



VITAZYME[®]

2001 Field Trial Results

**A SUMMARY OF EXPERIMENTS USING
VITAZYME SOIL AND PLANT BIOSTIMULANT
ON FIELD AND ORCHARD CROPS**

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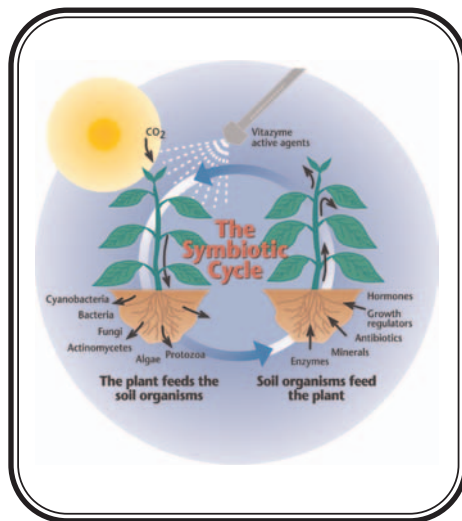
2001 Vitazyme Field Trial

This is the seventh year of major testing of Vitazyme for a wide array of crops across the United States and in other countries. As in other years, the product has done very well over a wide range of soil and climate conditions, even in places like Kentucky where growing conditions were very unfavorable; sometimes good weather reduce crop responses to Vitazyme, but not in 2001.

For those unfamiliar with Vitazyme soil and plant biostimulant and its recommended program, please review the information given below to understand how the material works within the plant-soil system.

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. Organism types include mycorrhizae, cyanobacteria, and various other bacteria, fungi, and actinomycetes.

Vitazyme contains "metabolic triggers" that stimulate the plant to photosynthesize better, fixing more sunlight energy in the form of car-

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 grow better, thus 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:

Soil Organic Matter			Previous Crop		Compaction		Soil NO ₃ -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 % of optimum N:			← 50-60% →		← 60-70% →		← 70-80% →						

bon 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 give a large physiological response from very little activator.

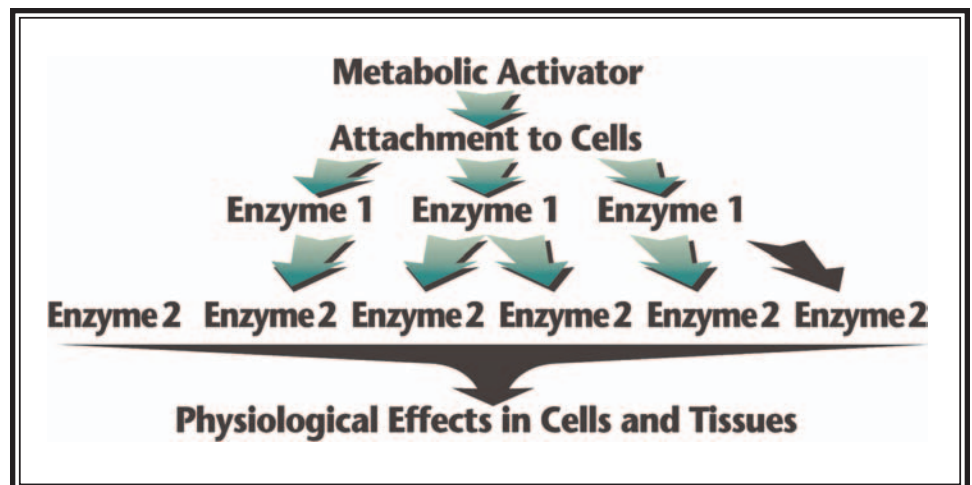
In short, Vitazyme enables the plant to better express its genetic potential by reducing the stresses that repress that expression.

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 a total program. Use crop rotations, minimum tillage, soil conservation practices, and adapted plant varieties.



Vitazyme Highlights for 2001

Weather across the United States was favorable for achieving high crop yields in 2001, although some areas of the North were wet and cold well into late spring. Then the weather turned dry for a protracted period. Despite these adversities Vitazyme did very well in boosting crop yields and quality at many test sites under diverse soil conditions, as this research booklet reveals.

Some major highlights for the 2001 cropping year are as follows.

1 Incorporating Vitazyme with sidedress nitrogen. When the product was applied with sidedressed nitrogen in Kentucky — Vitazyme being the only variable — the yield increased about 14 bu/acre, a very fine response indeed. The return per dollar invested in this test was nearly \$10.00, even for a very good cropping year when returns were expected to be lower for biological agents.

2 Good benefits for corn silage production. Another silage study was conducted in 2001 in New York, resulting in a 14% yield increase and an improvement in several quality parameters such as protein, fiber, and mineral content. Of special interest is an increase in calculated milk income of up to \$339/acre with Vitazyme as estimated by the Milk 2000 program; a similar calculation done with 2000 data using Milk 1995 produced a \$908/acre

income increase.

3 Beneficial effects on soil organisms. Two studies performed on soil organisms, by two of the nation's top soil microbiological laboratories, showed that Vitazyme triggered much higher biomasses of fungi and bacteria compared to the control and to certain other products. At the same time, actinomycetes and nitrogen-fixing bacteria increased in the soil, both being very beneficial responses.

4 Synergisms with other materials. Tests with the seed and soil inoculant T-22 (*Trichoderma harzianum* strain T-22) and Vitazyme produced some good synergisms, demonstrated especially in a corn study in Utah where a seed and foliar application of Vitazyme, together with T-22 on the seeds, increased yield by 13% over the control. The increase was about 39 bu/acre over T-22 alone. The metal Sucrate called "Greenup -6+16" with Vitazyme produced an excellent 30% yield increase with corn in the greenhouse; Greenup -6+16 alone gave only a 23% increase.

5 High pH is not detrimental to Vitazyme. A study involving the treatment of Vitazyme to pH's of 7 to 10 revealed that, despite storage times of over a month, product effectiveness was not reduced by the high pH ... although pH 10 reduced the product's benefits somewhat. Surprisingly

the pH 8 and 9 solutions of Vitazyme actually *increased* corn yield above the pH 7 control, by up to 18% in dry matter above the pH 7 control.

Excellent results with Vitazyme are being realized in tests and actual on-farm use in South Korea, Mexico, Ecuador, the Caribbean, and Sweden. Several flower tests from Ecuador are included in this booklet — all very positive — and test results from South Korea show very good benefits for Chinese cabbage, garlic, onions, radishes, lettuce, peppers, and tomatoes. Mexican farmers are beginning to use Vitazyme in a big way, especially on tomatoes, and Swedish organic farmers will soon have the product to use on their crops after a successful 2001 testing season. Inquiries from other countries continue to arrive, and introductions into other countries of South America, the Far East, Europe, and Africa could begin in 2002.

Vitazyme continues to consistently prove itself as a reliable agronomic and horticultural amendment, producing in most cases a high return on investment. It appears that a great variety of application systems are effective, including additions with sidedress fertilizer as revealed this year ... and mixing the product with high pH materials in the tank — and even storing these alkaline mixes for some time — is not deleterious to its activity.

Vitazyme Field Tests for 2001

Solution pH Over Time and Effects On Corn

Researcher: Paul W. Syltje

Location: Vital Earth Resources Research Center, Gladewater, Texas

Purpose: Little information is available regarding the effects of the pH of the solution during storage on the resultant effectiveness of Vitazyme's active agents for plant growth. Therefore, this study, using corn as the test crop, was initiated to answer the questions of efficacy with pH over time.

Experimental design and conduct: Two Vitazyme concentrations were used in this study — 1% and 100% — to simulate conditions during use in the field when mixed either undiluted or diluted with agricultural chemicals. These solutions were placed in beakers which were sealed with Parafilm to prevent evaporation. For each concentration, the pH of the solution was adjusted to pH 7.0, 8.0, 9.0, or 10.0. These dilutions, prepared on April 4, 2001, are summarized in Table 1. The pH of each solution was determined again on May 7, 2001, 34 days after initial preparation.

Solution pH*	Parts of Vitazyme	Parts of Water (distilled)
	100% solution	1% solution
7.0	100:0	1:99
8.0	100:0	1:99
9.0	100:0	1:99
10.0	100:0	1:99

* Solution pH was adjusted using a NaOH solution having a pH of 12.90.

Table 1 (left). Dilutions of Vitazyme at various pH's of a corn efficacy study

On May 8, 2001, the corn study was initiated in the Vital Earth Resources Research Greenhouse. One gallon pots were filled with Bowie fine sandy loam and placed in a complete block arrangement (eight replications), with five treatments for each concentration. See Table 2 for a summary of these treatments.

Table 2 (next page). Treatments for corn in a Vitazyme study using two concentrations of product stored at various pH's

Seven corn seeds (yellow dent, treated with Captan fungicide) were planted in each pot at a depth of 0.75 inch, and each pot received 100 ml of solution carefully distributed to the soil surface of the pots. The 100% Vitazyme pots received 100 ml of a 0.1% (1 ml/liter) solution of actual Vitazyme, while the 1% Vitazyme pots received 100 ml of a 0.05% (50 ml/liter) solution of actual Vitazyme. The 1% solution was applied half as concentrated as the 100% solution because there was not enough prepared solution of the 1% concentration.

On May 5, 2001, the emerged corn plants were thinned to three aggressive plants per pot, and on May 30, 2001, 22 days after planting, the plants were harvested. All soil was washed from the roots, the height of each plant was measured, and the plants were dried in a drying oven at about 115° F for two days. Each set of three plants from each pot was weighed to the nearest 0.01 gram, and a statistical analysis (ANOVA) was run on each concentration (100% and 1%) using Cohort software.

Results:

Solution pH changes over 34 days

The pH of the stored solutions tended to move towards neutrality over the 34-day storage period. Interestingly, the 1% concentration moved more towards neutrality than did the 100% concentration (see Figure 1).

Treatment	Vitazyme, 100%	Vitazyme, 1%
1. Control	none	none
2. pH 7.0	x	x
3. pH 8.0	x	x
4. pH 9.0	x	x
5. pH 10.0	x	x

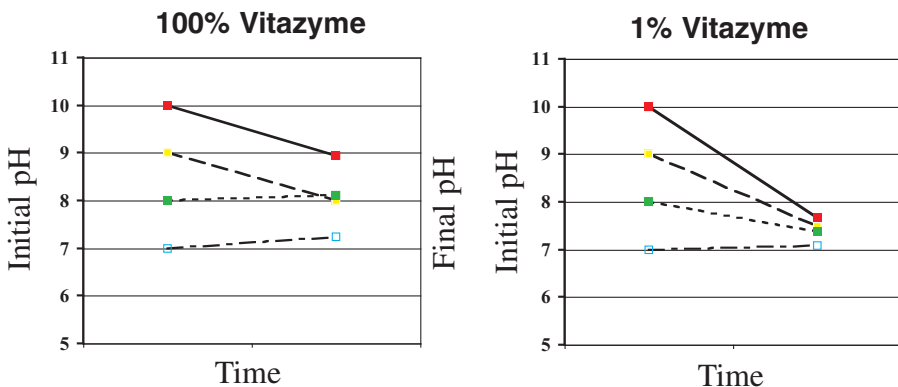


Figure 1. pH changes during 34 days of storage of Vitazyme solutions

Vitazyme tended to move towards neutrality (pH 7.0) at both the 1% and 100% concentrations when stored at room temperature for 34 days. This was equally true for the dilute (1%) solution, where all four solution pH's ended up between pH 7.08 and 7.66 at the end of the storage period.

Corn Growth Effects

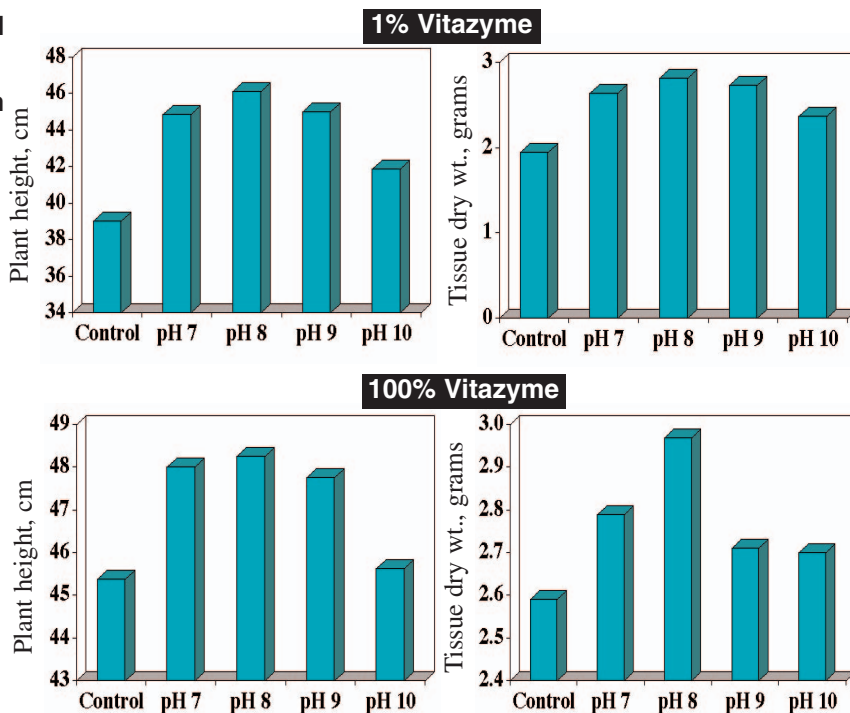
The average height and weight of the corn plants for the treatments are shown in Figure 2.

Figure 2. Corn heights and weights treated with Vitazyme solutions stored at five pH's

Table 3 (below). A statistical analysis of a corn study, using Vitazyme stored at different pH's

Treatment	Corn height (cm)	Tissue dry weight (g)
1% Vitazyme*		
3. pH 8.0	46.13 a (+18%)	2.81 a (+44%)
4. pH 9.0	45.00 a (+15%)	2.73 a (+40%)
2. pH 7.0	44.88 ab (+15%)	2.64 ab (+35%)
5. pH 10.0	41.88 bc (+7%)	2.37 b (+22%)
1. Control	39.00 c	1.95 c
LSD _{0.10}	2.02	0.23
100% Vitazyme*		
3. pH 8.0	48.25 a (+6%)	2.97 a (+15%)
2. pH 7.0	48.00 a (+6%)	2.79 ab (+8%)
4. pH 9.0	47.75 a (+5%)	2.71 ab (+5%)
5. pH 10.0	45.63 a (+1%)	2.70 ab (+4%)
1. Control	45.38 a	2.59 b
LSD _{0.10}	1.91	0.22

*Means followed by different letters are significantly different according to the Tukey-Kramer Test.



Conclusions: This study reveals that Vitazyme significantly improved corn height and dry weight at any product pH when stored for 34 days, but especially at pH 8.0. Thus, the use of Vitazyme in fertilizer or pesticide solutions of pH 7.0 to 9.0 is recommended, and such use can boost product efficacy. Product effectiveness when stored at pH 10.0 appears to be somewhat diminished.

Bananas

Location: Vital Earth Resources Research Center, Gladewater, Texas

Planting date: summer, 1998

Experimental design: This study continued the experiment begun in 2000. Two banana plants that were of nearly equal vigor and size the spring of 2000 were treated through the summer of 2000, giving a large advantage to the Vitazyme treatment. Treatments were continued the summer of 2001.

1. Control

2. Vitazyme

Fertilizer treatments: Both plants received a 6-inch layer of turkey manure compost (Vital Earth Premium Grade Compost) to about a foot in radius from the stem of the plants.

Vitazyme treatment: a leaf spray application of a 1% solution three times from June through September of 2001

Leaf chlorophyll: On October 19, a Minolta SPAD meter was used to evaluate the chlorophyll in the top five leaves of the main stem plants for each treatment (10 subsamples per plant)

Soil type: Bowie fine sandy loam

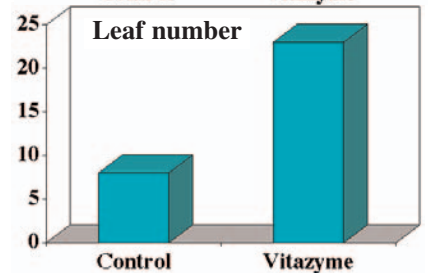
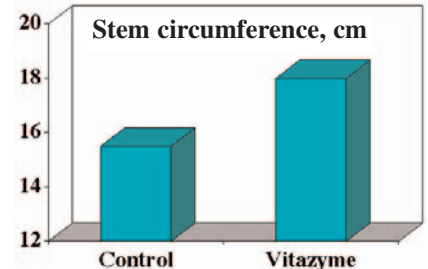
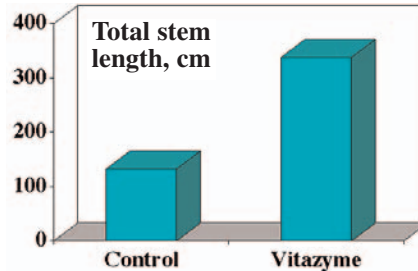


The Vitazyme treated plant in the foreground displayed much better tillering than the control plant.

	Control	Vitazyme	Change
	----- SPAD Units -----		
Leaf chlorophyll	29.8	30.2	0.4

Growth parameters: On October 19 a series of measurements were made to evaluate differences in the two plants. The main plants looked quite similar in 2001, likely due to the compost application to both stems, but the Vitazyme plant had many more tillers.

Conclusions: Vitazyme continued to improve overall banana plant growth into the second year of this study. Although a liberal compost application to both plants tended to mask differences in soil fertility and growth elicited by Vitazyme so noted in 2000, differences in growth were still marked, especially in tillering . . . where Vitazyme encouraged three tillers to none for the untreated plant.



Parameter	Control	Vitazyme	Change
Main stem plus tillers	1	4	3 (+300%)
Heights:			
Main stem, cm	132	133	1 (+1%)
Tillers	—	107, 83, 15	
Total stem length, cm	132	338	206 (+156%)
Leaf number:			
Main stem	8	8	
Tillers	0	6, 6, 3	
Total leaves	8	23	15 (+188%)
Longest leaf, cm	59	56	3 (-5%)
Widest leaf, cm	29	29	0
Stem circumference at 10 cm, cm	15.5	18.0	2.5 (+16%)

Basil

Researcher: California Herb and Spice

Variety: Italian large leaf sweet basil

Soil type: San Joaquin silt loam

Experimental design: A large and uniform field of 40 acres of basil was divided into four 5-acre plots of about 30 rows each. The plot treatments were as follow:

1. Control 2. Awaken 3. Vitazyme + Awaken 4. Vitazyme

Fertilization: 125 lb/acre of N and 75 lb/acre of P₂O₅ drilled in at planting

Vitazyme treatment: 13 oz/acre sprayed on the leaves and soil at 4 weeks after planting, about 15 days before the first cutting.

Awaken treatment: 32 oz/acre sprayed on the leaves and soil at 4 weeks after planting, about 15 days before the first cutting.

Vitazyme + Awaken treatment: 13 oz/acre and 32 oz/acre respectively of Vitazyme and Awaken combined

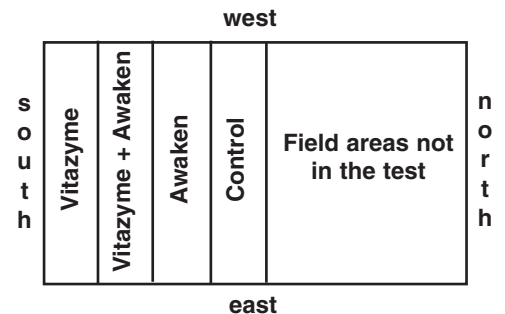
Harvest date: late August, 2001

Growth and yield results: On August 28, 2001, samples of the treatments were collected to evaluate dry matter weight per plant, overall appearance and size, and root growth. Chlorophyll levels were also determined using a Minolta SPAD Meter.

Location: Terra Bella, California

Planting date: the last week in June

Watering: sprinkler irrigated



Leaf Chlorophyll

	Control	Awaken	Awaken + Vitazyme	Vitazyme
	----- SPAD units -----			
Leaf chlorophyll*	41.5	43.4	45.0	45.6

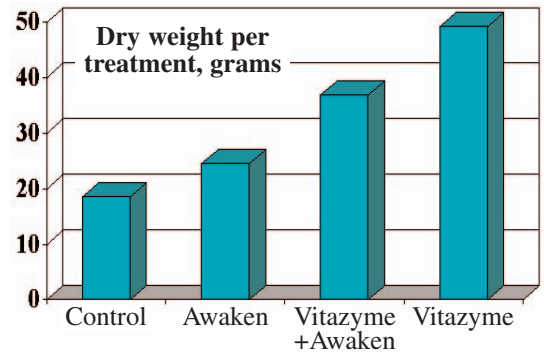
*Average of 30 representative leaves for the treatment.

Plant Dry Weight

Actual cut yield values were not obtained in 2001, though they were in 2000 (see the Conclusions).

	Control	Awaken	Awaken + Vitazyme	Vitazyme
	-----\$/acre-----			
Dry weight*	18.5	24.5 (+32%)	36.9 (+99%)	49.1 (+165%)

*Seven average plants were collected from each treatment by sampling two areas to get 20 to 25 plants. To remove bias, small and large plants were discarded, and then normal plants were laid out and every other plant (up to 7 plants) were selected for the sample. Samples were dried and weighed at J.M. Lord, Inc., Fresno, California.



Fusarium Wilt Infection

Control	Awaken	Awaken + Vitazyme	Vitazyme
High	Medium	Medium	Medium

Note: All areas received a special anti-Fusarium soil treatment.

Conclusions: Results using Vitazyme in this basil test were quite dramatic as leaf size and number were improved considerably, with only one application of Vitazyme applied two weeks before cutting began. Both Awaken and Vitazyme markedly increased leaf and root growth, but especially Vitazyme.

If Vitazyme had been applied at planting, and perhaps once more during the growing season, it is likely the Vitazyme treatments would have performed even better.

The results of this 2001 study are similar to results from 2000, when the yield increase from foliar Vitazyme application was 21% (625 more dry lb/acre), which gave a \$2,187.50 income increase per acre.

Comments from the grower (Eugene Batters):

- “The product is doing very well! I intend to use it on my entire acreage next year.”
- “I got double the production in terms of pounds per acre with the Vitazyme as I did with the normal program.”
- “The treated stems are large, and I have raised the cutter bar 2 to 3 inches so I will get the vigorous new growth.”
- “The plants are coming back faster where Vitazyme is applied.”
- “The roots of the treated plants are more massive than those of the control.”
- “Leaves on the Vitazyme treatment are so much bigger than the others. Two inches wide versus the usual 1 to 1.25 inches wide.”
- “Together with the new soil treatment I am getting good control of Fusarium wilt.”

• **Increase in leaf chlorophyll with Vitazyme: 4.1 SPAD units**



While Awaken increased basil weight by 32%, Vitazyme increased dry weight by an amazing 165% versus the control, as can be seen in this photograph.

• **Dry weight increase with Vitazyme: 165%**

Bush Beans

Southern Regional Project S-269: Evaluation of Biological Seed Treatments

Researchers: William Batson, Ph.D., Mississippi State University, Mississippi State, Mississippi
Bonnie Ownley, Ph.D., University of Tennessee, Knoxville, Tennessee

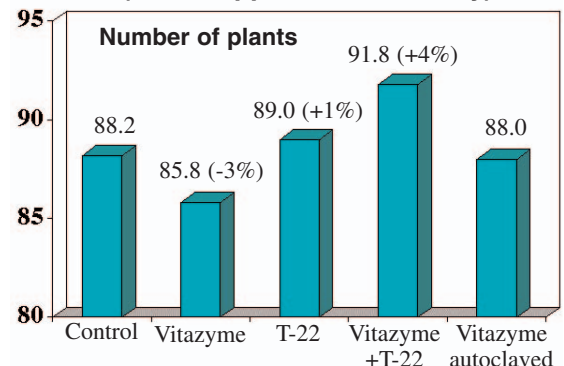
Experimental design: Four lots of bush beans were sent to Vital Earth Resources from Dr. Batson for treatment with Vitazyme and T-22 (*Trichoderma harzianum*, strain T-22). The treatments were as follows:

- (1) Lot 1. **Regular Vitazyme** (10%), with seeds soaked for five minutes and then dried.
- (2) Lot 2. **T-22** (1 oz/gallon of soluble powder), with seeds soaked for five minutes and then dried.
- (3) Lot 3. **Vitazyme** (10%) + **T-22** (1 oz/gallon), with seeds soaked for five minutes and then dried.
- (4) Lot 4. **Vitazyme autoclaved** (10%), with seeds soaked for five minutes and then dried. [The Vitazyme was autoclaved at 15 lb/in² pressure for 15 minutes at 121°C.]

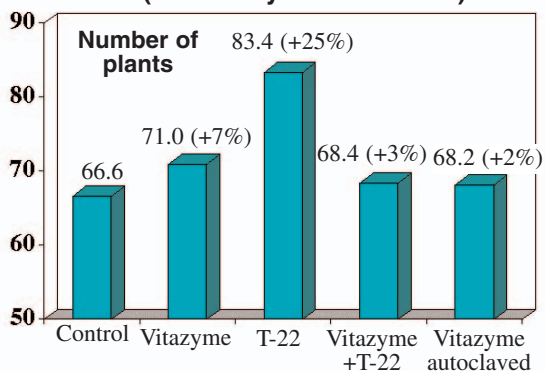
Care was taken to maintain cleanliness during the inoculation process. The seeds were returned to Dr. Batson at Mississippi State and sent to the researchers for growth studies at the research stations. The seeds were planted in 30 to 40-foot rows, and populations were determined after 28 days of growth. Final stand counts were used to determine the effectiveness of the products to enhance seed germination for the various other products and the control. Twenty-four total treatments were involved in this study.

