

Purpose: Showing the power of microbial blends to build soil fertility, affecting **HUMUS** and **Nitrogen**. It has been proven by NRCS-USDA-ARS research that adding selected soil microbes increases fertility factors that then aid soils to grow superior crops and orchards. The multiple returns on investment ROI are noted in the literature.

Trial Information: Soil weight to 12 inches deep, estimated at 4,000,000 lbs. No compost or supplemental fertilizer was added. Normal water was allowed. Research was conducted at a Midwest university. Data not published because the research standard of 0.05 percent was not achieved. See supplemental notes in Appendix.

Values found in

4 million lbs of soil:	@ 12 inches	@ 12 inches
Items Tested:	Control Soil	Treated Soil
Humic Acid, measured amts	0.0010 percent	0.0010 percent
Nitrogen, measured amounts		
Microbial of weight lbs (NRCS="N/ac")	0.0010 percent	0.0010 percent
Input of (*2) test microbes	none	32 ounces per acre

Humus Change:

Weight of item measured		
Humus measured as humic acid	0.0010 percent	0.0012 percent
+0.0002 x 4,000,000 pounds soil	0.000 x 4,000,000=0	0.0002 x 4,000,000= 800 .

Results:

Change (x) Weight HUMUS	- 0 - lbs	800 lbs Humic Acid
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Microbial Nitrogen:

Total lbs Microbes	Standard in Test Soil	Increase in Treated Soil
	0.0010 - no - Change	0.00175 percent Change
Microbial Wt in pounds (*1)	- 0 - lbs	720 lbs Microbial
Microbes are 88% protein div./6.25 =	- 0 - lbs	
(*1) Microbes are pure protein. Protein divided by 6.25% equals total Nitrogen		720 lbs / 6.25 = N weight 115.2 lbs. Nitrogen

(*2) product used in the test was Natur's Choice A1 Microbes as found in Vi GEST-R. Similar results have been found with NOP Fish Alive, NOP Bio-Genesis SSB, and Vi CLOUT

(*3) Bio-diverse Compost will give similar results. HOWEVER to get those results, 800 lbs Humic Acid., would require getting the compost down 12" deep in the soil. It would require 40 yards worked into 12 inches of soil. That action would radically change soil structure and use a lot of fuel and labor, not an option in no-till operations. Result: 800 lbs humus as humic acid = 80 gal Humic Acid.

APPENDIX: Supplemental: Data published here shows that microbes when used at the above application rate, soil HUMUS increased by eighteen percent per application. Soil science indicates that in the presence of adequate soil food sources these microbes will convert at the rate of up to a seventy percent increase of humus per square foot per year. Additional testing has shown significant results in all soils. The amount of 115.2 lbs. of Nitrogen is equal to 32.5 gallons of UAN 32 (value \$65.54-2015). Microbial Nitrogen is slow release Nitrogen and is non-leachable Nitrogen. The results were the following: increases of soil organic matter, water utilization-retention, less shear in soil workability for root penetration and especially in the effects on no-till soils for residue management. When used at the recommended application rate, at one, two, three or four times per year resulted in the potential increase of soil humus by 0.7 pound per square foot each year.

Original testing was done by Dr. Robert Ellsworth, PhD., 1985.

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