

It's the Pits

Leveraging the Value of Your Manure

Bioaugmentation of manure is the cornerstone of proper management of liquid manure. The bioaugmentation process involves biologically digesting manure to enhance its agronomic value, reduce negative attributes and improve ease of handling. After proper bioaugmentation is accomplished, additional management strategies and technologies can be used to further extract additional value from the manure.



At-application Manure Additive Technology

Catawater® AG—is a natural stimulant that enables the bioaugmentation of manure and the natural balancing of soil. Catawater AG is based entirely on natural extracts that function in synergistic association with microorganisms, natural elements and natural processes in the environment to accelerate such functions as plant growth, mineral uptake, chemical conversion and decomposition.

Catawater AG benefits:

- Enhanced manure nutritional and microbiological activity when applied with manure at application time.
- Reduced gas emission, including hydrogen sulfide, when agitated into the manure pit.
- Helps further break down of manure and soil salts.
- Stimulates soil microbes, which results in the natural balancing of soil nutrients, pH and improves soil aeration, structure and drainage.
- Elevates plant defense mechanisms, which improves plant health, minimizes disease, insect pressure and weather related stress.
- Helps buffer the negative side effects of pesticides including glyphosate.
- When applied with manure, it triggers an explosion of beneficial microbes in the soil.



At-planting Over the Top of Manure Applications

Several at-plant technologies can be used to further extract value out of the applied manure. They are **Bio-Release™** and **Soil Biology Boost™** that can be added to the starter at planting time.

The first technological key advantage is Bio-Release. It is an at-plant starter or sidedress additive that reduces fixation of plant nutrients after soil application and unlocks unavailable plant nutrients in the soil, which allows for maximum crop uptake. This includes nutrients in fall or spring applied manure. When added to the soil, it limits the chemical bonding of negatively charged nutrients, such as phosphate, with the positively charged elements (Ca^{2+} , Fe^{3+} , Zn^{2+} , Al^{3+} , Mg^{2+} , etc.) that are present in soil, manure, water or commercial fertilizer. Bio-Release works to free up both negatively (anions P, S, B, Cl, Mo) and positively charged (cations, K, Ca, Mg, Fe, Mn, Co, Cu, Zn, Na, Ni, Si, etc.) nutrients. In addition, it holds the nutrients in an available state for uptake by the plant and reduces leaching or volatilization of the elements.

Also, Bio-Release works biologically to unlock unavailable plant nutrients in the soil and helps naturally balance the nutrient make-up of the soil. It is a major food/nutrient source for the stimulation and growth of crucial soil biology (bacteria, fungi, protozoa, nematodes) that help protect roots against disease causing pathogens, assists the plant in water and nutrient conversion and uptake and restructures compacted soils to allow water and air to penetrate deeper into the soils, which also allows for greater root expansion with access to more available mineral and water sources.

The second technological key is Soil Biology Boost.

It has nitrogen-fixing bacteria, mycorrhizal fungi that are excellent at solubilizing phosphate, calcium potassium sulfur, magnesium, some nitrogen and many trace elements as well. There are additional groups that break down phosphate and others that provide bio-chemical compounds to help plants grow and defend themselves as well as organisms that destroy pathogens in and near the plants root zone for defense. In all, there are approximately 12 various types and species of microorganisms that are highly beneficial to the plants' health, function, production and defenses. This team of microbes has the ability to breakdown mineral bonds and solubilize minerals from the applied manure and soil for plant uptake and use. In

exchange for soil minerals, the plants provide sugars and energy to the biology in the root zone.



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Crop AdvantagePlus Program**
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