Conclusions: Unfortunately there were no significant differences among the various treatments, and the control treatment did very well compared to the others. Even so the T-22 and Vitazyme treatments did well in most cases, especially T-22 alone in the Tennessee study (+25%); in that study

MISSISSIPPI (Mississippi State University)



TENNESSEE
(University of Tennessee)



Vitazyme increased plant survivability by 7%. The combined Vitazyme + T-22 increased surviving plants in both tests, by 3 to 4%, showing that there is good compatibility between the two materials.

Parsley Responds Well to Vitazyme!

In late 2001 four equal-sized pots of newly sprouted parsley were placed in the Vital Earth Resources Research Greenhouse. Two were treated with 200 ml of a 0.1% Vitazyme solution per pot and the other two were left untreated. Note the great difference in growth only 26 days after treatment.

Average height with Vitazyme: 5.4 inches
Average height of the control: 3.1 inches



Pinto Beans

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Pinto beans

Pot size: one gallon

Soil type: Bowie fine sandy loam

Planting rate: seven seeds/pot, thinned to three

Replicates: five

Planting date: February 22, 2001

Experimental design: Seven treatments were used to evaluate any possible synergism between T-22 (*Trichoderma harzianum*, strain T-22) and Vitazyme with pinto beans. Various soil and foliar combinations were used.

- Control
- T-22 on the soil
- Vitazyme on the soil
- T-22 on the leaves
- Vitazyme on the leaves
- T-22 and Vitazyme on the soil
- T-22 and Vitazyme on the leaves

T-22 and Vitazyme treatments: T-22 was applied as a 1% Plant Shield suspension (1 oz/gallon of water), at 100 ml/pot at planting (soil), or as a spray on all leaf surfaces at three weeks after planting along with 2 tbsp/gal of Sunspray crop oil. Vitazyme was applied with a 0.1% solution (1 ml/liter) at 100 ml/pot at planting (soil), or as a 1% solution at 3 weeks after planting along with 2 tbsp/gal of Sunspray.

Growth results: On April 4, 2001, 41 days after planting, the roots were washed clean of soil and dried in a drying oven at 115°F. Weights were determined to the nearest 0.01 gram for each pot. Analyses of variance was completed using Cohort software.

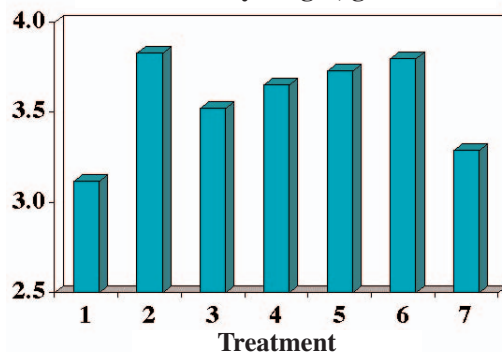
DRY WEIGHT

Treatment	Dry weight*	Increase vs. control
	g	g
2 (T-22, soil)	3.83 a	0.71 (+23%)
6 (T-22+Vit, soil)	3.80 ab	0.68 (+22%)
5 (Vit, leaves)	3.73 ab	0.61 (+20%)
4 (T-22, leaves)	3.65 ab	0.53 (+17%)
3 (Vit, soil)	3.52 abc	0.40 (+13%)
7 (T-22+Vit, leaves)	3.29 bc	0.17 (+5%)
1 (Control)	3.12 c	—

* Means followed by the same letter are not significantly different at P=0.10 according to Duncan's Multiple Range Test. LSD_{0.10}=0.31 g.

T-22 applied to the leaves or soil, and together with Vitazyme when applied to the soil, plus Vitazyme applied to the leaves of these pinto bean plants significantly increased plant dry weight above the control. Vitazyme applied to the soil gave a 13% nonsignificant yield increase, while the T-22 and Vitazyme combination applied to the leaves gave only a small (5%) yield increase.

Plant dry weight, grams



Conclusions: Both Vitazyme and T-22 gave significant yield increases (20 to 23%): T-22 on the soil and Vitazyme on the leaves. The T-22 leaf application also gave a significant weight increase, showing its potential use as a foliar spray.

Snap Beans

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Kentucky Wonder

Soil type: Bowie very fine sandy loam

Planting rate: 7 seeds/pot, thinned to 3 plants/pot

Pot size: one gallon

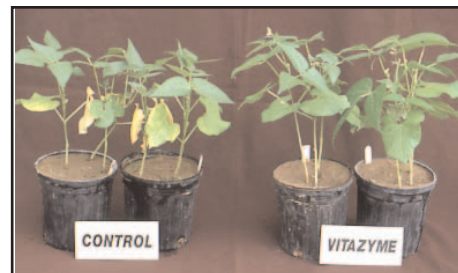
Experimental design: A complete block design using eight replications was set up with four treatments, two of which are described in this report; the other two treatments received another nutrient fertilizer. The pots were watered on demand, and maintained at 55°F to 80°F during the growing period.

- Control
- Vitazyme

Fertilization: none

Vitazyme treatments: 100 ml of a 0.002% solution applied over the soil surface after planting; control pots received 100 ml of water only.

Growth results: The Vitazyme treated plants had taller stems, larger leaves, and enhanced maturity throughout the growing cycle, which also translated into greater flower and bean development.



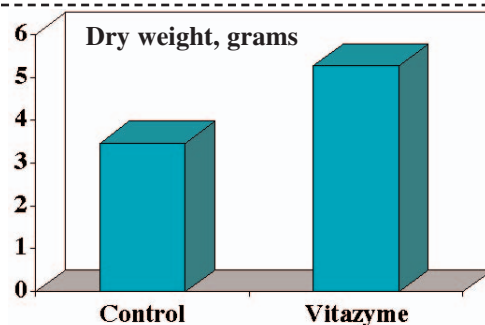
Notice how Vitazyme increased overall plant size and development in this greenhouse study. Note also the improved chlorophyll development with Vitazyme.

Yield and harvest results: On December 4 the plant roots were washed thoroughly, bean and flower counts were made, and plant heights were measured. Then the plants were thoroughly dried in a drying oven at 115°F, and weights for each pot were measured to the nearest 0.01 gram.

Plant Dry Weight

	Control	Vitazyme	Change
	----- grams -----		
Dry weight*	3.46 b	5.28 a	1.82 (+53%)

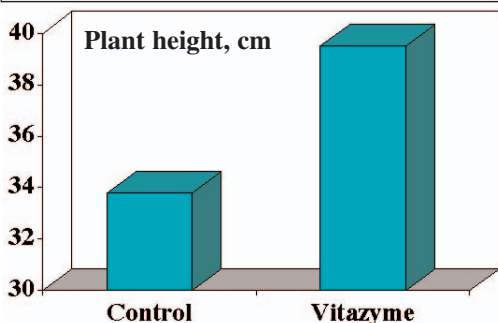
* Means followed by different letters are significantly different at P=0.10 according to the Student-Newman-Keuls Test. LSD_{0.10}=0.42g.



Plant Height

	Control	Vitazyme	Change
	----- cm -----		
Plant height*	33.8 b	39.5 a	5.7 (+17%)

* Means followed by different letters are significantly different at P=0.10 according to the Student-Newman-Keuls Test. LSD_{0.10}=2.2cm.



Conclusions: In this greenhouse pot study, Kentucky Wonder bush beans responded extremely well to Vitazyme

application, increasing all measured growth parameters substantially and highly significantly.

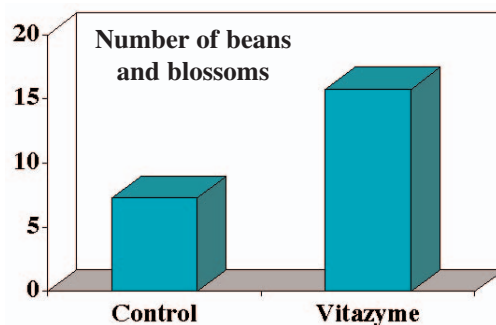
Dry weight increased by 53%, height by 17%, and beans and blossoms by 116% over the control. Of particular interest is the fact that the potential bean yield was dramatically improved with Vitazyme, as evidenced by a much higher increase in reproductive meristems versus total dry plant tissue mass . . . 116% vs. 53%. This

demonstrates the potential of Vitazyme to benefit bean farmers by increasing flowering and bean production through its metabolic stimulating effects.

Beans and Blossoms

	Control	Vitazyme	Change
Number of beans and blossoms*	7.3 b	15.8 a	8.5 (116%)

* Means followed by different letters are significantly different at P=0.10 according to the Student-Newman-Keuls Test.



• **Increase in dry weight: 53%**

• **Increase in plant height: 17%**

• **Increase in beans and blossoms: 116%**

Cabbage (Transplants)

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Soil medium: Vital Earth Ultra-Blend Potting Soil

Variety: Copenhagen Market

Planting date: January 19, 2001

Pot size: 3.25 in. x 3.25 in.

Experimental design: Forty pots were planted and placed on a greenhouse bench. Half of the pots were treated with Vitazyme and the other half was left untreated.



The dramatic improvement in leaf size and plant height of cabbage transplants can be seen in these contrasting flats of plants (Vitazyme treatment on the right).

1. **Control**

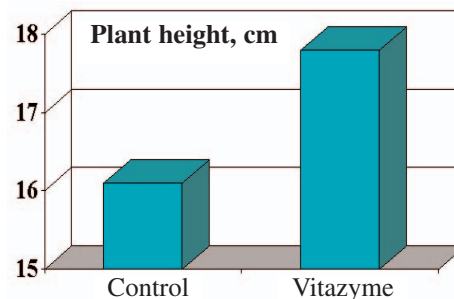
2. **Vitazyme**

Vitazyme treatment: 50 ml of a 0.1% Vitazyme solution applied to each pot immediately after planting

Growth results: On February 25, 2001, 37 days after planting, the forty plants were measured for height and leaf width, and the data were statistically analyzed as a

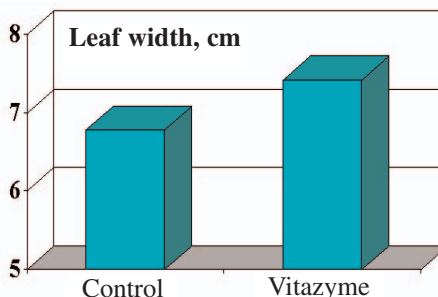
	Control ¹	Vitazyme ¹	Change
	----- cm -----		
Plant height	16.1 b	17.8 a	1.7 (+11%)

¹Means followed by the same letter are not significantly different at P=0.05 according to Tukey's Honestly Significant Difference Test. LSD_{0.05}=1.6 cm.



	Control ¹	Vitazyme ¹	Change
	----- cm -----		
Leaf width	6.78 b	7.42 a	0.64 (+9%)

¹Means followed by the same letter are not significantly different at P=0.05 according to Tukey's Honestly Significant Difference Test. LSD_{0.05}=0.63 cm.



completely randomized design.

Conclusions: Vitazyme significantly stimulated the early growth of cabbage transplants, by 11% for height and 9% for leaf width. This early aggressiveness for the plants should translate into more vigorous and profitable growth of mature plants when the product is applied on a commercial scale.

Chinese Cabbage

Research company: Dae Yu Company, Ltd.

Location: Kyungju City, Kyungbuk, Korea

Soil type: clay loam

Transplanting date: September 20, 2000

Experimental design: This plot study involved five treatments with three replicates, involving 180 pots (12 plants per plot). The five treatments are as follows:

1. Control
2. Vitazyme
3. Product A
4. Product B
5. Product C

Fertilization: unknown

Vitazyme application: A 1:250 solution (0.4%) of Vitazyme was applied as a foliar spray on the leaves and soil on October 7, 14, and 21.

Data collection: Growth parameters were measured on December 3.

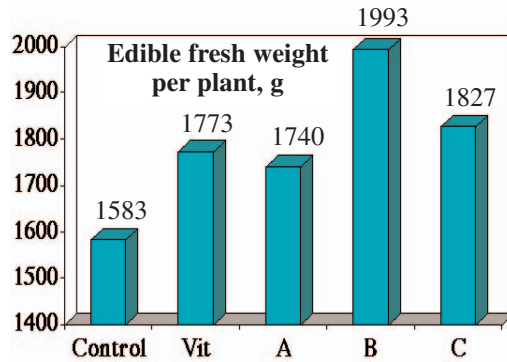
Conclusions: Vitazyme increased Chinese cabbage growth and yield in this Korean study, along with the other three products tested. Product B did especially well, but the final yield increase for all four products was not significantly different.

Researcher: unknown

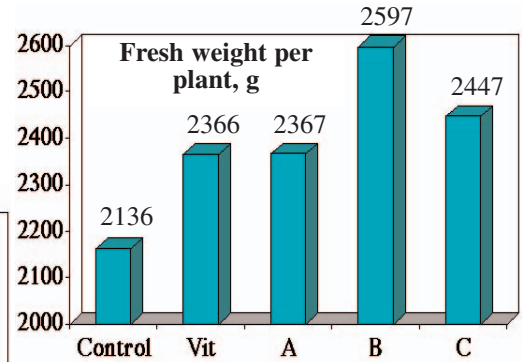
Variety: Nongwoo Green

Plant number: 180

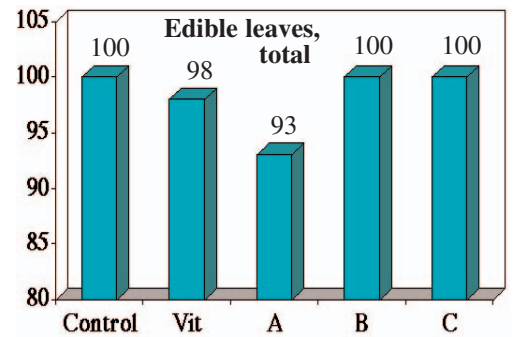
Edible fresh weight per plant



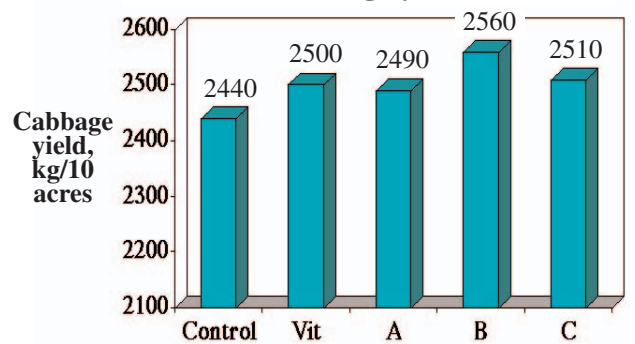
Fresh weight per plant



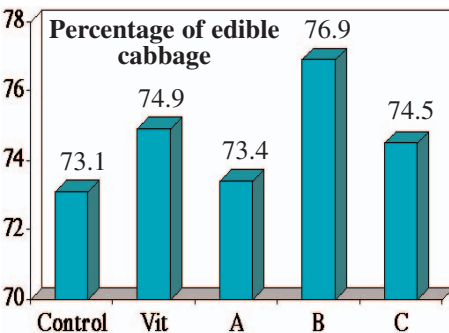
Edible leaves



Cabbage yield



Edible cabbage, %



• **Increase in edible fresh weight per plant with Vitazyme: 12%**

• **Increase in fresh weight per plant with Vitazyme: 11%**

Red Clover (Cover Crop)

A Testimonial

Location: Blaine, Maine

Variety: unknown

Soil type: gravelly loam

Experimental design: Fields of oats were underseeded with red clover as a cover crop, to plow down in preparation for potatoes next year. Some parts of the fields were sprayed with Vitazyme.

1. Control

2. Vitazyme

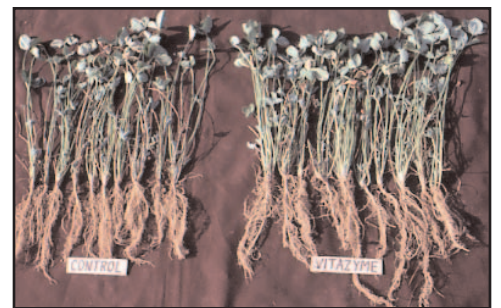
Fertilization: the same for all areas

Vitazyme treatment: 13 oz/acre one time, sprayed over the leaves and soil

Growth results: Observations on August 19 revealed several benefits of plants treated with Vitazyme, versus untreated control plants:

- Taller, leafier plants
- More tillers
- Larger root systems with more fine root hairs

Alan Perry: "Denis was very excited about the root differences discovered during the growing season."



Red clover treated only once with Vitazyme displays a marked increase in root and top growth versus the control. Samples were taken only a short distance from one other in a split field.

Coffee

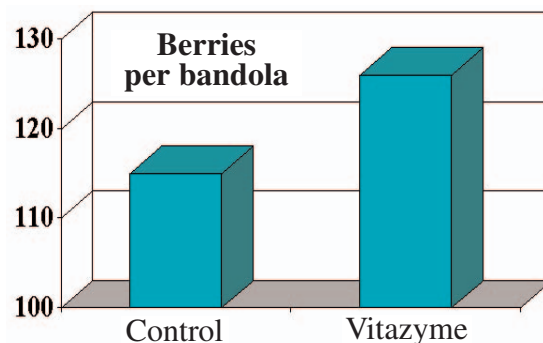


Coffee treated with Vitazyme in Costa Rica produced more flowers and berries, an excellent response.

Research farm: El Rodeo farm
Location: Costa Rica
Variety: unknown
Soil type: unknown
Experimental design: A small part of a coffee plantation was treated with Vitazyme, and an adjoining area was left as a control.

1. Control
2. Vitazyme

Fertilization: unknown
Vitazyme treatment: Vitazyme at 13 oz/acre (1 litre/ha) at midseason on the foliage and soil



Number of Coffee Berries per Bandola

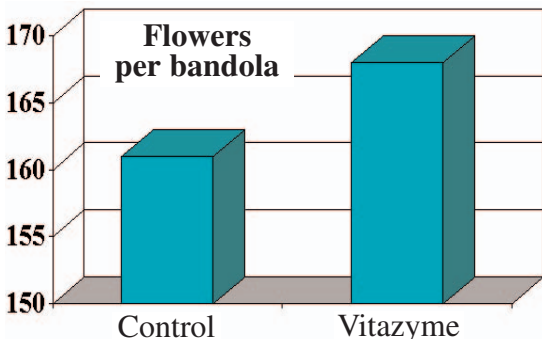
	Control	Vitazyme	Change
	-----ave. of four reps-----		
Berries/bandola	115	126	11 (+10%)

Number of Flowers per Bandola (April, 2001)

	Control	Vitazyme	Change
	-----ave. of four reps-----		
Flowers/bandola	161	168	7 (+4%)

• Yield increase: 15%

Yield increase: A yield increase of 15% was determined although the actual harvested weight was not available.



Conclusions: The improvements in coffee plant characteristics as a result of only one Vitazyme application — 4% more flowers and 11% more berries — resulted in a pronounced yield increase of 15%.

Corn

Research Organization: Cecilia Farm Service, Inc.

Variety: Novartis 6367

Planting date: April 10, 2001

Experimental design: A test field was divided into five portions, each with a treatment as shown below.

Row spacing: 30 in

Soil type: unknown

Location: Cecelia, Kentucky

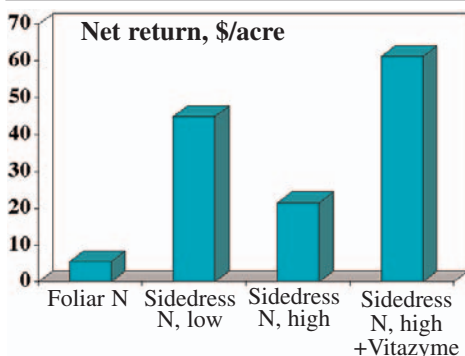
Population: 26,600 seeds/acre

Treatment	Foliar N	Sidedress N	Vitazyme
1. Control	0	0	0
2. Foliar N	5 gal/acre of 28% N	0	0
3. Sidedress N, low	0	80 lb/acre of 28% N	0
4. Sidedress N, high	0	105 lb/acre of 28% N	0
5. Sidedress N, high + Vitazyme	0	105 lb/acre of 28% N	13 oz/acre

Fertilization: 50-60-60 lb/acre N-P₂O₅-K₂O preplant incorporated; sidedress fertilizer as shown above

Vitazyme treatments: 13 oz/acre along with the 28% nitrogen solution, applied June 9

Yield and income results: Harvest was on October 11, 2001.



Treatment	Grain yield bu/acre	Increase over the control bu/acre	Product cost* \$/acre	Net return \$/acre
1. Control	102.6	—	0	—
2. Foliar N	112.3	9.7 (+9%)	15.88	5.46
3. Sidedress N, low	124.4	21.8 (+21%)	33.25	44.85
4. Sidedress N, high	138.1	35.5 (+35%)	26.52	21.48
5. Sidedress N, high + Vitazyme	151.9	49.3 (+48%)	37.25	61.27

* Product costs were determined by Cecilia Farm Service, including \$4.00/acre for Vitazyme and \$2.00/bu for corn.

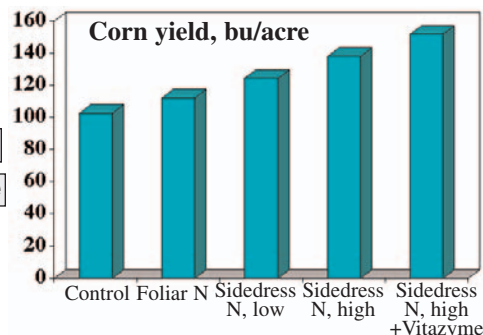
• Return per dollar invested in Vitazyme: \$ 9.95

True increase from Vitazyme

Yield: Treatment 5 vs. Treatment 4: 151.9 bu/acre – 138.1 bu/acre = **13.8 bu/acre**

Net income: Treatment 5 vs. Treatment 4: \$61.27/acre – \$21.48/acre = **\$39.79/acre**

Conclusions: In this corn study in Kentucky, Vitazyme proved to be highly beneficial to corn production in terms of yield increase and income increase. The 13.8 bu/acre increase in yield provided an extra \$39.79/acre income, showing its high profitability in farming programs.



Corn (Silage)

Milk Returns Calculated by "Milk 95"

Location: Stutzman Research Farm, Arkport, New York **Soil type:** silt loam
Variety: Golden Harvest 7651 Roundup Ready **Row spacing:** 30 inches
Seeding rate: 32,000 seeds/acre **Planting Date:** May 25, 2000
Experimental design: A randomized complete block design was set up with a plot size of 10 x 50 ft. (0.0115 acre). Three treatments were used on the 12 plots with four replications.

1. Control
2. Furrow (seed) application
3. Foliar application

At harvest time the corn from each plot was harvested with a forage chopper, and a sample was placed in a cooler overnight to stop respiration. This sample was then sent to DHI Forage Testing Laboratory in Ithaca, New York.

Fertilization: 175 lb/acre N and 120 lb/acre K₂O preplant incorporated and sidedressed, plus 100 lb/acre 5-24-25-micronutrients starter at planting

Vitazyme treatment: Treatment 2: 13 oz/acre in the seed row at planting; Treatment 3: 13 oz/acre sprayed on the leaves and soil at 15 inches corn height

Harvest date: September 27, 2000

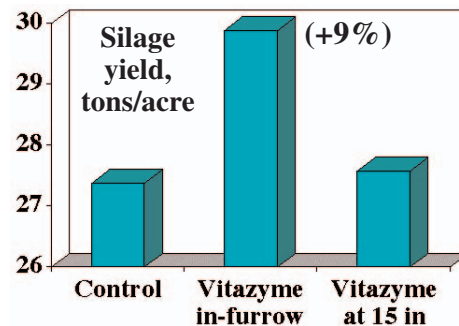
Yield results: Wet silage yields were adjusted to 32% moisture.

	Control*	Vitazyme in furrow*	Vitazyme at 15 in*
----- ave. of four reps -----			
Silage yield	115	126	11 (+10%)

* Means followed by the same letter are not significantly different at P=0.06 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 1.77.

Silage quality results:

Note the graphs for NDF, DM, NDF, as fed, IVTD, DM, and DNDF, DM.



Dry Matter/Moisture

	Control*	Vitazyme in furrow*	Vitazyme at 15 in*
----- % H ₂ O -----			
Moisture content	71.83 a	70.48 b	70.78 ab
Dry matter	28.13 a	29.52 b (+5%)	29.22 ab (+4%)

* Means followed by the same letter are not significantly different at P=0.06 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 0.90.

IVTD, DM*

	Control**	Vitazyme in furrow**	Vitazyme at 15 in**
----- % DM -----			
IVTD	81.10 b	83.15 a (+3%)	82.90 a (+2%)

* IVTD, DM = in vitro true digestibility, expressed in terms of dry matter. It is an anaerobic fermentation performed in the laboratory using rumen fluid from cows consuming a typical ration.

** Means followed by the same letter are not significantly different at P=0.04 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 1.28.

DNDF, DM*

	Control**	Vitazyme in furrow**	Vitazyme at 15 in**
----- % DM -----			
DNDF	57.18 b	61.98 ab (+8%)	66.60 a (+16%)

* DNDF, DM = the digestible portion of the plant less the grain (vegetation portion only); expressed in terms of dry matter

** Means followed by the same letter are not significantly different at P=0.1 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 9.43.

Milk 95 Calculations

Milk 95 is a computer program devised by the Department of Dairy Science and Agronomy at the University of Wisconsin-Madison, to evaluate the probable milk output of dairy cows in response to being fed a ration containing a particular forage . . . in this case corn silage. Taken into account are total yield, dry matter, crude protein, fiber, digestibility, and other factors. Thus, it is a good estimate of forage quality as it relates to milk output and dollar returns.

