A Comparative Evaluation of EM on Soil Quality and Fresh Yield of Brassica oleracea var. acephala Grown on Orangeburg Loamy Sand Soil

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INTRODUCTION
Growing concern over pesticide and fertilizer residues on our fresh food supply, and surface and groundwater resources has prompted interest in alternative production systems that involve use of organic based pesticide and nutrient sources such as legume cover crops and soil microbial amendments. Previous field studies have shown that microbial organisms perform essential functions including nutrient cycling and soil stabilization that contribute to increased crop yield (Carrera et al., 2007). Effective Microorganisms (EM) is a commercial microbial inoculant designed to improve soil condition leading to improvement in crop growth and production while reducing the use of inorganic materials. Research to better understand the relationships between soil microbial amendments and soil quality will allow for greater use of the technology for food production and environmental stewardship.

OBJECTIVE
This study was conducted to determine the effects of EM and traditional nutrient sources on fresh leaf yield of collard greens (Brassica oleracea var. acephala) and post harvest soil quality.

METHODS
The study, a 4 x 4 RCBD was conducted on the Research and Extension Center Farm of Florida A&M University, Quincy, Florida, during the fall of 2011. The treatments were 202 kg / hectare of N as ammonium-nitrate fertilizer, mushroom compost with N content of 2 percent, EM at 0.1 percent per hectare, and control. Seedlings were planted on raised beds covered with black plastic, and drip irrigated. The crops were harvested approximately 12 weeks after planting. Data collected includes plant height, plant weight, leaf length, leaf width, root length, and root weight. The fresh yield in kilograms per hectare was derived using aboveground plant weight. Approximately 2 weeks after harvesting, soil cores were removed at 0-15.24 cm and 15.24 cm – 30.5 cm and were processed and subjected to physical and chemical analyses. All data were statistically analyzed using SAS 9.3.

RESULTS
• Fresh leaf yield was approximately 20% higher for the ammonium-nitrate fertilizer treatment compared to the mushroom compost treatment, but was not significantly different (p = 0.05).
• Fresh leaf yield was at least 33% higher for either the mushroom compost or ammonium-nitrate fertilizer treatments compared to the EM treatment and control, and the difference was significant (p<0.05).
• The fresh leaf yield for the EM treatment was almost twice (48%) the fresh leaf yield for the control.
• The mean concentrations of P and NO3 for the mushroom compost treatment were higher than the mean concentrations for all the other treatments.
• The mean percent OM for the mushroom compost treatment was higher than the mean percent OM for all the other treatments.

CONCLUSIONS
The soil microbial amendment EM, increased fresh leaf yield of collard greens (Brassica oleracea var. acephala) up to 48% greater than the control. EM also has the potential to enhance soil quality through increased concentrations of NO3, phosphorous, and organic matter content.