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Internal Memo:

RE: Composting implications of TerReplenish

Composting techniques require several good management strategies including the proper carbon to nitrogen ratio, adequate moisture and temperature to insure no foul odors and a useful final product. Little can be done to vary these basic rules. Traditional research finds no value in inoculants or bacteria amendments with conventional wisdom holding that indigenous bacteria are in sufficient population given the proper environment.

"Bacteria are always present in every bit of organic matter, whether manure, vegetable waste, leaves, and can be eliminated only by drastic sterilization methods. So it makes sense that inocula is not necessary for the composting process. In any case, the number of bacteria is rarely a limiting factor in composting because, provided the environmental factors are appropriate, the indigenous bacteria, which are much better adapted when forms attenuated under laboratory conditions, multiply rapidly. Thus the rate of composting is governed simply by the environmental conditions." Washington State University

The same researchers made note that when adding Biodynamic preps (500-502) to the compost the temperatures were higher and total composting time was shorter for unknown reasons. The Biodynamic preps are pseudo-science at best when they bury cow horns filled with livestock manure to receive cosmic forces. The liquid resulting from the underground storage of this combination is added to the spray water with everything ranging from yarrow to dandelions. This process may be producing "thermohillic" actinomycetes.

Actinomycetes are a family of ubiquitous aerobic bacteria that resemble fungi in that they grow in web-like structures and form mycelia. Without quantification, we know that TerReplenish contains actinomycetes. Our process utilizes an anerobic period during which I suspect the actinomycetes are *converted or hybridized* from mesophylic bacteria into thermophillic bacteria. Mesophylic bacteria thrive from 70° to 90° F, but just survive at temperatures above and below (40° to 70° F, and 90° to 110° F). In most compost piles, these mid-range bacteria do most of the work. However, the thermophilic, or heat- loving bacteria, work fast. Their optimum temperature range is from 104° to 160° F.

This theory is evidenced in our trial on the Heritage Blue Berry farm of Wayne Kiel at Holland, MI. We put 2,000 cubic yard of dairy and poultry manure in seven 300' long windrows, approximately 8 feet wide and 5 feet in height. TerReplenish was mixed at a 25-1 ratio with water and applied to four of the seven windrows at 50 gallon per acres rate. Temperatures were monitored and piles were turned at 140° F.

The treated piles rose to temperature faster and had to be turned more frequently. White mycelia were much more prevalent on the treated piles. After 4 weeks, the treated piles were reduced in height to 80% of the untreated piles. The treated piles were much higher in moisture. The wood chips in the treated piles were crumbly while those is in the untreated remained firm. No noticeable ammonia order was present in any of the piles. All piles have been sampled and sent to the lab for analysis.

Preliminarily, we suspect that adding TerReplenish to compost piles can reduce composting time by 15-20%. Odors can be greatly reduced by keeping the compost in an aerobic state at higher temperatures, additional nitrogen capture will increase the value of the compost and management requirements will be reduced. The other significant implication is the application of the compost to cropland will reduce or *eliminate soil borne pathogens* adding value to the end-product because of the high concentration of actinomycetes.