NDF, DM*

	Control**	Vitazyme in furrow**	Vitazyme at 15 in**
----- % DM -----			
NDF	44.15 b	44.45 a (+1%)	44.43 a (+1%)

* NDF, DM = neutral detergent fiber, expressed in terms of dry matter

** Means followed by the same letter are not significantly different at P=0.1 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 0.32.

NDF, as fed*

	Control**	Vitazyme in furrow**	Vitazyme at 15 in**
----- % as fed -----			
NDF	12.45 b	13.10 a (+5%)	12.93 ab (+4%)

* NDF, as fed = neutral detergent fiber, on an as-fed moist basis

** Means followed by the same letter are not significantly different at P=0.12 according to Tukey's Honestly Significant Difference Test. LSD_{0,1} = 0.85.

Treatment	Return per ton of dry matter	Increase over control	Return per acre	Increase over control
Control	\$258/ton	—	\$7,062/acre	—
Vitazyme in-furrow	\$267/acre	\$9/ton	\$7,970/acre	\$908/acre
Vitazyme at 15 inches	\$265/ton	\$7/ton	\$7,302/acre	\$240/acre

Summary of Silage Quality Parameters, as Affected by Vitazyme*

Treatment	Dry matter	NDF, as fed	NDF, DM	IVTD, DM	DNDF, DM
----- % increase above the control -----					
Vitazyme in-furrow	+5%	+5%	+1%	+3%	+8%
Vitazyme at 15 in	+4%	+4%	+1%	+2%	+16%

Conclusion: Due to increases in silage quality, Vitazyme applied in the furrow or to the leaves and soil increased the per acre and per ton return above the costs of production. A \$908/acre return increase represented the greatest improvement, with the in-furrow treatment.

- **Increase in income with Vitazyme (in furrow): \$908/acre, or \$9/ton**

Corn (Silage)

Location: Stutzman's Research Farm, Arkport, New York

Soil type: silt loam

Planting date: May 22, 2000

Soil test values: pH, 6.8; P, 165 lb/acre; K, 399 lb/acre; Mg, 501 lb/acre; Ca, 3,153 lb/acre; CEC, 12.6 mg/100 g of soil

Experimental design: A randomized complete block design was devised, with each plot 10 x 50 ft (0.0115 acre). Three replicates were utilized, with five treatments, or 15 total plots. The treatments were as follows:

Variety: Mycogen 108

Population: 30,000 plants/acre

Row spacing: 30 inches

Harvest date: September 11, 2001

1. Control

2. Vitazyme at 13 oz/acre in the seed furrow with pop-up fertilizer at planting plus 100% N

3. Vitazyme at 13 oz/acre in the dry fertilizer, 2 x 2 inch placement from the seeds

4. Vitazyme at 13 oz/acre in the seed furrow with pop-up fertilizer at planting, plus 100% N, and Vitazyme a second time at 13 oz/acre at 20-inch height

5. Same as Treatment 4, but 70% N

Fertilization : 80 lb/acre N + 145 lb/acre K₂O plowed down in the fall; 80 lb/acre N topdressed July 15

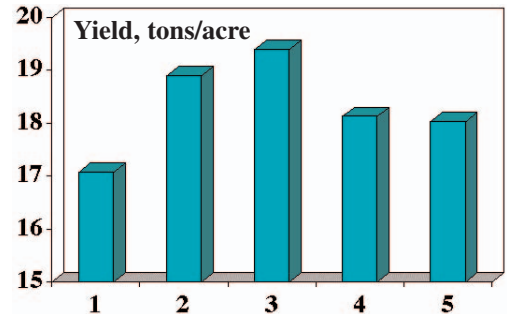
Vitazyme treatments: Treatments 2, 4, and 5 received 13 oz/acre of Vitazyme directly on the seed at planting, while Treatments 4 and 5 were given an additional 13 oz/acre sprayed over the plants and soil at 20 inches in plant height. Treatment 3 received 13 oz/acre of Vitazyme in the dry fertilizer, placed 2 inches below and 2 inches beside the seed row.

Weather during the growing season: The entire growing season had minimal rain, with severe drought conditions by mid-summer. Temperatures in mid-summer were usually high. Rainfall amounts: May, 2.7 in; June, 2.5 in; July, 1.9 in; August, 2.8 in; September, 1.7 in; total, 10.5 in.

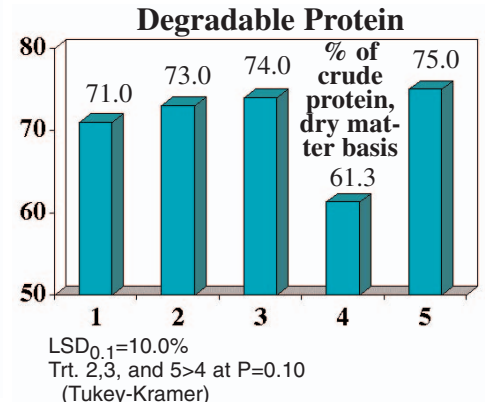
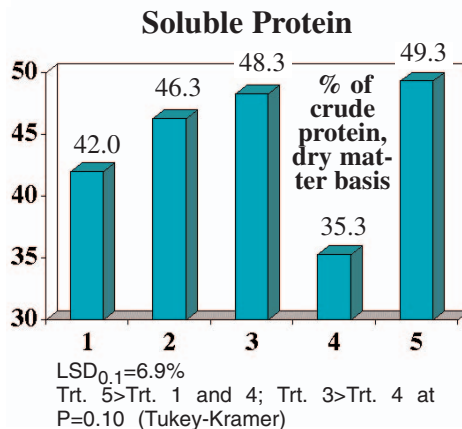
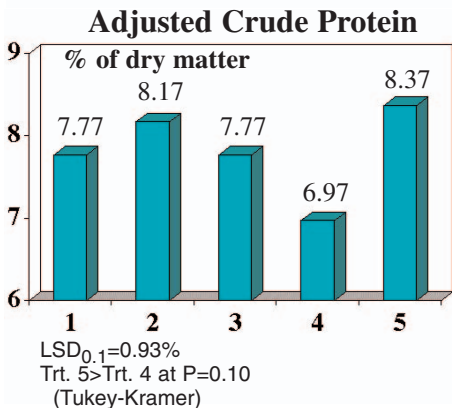
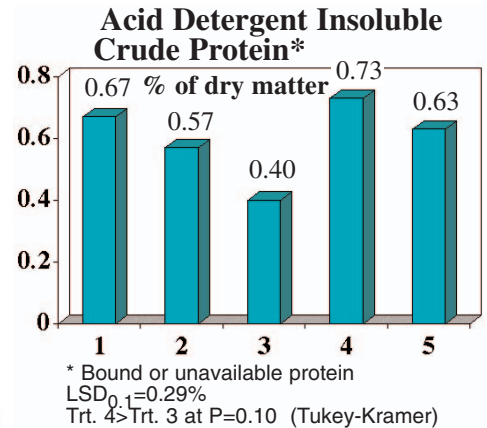
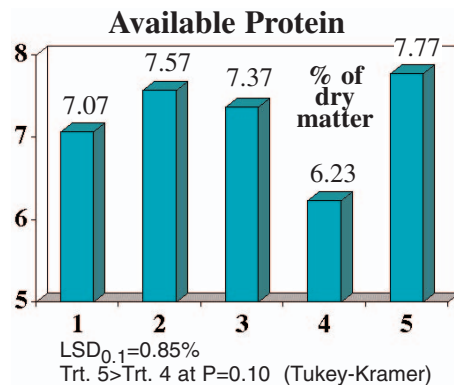
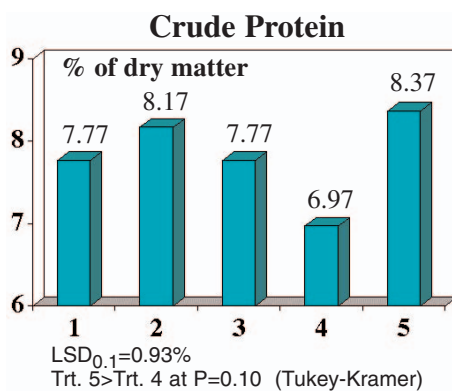
Yield results: Because of the severe drought, growing conditions were highly unfavorable for respectable yields. On August 15 it was obvious that tasseling was being restrained by the lack of moisture, but rains on August 16, 19, 26, and 28 – totaling 3.8 inches – recovered the crop to some degree.

Treatment	Yield ¹	Change vs. control
		----- tons/acre -----
3. Vitazyme in fertilizer	19.40	(+2.33 (+14%))
2. Vitazyme on seed + 100% N	18.90	(+1.83 (+11%))
4. Vitazyme on seed + leaves + 100% N	18.13	(+1.06 (+6%))
5. Vitazyme on seed + leaves + 70% N	18.03	(+0.96 (+6%))
1. Control	17.07	—

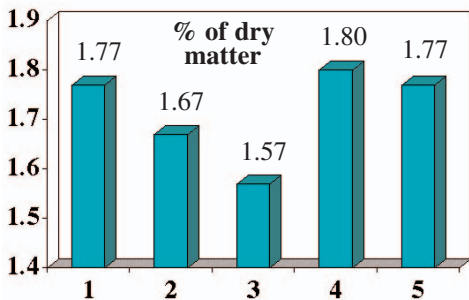
¹ Adjusted yield to 32% dry matter. Yields are not significantly different at P=0.10, but Treatment 3 is greater than the control at P=0.12 according to the Tukey-Kramer Test. LSD_{0,1}=2.63 tons/acre



Quality and feeding value results: A number of quality and feeding value parameters were determined at the DHI Forage Testing Laboratory in Ithaca, New York. These evaluations are shown below. All are calculated on a dry matter basis.

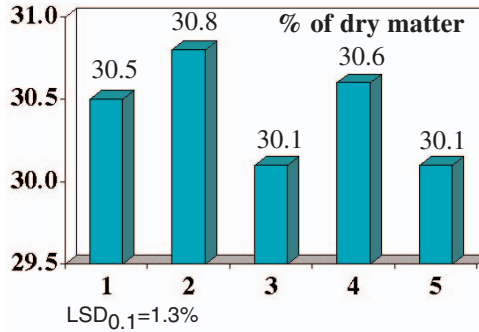


Neutral Detergent Insoluble Crude Protein*



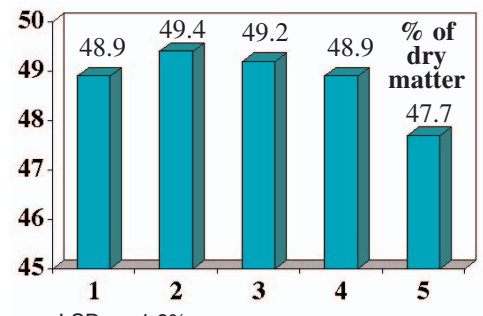
*Utilizable protein that is not termed available
LSD_{0.1}=0.26%

Acid Detergent fiber



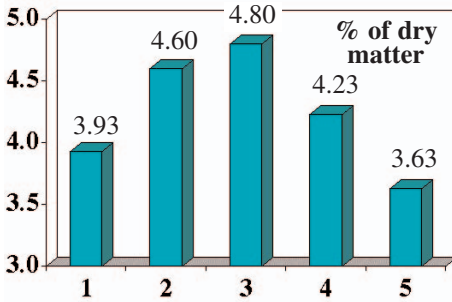
LSD_{0.1}=1.3%

Neutral Detergent Fiber



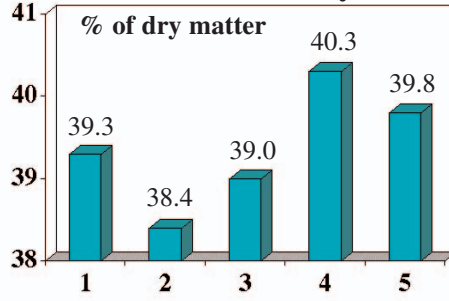
LSD_{0.1}=1.6%
Trt. 2>Trt. 5 at P=0.10 (Tukey-Kramer)

Lignin



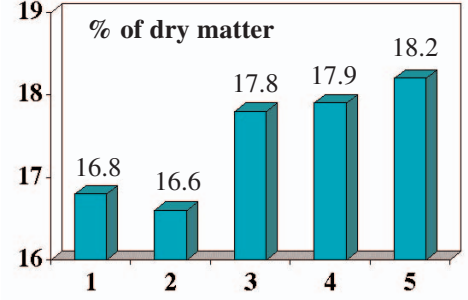
LSD_{0.1}=1.22%

Non-Fiber Carbohydrate



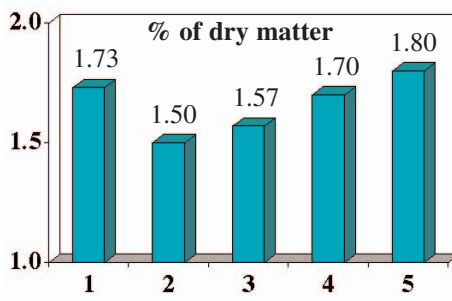
LSD_{0.1}=2.5%

Starch



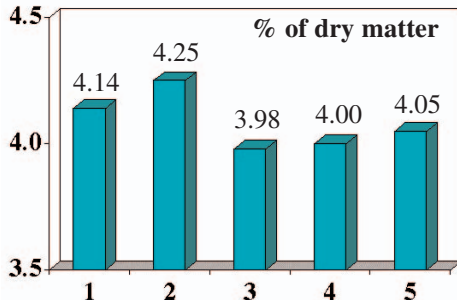
LSD_{0.1}=2.0%

Crude Fat



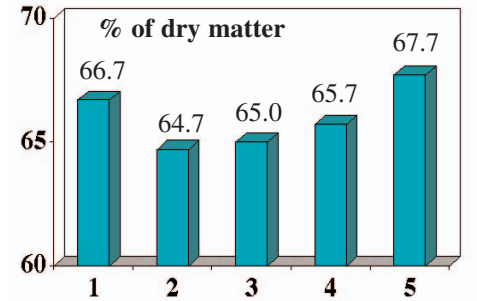
LSD_{0.1}=0.34%

Ash



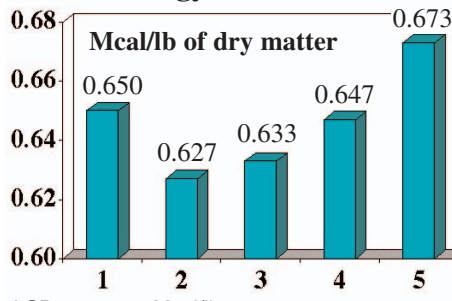
LSD_{0.1}=0.34%

Total Digestible Nutrients



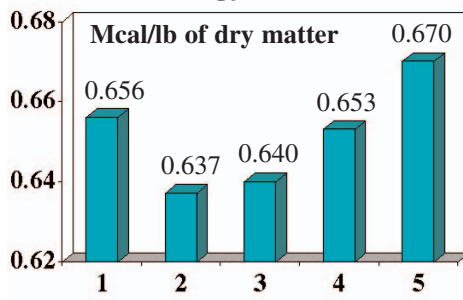
LSD_{0.1}=2.0%
Trt. 5>Trt. 2, 3, and 4; Trt. 1>2 at P=0.10 (Tukey-Kramer)

Net Energy of Maintenance



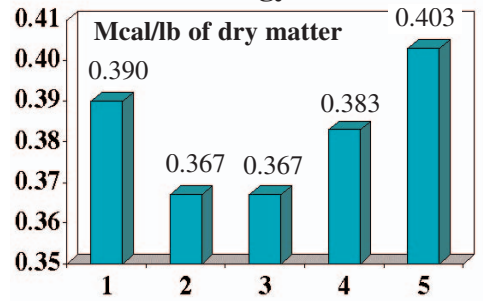
LSD_{0.1}=0.029 Mcal/lb
Trt. 5>Trt. 2, 3, and 4 at P=0.10 (Tukey-Kramer)

Net Energy of Lactation



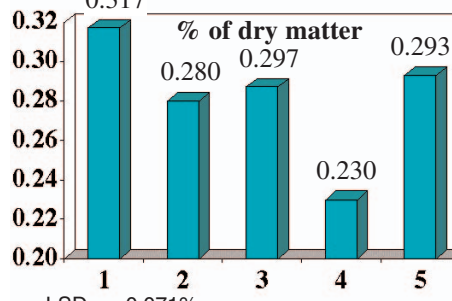
LSD_{0.1}=0.016 Mcal/lb
Trt. 5>Trt. 2, 3, and 4; Trt. 1>Trt. 2 and 3; Trt. 4>Trt. 2 at P=0.10 (Tukey-Kramer)

Net Energy of Gain



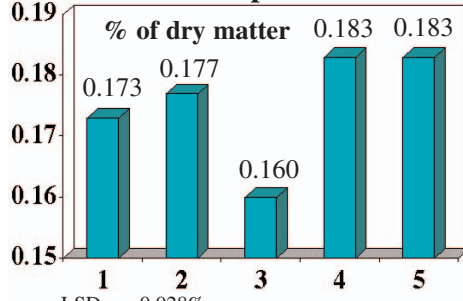
LSD_{0.1}=0.026 Mcal/lb
Trt. 5>Trt. 2 and 3 at P=0.10 (Tukey-Kramer)

Calcium



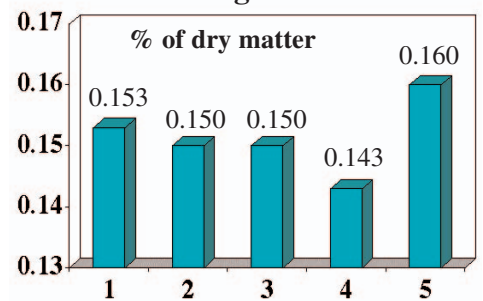
LSD_{0.1}=0.071%
Trt. 1>Trt. 4 at P=0.10 (Tukey-Kramer)

Phosphorus

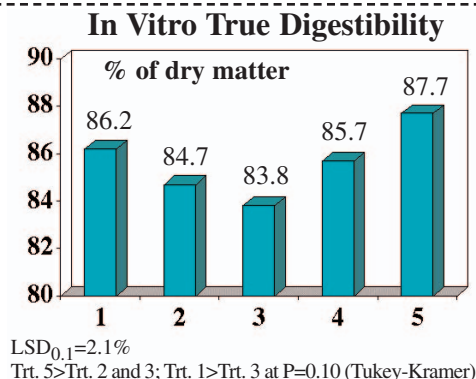
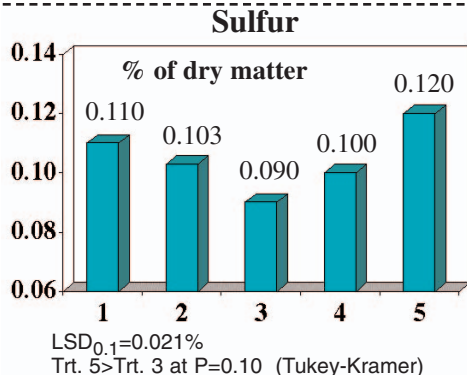
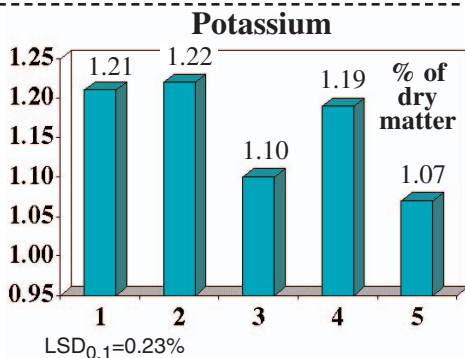


LSD_{0.1}=0.028%

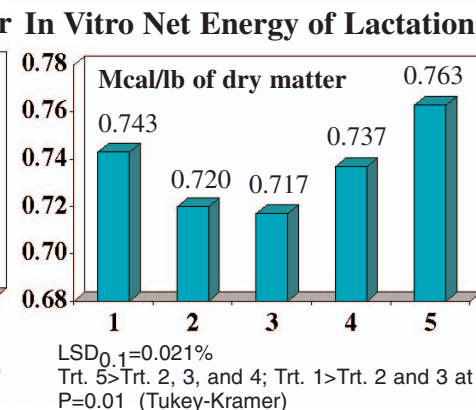
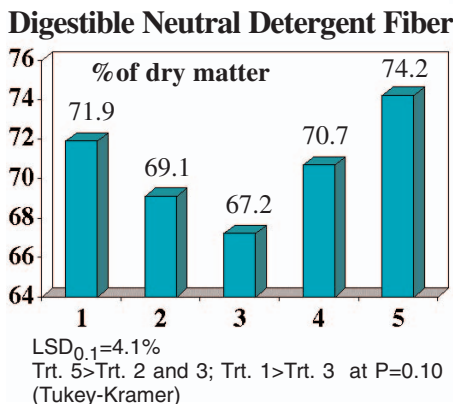
Magnesium



LSD_{0.1}=0.027%



This replicated research study in New York proved that Vitazyme applied with dry fertilizer at planting improves silage quality.



Conclusions for quality and yield analyses: Despite severe drought effects on the corn crop, some trends are detectable. Treatment 3 (Vitazyme on the dry fertilizer) produced the highest yield in this test – 14% above the control – followed closely by Treatment 2 (Vitazyme on the pop-up fertilizer in the seed row and 100% nitrogen), which gave an 11% yield increase. Quality analyses proved that Treatment 5 was superior. Notice the following summary table.

A Summary of Digestibility and Components of Silage Treatments
(Treatments are arranged from the highest on the left to the lowest on the right.)

Crude Protein	5 2 3 1 4	Lignin	3 2 4 1 5	Calcium	1 3 5 2 4
Available protein	5 2 3 1 4	Non-fiber carbohydrate	4 5 1 3 2	Phosphorus	5 4 2 1 3
ADI crude protein	4 1 5 2 3	Starch	5 4 3 1 2	Magnesium	5 1 2 3 4
Adjusted crude protein	5 2 3 1 4	Crude fat	5 1 4 3 2	Potassium	2 1 4 3 5
Soluble protein	5 3 2 1 4	Ash	2 1 5 4 3	Sulfur	5 1 2 4 3
Degradable protein	5 3 2 1 4	Total digestible nutrients	5 1 4 3 2	In vitro digestibility	5 1 4 2 3
NDI crude protein	4 5 1 2 3	Net energy l	5 1 4 3 2	DNDF	5 1 4 2 3
Acid detergent fiber	2 4 1 3 5	Net energy m	5 1 4 3 2	IVNEL	5 1 4 2 3
Neutral detergent fiber	2 3 4 1 5	Net energy g	5 1 4 3 2		

It will be noted from this table that treatment 5 usually has the highest value of all five for nutrients and digestibility factors. Note that the protein values are highest for treatment 5, while unavailable protein (ADI crude protein) is not high for this treatment. Fiber and lignin,

on the other hand, are low for Treatment 5. Starch and fat levels are highest, and consequently energy levels are highest for Treatment 5, as are levels of several elements (P, Mg, and S). Thus, it is quite clear that **the silage produced by corn grown with Vitazyme applied in-furrow with pop-up fertilizer at planting, 70% of the normal nitrogen, and Vitazyme sprayed on the leaves and soil at 20 inches corn height, produced the best overall feed for animals.**

Estimates On Milk Per Acre

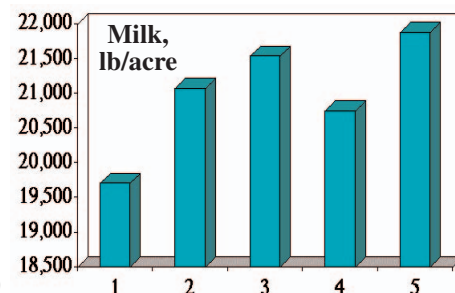
Treatment	Milk per acre	Change	Value of Increase*
	---- lb of milk/acre ----		\$/acre
1 (Control)	19,607	---	---
2 (Vita on seed, 100% N)	21,075	+1,378 (+7%)	213.59
3 (Vita of dry fertilizer)	21,075	+1,839 (+9%)	285.05
4 (Vita twice, 100%)	20,749	+1,052 (+5%)	163.06
5 (Vita twice, 70% N)	21,883	+2,186 (+11%)	338.83

* Based on an average price of \$15.50/cwt.

Conclusions: In spite of a very dry and hot summer, Vitazyme for all four applications increased milk production per acre, but especially the double application with 70% nitrogen. The nitrogen reduction was presumably instrumental in improving forage quality (see earlier in this report), which translated to a big increase in likely milk output. While Vitazyme on the dry fertilizer increased yield the most, the quality of the yield was higher for the double Vitazyme application with reduced nitrogen.

• Yield increase : 6% • Income increase: \$13.80/acre

An estimate was made of milk production per acre using the Milk 2000 computer program developed by the University of Wisconsin. This program requires the percentage of dry matter of the silage, crude protein, neutral detergent fiber, digestibility of the neutral detergent fiber, starch, neutral detergent fiber crude protein, ash, ether extract, and yield.



Corn

A Greenhouse Study With Several Biostimulants

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Soil type: Bowie very fine sandy loam (50%) and Carl Pool Topsoil mix (50%)
Variety: Mexican flint corn **Pot size:** one gallon **Replicates:** eight
Planting rate: seven seeds/pot, thinned to three plants/pot
Experimental design: Eight pots were selected for each treatment and treated with the various biostimulants. All eight replicates were configured in a randomized complete block design.



This corn study in the Vital Earth Resources research greenhouse involved several biostimulant products. Vitazyme performed the best of any along with an experimental product.

