

# VITAZYME<sup>®</sup>



THE NATURAL SOIL FERTILITY BOOSTER FOR  
HEALTHIER, MORE PROFITABLE CROPS AND SOIL

# FIRST IN A NEW GENERATION OF BIOSTIMULANTS



*Vitazyme represents a breakthrough to higher, more profitable crop yields. Farmers today are searching for ways to reduce off-farm inputs while maintaining or increasing their yields . . . a difficult order in today's world. Standard chemical approaches have helped spur the "green revolution," but have created potential toxicity problems for farmers as well as consumers. Commercial fertilizer applications have at times contributed to ground and surface water contamination as well as soil compaction. In addition, most of these inputs are expensive and have driven many farmers to reconsider their approach.*



## A Sustainable Approach

**V**itazyme, used within the context of common-sense management, will help the farmer overcome many of his production problems. While not a "magic bullet," it helps the entire system work better . . . greasing the wheels of his cropping system. Besides, the material is nontoxic and environmentally safe. Vitazyme enables the farmer to . . .

- INCREASE CROP YIELDS AND PROFITS

- IMPROVE CROP QUALITY

- REDUCE FERTILIZER NITROGEN INPUTS

- HASTEN GERMINATION AND MATURITY

- IMPROVE SOIL STRUCTURE AND INFILTRATION

Agriculture in the future must emphasize the use of biological systems—not strictly chemical approaches—to achieve long-term soil productivity.

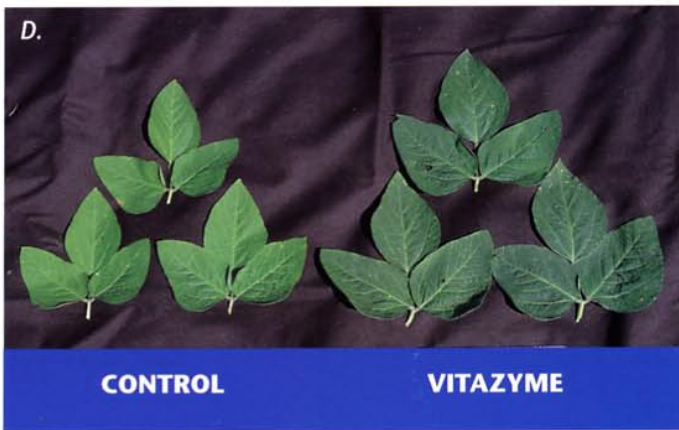
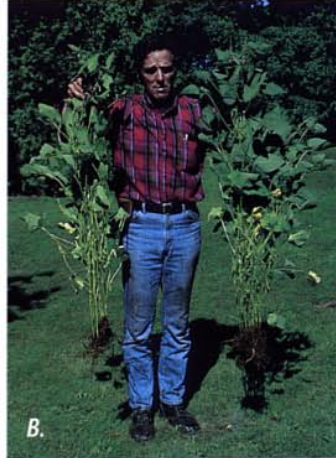
The promotion of life by conforming with natural laws will prevail . . . for instance, encouraging natural predators to control insect and nematode pests, or promoting more intensive biological nitrogen fixation. Stewardship of soil and plant resources must become the prime concern of the farmer, wherein Vitazyme can play an integral role.

# How Vitazyme Works

## Improved Symbiosis: The Secret of Vitazyme's Action

All plants that grow in soils develop an intimate relationship between the roots and the organisms that populate the root zone. The teeming billions of bacteria, fungi, algae, cyanobacteria, protozoa, and other organisms that grow along the root surfaces—the rhizosphere—are much more plentiful than in the bulk of the soil. This is because roots feed the organisms with dead root epidermal cells as well as compounds exuded from the roots themselves. The plant may inject up to 25% or more of its energy, fixed in the leaves as carbohydrates, amino acids, and other compounds, into the root zone to feed these organisms . . . for a very good purpose.

The microorganisms which feed on these exuded carbon compounds along the root surfaces benefit the plant in many ways . . . a beautiful symbiotic relationship. The plant feeds the bacteria, fungi, algae, and other microbial species in the rhizosphere, which in turn secrete enzymes, organic acids, antibiotics, growth regulators, hormones, and other substances which are absorbed by the roots and transported to the leaves. The acids help dissolve essential minerals, and reduced iron releases anionic elements. A few important microbe groups are listed below.



A. Cranberry beans treated with Vitazyme show considerably better seed and pod development than the control.  
 B. Soybean plants randomly selected from nearby locations on either side of the treatment division show considerable response to Vitazyme (right).  
 C. Pods removed from three average soybean plants of each treatment show that the improved photosynthesis, root growth, and flowering of the Vitazyme treated plants led to a greater pod set.  
 D. Note the much greater chlorophyll development in the Vitazyme treated soybeans, indicating a better ability to fix atmospheric carbon and thus grow faster.

