USE OF RHIZOSPHERE MICROORGANIMS FOR IMPROVEMENT OF AVOCADO SEEDLINGS DEVELOPMENT.

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Introduction.

The soil ecosystem is a complex environment exhibiting a large diversity of microorganism populations. Some rhizosphere-associated microbe species have been successfully used for plant health and nutrition improvement in a number of crop systems. Avocado crops have been rapidly increased in Colombia during the last decade demanding new inexpensive sustainable agronomical practices. Beneficial soil microorganisms have the potential to be evaluated in avocado crops in Colombia as an alternative to synthetic chemical products.
This study aimed to evaluate under greenhouse conditions the effect of the single, double and triple interaction of *Trichoderma harzianum*, *Glomus fasciculatum* and a strain of fluorescent *Pseudomonas* spp., on *Persea americana* seedlings growth and development.

Methods.

This work was carried out in the greenhouse facilities at Universidad Nacional de Colombia sede Medellín (6°15N, 75°35´W, located at 1495 masl. The microbe strains tested were: *G. fasciculatum*, fluorescent *Pseudomonas* sp. and a commercial formulation of *T. harzianum* (Biotropical™). The fluorescent *Pseudomonas* sp. was isolated from avocado rizhosphere and selected based on its índole production ability following the method from (1) modified by (2). Plant variables measured were seedling height and diameter at the base of the stem every 15 days. After 120 days dry root and aerial plant biomass weight, leaf area, root viability, VAM root colonization and foliar phosphorus content were quantified.

Results.

From thirty days after strains application and up to the end of the evaluation time period, *G. fasciculatum,* fluorescent *Pseudomonas* sp., *Pseudomonas* sp. fluorescentes + *G. fasciculatum* and *Trichoderma harzianum* + *G. fasciculatum* + fluorescent *Pseudomonas* sp.; significantly increased all plant growth and development variables evaluated (Figure 1). These treatments improved mycorrhizal colonization, root viability and foliar P content.
When *G. fasciculatum* was applied together with *Trichoderma harzianum*, growth decrease was observed suggesting a possible antagonism at some degree between these microbe strains.
Our results indicate that *G. fasciculatum* and the fluorescent *Pseudomonas* sp. bacterium, individually or in combination have the potential to be used during the avocado plant germination and seedling establishment, since they may improve growth and development before transplantation to the field.

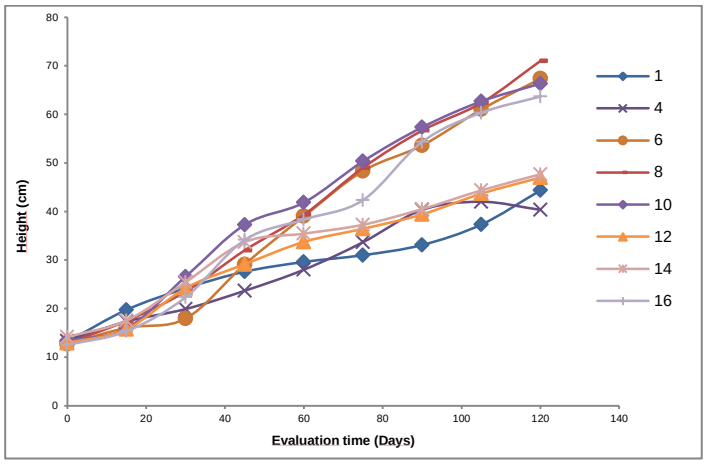

Figure 1. Height values observed in avocado seedlings for the microbe strains tested. 1: Control; 4: *Trichoderma harzianum;* 6: *Glomus fasciculatum;* 8: fluorescent *Pseudomonas* sp.; 10: fluorescent *Pseudomonas* sp. + *Glomus fasciculatum*; 12: *Trichoderma harzianum* + *Glomus fasciculatum*; 14: *Trichoderma harzianum* + fluorescent *Pseudomonas* sp.; 16: *Trichoderma harzianum* + *Glomus fasciculatum* + fluorescent *Pseudomonas* sp.

Conclusions.

G. fasciculatum and the fluorescent *Pseudomona* sp. Bacterium strains, applied combined or individually increase avocado seedlings growth and development.

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