- | | | |
|--|--|----------------------|
| 1. Control | 5. H ₂ O ₂ , 1% | 9. HB-101 |
| 2. Vitazyme, 0.1% | 6. H ₂ O ₂ , 0.01% | 10. Experimental – 1 |
| 3. Vitazyme, 0.01% | 7. Percplus | 11. Experimental – 2 |
| 4. H ₂ O ₂ , 40% | 8. Botanicare Blastoff | 12. Vinegar |

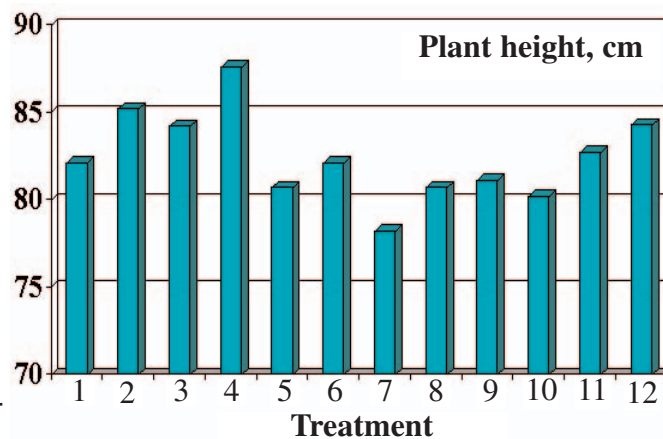
Biostimulant treatments: All products were applied at 100 ml of the solution per pot. Rates were those recommended by the manufacturer, except Vitazyme and H₂O₂ were applied at varied rates. Rates: 2, 0.1%; 3, 0.01%; 4, 40%; 5, 1%; 6, 0.01%; 7, 0.01%; 8, 0.4%; 9, 5 drops/gal; 10, 0.01%; 11, 0.01%; 12, 1%.

Growth results: The corn roots were washed, and the plants dried (115°F), on January 26, 2001. The height of each plant was measured before drying, and an average of three plants was obtained for each pot. Dry weight of each pot was measured to the nearest 0.01 gram. Statistical analyses were performed using ANOVA with CoHort software.

Treatment	Height*	Change from Control
	----- cm	
4 H ₂ O ₂ , 40%	87.6 a	5.5 (+7%)
2 Vitazyme, 0.1%	85.2 ab	3.1 (+4%)
12 Vinegar	84.3 ab	2.2 (+3%)
3 Vitazyme, 0.01%	84.2 ab	2.1 (+3%)
11 Exp – 2	82.7 ab	0.6 (+1%)
6 H ₂ O ₂ , 0.01%	82.1 ab	0 0
1 Control	82.1 ab	— —
9 HB-101	81.1 ab	-1.0 (-1%)
8 Bot-Blast	80.7 ab	-1.4 (-2%)
5 H ₂ O ₂ , 1%	80.5 ab	-1.6 (-2%)
10 Exp – 1	80.2 ab	-1.9 (-2%)
7 Percplus	78.2 b	-3.9 (-5%)

* Means followed by the same letter are not significantly different at P=0.10 according to the Tukey-Kramer test.

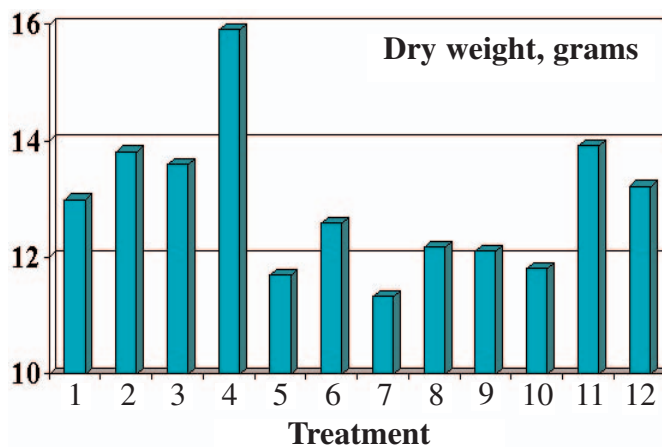
PLANT HEIGHT



There were few significant differences in plant height caused by the different products, although the 40% H₂O₂ significantly increased height above Percplus. The Vitazyme treatments increased height by 3 to 4%.

The 40% H₂O₂ treatment was by far the best treatment, but Vitazyme (both 0.1% and 0.01%) and Exp – 2 increased dry weight by 5 to 7% over the control. Several of the products reduced plant dry weight below the control, Percplus by 13%

PLANT DRY WEIGHT



Treatment	Dry weight*	Change from Control
	----- grams -----	
4 H ₂ O ₂ , 40%	15.91 a	2.92 (+22%)
11 Exp – 2	13.92 b	0.93 (+7%)
2 Vitazyme, 0.1%	13.81 b	0.82 (+6%)
3 Vitazyme, 0.01%	13.60 bc	0.61 (+5%)
12 Vinegar	13.22 bcd	0.23 (+2%)
1 Control	12.99 bcde	— —
6 H ₂ O ₂ , 0.01%	12.59 bcde	-0.40 (-3%)
8 Bot-Blast	12.17 bcde	-0.82 (-6%)
9 HB-101	12.10 bcde	-0.89 (-7%)
10 Exp – 1	11.81 cde	-1.18 (-9%)
5 H ₂ O ₂ , 1%	11.69 de	-1.30 (-10%)
7 Percplus	11.32 e	-1.67 (-13%)

* Means followed by the same letter are not significantly different at P=0.10 according to the Tukey-Kramer test.

Conclusions:

While plant height was not significantly affected by the various products, except the 40% H₂O₂ which increased height by 7%, plant dry weight was significantly increased by 40% H₂O₂ (22%). Vitazyme and an experimental product increased dry weight somewhat, but the majority of the treatments actually decreased dry weight, some significantly. The 40% H₂O₂, while an effective treatment, would never be a profitable treatment due to its cost and highly caustic nature; the soil bubbled vigorously for several minutes after application as the H₂O₂ sterilized the soil, removing pathogen stress.

Corn and Soybeans -- A Testimonial

Location: Delavan, Minnesota **Soil type:** Clarion-Nicollet-Webster series

Experimental design: Several split-field experiments were set up on the Jones farm for both corn and soybeans, with variably sized treated and control areas.

Weather: Weather conditions during the year were very unfavorable for high yields, starting out very wet to delay planting, and then turning very dry for much of the summer. Yields throughout the region were down this year.

Vitazyme application: 13 oz/acre on the seeds at planting for both corn and soybeans

Data collection: Because of considerable variability in field conditions due to the wet spring and dry summer, the farmer decided not to collect yield data but closely observed effects during the season and at harvest, and during post-harvest tillage.

Chlorophyll content: Both the corn and soybeans showed more leaf chlorophyll on July 30, as detected by a Minolta SPAD chlorophyll meter. For example, one soybean trial showed the following results:

Treatment	Leaf chlorophyll*	Change
----- SPAD units -----		
Control	35.8	—
Vitazyme	38.0	+2.2

* Twenty leaves per treatment were examined

Other crop responses noted on July 30, 2001:

Corn: taller plants, larger stalks, darker green color (more chlorophyll), larger roots with more hair roots

Soybeans: larger plants, more leaves, thicker stems, darker green color (more chlorophyll) larger roots

Observations by Tom Jones:

“Where I used Vitazyme on my beans they had more fine root hairs, and they were a little bushier in appearance. Because of the poor growing season and erratic field conditions, I didn’t get a yield check. However, they were some of my best beans.

The corn that had Vitazyme on also had a lot more fine root hairs. I couldn’t believe the difference when I disked my stalks. I could see all these bushy looking root balls, unlike in the untreated fields. Again, no yield check was taken, but I know I could see a difference in the combine hopper. I plan to use more Vitazyme next year – perhaps on all my acres.”

Thanks,
Tom Jones, Faribault County, Southern Minnesota



Notice the much greater root systems with the Vitazyme treatment in this Minnesota study. Leaf area, stalk size, and yield also responded.

Corn -- Synergism with Trichoderma

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Pencil cob corn **Pot size:** one gallon **Soil type:** Bowie fine sandy loam

Planting rate: seven seeds/pot, thinned to three **Replicates:** five **Planting date:** February 22, 2001

Experimental design: Seven treatments were used to evaluate any possible synergism between T-22 (*Trichoderma harzianum*, strain T-22) and Vitazyme with corn. Various soil and foliar combinations were used.

- | | |
|-------------------------|------------------------------------|
| 1. Control | 5. Vitazyme on the leaves |
| 2. T-22 on the soil | 6. T-22 and Vitazyme on the soil |
| 3. Vitazyme on the soil | 7. T-22 and Vitazyme on the leaves |
| 4. T-22 on the leaves | |

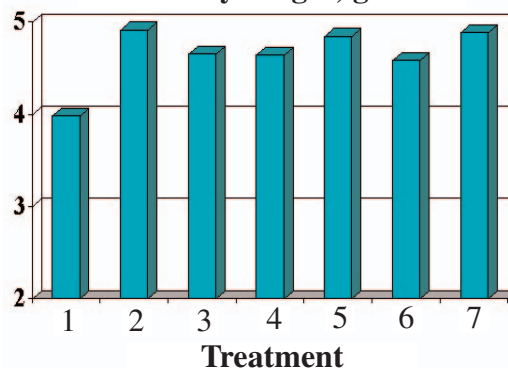
T-22 and Vitazyme treatments: T-22 was applied as a 1% Plant Shield suspension (1 oz/gallon of water), at 100 ml/pot at planting (soil), or as a spray on all leaf surfaces at three weeks after planting along with 2 tbsp/gal of Sunspray crop oil. Vitazyme was applied with a 0.1% solution (1 ml/liter) at 100 ml/pot at planting (soil), or as a 1% solution at 3 weeks after planting along with 2 tbsp/gal of Sunspray.

Growth results: On April 4, 2001, 41 days after planting, the roots were washed clean of soil and dried in a drying oven at 115°F. Weights were determined to the nearest 0.01 gram for each pot. Analyses of variance was completed using Cohort software.

T-22 bacteria applied to the soil, Vitazyme plus T-22 applied to the leaves, and Vitazyme alone to the leaves all gave 22 to 23% growth responses, which were significantly greater than the control. The other treatments gave growth increases of 15 to 17%, but they were not significantly greater than the control.

Conclusions: Both Vitazyme and *Trichoderma harzianum*, strain T-22, caused significant growth responses in this corn test. In this study the T-22 soil application was more effective than the leaf application, while the Vitazyme leaf applications were more effective than the soil applications.

Plant dry weight, grams



DRY WEIGHT

Treatment	Dry weight*	Change from Control
	g	g
2 (T-22, soil)	4.91 a	0.93 (+23%)
7 (T-22+Vit, leaves)	4.88 a	0.90 (+23%)
5 (Vit, leaves)	4.84 a	0.86 (+22%)
3 (Vit, soil)	4.65 ab	0.67 (+17%)
4 (T-22, leaves)	4.64 ab	0.66 (+17%)
6 (T-22+Vit, soil)	4.58 ab	0.60 (+15%)
1 (Control)	3.98 b	—

* Means followed by the same letter are not significantly different at P=0.10 according to Duncan's Multiple Range Test. LSD_{0.10}=0.44 g.

Corn

Iowa State University of Science and Technology

Location: Ames, Iowa (Berkey Research Farm)

Variety: P-34G13

Population: 30,000 seeds/acre

Row spacing: 30 inches

Soil type: Clarion clay loam

Planting date: May 16, 2001

Depth of planting: 1.5 inches

Previous crop: corn

Harvest date: unknown

Experimental design: A field area was divided into four-row plots that were 10 x 40 feet (0.009183 acre), using ten replicates. Two control treatments were included with the Vitazyme and T-22 treatments.

Treatment	Vitazyme		T - 22	
	On seeds	On soil/leaves	On seeds	On soil/leaves
1	0	0	0	0
2	x	0	0	0
3	x	x	0	0
4	0	0	x	0
5	0	0	x	x
6	x	0	x	0
7	x	x	x	x

Fertility treatments: Phosphorus and potassium levels were maintained above medium soil test levels. Nitrogen was applied preplant incorporated at 100 lb N/acre.

Vitazyme treatments: Treatments 2, 3, 6, and 7 received 13 oz/acre in the seed row at planting, while Treatments 3 and 7 received an additional 13 oz/acre on the soil and foliage on July 11.

T-22 treatments: T-22 is *Trichoderma harzianum*, strain T-22. The soluble powder form was applied in the seed row at 1 oz/acre for Treatments 4, 5, 6, and 7, and again at 1 oz/acre over the leaves and soil for Treatments 5 and 7 on July 11.

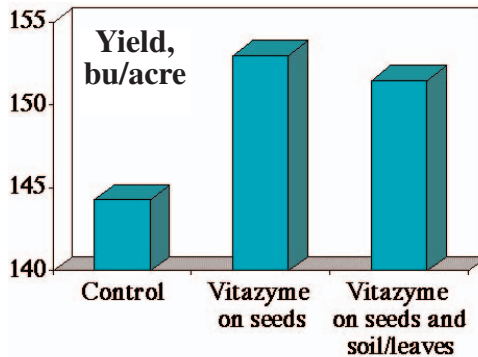
Data analysis: The corn weights were analyzed using the Tukey-Kramer Test at P=0.10. The plots were divided into three groups according to their location, and analyzed together with the appropriate control for each group.

Yield results:

Plot Area 1: Vitazyme only

Treatment	Yield*	Change
	----- bu/acre -----	
2 (Vit on seeds)	153.0 a	+8.7 (+6%)
3 (Vit twice)	151.5 a	+7.2 (+5%)
1 (Control)	144.3 b	—

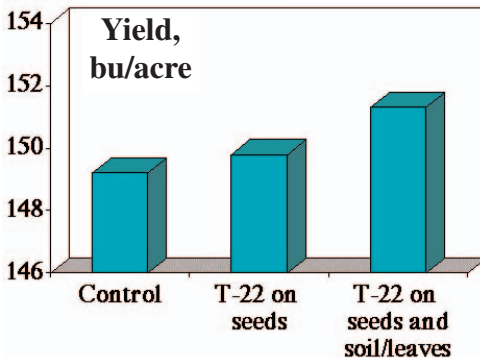
* Means followed by the same letter are not significantly different at P=0.10, according to the Tukey-Kramer Test. LSD_{0.10}=7.4 bu/acre.



Iowa State University corn studies showed once again, as they have for many years, that Vitazyme is a viable stimulator of corn yields in the North.

Both Vitazyme treatments, once on the seeds plus later on the soil and leaves, gave significant yield increases. The seed treatment alone produced the most increase, 8.7 bu/acre above the control.

Plot Area 2: T-22 only

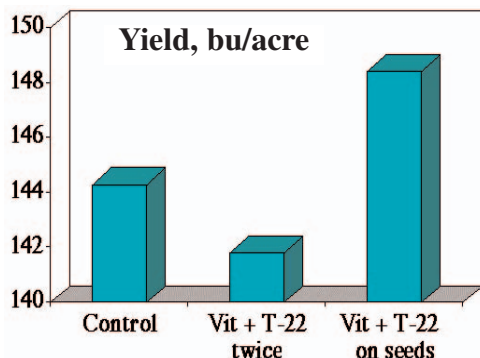


Treatment	Yield*	Change
	----- bu/acre -----	
2 (T-22 on seeds)	151.3 a	+2.1 (+1%)
4 (T-22 twice)	149.8 a	+0.6
1 (Control 2)	149.2 a	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Tukey-Kramer Test. LSD_{0.10}=8.2 bu/acre.

yield increases above the control. A very dry and hot summer likely decreased rhizosphere activity in the upper part of the root zone, reducing corn response to both products. There was substantial variability in yields across the plot area, as evidenced by control plots that varied from 140.6 to 149.2 bu/acre for ten replications. Experimental error was also introduced by some variations in soil fertility across the test area, the upper portion of the plots being near a terrace.

Plot Area 3: Vitazyme + T-22



Treatment	Yield*	Change
	----- bu/acre -----	
6 (Vit on seeds)	148.4 a	+4.1 (+3%)
1 (Control 1)	144.3 a	—
7 (Vit + T-22 twice)	141.8 a	-2.5 (-2%)

* Means followed by the same letter are not significantly different at P=0.10, according to the Tukey-Kramer Test. LSD_{0.10}=7.4 bu/acre.

The yield increases for T-22 in this study were slight and non-significant, though a 2.1 bu/acre increase for the double application is notable.

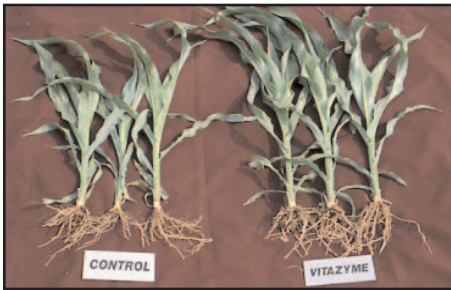
Conclusions: Both Vitazyme and T-22 have been shown in this Iowa State study to increase corn yield, though only Vitazyme significantly. Both the seed and the seed plus foliar/soil Vitazyme treatments showed significant (P=0.10)

The supposed interaction of Vitazyme with T-22 bacteria in the rhizosphere of corn plants, while not displayed in this study, is even so a most likely reality that should be demonstrated under normal growing conditions.

- Grain increase with Vitazyme: 6%
- Grain increase with Vitazyme + T-22: 3%

Corn

Brigham Young University



Corn treated at planting increased growth significantly in this study. Note both the leaf and root growth increases.

Research Organization: Advanced Biological Marketing
Location: Brigham Young University Research Farm, Spanish Fork, Utah
Variety: B54v (Bird Hybrids) **Planting date:** April 30, 2001
Population: thinned to 30,000 plants/acre **Soil type:** silty clay loam
Row spacing: 36-in between rows, 4 to 6-in in rows
Experimental design: Small plots (6 ft x 25 ft, two rows/plot) were laid out with seven treatments and four replications. The treatments were as follows:

1. Control
2. T-22 Root Shield, 6 oz/acre
3. T-22 Plant Shield, 1 oz/acre
4. T-22 Plant Shield, 2 oz/acre
5. T-22 Plant Shield, 3 oz/acre
6. Vitazyme, 5 oz/acre, + Plant Shield, 1 oz/acre
7. Vitazyme, 5 oz/acre + 13 oz/acre, + Plant Shield, 1 oz/acre

Weed control: Dual/Bladex was applied before emergence, one day after planting.

Fertility treatments: All plots received 93 lb/acre of N as urea (34-0-0) before planting. Another 53 lb/acre of N were applied on June 19.

Vitazyme treatment: For Treatment 6, 5 oz/acre were applied with the Plant Shield on the seeds at planting; for Treatment 7, the same was applied at planting as for Treatment 6 plus 13 oz/acre on the leaves and soil at the 8 to 10 leaf stage (June 19; 18-inch height).

T-22 [Trichoderma harzianum, strain T-22] treatments: Treatment 2 (Root Shield granules) were applied in the planter box at a 6 oz/acre rate to be deposited in the seed row. All other T-22 treatments (Treatments 3 to 7) were applied using a Plant Shield solution applied on the seeds at planting.

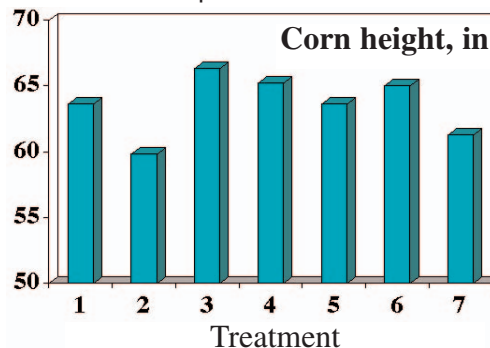
Statistical analysis: Due to a high degree of variability among the four replicates, the significant differences between means were not greater than P=0.10 for any of the variables. Thus, only means for each variable were examined in the analysis.

Growth results: On July 2, 2001, corn height was measured for each plot.

Corn height

Treatment ^a	Corn height	Change from control
	inches	
3. T-22 SP (1 oz)	66.3	+2.7 (+4%)
4. T-22 SP (2 oz)	65.2	+1.6 (+3%)
6. T-22 SP + Vit (1x)	65.0	+1.4 (+2%)
5. T-22 SP (3 oz)	63.6	0
1. Control	63.6	—
7. T-22 SP + Vit (2x)	61.3	-2.3 (-4%)
2. T-22 PB (6 oz)	59.8	-3.8 (-6%)

^a SP=soluble powder; PB=planter box granules



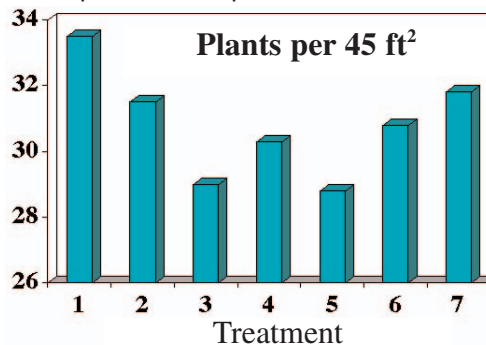
The height of the corn appeared to have little relationship to the treatment in the sense that, as will be shown later, the taller plants did not produce the most yield. All plant heights varied within a fairly narrow range, of 59.8 to 66.3 inches, on July 2.

Yield and harvest results: Harvesting of the plots was completed on September 27.

Plants per 45 ft²

Treatment ^a	Plants	Change from control
1. Control	33.50	—
7. T-22 SP + Vit (2x)	31.75	-1.75 (-5%)
2. T-22 PB (6 oz)	31.50	-2.00 (-6%)
6. T-22 SP + Vit (1x)	30.75	-2.75 (-8%)
4. T-22 SP (2 oz)	30.25	-3.25 (-10%)
3. T-22 SP (1 oz)	29.00	-4.50 (-13%)
5. T-22 SP (3 oz)	28.75	-4.75 (-14%)

^a SP=soluble powder; PB=planter box granules

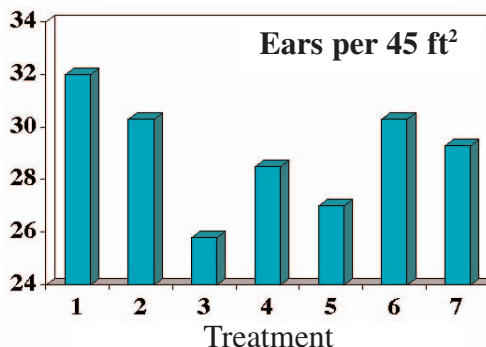


Plant density was quite uniform throughout the test area, due to thinning during the test, the control having the most plants while the T-22 3 oz rate had the least. Since plants tend to compensate for differences in stand there was no great problem with this stand variation.

Ears per 45 ft²

Treatment ^a	Ears	Change from control
1. Control	32.00	—
6. T-22 SP + Vit (1x)	30.25	-1.75 (-5%)
2. T-22 PB (6 oz)	30.25	-1.75 (-5%)
7. T-22 SP + Vit (2x)	29.25	-2.75 (-9%)
4. T-22 SP (2 oz)	28.50	-3.50 (-11%)
5. T-22 SP (3 oz)	27.00	-5.00 (-16%)
3. T-22 SP (1 oz)	25.75	-6.25 (-20%)

^a SP=soluble powder; PB=planter box granules

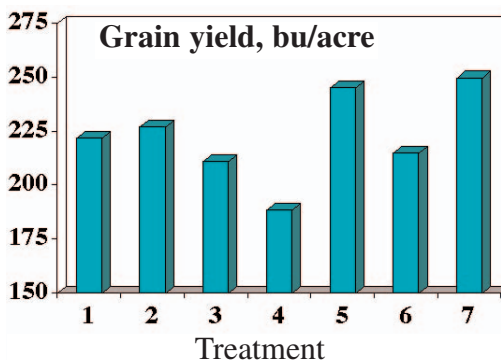


To some degree the number of ears per 45 ft² followed the plant number for the same area. However, there were some minor differences, such as Treatments 6 and 7, and 3 and 5 reversing themselves for the two parameters.

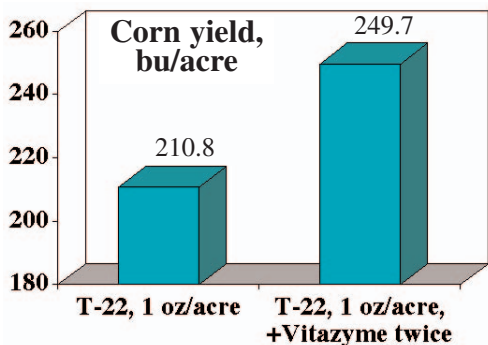
Grain Yield

Treatment ^a	Yield ^b	Change from control
		----- bu/acre -----
7. T-22 SP + Vit (2x)	249.7	+27.8 (+13%)
5. T-22 SP (3 oz)	245.2	+23.3 (+11%)
2. T-22 PB (6 oz)	226.8	+4.9 (+2%)
1. Control	221.9	—
6. T-22 SP + Vit (1x)	214.7	-7.2 (-3%)
3. T-22 SP (1 oz)	210.8	-11.1 (-5%)
4. T-22 SP (2 oz)	188.4	-33.5 (-15%)

^a SP=soluble powder; PB=planter box granules
^b Adjusted to 30,000 plants/acre at 15.5% moisture



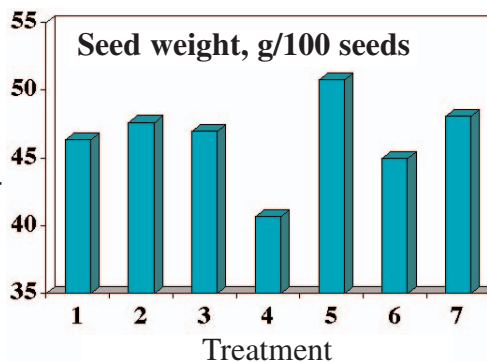
Unadjusted grain yield showed considerable difference across the seven treatments, with the control being directly in the middle of the seven. Vitazyme on the seed (5 oz/acre) plus later on the foliage (13 oz/acre), along with T-22 at 1 oz/acre, produced the highest yield. This



Weight for 100 seeds

Treatment ^a	Seed weight ^b	Change from control
		----- grams -----
5. T-22 SP (3 oz)	50.75	+4.42
7. T-22 SP + Vit (2x)	48.05	+1.72 (+4%)
2. T-22 PB (6 oz)	47.63	+1.30 (+3%)
3. T-22 SP (1 oz)	46.95	+0.62 (+1%)
1. Control	46.33	—
6. T-22 SP + Vit (1x)	44.98	-1.35 (-3%)
4. T-22 SP (2 oz)	40.68	-5.65 (-12%)

^a SP=soluble powder; PB=planter box granules
^b Adjusted to 15.5% moisture



yield was 13% above the control, and 18% above the T-22 alone at the same 1 oz/acre rate. Also of interest is the fact that the single highest producing plot within the entire experiment was a plot with T-22 (1 oz/acre) + Vitazyme twice, which gave 328.9 bu/acre. The next highest yielding plot produced only 281.0 bu/acre (Treatment 2). This very high plot yield for Treatment 6 shows the potential for this program to produce high yields. T-22 at 3 oz/acre also did very well, increasing yield 11% above the control. There is no obvious answer for why the 2 oz/acre T-22 rate did not produce a higher yield than 188.4 bu/acre.

