

MODE OF ACTION

TRUESOLUM® ENHANCES MYCORRHIZAL COMMUNITIES IN THE SOIL

SUMMARY

TrueSolum® causes changes in both the fungal and bacterial components of the soil microbiome. These changes are marked by **increases in mycorrhizae spore counts** and **root colonization** which will help solubilize phosphorus and bring soil nutrients to the plant.

INTRODUCTION

TrueSolum is an organic and proprietary liquid containing useful metabolites that are expressed during the cultivation of *Chlorella* microalgae. These metabolites are separated from the algae biomass, creating an algae free, metabolite rich liquid which stimulates natural microbial activity in the soil. Research studies were initiated to confirm the specific changes that TrueSolum causes in mycorrhizae, both with naturally occurring and through inoculated mycorrhizae.

METHODOLOGY

Two research studies were performed by Florida Ag Research (AgMetrics) to assess TrueSolum's impact on the soil microbiome, particularly mycorrhizae.

Watermelons

In the first study, watermelons were grown in Dover, FL and TrueSolum treatments were applied to a grower's field through drip irrigation with no mycorrhizal inoculation. Six applications were made during the growing season. Soil samples were taken periodically during the trial and assessed for microbial changes.

Tomatoes

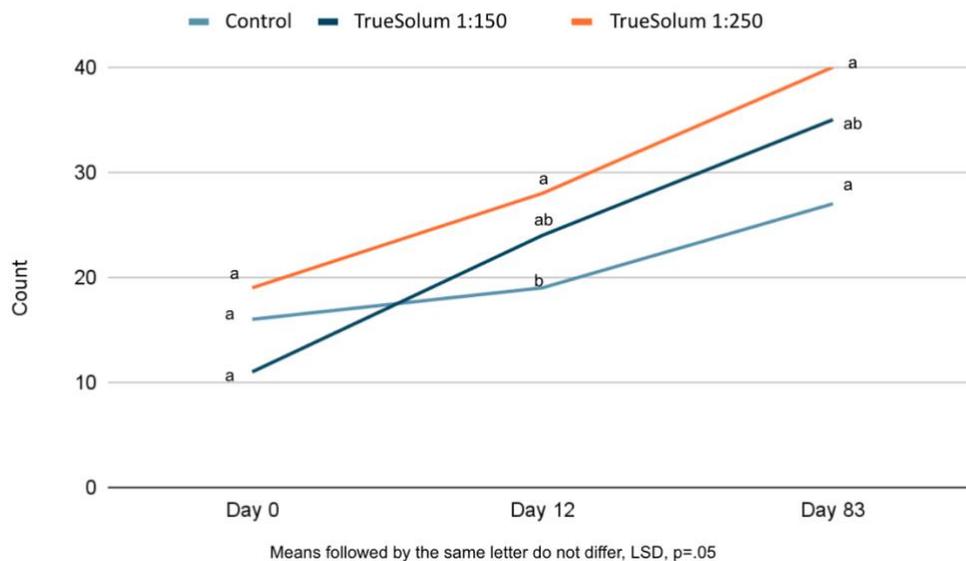
In the second study, Florida Ag Research (AgMetrics) assessed the relationship of TrueSolum + commercial mycorrhizal inoculation for enhancing root colonization, bacterial CFU counts and *Actinomyce* counts in soil, compared to grower's standard fertilizer program (GSP), GSP + mycorrhizae and TrueSolum alone in tomatoes. TrueSolum was added at .5 gallons/acre weekly for 9 weeks. Roots and soil samples were assessed for spores and root colonization by mycorrhizae.

RESULTS

Watermelons

Soil treated with TrueSolum had higher counts of microorganisms such as *Bacillus*, *Actinomyces*, algae and other beneficial fungi and bacteria. Mycorrhizal spore counts were significantly higher, by 150%, for the TrueSolum treatment at the 1:250 dilution ratio, when compared to the control sample.

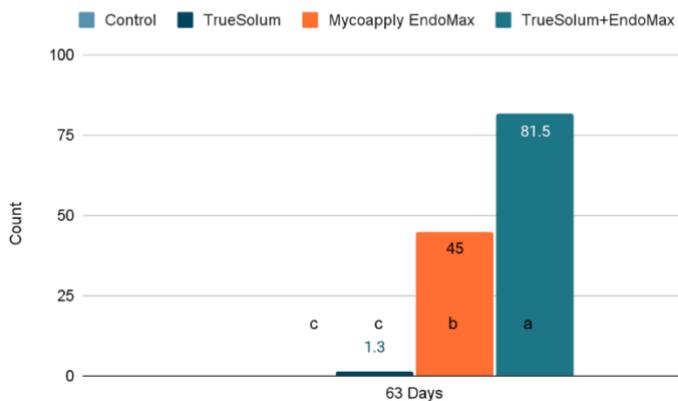
Number of Mycorrhizae Spores in 1 gram of Soil



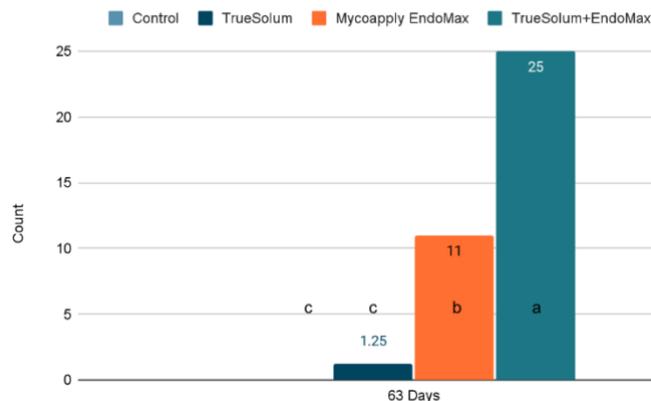
Tomatoes

Double the root colonization and spore formation were seen in the TS treated + mycorrhizae vs mycorrhizae alone at 63 days after trial initiation.

Number of Spores in 1 gram of Soil



Number of CFUs in 1 gram of Soil



Means followed by the same letter do not differ, LSD, p=.05

DISCUSSION

In both trials, soil treated with TrueSolum showed greater overall biological diversity and higher counts of beneficial microorganisms. The results show that TrueSolum has a symbiotic working relationship with mycorrhizae. Beneficial compounds that microbes produce - metabolites - have been shown to enhance spore germination of arbuscular mycorrhizae (Xavier and Germida, 2003) and signal the beneficial fungi to grow and proliferate. These specific metabolites, also called small molecules, increase root cell permeability which favors the penetration of the mycorrhizae with plant roots (Vivas, *et al.*, 2003). Increases in mycorrhizal and other microbial populations in the soil are known to improve fertility and porosity, enhance seed germination and promote primary nutrient availability in the host plants (Mukerji, *et al.*, 2006). TrueSolum supports these microbial communities whether native to the soil or inoculated further enhancing crop vigor and nutrient uptake.

REFERENCES

Mukerji, K.G., Manoharachary, C. and Singh, J.,2006. Microbial Activity in the Rhizosphere. Springer Berlin Heidelberg, New York.

Vivas, A., Marulanda, A., Ruiz-Lozano, J.M., Barea, J.M. and Azcn, R., 2003. Influence of a Bacillus sp. on physiological activities of two arbuscular mycorrhizal fungi and on plant responses to PEG-induced drought stress. *Mycorrhiza*; 13:249–256.

Xavier, L.J.C. and Germida, J.J. 2003. Bacteria associated with *Glomus clarum* spores influence mycorrhizal activity. *Soil Biology and Biochemistry*; 35(3):471-478.