIDIAL CULTURES



CONIDIA ISOLATION