There was some variation in seed weight (adjusted to 15.5% moisture) with the grain of Treatments 5 (T-22 at 3 oz/acre) and 7 (T-22 at 1 oz/acre + Vitazyme twice) being the heaviest. For some unknown reason the grain of Treatment 2 (T-22 at 2 oz/acre) was somewhat lighter than that of the other treatments.

Conclusions: The results of this study reveal that, in spite of variation amongst treatments that increased experimental error such that

no significant differences appeared, **Vitazyme and T-22 can produce a powerful synergism with corn.** This fact was revealed by comparing the effects of Vitazyme with T-22, and T-22 alone at the same rate. Also, **the largest single plot yield (328.9 bu/acre) was with Vitazyme plus T-22, illustrating the potential of this combination to give high yields.**

Vitazyme on the seed plus T-22 at 1 oz/acre did not produce a very great increase in yield above T-22 alone at 1 oz/acre, about 4 bu/acre more with Vitazyme added. **It appears that a foliar Vitazyme treatment is the most effective means of interacting with T-22,** although the fairly low precision of the study may leave that question somewhat in doubt. T-22 at 3 oz/acre did an excellent job of increasing yield, producing 245.2 bu/acre. For unknown reasons, possibly due to random small plot variations caused by previous experiments on the same soils, the 2 oz/acre T-22 rate decreased yield substantially.

• **Vitazyme on the soil (5 oz/acre) + on the leaves and soil (13 oz/acre) + T-22 (1 oz/acre): 249.7 bu/acre**
 • **T-22 alone (1 oz/acre): 210.8 bu/acre**

Corn, with Greenup

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent
Soil type: Bowie very fine sandy loam
Planting date: October 24, 2001
Pot type: 1 gallon
Population: 7 seeds/pot, thinned to 3/pot
Experimental design: A complete block design was set up using eight replicates for each of four treatments. The soil was carefully packed into each pot, watered evenly, and then treated with the materials. Plants were watered on demand, and grown in the greenhouse at about 70°F for a high and 55°F for a low temperature.

- | | |
|---|---|
| <p>1. Control
 2. Vitazyme only</p> | <p>3. Greenup only
 4. Vitazyme + Greenup</p> |
|---|---|

Vitazyme application: After planting on October 24, 100 ml of a 0.002% Vitazyme solution was applied to the soil surface of each pot for Treatment 2. This application was equal to the amount of Vitazyme contained in the Greenup of Treatment 4.



Note how Greenup plus Vitazyme greatly improved corn growth in this greenhouse experiment (+ 30% yield).

Greenup – 6 + 16 application: Regular Greenup granules, a “Sucrate”, were applied to the soil surface of the pots of Treatment 3 at 1 gram per pot; this rate equaled 10 lb/1,000 ft². The Greenup for Treatment 4 had been prepared earlier at the facilities of American Minerals. Two ounces of Vitazyme were mixed with the binder of 50 lb of Greenup during processing, a 0.04 oz/lb rate. At 10 lb/1,000 ft.² of Greenup application, this would then give a Vitazyme application rate of about 18 oz/acre. This product was also applied at 1 gram per pot, as for Treatment 3.

Product specifications: Vitazyme: a liquid fermentation product of various plant materials, organisms, simple and complex carbohydrates, and other materials to yield a multiple mode of action - multiple active agent metabolic stimulator containing natural growth regulators (triacontanol, etc.), vitamins (B-complex, etc.), enzymes, and other phytoactive substances that are biologically active at very low application rates. Producer: Vital Earth Resources, Gladewater, Texas.

Greenup –6+16: a sucrate carboxylate containing a simple carbohydrate binder, together with various minerals (N, 1.0%; Mg, 6.0%; Ca, 13.0%; S, 6.0%; B, 0.01%; Fe. 10.0%; Mn, 2.0%; Cu, 0.1%; Zn, 0.05%) able to pass a –6+16 mesh screen. It supplies plant nutrients quickly through the breakdown of the granules in water. Producer: American Minerals, Dunedin, Florida.

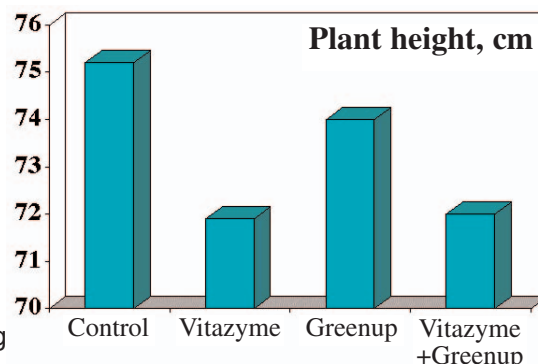
Harvest date: December 4, 42 days after planting.

Height results: On December 4, all of the plant roots were washed clean of soil, and the plants were measured for height. The plants were then dried in a drying oven at 115°F for 48 hours.

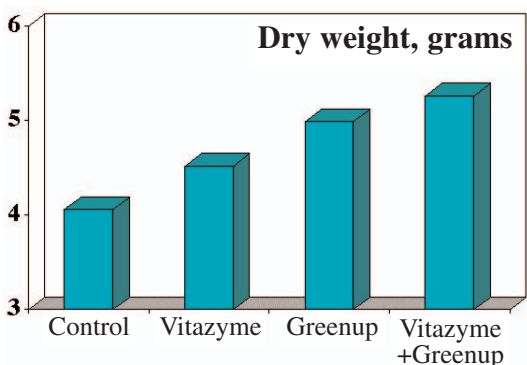
There were only slight differences in plant height among the four treatments. The control treatment slightly exceeded the others, but there was little difference noted.

Treatment	Plant height*	Change vs. the control
	----- cm	
1. Control	75.2 a	—
3. Greenup	74.0 a	-1.2 (-2%)
4. Vitazyme + Greenup	72.0 a	-3.1 (-4%)
2. Vitazyme	71.9 a	-3.3 (-4%)

* Means followed by the same letter are not significantly different at P=0.10, according to the Student-Newman-Keuls Test. LSD_{0.10}=4.1 cm.



Dry weight results: These results showed highly significant differences among treatment means.



Treatment	Plant weight*	Change vs. the control
	----- grams	
4. Vitazyme + Greenup	5.26 a	+1.20 (+30%)
3. Greenup	4.99 ab	+0.93 (+23%)
2. Vitazyme	4.52 bc	+0.46 (+11%)
1. Control	4.00 c	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Student-Newman-Keuls Test. LSD_{0.10}=0.52 g.

Dry weight responded highly significantly in this study, with corn dry matter accumulation being 30% higher with both Vitazyme and Greenup versus the control. Greenup alone boosted yield by 23%, and Vitazyme, without

any nutrients, also boosted dry matter yield. Thus, it is clear that a synergism exists with corn growth for the components of Vitazyme and Greenup, and they can be profitably used together. The addition process of Vitazyme at the

production plant, and storage before use, do not reduce the effectiveness of the product.

Corn

Agricultural Custom Research and Environmental Services

Location: ACRES Research Farm, Cedar Falls, Iowa

Variety: Pioneer 33P67

Previous crop: soybeans

Planting depth: 1.5 inches

Herbicide: half rate of Buctril (2.25 qt/acre) and Accent (0.67 oz/acre)

Experimental design: A randomized complete block design was established with several treatments using plots that were 15 ft x 50 ft, with four replications. The center four rows of each plot were treated as specified (IF = in-furrow; BC = broadcast).

Soil Type: Kenyon loam

Row spacing: 30 inches

Planting date: May 9, 2001

Tillage: no-till

Population: 29,900 seeds/acre

Nitrogen

- | | |
|---|-----|
| 1. Starter (6-18-6) alone | 120 |
| 2. Restore IF + Bacteria IF | 120 |
| 3. Vitazyme IF | 120 |
| 4. Vitazyme IF + Restore IF | 120 |
| 5. Vitazyme IF + Restore IF + Bacteria IF | 120 |
| 6. Restore BC + Bacteria BC | 120 |
| 7. Vitazyme BC + Restore BC | 120 |
| 8. Vitazyme BC + Restore BC + Bacteria BC | 120 |
| 9. Starter (6-18-6) alone | 160 |
| 10. Vitazyme IF + Restore IF | 160 |



Corn treated with Vitazyme on the seeds at planting produced a marked increase in root and top growth. Note the greatly advanced root systems on the right.

[Note: Restore and Bacteria are herbal homeopathic preparations from Parametic Associates, Inc., St. Louis, Missouri.]

Fertilization: The starter (6-18-6% N-P₂O₅-K₂O) on all plots was applied with the seeds at planting, and the nitrogen was applied pre-plant as a 28% nitrogen solution.

Vitazyme application: 13 oz/acre in-furrow at planting (May 9) for the IF applications; 13 oz/acre over the soil (one week after planting May 16) for the BC applications

Restore applications: 2 oz/acre in-furrow at planting (May 9) for the IF application; 2 oz/acre over the soil (a week after planting on May 16) for the BC application.

Bacteria applications: 2 oz/acre in-furrow at planting (May 9) for the IF application; 2 oz/acre over the soil (a week after planting on May 16) for the BC application.

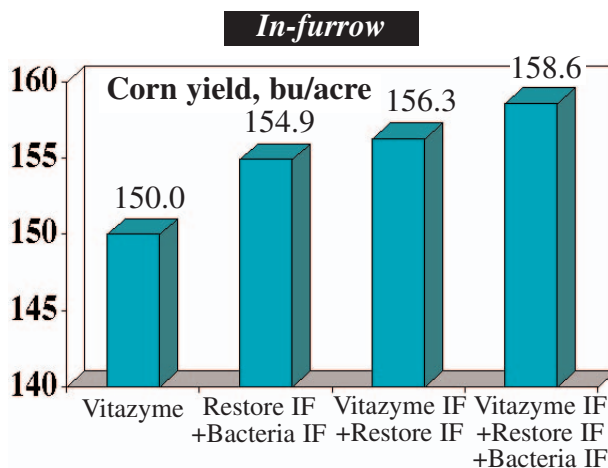
Harvest results: Unfortunately none of the yield means were significantly different, nor were any of the other treatment means for grain moisture, plant population, per plant yield, and test weight.

Treatment	Nitrogen lb/acre	Grain yield bu/acre
1. Starter alone	120	155.7
2. Restore IF + Bacteria IF	120	154.9
3. Vitazyme IF	120	150.0
4. Vitazyme IF + Restore IF	120	156.3
5. Vitazyme IF + Restore IF + Bacteria IF	120	158.6
6. Restore BC + Bacteria BC	120	150.5
7. Vitazyme BC + Restore BC	120	159.2
8. Vitazyme BC + Restore BC + Bacteria BC	120	164.2
9. Starter alone	160	153.0
10. Vitazyme IF + Restore IF	160	156.2

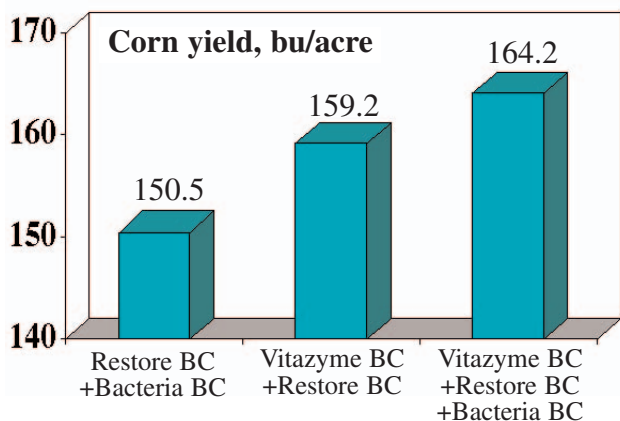
When Vitazyme was added to Restore, the yield of corn grain increased, from 150.0 to 156.3 bu/acre (+4%). When Vitazyme was added to Restore + Bacteria, the yield increased to 158.6 bu/acre (+6%). Thus, despite the lack of significance of the difference in treatment means, there appears to be a synergism amongst Vitazyme, Restore, and Bacteria to increase corn yield.

• Yield increase with all three products: 8.6 bu/acre

Effects of Restore and Bacteria with Vitazyme at 120 lb/acre N



Broadcast

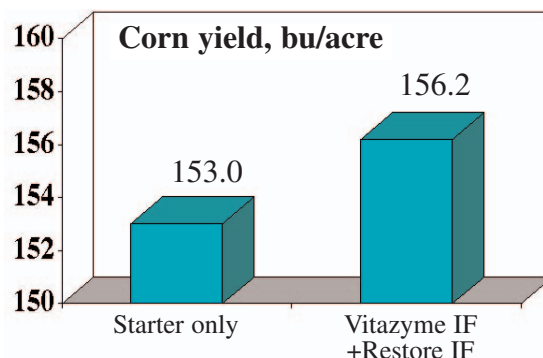


As for in-furrow application, Vitazyme together with Restore increased the corn yield above Restore and Bacteria alone, from 150.5 to 159.2 bu/acre (+6%). When Restore and Bacteria were applied broadcast with Vitazyme, the yield increased to 164.2 (+9%). There appears to be a good synergism between Vitazyme, Restore, and Bacteria despite a lack of significance of the treatment mean difference.

• Yield increase with all three products: 13.7 bu/acre

Effects of Restore with Vitazyme at 160 lb/acre N

In-furrow



With a higher rate of nitrogen fertilizer, Vitazyme and Restore together increased the corn grain yield by 3.2 bu/acre (+2%), though the increase is not significant. No individual treatments compared Vitazyme and Restore individually to the combined treatment.

Conclusions: A very good cropping year at Cedar Falls, Iowa, led to record yields and a lack of response to many products at the ACRES Research Farm in 2001. Although Vitazyme, Restore, and Bacteria did not give significant yield differences, there appeared to be a trend of increased yield responses when Vitazyme was combined with Restore, and especially with both Restore and Bacteria. The yield increase with Vitazyme and both products was 13.7 bu/acre (+9%) for the broadcast applications and 120 lb/acre of nitrogen which, though not significant, is sizable. For in-furrow applications, the increase was 8.6 bu/acre (6%) at 120 lb/acre of nitrogen. It is recommended that these products be used together to maximize corn yields.

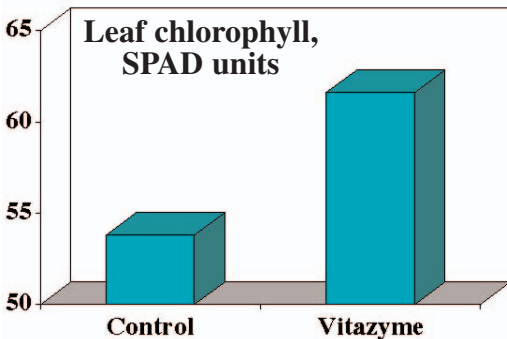
Corn – A Testimonial



Notice that, besides being taller, the treated corn has more soil adhering to the roots from more intense rhizosphere activity.

- More soil clung to the roots of treated plants, indicating a more active rhizosphere.

• Increase in leaf chlorophyll: 4.5 SPAD units



- Leaf chlorophyll was considerably higher with Vitazyme.
- Plant sizes were similar for both treatments.
- Root development revealed more major roots penetrating vertically downwards with Vitazyme; these root systems also had more fine roots developing laterally near the soil surface.

• Increase in leaf chlorophyll: 7.8 SPAD units

Conclusions: Based on observations in the field of better roots, more leaf chlorophyll — and thus a greater photosynthetic and carbon fixing capacity — and generally larger plants with Vitazyme, this product would be expected to increase grain yield and profitability in these corn trials.

Research organization: Agronomy Supply Company, Inc.
Location: near Norfolk, Nebraska
Soil type: unknown
Experimental design: Two corn fields for seed were treated with Vitazyme over a portion of the fields.

Variety: proprietary
Planting date: unknown
Irrigation: center pivot

1. Control 2. Vitazyme

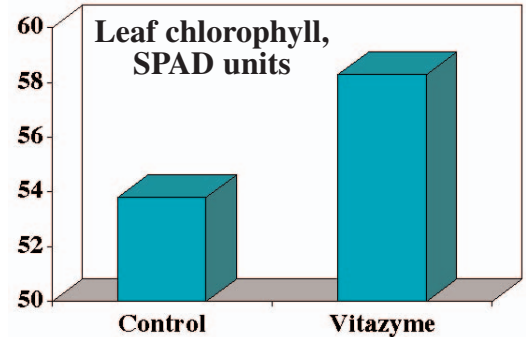
Fertilization: proprietary

Vitazyme treatments: (1) 13 oz/acre with the herbicide at planting; (2) 13 oz/acre on the leaves and soil sometime later

Growth observations: On August 1, 2001, the following observations were made. Leaf chlorophyll was determined using a Minolta SPAD meter on a number of leaves for each determination.

Field 1

	Control	Vitazyme	Change
	----- SPAD units -----		
Leaf chlorophyll	53.8	58.3	+4.5



- Leaf chlorophyll was considerably higher with Vitazyme.
- Treated plants were taller, with more leaf area.

Field 2

	Control	Vitazyme	Change
	----- SPAD units -----		
Leaf chlorophyll	53.8	61.6	+7.8

Corn

Location: Albion, New York

Three corn fields were treated with various combinations of Vitazyme, liquid $\text{Ca}(\text{NO}_3)_2$, a homeopathic soil conditioning agent (Soil Conditioner = SC), and a homeopathic soil and plant supplement (Soil Restore = Restore). All fields were harvested using a six-row combine fitted to a GPS yield monitoring device that plotted grain yield continuously across the field. For field yield determination, the yield at each data point was carefully determined from a colored map printout using the 7th to 12th rows from the treatment boundary so as to avoid effects of the adjoining treatment. An average yield was calculated for each map color to use in this averaging method, which utilized from 21 to 140 data points for each yield determination.

Field 22

Variety: Pioneer 38P05

Row width: 30 in

Planting date: May 10, 2001

Population: 32,000 seeds/acre

Field size: 54 acres

Previous crop: wheat

Experimental design: The field was divided into a control strip, a treated strip, and then a control for the remainder of the field.

1. Control 2. Vitazyme, Ca-nitrate, SC, and Restore

Fertilization: 125 lb/acre of liquid N (32%) preplant incorporated; 200 lb/acre of 11-22-22% N-P₂O₅-K₂O + Zn and B, at planting.

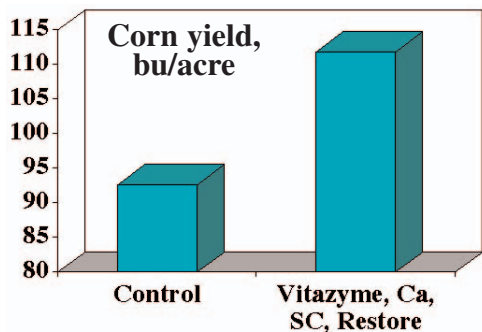
Vitazyme treatment: 13 oz/acre with the liquid N, preplant incorporated

Ca-nitrate, SC, and Restore: applied at recommended rates, with the liquid N and Vitazyme preplant incorporated

Yield results: The field was harvested on October 17 or 18.

	Control			Vitazyme + others		
	Boundary 1 ^a	Boundary 2 ^b	Average	Boundary 1 ^c	Boundary 2 ^d	Average
	----- bu/acre -----					
Corn yield	91.5	93.6	92.6	112.6	110.9	111.8 (+21%)

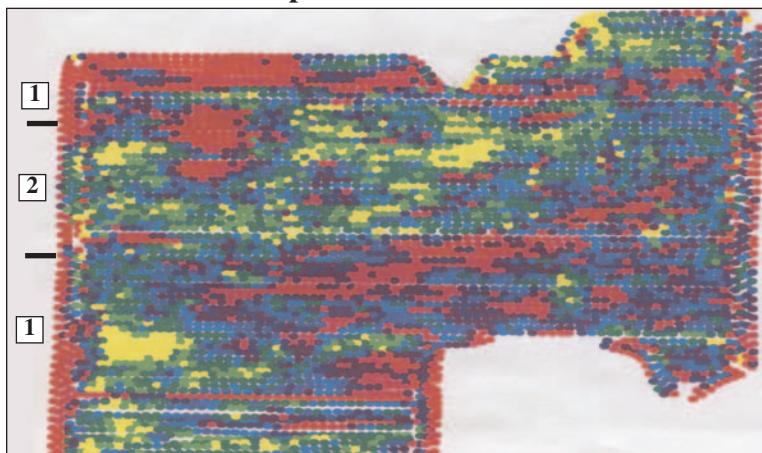
^aAverage of 66 data points; ^baverage of 63 data points; ^caverage of 66 data points; ^daverage of 63 data points.



• **Yield increase: 21%**

Income increase with Vitazyme and other additions: 19.2 bu/acre x \$2.25/bu = **\$43.20/acre**

GPS printout of Field 22



Field 529

Variety: NK3030BT

Planting date: May 7, 2001

Field size: 82 acres

Row width: 30 in

Population: 32,000 seeds/acre

Previous crop: wheat

Experimental design: The field was divided into four portions, long strips incorporating the two treatments and a control.

1. **Control**

2. **Vitazyme, Ca-nitrate, SC, and Restore**

3. **SC and Restore**

Fertilization: 125 lb/acre of liquid N (32%) preplant incorporated; 200 lb/acre of 11-22-22% N-P₂O₅-K₂O + Zn and B, at planting.

Vitazyme treatment: 13 oz/acre with the liquid N, preplant incorporated

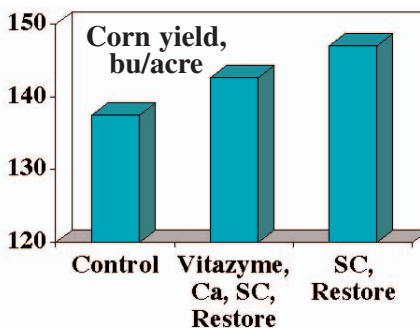
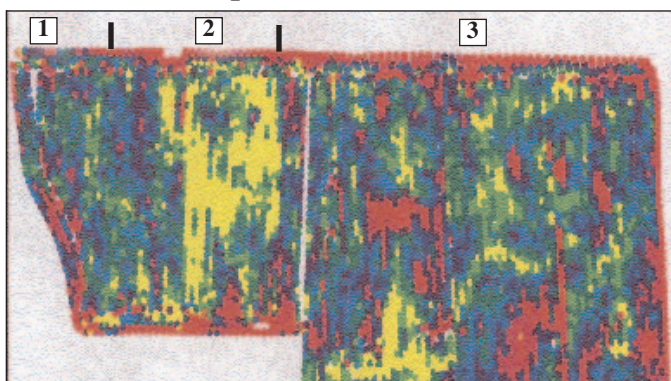
Ca-nitrate, SC, and Restore: applied at recommended rates, with the liquid N and Vitazyme preplant incorporated

Yield results: The field was harvested the week of October 21 to 28.

	Control			Vitazyme + others			SC + Restore		
	Boundary 1 ^a	Boundary 2 ^b	Average	Boundary 1 ^c	Boundary 2 ^d	Average	Boundary 1 ^e	Boundary 2 ^f	Average
Corn yield	131.3	143.6	137.5	144.5	140.8	142.7 (+4%)	142.7	151.5	147.1(+7%)

^aAverage of 156 data points; ^baverage of 138 data points; ^caverage of 140 data points; ^daverage of 138 data points; ^eaverage of 131 data points; ^faverage of 140 data points.

GPS printout of Field 529



• **Yield increase: 4 to 7%**

Income increase with Vitazyme and other additions: 5.2 bu/acre x \$2.25/bu = **\$11.70/acre**
Income increase with SC and Restore: 9.6 bu/acre x \$2.25/bu = **\$21.60/acre**

Field 510

Field size: 75 acres

Row width: 30 in

Variety: Pioneer 38PO5

Planting date: May 15, 2001

Population: 32,000 seeds/acre

Previous crop: wheat

Experimental design: The field was divided into three portions as indicated below

1. **Control**

2. **Vitazyme, Ca-nitrate, SC, and Restore**

3. **Vitazyme and Ca-nitrate**

Fertilization: 125 lb/acre of liquid N (32%) preplant incorporated; 200 lb/acre of 11-22-22% N-P₂O₅-K₂O + Zn and B, at planting.