**Mycorrhizae**, especially vesicular-arbuscular (VAM) types, form "arbuscules" within root cortical cells and extend thread-like hyphae into the soil, increasing the root feeding surface by ten times or more. They are a major means for uptake of phosphorus, copper, zinc, and other less mobile elements. They also can extract water under much drier conditions than can plant roots.



**Cyanobacteria** fix carbon (they photosynthesize), and also fix nitrogen from the air for plant use.



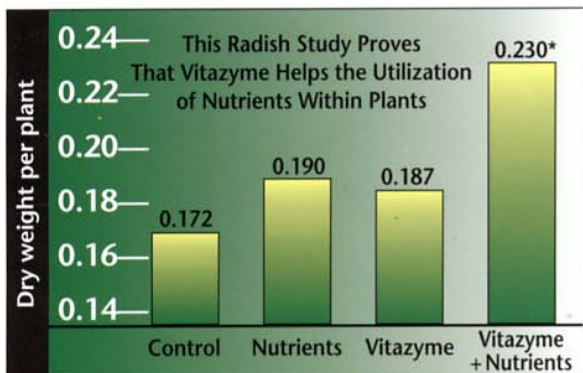
**Phosphate-dissolving bacteria** excrete acids that dissolve minerals and release hard-to-get phosphorus.



**Azotobacter** species live on exudates and other carbon sources while fixing nitrogen.



**Actinomycetes** generate a variety of pathogen-fighting antibiotics.



\* Significantly greater at P=0.02

# Vitazyme Stimulates Rhizosphere Symbiosis

Vitazyme contains “metabolic triggers” that stimulate the plant to photosynthesize better, fixing more sunlight energy in the form of carbon compounds to increase the transfer of carbohydrates, proteins, and other growth substances into the root zone. These active agents may enter the plant through

either the leaves or the roots. Root growth and exudation are both enhanced. This enhancement activates the metabolism of the teeming population of rhizosphere organisms to a higher level, triggering a greater synthesis of growth-benefiting compounds and a faster release of minerals

for plant uptake. The plant-microbial symbiosis is stimulated.

Very small amounts of these metabolic triggers in Vitazyme are needed to greatly improve plant and rhizosphere microbe response. This is because of the **enzyme cascade effect**. Successive tiers of enzymes are activated in plant and microbial tissues to yield a large physiological response from very little applied activator.

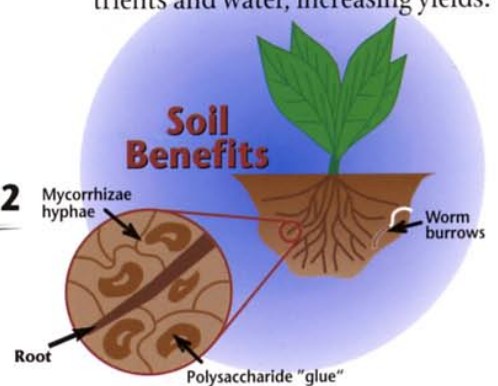
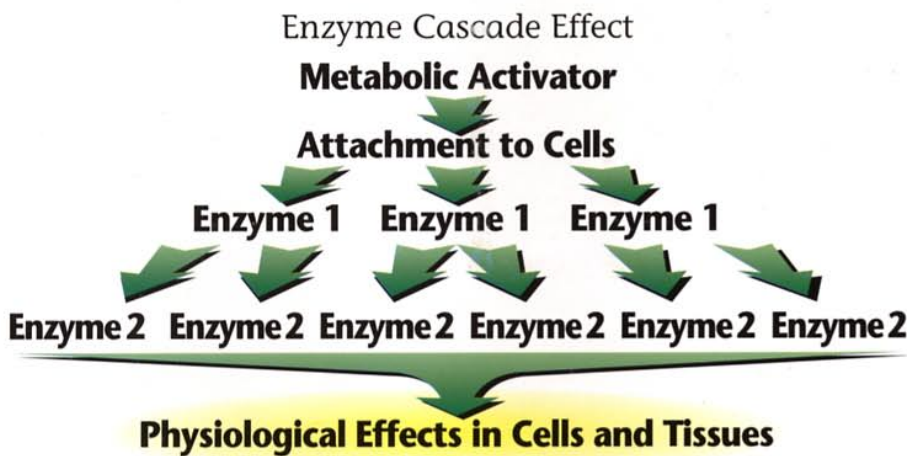
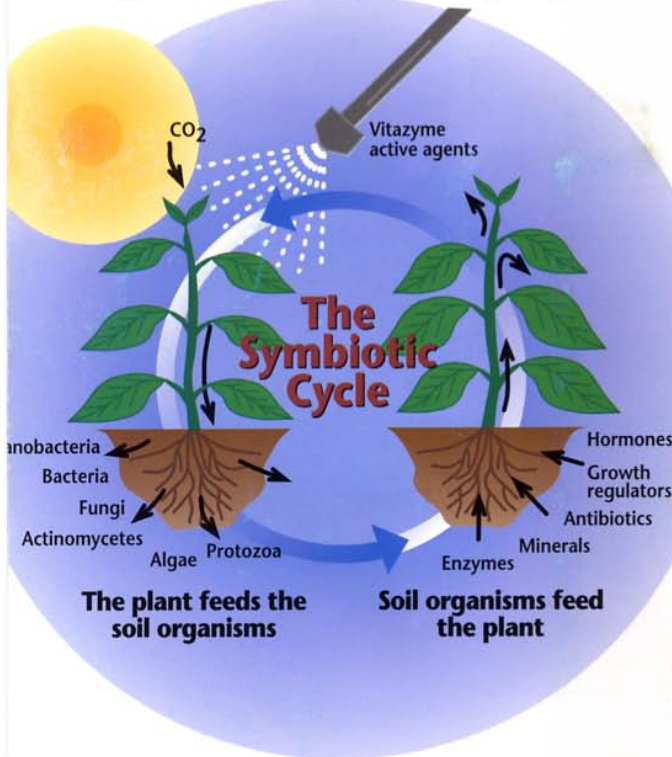
In short, Vitazyme enables the plant to better express its genetic potential by reducing the stresses that repress that expression.



