

Indigenous Microorganism (IMO) Microbial Spray

Summarized results from our full report:

[“Effect of an Indigenous Soil Microbial Inoculant on Soil Microbiome, Nutrient Availability, and Leaf Nutrient Density”](#)

Background

In an effort to cultivate nutrient-rich and microbially-active soil and produce, vegetable farmers have been using both commercial and homemade microbial sprays on vegetable crops. Despite this interest and anecdotal results, limited research exists on locally made microbial sprays, typically referred to as indigenous microorganism (IMO). Existing research has focused on indirect effects of IMO, showing both positive relationships and no relationship with plant yield and size.

We performed an experiment in the summer of 2019 at Endless Farm LLC in Johnston, RI to measure direct impacts of IMO, including soil microbial diversity, soil nutrient availability, and plant nutrient density.

We prepared indigenous microorganism (IMO) inoculant according to the method of [Llamelo et al \(2016\)](#). Rice cooked with water 1:1 by weight was placed in a permeable basket in a nearby forest. The moldy rice was mixed with equal weight of brown sugar, mixed with well water at a 1:5 ratio by weight, strained, and sprayed on crops in the evening.

What we tested:

- Planted lettuce (*var. Cardinale*) in test plots
- IMO 4X: Applied an IMO spray weekly during the one-month growing period, a total of four applications
- IMO 1X: Applied an IMO spray once at the beginning of the one-month period, and applied water during the other three applications
- Control: Applied water only during all four applications to account for the moisture in the IMO spray

What we looked for:

- Standard soil fertility (pH, Modified Morgan extractable nutrients (P, K, Ca, Mg, Fe, Mn, Zn, Cu, B), lead, and aluminum, cation exchange capacity, and percent base saturation): before planting lettuce and after harvest
- Soil microbial communities via a Phospholipid Fatty Acid (PLFA) analysis: performed before planting lettuce and at harvest time
- Leaf nutrient density: performed at the time of the last soil sample

Results

We did not find a significant impact (either positive or negative) of IMO treatments on any soil nutrient concentrations, leaf tissue nutrient concentrations, or PLFA measures of soil microbial communities over time, including the composition of the soil microbiome, or the ratios of microbial groups to each other.

Conclusion

Our preliminary experiment found no impacts of IMO applications on the nutrient concentrations or microbial communities under the conditions the spray was tested. More research is needed to study the impacts of microbial inoculants on yield, pest and disease control, and soil microbial communities before recommendations can be made to farmers. Additional research is needed on a larger scale to determine the cost preparing and applying the spray compared to the benefits.

Llamelo, N, S Bulalin, A Pattung, S Bangyad. 2016. Effect of Different Bio-Fertilizers Applied as Supplemental Foliar Spray on the Growth and Yield of Corn (*Zea Mays* L.). *Asia Pacific Journal of Multidisciplinary Research*. 4:4 119-125.

©2022 Rebecca Roberts

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, through the Northeast Sustainable Agriculture Research and Education program under subaward number FNE19-943