Vitazyme treatment: 13 oz/acre with the liquid N, preplant incorporated

Ca-nitrate, SC, and Restore: applied at recommended rates, with the liquid N and Vitazyme preplant incorporated

Yield results: The field was harvested on October 27 or 28.

	Control ^a	Vitazyme + others		Vitazyme + CA-nitrate ^d
		Boundary 1 ^b	Boundary 2 ^c	Average
Corn yield	125.1	146.0	146.0	146.0 (+17%)
				141.1 (+13%)

^aAverage of 21 data points; ^baverage of 21 data points; ^caverage of 34 data points; ^daverage of 34 data points.



A root response such as shown here is typical with Vitazyme, wherein roots are stimulated to produce more fine rootlets to enhance nutrient uptake.

• Increase with Vitazyme and other additions: 13 to 17%

Income increase with Vitazyme and other additions:

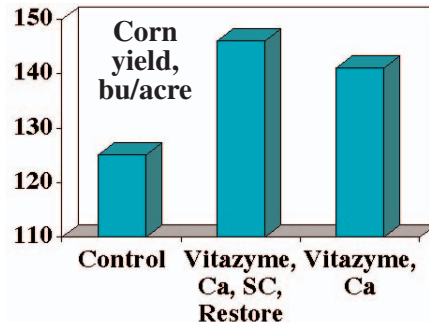
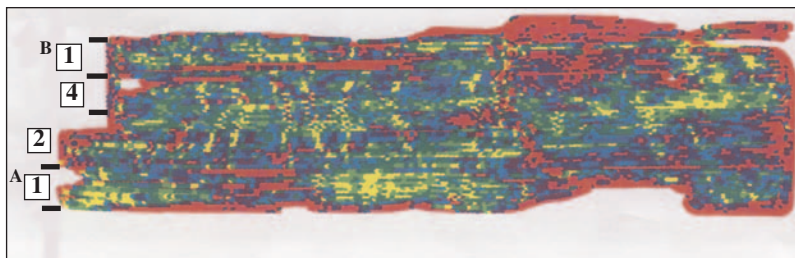
20.9 bu/acre x \$2.25/bu = **\$47.03/acre**

Income increase with Vitazyme and Ca-nitrate:

16.0 bu/acre x \$2.25/bu = **\$36.00/acre**

Conclusions: It is clear from this study that Vitazyme, in combination with Ca-nitrate, Restore, and Soil Conditioner, can substantially improve corn yields and income in New York. The yield increases were up to 21%, and income increases up to \$47.03/acre with these items added preplant incorporated along with nitrogen. This proves that Vitazyme and these other components in the fertility system are not adversely affected by applying them to the soil and incorporating them before planting. Restore along with the Soil Conditioner also showed effectiveness to increase yield in Field 529. Vitazyme was not used by itself in any of these studies.

GPS printout of Field 510



Sweet Corn



Sweet corn grown for seed in the study shown above revealed excellent root stimulation despite the poor vigor of the plants.

Location: Albion, New York

Soil type: unknown

Population: 18,000 seeds/acre

Previous crop: field corn

Experimental design: A sweet corn field was divided into two parts, untreated and with Vitazyme preplant incorporated.

Fertilization: 200 lb/acre of 11-22-22% N-P₂O₅-K₂O + Zn + B at planting; 125 lb/acre N (as a 32% N solution) preplant incorporated with the Vitazyme and the herbicide

Vitazyme treatment: 13 oz/acre preplant incorporated with the fertilizer and herbicide

Herbicide treatment: Atrazine (1 qt/acre) + Partner (3.5 lb/acre) preplant incorporated

Yield results: Weights were made from custom harvesting trucks for the treatments.

Income increase: Sweet corn sold for about \$50/ton.

Variety: Bonus

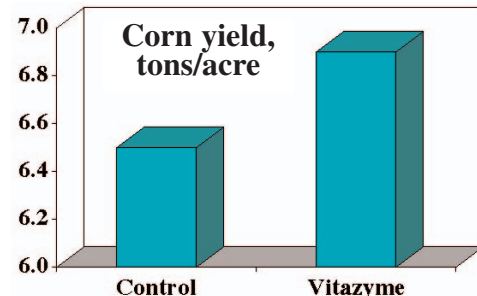
Row spacing: 30 inches

Planting date: June 28, 2001

Harvest date: October 14, 2001

1. Control 2. Vitazyme

Treatment	Corn Yield	Increase
	----- tons/acre -----	
1. Control	6.5	—
2. Vitazyme	6.9	0.4 (+6%)



Conclusions: Vitazyme caused a sizable yield and income increase in this New York study when applied and incorporated before planting. This reveals that the product's effects are not diminished by the proximity of fertilizers and herbicides in the cultural system.

- **Yield increase with Vitazyme: 6%**
- **Income increase with Vitazyme: \$20/acre**

Sweet Corn

New York Crop Research Facility, Cornell University

Location: near Batavia, New York

Spacing-in-row: 9 inches

Experimental design: A small field experiment was designed in a randomized complete block fashion, with four replications. Individual plots were 6 rows wide and 20 feet long. Foliar treatments were made to the center two rows only for all eight treatments.

- | | |
|----------------------------------|-------------|
| 1. Vitazyme | 5. Asset RS |
| 2. Harpin protein seed treatment | 6. Auxigrow |
| 3. Messenger | 7. K-Mag |
| 4. ACA | 8. Control |

Fertilization: All areas received 250 lb/acre of a 15-15-15% N-P₂O₅-K₂O dry formulation banded along the seed row at planting. On July 10, 100 lb/acre of N was applied.

Vitazyme application: (1) 13 oz/acre sprayed over the soil after emergence on July 6, and (2) again before tasseling on July 30; other products were added according to supplier recommendations.

Herbicides: Atrazine (3 pints/acre), Basagran (1.5 pints/acre) post-emergent, June 21

Harvest date: August 31, 2001

Weather: It was very hot and dry during the summer, with growth and yields curtailed due to the drought.

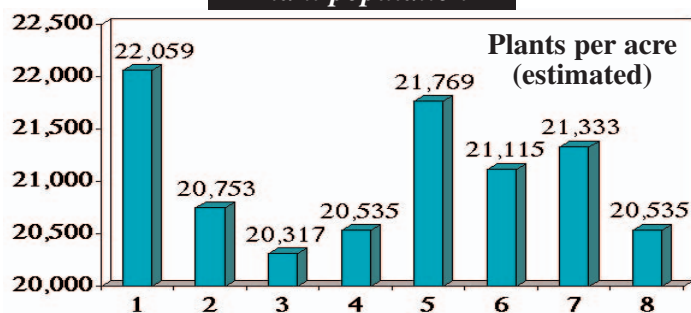
Row spacing: 30 inches



Though plagued by severe drought, this Cornell University sweet corn trial showed good responses with Vitazyme versus all other treatments.

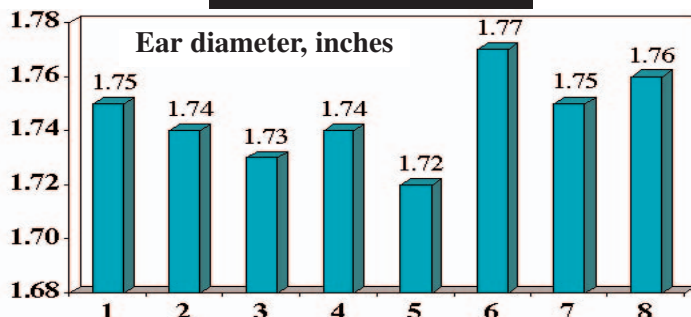
Yield and harvest results: Total yield and cob characteristics were evaluated before or at harvest.

Plant population



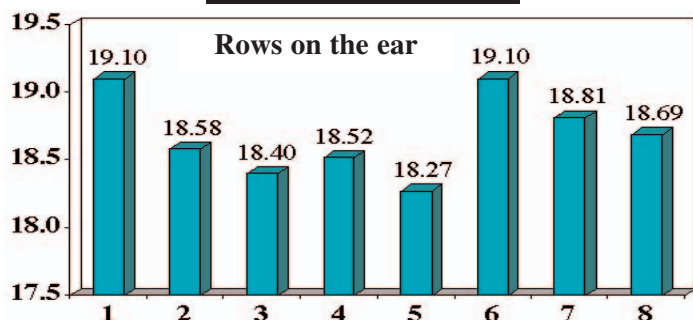
All values were not significantly different, but the population with Vitazyme was the highest, being 7% higher than the control.

Ear Diameter



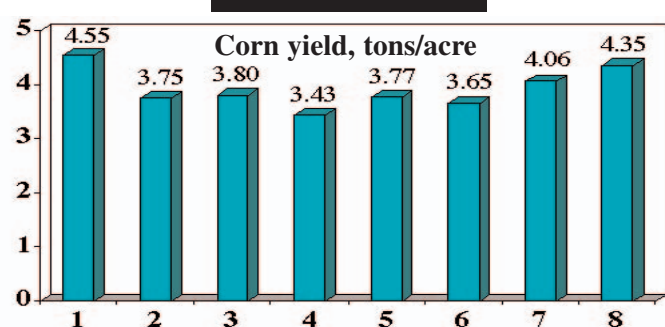
There was relatively little difference amongst the various treatments for ear diameter. None were significantly different.

Numbers of Rows



Vitazyme and K-Mag had the highest numbers of rows of kernels per ear, being 2% higher than the control. There were no significant differences amongst these values.

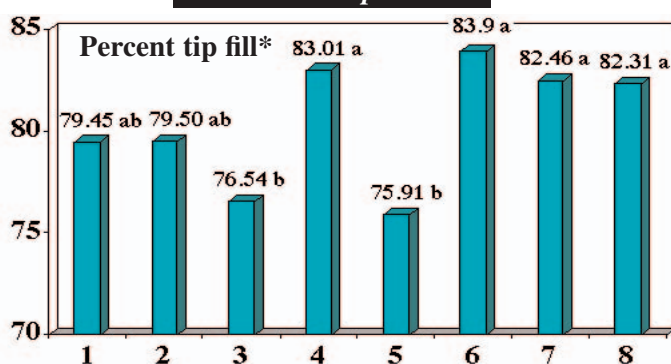
Corn Yield



Vitazyme yielded the most corn of any treatment, exceeding the control by 5% but exceeding the lowest other treatment (ACA) by 33%. The difference was equivalent to \$54.88/acre based on a \$49/ton sweet corn price. None of these differences were significant, however.

ears. Vitazyme treatment produced 33% more yield than the mean differences was lacking, the consistent trend of this study was for Vitazyme to provide excellent plant responses.

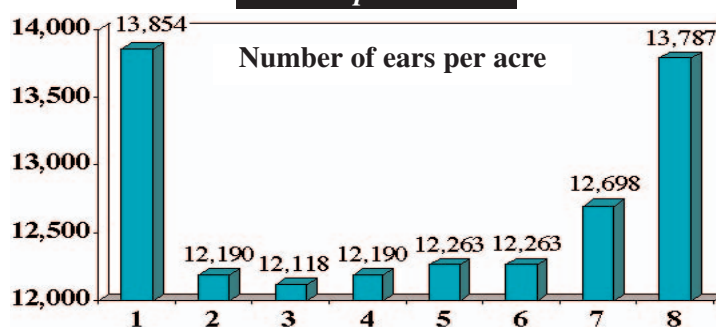
Percent Tip Fill



Some significant differences in percent tip fill appeared, with Messenger and Asset RS being the lowest in value of all treatments. Vitazyme was statistically equal to the highest tip fill value.

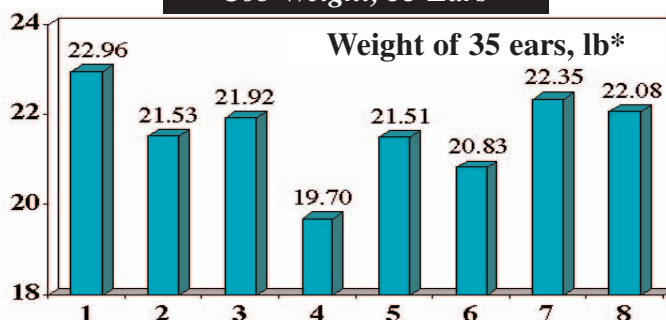
*Means followed by the same letter are not significantly different according to Fisher's Protected LSD; $P_{0.05} = 0.04$.

Ears per Acre



Vitazyme produced the greatest number of ears per acre, being slightly greater than the control but considerably greater than the other treatments by about 13%. This increase was a reflection of higher estimated plant population as noted earlier. No treatment means were significantly different.

Cob Weight, 35 Ears



* Growers are urged to grow large ears, so the weight of 35 ears should equal or exceed 25 lb; lower prices result from underweight ears. In 2001 the weights were low because of the severe drought. Nonetheless, the 25-ear weight for Vitazyme was the highest of all the treatments, exceeding the control by 4%. Vitazyme exceeded ACA ear weight by 17%.

Conclusions: Results with sweet corn in this study were greatly affected by a severe summer drought. In spite of this fact, **Vitazyme performed the best of all seven treatments used in this study, being highest in plant population, rows per ear, ears per acre, yield per acre, and total weight per 35 ears.** Though significance in the mean differences was lacking, the consistent trend of this study was for Vitazyme to provide excellent plant responses.

Sweet Corn

Location: Mississippi State University, Mississippi State, Mississippi

Variety: unknown

Planting date: April 10, 2001

Experimental design: Four lots of sweet corn were sent to Vital Earth Resources from Dr. Batson for treatment with Vitazyme and T-22 (*Trichoderma harzianum*, strain T-22). The treatments were as follows:

- (1) Lot 1. Regular Vitazyme (10%), with seeds soaked for five minutes and then dried.
- (2) Lot 2. T-22 (1 oz/gallon of soluble powder), with seeds soaked for five minutes and then dried.
- (3) Lot 3. Vitazyme (10%) + T-22 (1 oz/gallon), with seeds soaked for five minutes and then dried.
- (4) Lot 4. Vitazyme autoclaved (10%), with seeds soaked for five minutes and then dried. [The Vitazyme was autoclaved at 15 lb/in² pressure for 15 minutes at 121°C.]

Care was taken to maintain cleanliness during the inoculation process. The seeds were returned to Dr. Batson at Mississippi State and used for growth studies at the research station. The seeds were planted in 40-foot rows, and the populations were determined at 14 days after planting. Final stand counts were used to determine the effectiveness of the products to enhance seed germination for the various treatments and the control. Eight treatments were involved in this study.

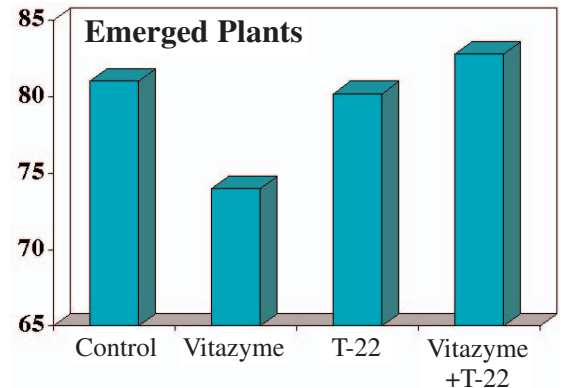
Growth results: On April 24, 2001, 14 days after planting, an evaluation was made of the number of emerged plants in the test area. While seven different product treatments were applied in this study, only three are reported here.

Conclusions:

Even though the treatment means were not significantly different,

there was a small improvement in emergence of the sweet corn plants when Vitazyme was included with the T-22 in the seed treatment, versus either product used alone. It is presumed that Vitazyme did not perform as well by itself in this study because the application rate to the seeds was excessive.

	Control	Vitazyme	T-22	Vitazyme +T-22
Emerged plants*	81.0 a	74.0 a	80.2 a	82.8 a
* Means followed by the same letter are not significantly different at P=0.05, according to the Student-Newman-Keuls Test. LSD _{0.05} =14.8.				



Sweet Corn

Research organization: Agronomy Supply Company, Inc.

Location: near Norfolk, Nebraska

Variety: proprietary

Planting date: unknown

Soil type: sandy loam

Irrigation: center pivot

Experimental design: Some rows of the large seed production field were sprayed with Vitazyme and the remainder of the field was left untreated. In this field one inbred line was left with tassels while the other inbred line was detasseled; these rows were regularly spaced and alternated.

1. Control

2. Vitazyme

Fertility treatments: 5-20-20% N-P₂O₅-K₂O + minerals (S, Mg, B, Zn, Mn, Cu) dry, preplant banded on either side of the rows; liquid starter; N applied periodically through the sprinkler system

Vitazyme treatments: 13 oz/acre with the herbicide at planting time (on the soil surface); 13 oz/acre later after emergence

Chlorophyll content: On August 1, 2001, ten random leaves from the treated area, and ten leaves from a nearby untreated area, were sampled for chlorophyll using a Minolta SPAD meter.

	Control	Vitazyme	Change
	----- tons/acre -----		
Leaf chlorophyll	52.1	53.8	(+) 1.7

Growth and yield results: Sampling on August 1, 2001, revealed many more root hairs and larger roots with Vitazyme treated plants. Also, the ears of the Vitazyme treated plants were somewhat larger than the control ears. Unfortunately, yield estimates of



Note how much better growth the Vitazyme treated sweet corn plants display; the roots, leaves, and stalks are all superior.

treated and control areas could not be made because yield sample bags were inadvertently mixed up.

Disease results: Stalk rot was a serious problem throughout the field, affecting the lowest portion of perhaps 10% of the plants. Vitazyme appeared to reduce the incidence of stalk rot somewhat, as determined by an informal tally of plants before harvest.

Conclusions: In spite of a lack of actual seed yield data, Vitazyme appears to be a highly beneficial treatment for sweet corn inbreds to . . .

- Increase seed yield
- Increase leaf chlorophyll
- Reduce stalk rot incidence
- **Increase in leaf chlorophyll: 1.7 SPAD units**

Cotton

Southern Regional Project S-269: Regional Evaluation of Biological Seed Treatments

Researchers: Don Huber, Ph. D., Purdue University, West Lafayette, Indiana

Peggy Thaxton, Ph.D., Texas A&M University, College Station, Texas

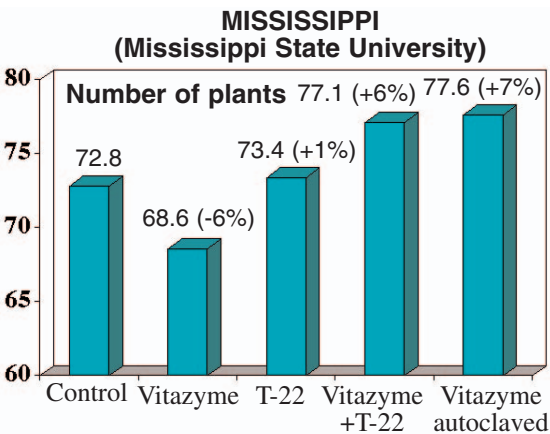
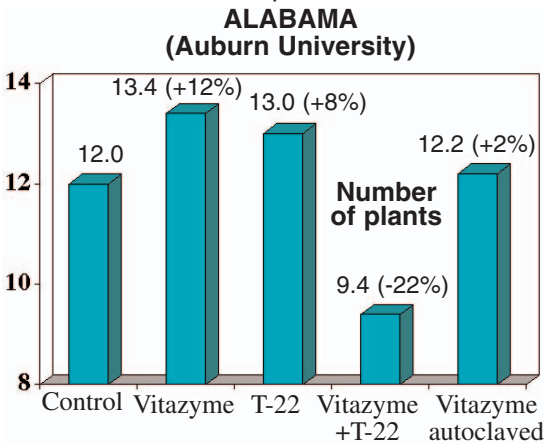
Kyle Rushing, Ph.D., and Tim Cavanaugh, Ph.D., Gustafson, Plano, Texas

William Batson, Ph.D., Mississippi State University, Mississippi State, Mississippi

Kathy McLean, Ph.D., Auburn University, Auburn, Alabama

Experimental design: Four lots of cotton seed (Sure Grow 747, 1.3 kg in each) were sent to Vital Earth Resources from Dr. Batson for treatment with Vitazyme and T-22 (*Trichoderma harzianum*, strain T-22). The treatments were as follows:

- (1) Lot 1. **Regular Vitazyme** (10%), with seeds soaked for five minutes and then dried.
- (2) Lot 2. **T-22** (1 oz/gallon of soluble powder), with seeds soaked for five minutes and then dried.
- (3) Lot 3. **Vitazyme (10%) + T-22** (1 oz/gallon), with seeds soaked for five minutes and then dried.
- (4) Lot 4. **Vitazyme autoclaved** (10%), with seeds soaked for five minutes and then dried. [The Vitazyme was autoclaved at 15 lb/in² pressure for 15 minutes at 121°C.]

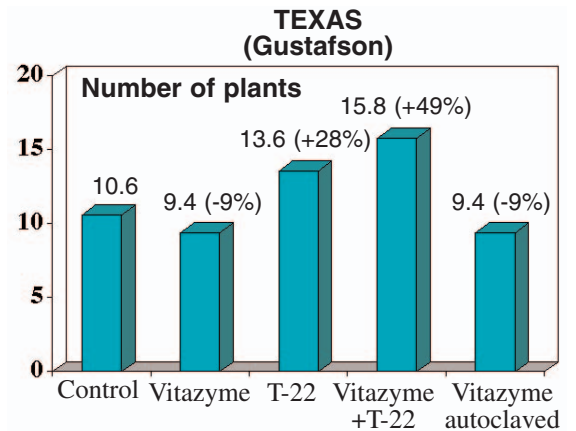
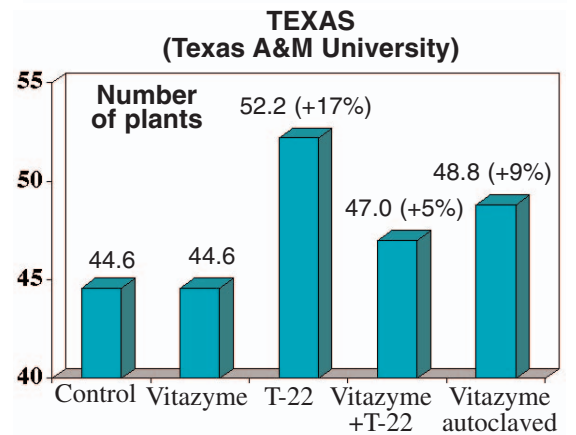
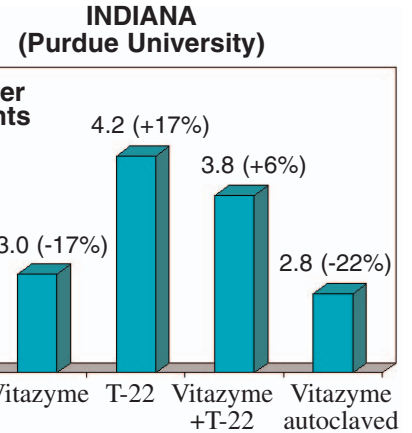


Care was taken to maintain cleanliness during the inoculation process. The seeds were returned to Dr. Batson at Mississippi State and sent to the various researchers for growth studies at the various research stations. The seeds were planted in 30 to 40-foot rows, and populations were determined after 28 days of growth. Final stand counts were used to determine the effectiveness of the treatments to enhance seed germination for the other products and the control. Twenty-four treatments were involved in this study. Not all of the studies at all stations showed good results in 2001, since the overall control did better than most of the treatments. No reason has been discovered for this result.

Conclusions: Although the controls did very well — for some unknown reason — in these studies compared to so many of the other treatments, Vitazyme, T-22, and the combined Vitazyme and T-22 in some cases produced increases in surviving plants versus the controls. In some cases autoclaved Vitazyme produced substantial increases in surviving plants. Responses were rather erratic, so few conclusions can be drawn from these results, quite unlike in 1999 and 2000, when similar studies revealed significant growth responses for both regular and autoclaved Vitazyme.

Improvements in survivability of plants show the effect of both Vitazyme and T-22 to reduce the incidence of root fungal diseases by colonizing the rhizosphere with beneficial organisms, preventing or limiting the proliferation of root-borne fungal and bacterial diseases. **The combined Vitazyme and T-22 gave quite good survival improvements for the Indiana, Mississippi, and both Texas sites, with an average increase of 17%.** Average changes for all treatments are as follows:

Vitazyme	-4%	Vitazyme + T-22	+9%
T-22	+14%	Autoclaved Vitazyme	-3%



Cotton

Texas A&M University Research and Extension Center, Lubbock, Texas

Location: Gaines and Dawson Counties, Texas

Two tests were initiated to evaluate the potential of Vitazyme to replace the highly toxic nematicide Temik in cotton production. All seed was treated with 1 lb/acre of *Trichoderma harzianum* strain T-22. Each site is discussed below.

Gaines County site

Variety: Paymaster 2326RR + T-22

Soil type: unknown

Experimental design: a randomized complete block design was set up with seven replications, on two rows per treatment that varied from 150 to 187 ft long.

Fertilization: standard for the area

Vitazyme treatment: (1) 13 oz/acre with the seeds at planting; (2) 13 oz/acre sprayed in 10 gal/acre of water over the leaves and soil at the pinhead square stage on June 22.

Temik treatment: 5 lb/acre in the furrow at planting

Growth results: Planting mapping was performed on September 14.

