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Actinomycetes come to rescue of viticulture sustainability

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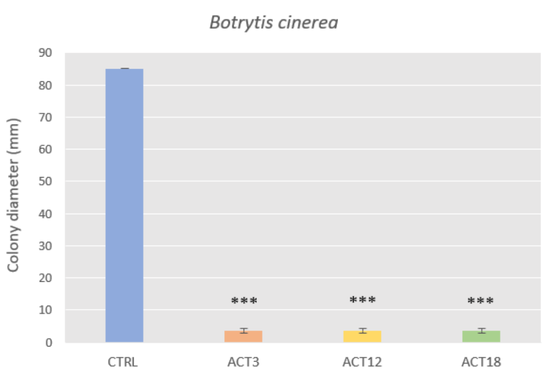
Introduction

A great number of recent researches have shown that Actinomycetes can be considered as promising beneficial bacteria improving the growth and the capacity of the plants to face up both biotic and abiotic stresses. However, very few studies have been performed about the use of Actinomycetes in grapevine and most of them have focused their attention just on those isolated from the soil. For this reason, we decided to isolate plant-associated bacteria directly from grapevine wood tissues looking for some beneficial endophytes.

Materials and Methods

Bacteria have been isolated by extraction with 0.1% SDS and the obtained mixture has been plated on selective medium (SPM) containing sodium propionate, cycloheximide and nalidixic acid. Subsequently, It has been characterized a collection of 42 isolates, 27 of which belonging to the Actinobacteria phylum. Among them, 9 bacteria have been selected on the basis of their antagonistic activity tested by bio-competition petri dish assays against some of the main grapevine's fungal pathogens: *Neofusiccoccum parvum, Phaeoacremonium minimum* and *Botrytis cinerea.* Additionally, we have examined if the pathogen inhibition effects have been linked with the production of any volatile compounds (VOCs) through septate petri dish assays.



Graph. 1: colony diameter (mm) of *Botrytis cinerea*

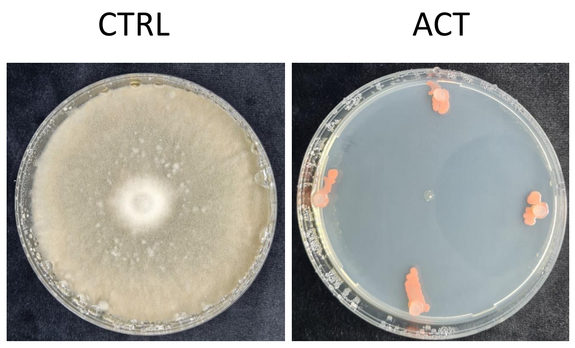


Fig. 1: bio-competition petri dish assay against *Botrytis cinerea*

Volatile compounds (VOCs).

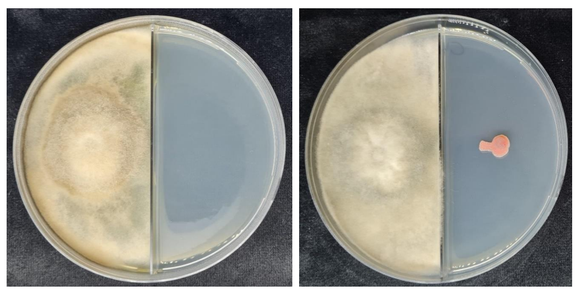
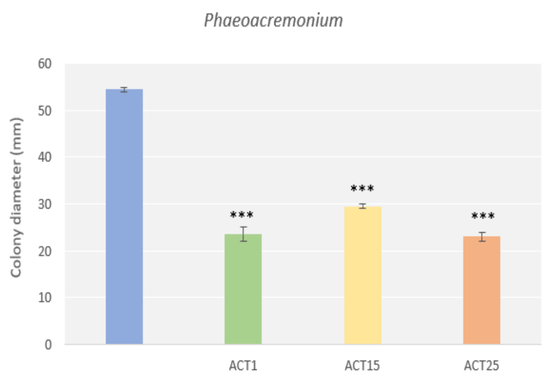


Fig. 2: septate petri dish assay against *Botrytis cinerea*

Results

Selected bacterial isolates have showed a pathogen's growth inhibition rate higher than 50% compared to the control thesis towards at least one of the fungal pathogens concerned. The isolates that previously had displayed a promising antagonistic activity against fungal pathogens have not showed a great antifungal effect by volatile organic compounds production and so we have hypothesized that the pathogen's growth inhibition capacity of these isolates is based on diffusible compounds. More studies are now ongoing to confirm these preliminary results and to better understand Actinomycetes potential ability to promote plant growth and wellness both in vitro and in vivo.



Graph. 2: colony diameter (mm) of *Phaeoacremonium minimum*

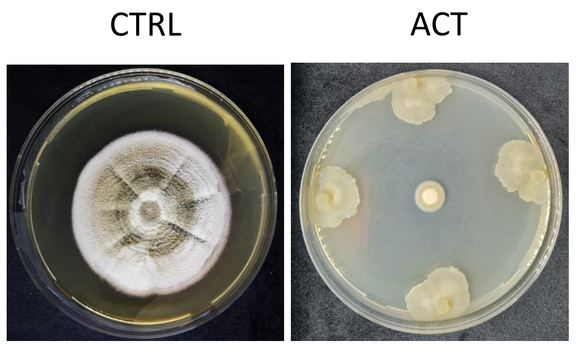
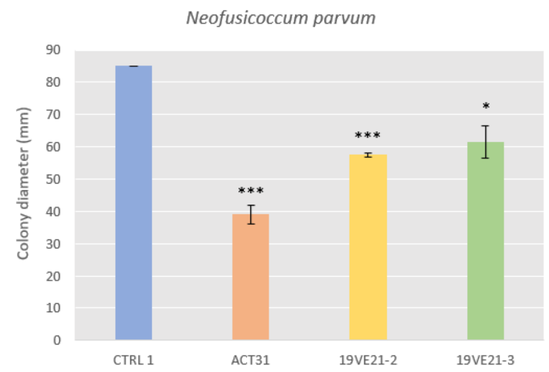


Fig. 3: bio-competition petri dish assay against *Phaeoacremonium minimum*



Graph. 3: colony diameter (mm) of *Neofusiccoccum parvum*

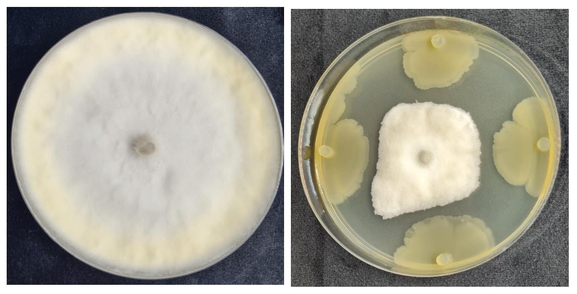


Fig. 4: bio-competition petri dish assay against *Neofusiccoccum parvum*

Conclusions

More studies are needed but preliminary results display an interesting attitude of these Actinomycetes as promising tool to reduce chemical input in pest management. Modern viticulture is now entering in a green revolution and Actinomycetes seem to be a very interesting way of achieving more sustainable productions.

References

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