## Soils Benefit Too

Besides improving the growth of plants, Vitazyme also benefits soil characteristics. Soil structure may markedly improve over time because of:

- Increased root growth, and thus more root channels
- Greater polysaccharide production by microbes to glue clay platelets together; only 0.2% more polysaccharide can markedly improve structure
- Improved mycorrhizal activity, creating sac-like structures.
- Greater earthworm activity, their burrows creating channels for air and water. Improvements in structure mean more cleavage planes to promote the ready exchange of air and water. Water infiltration is increased, and runoff and erosion are consequently decreased. Compaction is reduced so roots can freely explore the soil for nutrients and water, increasing yields.





A.



B.



C.

## How to Use Vitazyme

Vitazyme should be used within the context of a complete crop management system, never by itself. Vitazyme will optimize your existing program by enabling the plant to utilize soil fertility and water more efficiently while reducing costs and increasing productivity. Follow this easy-to-use five-point program.

1. If possible, analyze the soil at a reputable laboratory and correct mineral deficiencies and imbalances with expert consultation.
2. Reduce nitrogen fertilizer applications for non-legumes using this test:

A. Vitazyme treated cotton has larger, deeper green, and thicker leaves which leads to greater photosynthesis, and therefore more lint and seed production.

B. The result of this Vitazyme field study was a great increase in lint yield. Samples were collected a few rows from each other on either side of the treatment division.

C. Potatoes treated with Vitazyme, as shown in this field study comparison, produced more tubers of larger size, with better keeping quality in storage.

Obtain a score for each of the following items:

Soil Organic Matter			Previous Crop		Compaction		Soil NO <sub>3</sub> -N Test						
Low(<1.5%)	Medium(1.5-3%)	High(>3%)	Non-legume	Legume	Much	Little	Low	Medium	High				
1	2	3	1	3	1	3	2	4	6				
Total additive score:			15	14	13	12	11	10	9	8	7	6	5
Apply this percent of optimum N:			50-60%			60-70%			70-80%				

## Remember . . .

- Vitazyme may be tank-mixed with fertilizers and pesticides.
- Vitazyme does not need to be tilled into the soil after application.
- The dilution rate is not critical as long as the proper application rate is made.
- Soil moisture is needed to activate Vitazyme.

For further information and crop recommendations, please contact

### Vital Earth Resources

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Reduce the application each time the fertilizer normally is applied. Legumes normally need no added nitrogen. Vitazyme will accelerate legume nitrogen fixation.

3. Treat the seeds or transplant roots, if possible, at planting. Treat seeds with a dilute Vitazyme solution, such as 1 liter of a 5% solution for every 50 kg of seed. Mix the seeds thoroughly in a seed or cement mixer or on a tarp. For excellent results, apply the solution directly on the seed row with a planting attachment. Dip or spray transplant roots with a 1% or 2% solution.

4. Apply Vitazyme to the soil and/or foliage. Follow instructions for each crop. In most cases from 10 to 20 oz/acre can be applied per application at one to three times during the cropping cycle. A fall application on stubble is effective to accelerate residue breakdown.

5. Integrate other sound, sustainable management practices into the total program. Use crop rotations, minimum tillage, soil conservation practices, and adapted plant varieties.



Note how the Vitazyme treated onions, on right, are larger and more uniform than the untreated control.

# VITAZYME

*A  
Non-Toxic,  
Safe Solu-  
tion for  
Today's  
Agriculture*

**CONTROL**

**VITAZYME**