Planting date: May 16, 2001

Plant population: standard for the area

Irrigation: center pivot

Row spacing: 36 inches

1. Control

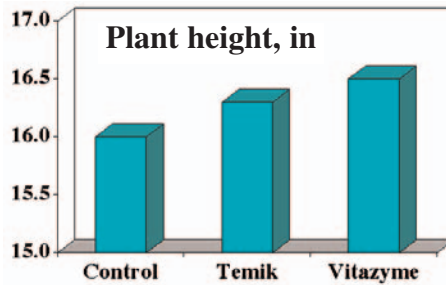
2. Temik

3. Vitazyme

Plant height

Treatment	Plant height	Change from the control
----- in -----		
Control	16.0	—
Temik	16.3	+0.3 (+2%)
Vitazyme	16.5	+0.5 (+3%)

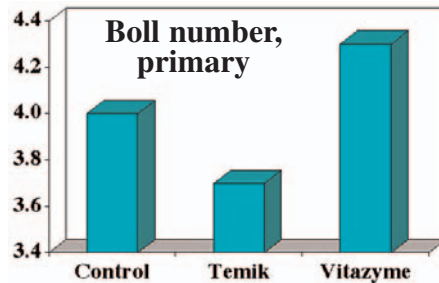
There was little difference in plant height, but Vitazyme and Temik both slightly increased height.



Primary bolls

Treatment	Primary bolls	Change from the control
----- number -----		
Control	4.0	—
Temik	3.7	-0.3 (-8%)
Vitazyme	4.3	+0.3 (+8%)

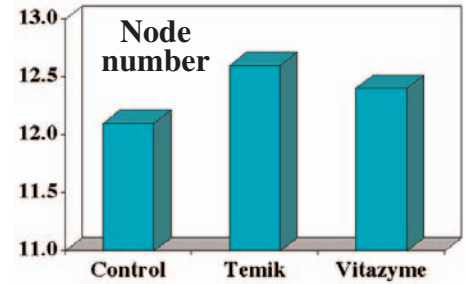
Vitazyme caused a higher number of primary bolls to be produced than any other treatment, which was 16% higher than the Temik treatment.



Node number

Treatment	Nodes	Change from the control
----- number -----		
Control	12.1	—
Temik	12.6	+0.5 (+4%)
Vitazyme	12.4	+0.3 (+2%)

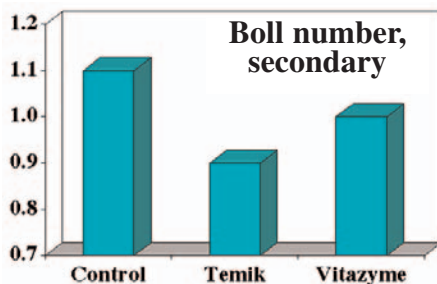
Both Vitazyme and Temik slightly increased the number of nodes per plant.



Secondary bolls

Treatment	Secondary bolls	Change from the control
----- number -----		
Control	1.1	—
Temik	0.9	-0.2 (-18%)
Vitazyme	1.2	+0.1 (+9%)

Both treatments had slightly lower secondary boll counts than the control, but Vitazyme treated plants had more than Temik treated plants.



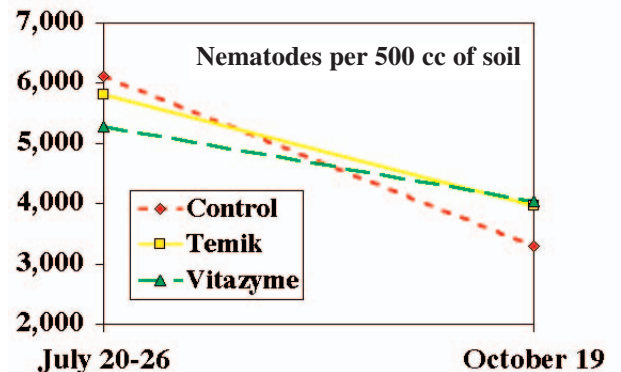
season (July 20 for reps 1 to 4, and July 26 for reps 5 to 7), and near harvest (October 19).

Nematode numbers: Soil samples for nematode analysis were collected mid-season (July 20 for reps 1 to 4, and July 26 for reps 5 to 7), and near harvest (October 19).

Treatment	Midseason nematodes	Change vs. control	Harvest nematodes	Change vs. the control
----- nematodes/500 cc of soil -----				
Control	6,111	—	3,291	—
Temik	5,811	-300 (-5%)	3,960	+669 (+20%)
Vitazyme	5,280	-831 (-14%)	4,042	+751 (+23%)

Nematode numbers were reduced by Vitazyme (-14%) the most early in the season, while the control had the lowest nematodes later on at harvest. Both Temik and Vitazyme had similar values throughout the season, only 9% apart in July and 3% apart in September.

Yield results: The plot was harvested on October 23 and 24. The control outyielded both the Temik and Vitazyme treatments at this site, and the Temik and Vitazyme yields were similar. It is thought that a restriction of water about two weeks after flower initiation affected yield, since many small bolls aborted as a result. With little rain during the growing season the yields were adversely affected by the severe drought.



Denver County site (AGCARES facility)

Variety: Paymaster 2326RR + T-22

Planting date: May 10, 2001

Irrigation: center pivot

Soil type: unknown

Plant population: standard for the area

Row spacing: 40 inches

Experimental design: A randomized complete block design was set up with four replications, of four rows per treatment that varied from 296 to 577 ft long.

1. Control 2. Temik 3. Vitazyme

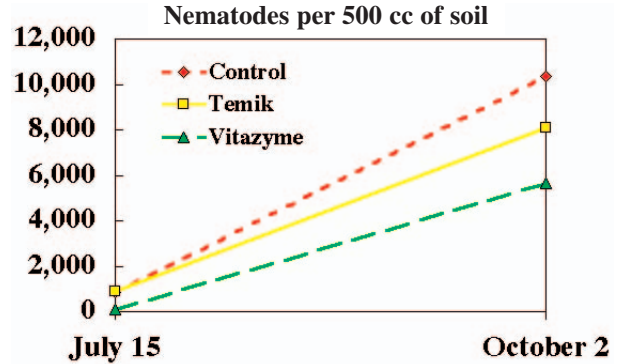
Fertilization: standard for the area

Vitazyme treatment: (1) 13 oz/acre with the seeds at planting; (2) 13 oz/acre in 10 gal/acre of water over the leaves and soil at the pinhead square stage on June 22.

Temik application: 5 lb/acre at planting in the furrow

Nematode numbers: Soil samples for nematode analysis were collected on July 15, and also later near harvest time on October 2.

Treatment	Midseason nematodes	Change vs. the control	Harvest nematodes	Change vs. the control
	----- nematodes/500 cc of soil -----			
Control	6,111	—	3,291	—
Temik	5,811	-300 (-5%)	3,960	+669 (+20%)
Vitazyme	5,280	-831 (-14%)	4,042	+751 (+23%)



Vitazyme treatment produced the lowest numbers of nematodes in this test detected both midseason and at harvest, being 86% less than for Temik midseason and 24% less than for Temik at harvest. There appears to be a definite inhibition of nematode numbers by Vitazyme.

Yield results: Yield data are not included for this study due to likely soil fertility problems across the test area. The Vitazyme area was much smaller in size than the Temik area, and likely gave biased yield values.

Conclusions: Based on the results of this study, Vitazyme appears to be as effective a nematode control agent for cotton as Temik. Growth parameters were enhanced by midseason at the Gaines County site, and nematode numbers were as good, if not better, for Vitazyme than for Temik. These data are summarized on the right.

	Gaines County site		Denver County site	
	Midseason	Harvest	Midseason	Harvest
Temik	-5%	+20%	+5%	-22%
Vitazyme	-14%	+23%	-91%	-46%

Garlic

Research organization: Dae Yu Company, Ltd.

Researcher: unknown

Location: Kunwe-Kun, Kyungbuk, Korea

Soil type: clay loam

Experimental design: A field area of established garlic was selected for this test. The area was divided into five areas having the following treatments:

Variety: Eusung

Transplanting date: unknown

1. Control 2. Vitazyme 3. Product A 4. Product B 5. Product C

Vitazyme application: A 1:1,000 dilution (0.1%) solution was sprayed on the leaves and soil of the garlic on April 19, April 26, and May 3, 2001.

Fertilization: unknown

Data collection:

Results on growth and bulb weight were collected on May 30 and June 7..

Conclusions: In this garlic test, all four products performed well in increasing both total plant and bulb weights. The values for the second evaluation are lower than the first, most likely because smaller plants were harvested the second time.

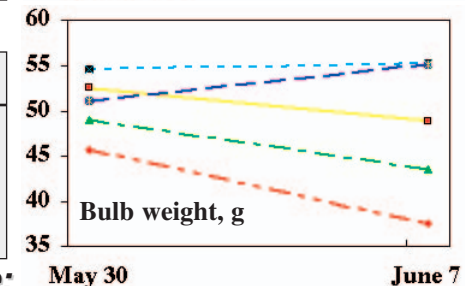
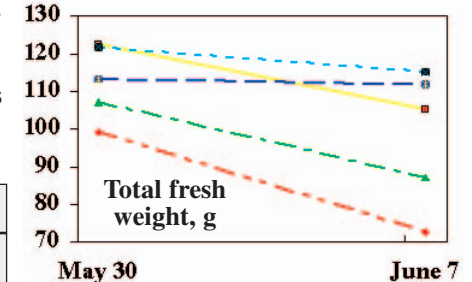
Treatment	Fresh weight, Change		Fresh weight, Change	
	May 30	June 7	May 30	June 7
	----- g -----			
1. (Control)	99.2	72.7	—	—
2. (Vitazyme)	122.5	105.3	+23.3 (+23%)	+32.6 (+45%)
3. (Product A)	107.1	87.2	+7.9 (+8%)	+14.5 (+20%)
4. (Product B)	121.7	115.3	+22.5 (+23%)	+42.6 (+59%)
5. (Product C)	113.3	112.0	+14.1 (+14%)	+39.3 (+54%)

Treatment	Bulb weight, Change		Bulb weight, Change	
	May 30	June 7	May 30	June 7
	----- g -----			
1. (Control)	45.7	37.5	—	—
2. (Vitazyme)	52.6	48.9	+6.9 (+15%)	+11.4 (+30%)
3. (Product A)	49.0	43.5	+3.3 (+7%)	+6.0 (+16%)
4. (Product B)	54.6	55.2	+8.9 (+19%)	+17.7 (+47%)
5. (Product C)	51.1	55.1	+5.4 (+12%)	+17.6 (+47%)

• **Increase in total plant weight with Vitazyme:**
First evaluation: 23% Second evaluation: 45%

All increases in total plant weight ranged from 8 to 23% for May 30, and from 20 to 59% for June 7. Bulb weights for the various products followed a similar pattern.

• **Increase in bulb weight with Vitazyme: First evaluation: 15% Second evaluation: 30%**



Grapes – An Organism Response Evaluation

Vineyard operator: Kiewer Farms

Location: Reedley, California

Variety: Ruby seedless

Location: Soil Foodweb, Inc., Corvallis, Oregon

Soil type: clay loam

Trellis system: standard T-bar

Spacing: 12 ft between rows, 8 ft in the row

Age: established

Experimental design: Eleven biological treatments were entered into a study to evaluate effects on organisms, especially fungi, in the rhizosphere of grape plants. Vitazyme was one of these treatments. An untreated control was also included. Each product and the control comprised 450 ft. of row, or 0.125 acre. Only Vitazyme and control data were made available to Vital Earth Resources.

1. Control

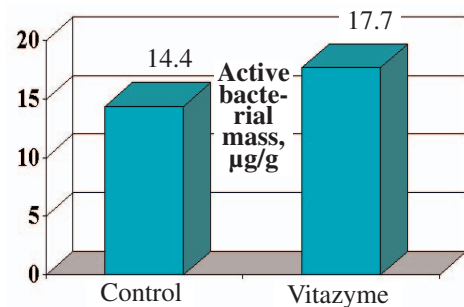
2. Vitazyme

Fertility program: unknown

Vitazyme application: The end of the drip line was disconnected and attached to a hose from a sprayer tank. Then 100 gallons of Vitazyme solution were applied in the row under 50 psi. A 13 oz/acre rate was applied, or 1.6 oz in the 100 gallons, on April 23, 2001.

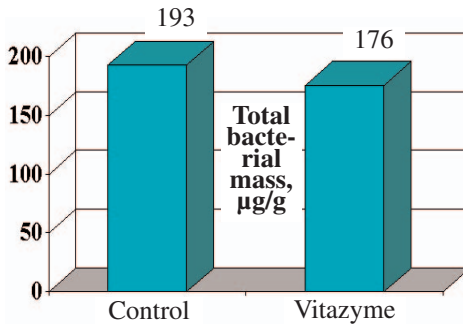
Organism population results: The soil and roots of all treatments were sampled on June 18, 2001, and submitted to the SFI laboratory on June 20, 2001. Sampling was performed by obtaining a soil core to 6 inches in the outer edge of the drip zone of 25 sites (every third plant) along the treated row. Care was taken to clean and sterilize the probe between product samplings. The results here show a comparison between the untreated control and the Vitazyme treatment on organism populations and ratios of these populations. Comments below each graph are, in part, from SFI personnel.

ACTIVE BACTERIAL BIOMASS



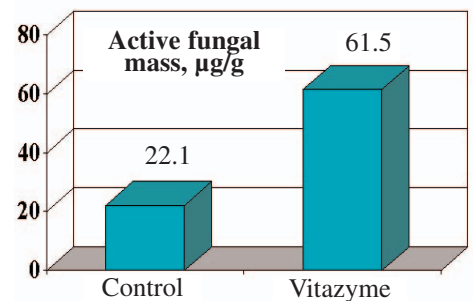
Control levels are good, and Vitazyme levels are excellent.

TOTAL BACTERIAL BIOMASS



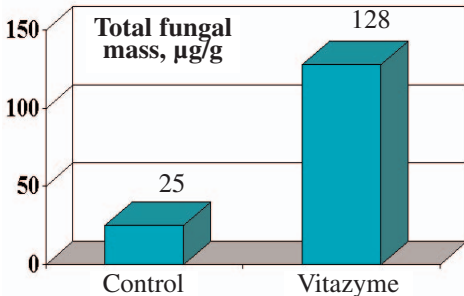
Both levels are in the excellent range.

ACTIVE FUNGAL BIOMASS



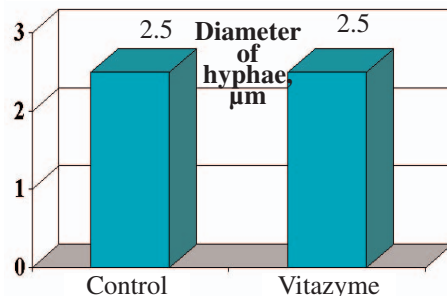
The control levels are good, but with Vitazyme excellent, prompting an SFI comment that fungal foods must have been added.

TOTAL FUNGAL BIOMASS



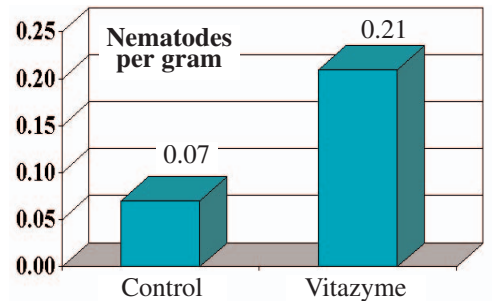
Both levels are low, but Vitazyme is helping restore levels and diversity of fungi.

HYPHAL DIAMETER



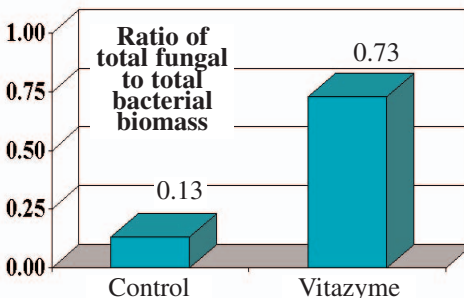
Both of these diameters indicate mainly a community of ascomycetes, typical of grasslands.

TOTAL NEMATODE NUMBER



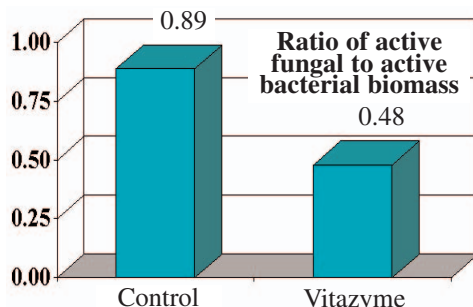
Both levels are low, and diversity is poor, but Vitazyme has enhanced numbers, especially bacterial feeders (Mesorhabditis and Geomonhystera) and also fungal feeders (Microdorylaimus).

TOTAL FUNGAL TO TOTAL BACTERIAL BIOMASS



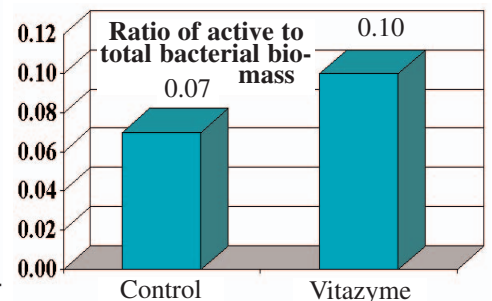
Both ratios are low, but Vitazyme is moving the fungal-bacteria balance much more in the right direction. Values of 2 to 5 are good for grapes.

ACTIVE TO TOTAL FUNGAL BIOMASS



In both cases the fungi are quite active; but there needs to be more diversity for both.

ACTIVE TO TOTAL BACTERIAL BIOMASS



Both values are acceptable

Pathogenic nematodes

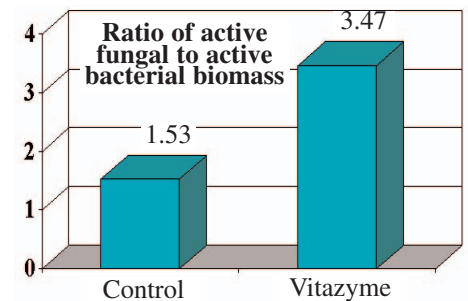
None were detected with Vitazyme, but some ring nematodes were detected in the control.

Conclusions: Vitazyme substantially improved the population of soil organisms within the soil of the drip zone of these grape plants. In particular, the following items were noted:

1. Vitazyme improved the **active bacterial biomass** above the control (+23%), into the "excellent" range.
2. Vitazyme boosted the **active bacterial biomass** by 178% above the control, into the "excellent" range.
3. Vitazyme increased the **total fungal biomass** by 412% above the control.
4. The Vitazyme treatment had three times as many **total nematodes** as the control, none of which were pathogenic species as for the control.
5. Vitazyme improved the various organism ratios:
 - **Total fungal: Total bacterial biomass**
 - **Active: Total bacterial biomass**
 - **Active fungal: Active bacterial biomass**

In summary, Vitazyme at only 13 oz/acre introduced through the drip system had a markedly positive effect on the microbiology of the soil, as determined by the Soil Foodweb analyses.

ACTIVE FUNGAL TO ACTIVE BACTERIAL BIOMASS



The control ratio is alright, but the Vitazyme level is especially good, within the optimum range of 2 to 5 for woody perennials. The SFI personal again think fungal food was added to kick them into high gear; such food was not added.

Grapes – An Organism Response Evaluation

Vineyard operator: Kiewer Farms
Location: Reedley, California
Location: BBC Laboratories, Inc., Tempe, Arizona
Variety: Ruby seedless
Soil type: clay loam
trellis system: standard T-bar
Spacing: 12 ft between rows, 8 ft in the row
Age: established

Experimental design: Eleven biological treatments were entered into a study to evaluate effects on organisms, especially fungi, in the rhizosphere of grape plants. Vitazyme was one of these treatments. A untreated control was also included. Each product and the control comprised 450 ft. of row, or 0.125 acre. Only Vitazyme and control data were made available to Vital Earth Resources.



A newly planted vineyard in the San Joaquin Valley of California, having a Vitazyme treatment on the right, revealed excellent vine response (vs. the control) during the first months of growth.

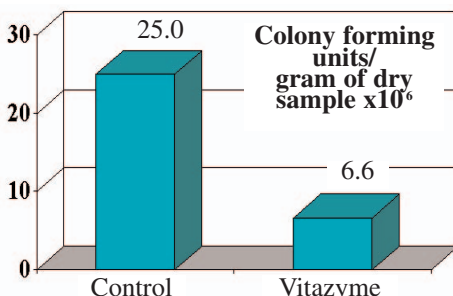
1. Control
2. Vitazyme

Fertility program : unknown

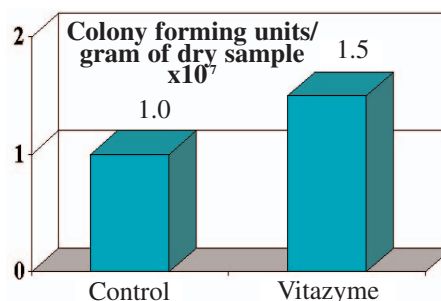
Vitazyme application: The end of the drip line was disconnected and attached to a hose from a sprayer tank. Then 100 gallons of Vitazyme solution were applied in the row under 50 psi. A 13 oz/acre rate was applied, or 1.6 oz in the 100 gallons, on April 23, 2001.

Organism population results: The soil and roots of all treatments were sampled on June 18, 2001, 56 days after product application, and submitted to the laboratory on June 20, 2001. Sampling was performed by obtaining a soil core to 6 inches on the outer edge of the drip zone of 25 sites (every third plant), along with the treated row. Care was taken to clean and sterilize the probe between core samplings, and the collection bucket was cleaned and sterilized between product samplings.

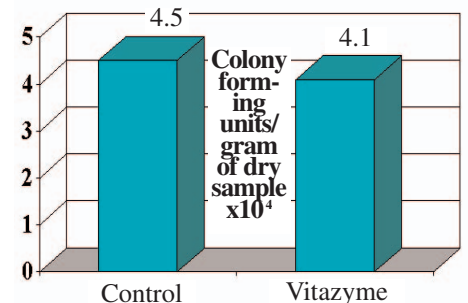
AEROBIC HETEROTROPHIC PLATE COUNT*



ANAEROBIC BACTERIA*



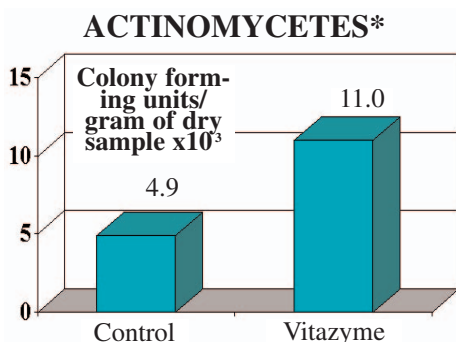
YEASTS AND MOLDS*



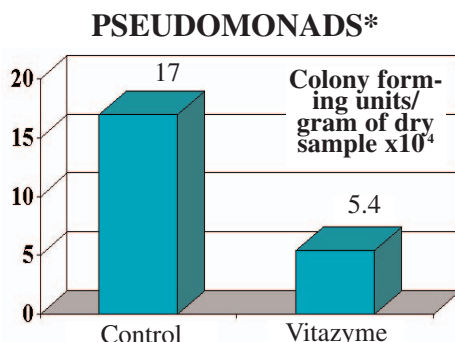
*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 37-5.2

*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 37-5.2

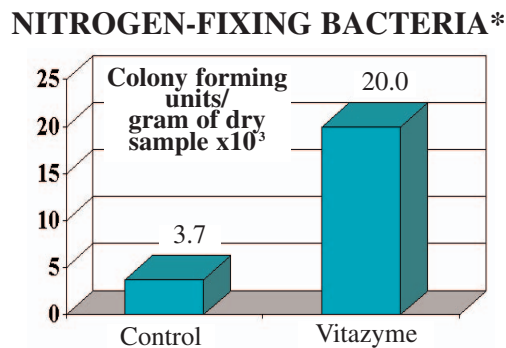
*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 37-8.1.2



*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 37-8.1.3



*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 37-8.3



*A modified version from *Methods of Soil Analysis*, Second Edition, ASA and SSSA; 50-3

Conclusions: In response to Vitazyme application, all organism groups were changed.

Changes in organism populations with Vitazyme						
Aerobic heterotrophs	Anaerobes	Yeasts/Molds	Actinomycetes	Pseudomonads	N-fixers	
-74%	+50%	-9%	+124%	-68%	+441%	

In spite of a drop in aerobic heterotrophs and pseudomonads, the anaerobic bacteria increased substantially. **Actinomycetes** increased dramatically, by 124%. These organisms are highly important in the breakdown of organic materials and in the production of stable humus. They degrade lignin, and help mineralize carbon and nitrogen. They are especially important in antibiotic production.

Anaerobic bacteria increased by 50%; it is not known what benefits this group may have. An astounding 441% increase in **nitrogen fixing bacteria** was documented, which means that the active agents in Vitazyme are stimulating the soil to produce more of its own nitrogen, meaning less commercial nitrogen needs to be added for plant requirements.

Grapes (Wine)



These Pinot Noir grapes are growing on a vine that a year earlier was about to be removed due to low productivity. Note the fine fruit set and aggressive plant. Vitazyme helps rejuvenate diseased vineyards.

midseason in 2000, Vitazyme at 13 oz/acre. All materials were applied through the drip system.

Yield results: No exact yield figures were collected, but close approximations were made.

Conclusions: Because of this great increase in grape production due to the use of Vitazyme, fish emulsion, and H₂O₂ the grower retained this portion of the Vineyard that he was planning to remove due to low production.

Grower: G.V.S.

Variety: Pinot Noir (wine grapes)

Soil type: sandy, very poor fertility

Spacing: 12 ft between rows, 7 ft in rows

Trellis system: vertical post and wire

Experimental design: A few rows of a large vineyard, that was destined to be removed due to low production, were treated with Vitazyme and certain other materials through the drip irrigation system.

Fertilization: unknown

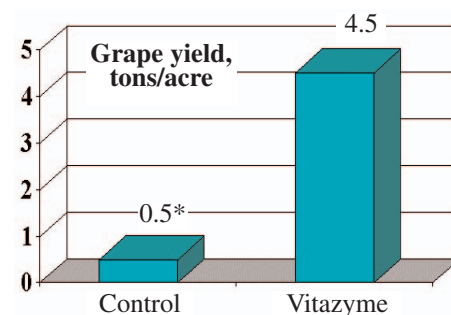
Fungal control: standard for the area

Vitazyme and other materials: Fall of 1999, Vitazyme at 13 oz/acre, fish at the recommended rate, and H₂O₂; spring of 2000, Vitazyme at 13 oz/acre;

Location: Gonzales, California

Vine age: mature

1. Control 2. Vitazyme + other materials



*This value was the expected yield for the area based on harvest data from the previous few years.

Vitazyme Works Well With Many Other Products!

Results of 2001 tests show that Vitazyme synergizes well with a number of materials including *Trichoderma harzianum* strain T-22 (a microbial inoculant), Awaken (a crop stimulant), and Greenup-6+16 (a granular Sucrate). Together with positive results with liquid fish, humates, and many fertilizer combinations in 2001 and previous years there is clear proof that Vitazyme works with most nutritional and microbial additives for soils and crops to help them work even better.

Gypsophylla

Research organization: Summer Zone, Quito, Ecuador

Cooperator: Ing. Fernando Guerra

Variety: Million Star

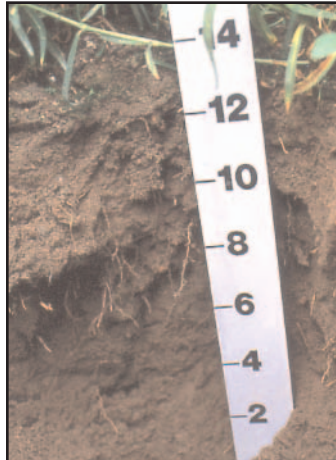
Growth environment: mountain soils with two extra hours of artificial light per day, to achieve a 14-hour day

Experimental design: Areas of the field were treated with Vitazyme in three ways:

1. Soil drench
2. Foliar spray
3. Combined soil drench and foliar spray

“From the experience we had with Vitazyme, we can certify the following:

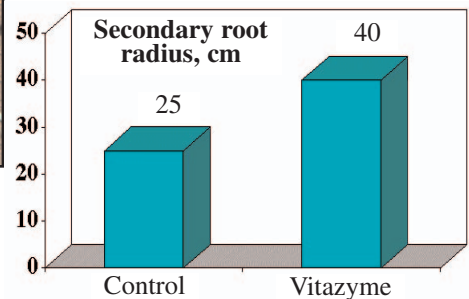
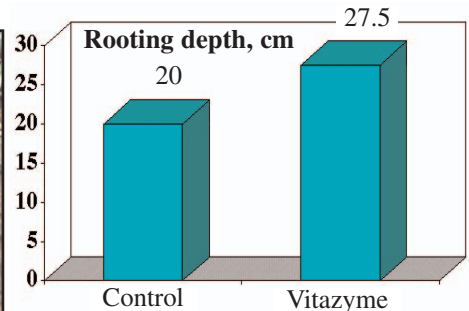
- From the results we’ve obtained, we can assure that the product helped the root area to grow in a better way, compared with the control, obtaining a depth of 25 to 30 cm, while the control got to 20 cm. It [also] increased the lateral root growth of the secondary roots, reaching a lateral cover of 40 cm in radius, different from the control that reached a 25 cm radius.”



Gypsophylla roots from plants not treated with Vitazyme show usual root development.



When treated with Vitazyme the roots developed much deeper, were larger, and possessed more root hairs.



- “The foliar applications helped to increase the photosynthetic area, increasing the number of lateral stems and the number of leaves.”
- “It also had an effect in the crop cycle, shortening it in one week; this caused a decrease in the final weight of the stems, because it did not complete its normal cycle.”
- “As a conclusion of this test, we can assure that the product behaved as expected, helping in the development of the root mass and increasing the photosynthetic area of the plants.”

Ing. Fernando Guerra
Flor Eterna S.C.C.

Lettuce

Research organization: Dae Yu Company, Ltd.

Location: greenhouse at Daegu University, Hayang Eup, Kyungan City, Kyungbuk, Korea

Soil type: “market bed” soil

Pot number: 48

Transplanting date: January 6, 2001

Seeding date: December 22, 2000

Experimental design: The pots were arranged in a randomized design, with three treatments and four replicates (4 plants per pot). The treatments were as follows:

1. Control
2. Vitazyme
3. Product A

Fertilization: unknown

Vitazyme application :

A 1:2,000 solution (0.05%) was used for a foliar spray on

February 16 and 26, and March 6.

Data collection: Evaluations were made on March 8, 2001.

Researcher: unknown

Variety: Kohyang

Fresh weight, above ground portion

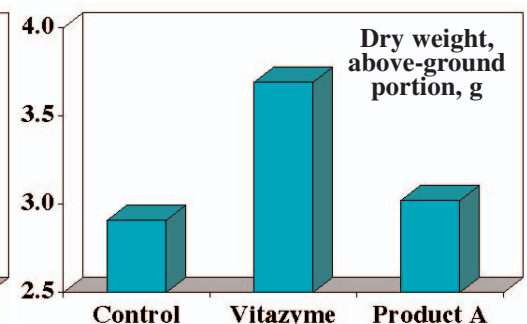
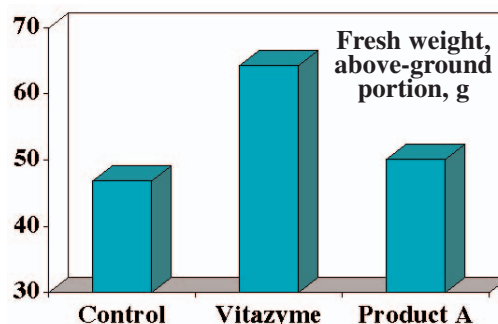
Treatment	Fresh weight, above-ground portion	Change
1. (Control)	46.9	—
2. (Vitazyme)	64.3	+17.4 (+37%)
3. (Product A)	50.1	+3.2 (+7%)

Dry weight, above ground portion

Treatment	Dry weight, above-ground portion	Change
1. (Control)	2.91	—
2. (Vitazyme)	3.69	+0.78 (+27%)
3. (Product A)	3.01	+0.11 (+4%)

- **Fresh weight increase with Vitazyme: 37%**

- **Dry weight increase with Vitazyme: 37%**



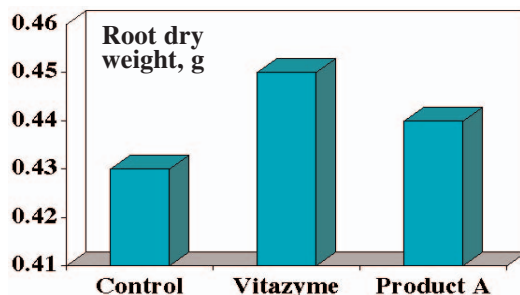


Lettuce treated with Vitazyme has proven to grow more quickly, with a more extensive root system and larger leaves. Note these beautiful Vitazyme treated lettuce heads.

Conclusions: In this replicated study at a South Korean University, Vitazyme greatly stimulated fresh lettuce leaf growth — by 37% over the control — and leaf dry weight by 27% above the control. Root weight increases were not similarly stimulated, but are not necessary for the production of lettuce, whose value is in the leaves. A mere 0.05% solution of Vitazyme sprayed three times during the growth period evoked this response.

Dry weight, roots

Treatment	Dry weight, roots	Change
1. (Control)	0.43	—
2. (Vitazyme)	0.45	+0.02 (+5%)
3. (Product A)	0.44	+0.01 (+2%)



Oats

Location: Mars Hill, Maine

Variety: unknown

Soil type: gravelly loam

Experimental design: An oats field was divided into treated and untreated areas, the Vitazyme treatment going through the center of the field.

1. Control

2. Vitazyme

Fertilization: the same over all areas

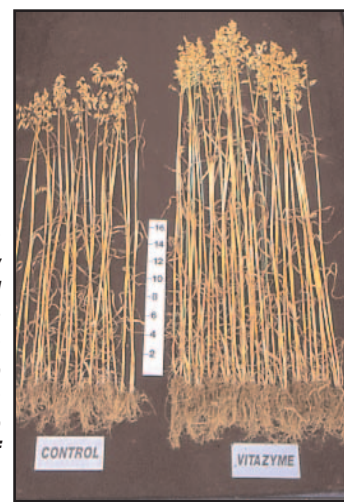
Vitazyme treatments: 13 oz/acre at a few inches in height

Yield and quality results: The test was well-done, but no yield checks were made. However, test weights were taken for the two treatments.

	Control	Vitazyme	Change
	----- lb/bu -----		
Test Weight*	33.5	35.0	+1.5

* Values are averaged from several locations in the treated and untreated areas.

Oats treated with Vitazyme in Maine grew more roots, tops, and grain in this study. Oats in a typical potato-grain rotation thus adds more income during grain years when Vitazyme forms an integral part of the grower's program.



- **Increase in test weight with Vitazyme: 1.5 lb/bu**

Oats – A testimonial

Farmer: Judd and Greg Hemphill

Location: Presque Isle, Maine

Variety: unknown

Soil type: gravelly loam

Experimental design: An oats field was divided into two areas:

1. Control

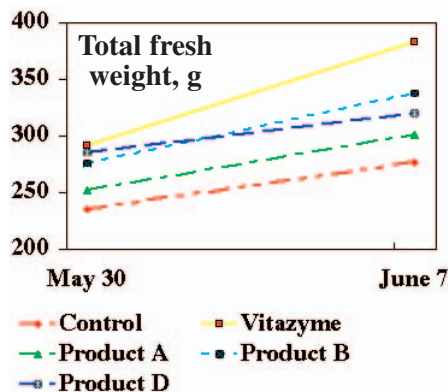
2. Vitazyme

Fertilization: equal throughout the field

Vitazyme treatment: 13 oz/acre at a few inches in height on the leaves and soil

Yield results: Greg: "The oats with Vitazyme were at least 10% better in yield than the untreated. I would like to run a larger test next year. It would help to get better data."

Onions



Research organization: Dae Yu Company, Ltd.

Researcher: unknown

Location: Kunwe-Kun, Kyungbuk, Korea

Variety: Manina

Soil type: clay loam

Transplanting date: unknown

Experimental design: A field area for the onions was selected in an established plot to evaluate growth parameters. The areas were divided into treatments using the following:

Total plant weight

Treatment	Fresh weight, May 30	Change	Fresh weight, June 7	Change
		g		g
1. (Control)	236.0	—	276.7	—
2. (Vitazyme)	291.8	+55.8 (+24%)	383.3	+106 (+39%)
3. (Product A)	252.5	+16.5 (+7%)	301.6	+24.9 (+9%)
4. (Product B)	276.1	+40.1 (+17%)	338.0	+61.3 (+22%)
5. (Product D)	286.1	+50.1 (+21%)	320.7	+44.0 (+16%)

1. Control

2. Vitazyme

3. Product A

4. Product B

5. Product D

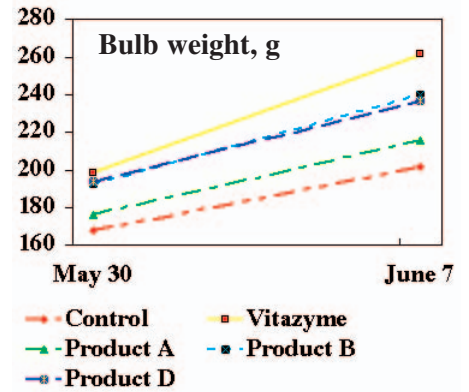
Vitazyme application : A 1:1,000 dilution (0.1%) solution was sprayed on the leaves and soil on April 19, April 26, and May 3, 2001.

Fertilization: unknown

Data collection: Results on growth and bulb weight were collected on May 30 and June 7, 2001.

Conclusions: Vitazyme gave excellent growth stimulation to these onions, increasing total plant weight by 24% on May 30, and by 39% on June 7. The increase in growth

was accelerating above the control as time passed. The same was true with bulb weight, where an 18% yield increase on May 30 gave way to a 30% bulb increase on June 7. Vitazyme outperformed the other three products in all situations.



Bulb weight

Treatment	Bulb weight, May 30	Change	Bulb weight, June 7	Change
		g		g
1. (Control)	167.7		201.6	
2. (Vitazyme)	198.6	+30.9 (+18%)	261.5	+59.9 (+30%)
3. (Product A)	176.1	+8.4 (+5%)	215.7	+14.1 (+7%)
4. (Product B)	192.3	+24.6 (+15%)	240.2	+38.6 (+19%)
5. (Product D)	193.9	+26.2 (+16%)	236.9	+35.3 (+18%)

- **Increase in plant weight with Vitazyme: First evaluation: 24% Second evaluation: 39%**
- **Increase in bulb weight with Vitazyme: First evaluation: 18% Second evaluation: 30%**

Onions (Transplanted)

Utah State University

Researcher: Dan Drost, Ph.D.

Location: Jeff Stevenson and Kelly Green Farms, Layton, Utah (Davis County)

Variety: Yellow Spanish (Vaquero and Mercury)

Bed spacing: 36 inches, two rows/bed at 10 in spacing

Planting date: April 11, 2001

Experimental design: Long rows (200 ft) were planted with transplants on which the treatments were applied, using T-22 (*Trichoderma harzianum*, variety T-22), and Vitazyme, TrigrO, Auxigro, and "Dramatic" Liquid Fish growth stimulants alone and in combination with T-22, and at planting as a transplant drench and as a foliar spray later in the season.

In this report, only the individual growth stimulants will be compared as they affected bulb size, since most parameters in this study did not reveal significant results.

1. Control
2. Auxigrow
3. Fish
4. TrigrO
5. Vitazyme

Weather during the growing season: Very cold weather conditions in the spring resulted in significant onion stand losses, especially for the seeded onions in one part of the study (not included here). Transplants were not so adversely affected.

Fertilization: 225 lb/acre of nitrogen

Vitazyme application: 13 oz/acre on the leaves and soil by backpack sprayer on July 19, using 30 psi with a cone nozzle

TrigrO, Auxigrow, and Fish applications: according to manufacturer recommendations

Weed control: Goal and Buctril applied after transplanting, plus cultivation and hand weeding

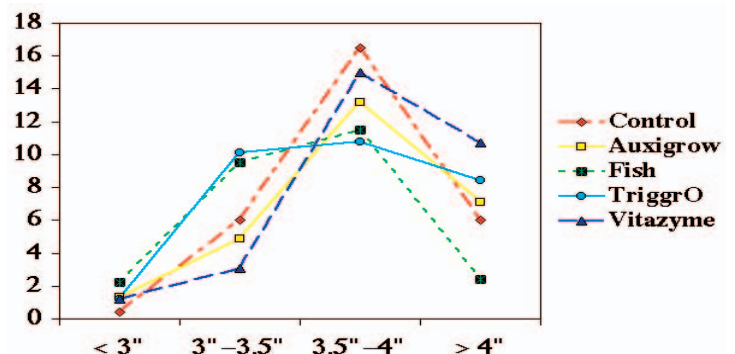
Harvest and size data: On August 7, 10-foot sections of each treatment were harvested by topping, bagging, and curing for two weeks under cover. They were then graded into colossal (4"+), extra-jumbo (3"-3.5"), medium (2.25"-3"), and cull (<2.25") sizes.

Conclusions: Vitazyme in this study revealed a tendency to produce larger sized onions with the yellow Spanish variety. This effect should be transmitted to combinations with other products as well, such as T-22 + Vitazyme,

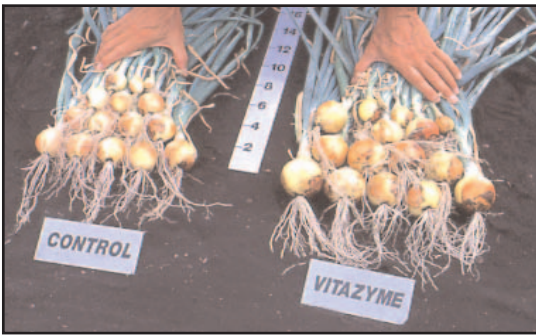
although other data in this study did not verify that hypothesis. It is possible that a lack of replication, and too small a sample (only 10 feet of row), contributed to some of the lack of consistency in results in this onion transplant study.

- **Percent of largest onions with Vitazyme: 86%**

Foliar Treatment	Total bulbs	Marketable bulbs	Size grades				Percent extra-jumbo and colossal
			< 3"	3"-3.5"	3.5"-4"	> 4"	
	--- no./10 ft row---		----- lb/10 ft row -----				% of total
1. Control	35	29.0	0.4	6.0	16.5	6.0	78
2. Auxigrow	36	26.5	1.3	4.9	13.2	7.1	77
3. Fish	42	25.6	2.2	9.5	11.5	2.4	54
4. TrigrO	42	30.5	1.2	10.1	10.8	8.4	63
5. Vitazyme	35	29.9	1.2	3.1	15.0	10.7	86



Onions (Transplanted)



Vitazyme treated onions are usually larger, as can be seen in samples from this New York study. Bigger bulbs increase income.

Farmer: Wm. Karas and Sons
Variety: Benchmark
Planting date: April 30 and May 1, 2001
Experimental design: Six side-by-side fields of 3.33 acres each, with very uniform muck soils across all fields, were divided into two parts: three fields treated with Vitazyme and three fields left untreated.

Location: Elba, New York
Soil type: muck (organic)
Watering: sprinkler irrigated

1. Control
2. Vitazyme

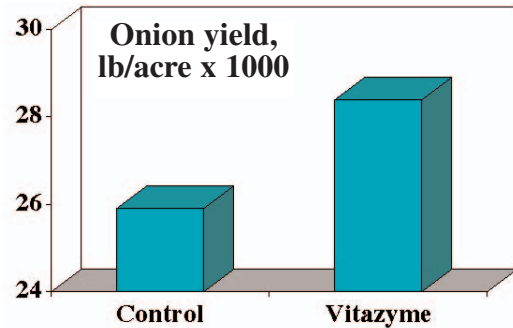
Fertilization: the same for all six fields: 1,000 lb/acre 10-8-28 at planting, and 100 lb/acre of urea (46-0-0) mid-season.



Vitazyme treatment: 13 oz/acre on the seeds at planting; 13 oz/acre on the leaves and soil at the 6 to 7 leaf stage.

Growing season observations: On August 14, 2001, shortly before harvest, the Vitazyme treated onions were noticeably larger on average, and the leaves were much greener compared to the senescing control leaves. Thus, the treated plants were continuing to photosynthesize later and add more bulk to the bulbs.

	Control	Vitazyme	Change
Onion yield	259	284	25 (+10%)
Total weight, lb	259,000	284,000	25,000 (+10%)
Per acre weight, lb/acre	25,900	28,400	2,500 (+10%)



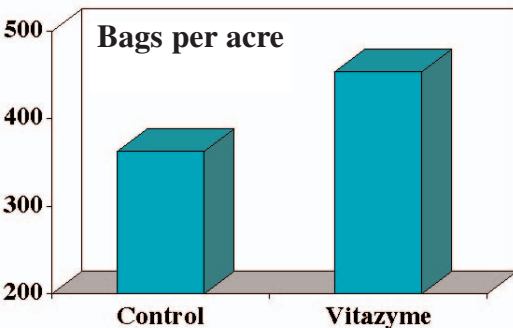
compared to the senescing control leaves. Thus, the treated plants were continuing to photosynthesize later and add more bulk to the bulbs.

Harvest date: late August, 2001

Yield results: All six fields were harvested at the same time, and the onions were placed in 1,000 lb boxes in the field. These boxes were counted for the different fields and totaled for each treatment.

Onion packout results: The onions were graded and packed into 50-lb bags. Only the bulbs that were 2 inches in diameter and larger were packed, and are included in these figures.

	Control	Vitazyme	Increase
----- onions >2" in diameter -----			
Bags per acre	362.6 bags/acre	454.4 bags/acre	91.8 (+25%)
Total weight	18,130 lb/acre	22,720 lb/acre	4,590 (+25%)



Income results: Average market price of onions: \$0.10/lb.

Conclusions: Vitazyme substantially improved the yield and size of onions in this New York muck soil field trial. While Vitazyme improved the overall yield by 10%, it increased the packout (onions > 2" in diameter) by an additional amount over the control so that the overall marketable weight was 25% greater than for the control. This extra weight amounted to \$459/acre more income, as Vitazyme returned \$51 for every dollar invested in the product.

Percent marketable yield of total harvest:

	Total yield	Marketable yield	Percent of total
----- lb/acre -----			
Control	25,900	18,130	70%
Vitazyme	28,400	22,720	80%

	Control	Vitazyme	Change
----- \$/acre -----			
Onion income	1,813	2,272	+459



Untreated onions produced an average crop on the Karas muck land in New York; from area 3.



Area 4, receiving Vitazyme twice, reveals a darker color and more tops and bulbs than the control.

- **Onion yield increase: 10%**
- **Income increase: \$459/acre**
- **Marketable onion yield increase: 25%**
- **Control % of Marketable: 70%**
- **Vitazyme % of Marketable: 80%**
- **Return per dollar invested with Vitazyme: \$51.00**

Red Peppers

Daegu University, South Korea

Research organization: Dae Yu Company, Ltd. **Researcher:** unknown **Variety:** Pochungchun
Location: greenhouse at Daegu University, Hayang Eup, Kyungan City, Kyungbuk, Korea
Soil type: peat moss with Perlite **Pot number:** 600 **Transplanting date:** April 22, 2000
Experimental design: The pots were arranged in a randomized design, with six treatments and three replicates. Some pots were treated by foliar spraying and some by fertigation. The treatments were as follows:

- 1. Control 2. Vitazyme 3. Product A 4. Product B 5. Product C 6. Product D**

Fertilization: unknown

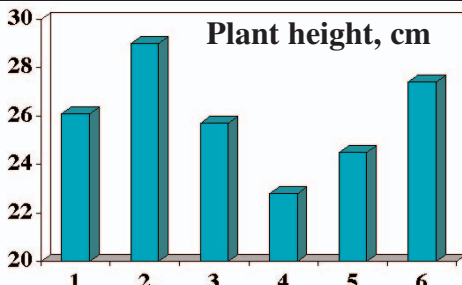
Vitazyme application: Vitazyme was diluted 1:200 (0.5%) in water and either sprayed on the plants or applied with fertilizer in the water to the soil media. Application dates for both methods were April 22, April 26, May 1, May 4, and May 10.

Data collection: All growth parameters were measured on May 12 for the foliar spray method, and on May 17 for the fertigation method of application.

Foliar Spray Application

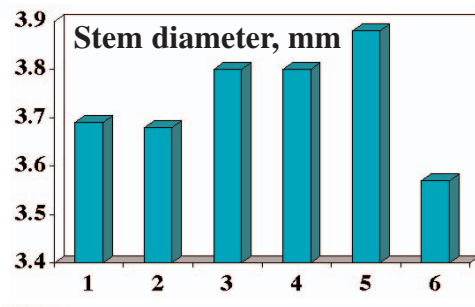
Plant height

Treatment	Plant Height	Change
	cm	cm
1. Control	26.1	—
2. (Vitazyme)	29.0	+2.9 (+11%)
3. (Product A)	25.7	-0.4 (-2%)
4. (Product B)	22.8	-3.3 (-13%)
5. (Product C)	24.5	-1.6 (-6%)
6. (Product D)	27.5	+1.3 (+5%)



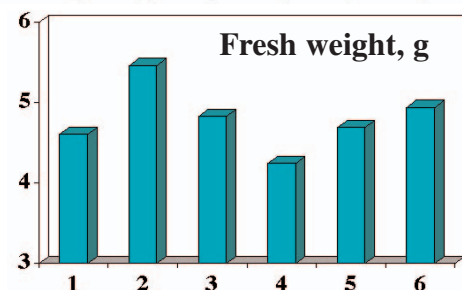
Stem diameter

Treatment	Diameter	Change
	mm	mm
1. Control	3.69	—
2. (Vitazyme)	3.68	-0.01
3. (Product A)	3.80	+0.11 (+3%)
4. (Product B)	3.80	+0.11 (+3%)
5. (Product C)	3.88	+0.19 (+5%)
6. (Product D)	3.57	-0.12 (-3%)



Fresh weight, above-ground portion

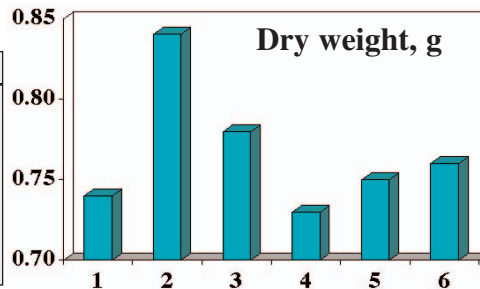
Treatment	Fresh Weight	Change
	g	g
1. Control	4.61	—
2. (Vitazyme)	5.46	+0.85 (+18%)
3. (Product A)	4.83	+0.22 (+5%)
4. (Product B)	4.25	-0.36 (-8%)
5. (Product C)	4.69	+0.08 (+2%)
6. (Product D)	4.94	+0.33 (+7%)



- **Increase in plant height with Vitazyme: 11%**
- **Increase in fresh weight with Vitazyme: 18%**
- **Increase in dry weight with Vitazyme: 14%**

Dry weight, above-ground portion

Treatment	Dry weight	Change
	mm	mm
1. Control	0.74	—
2. (Vitazyme)	0.84	+0.10 (+14%)
3. (Product A)	0.78	+0.04 (+5%)
4. (Product B)	0.73	-0.01 (-2%)
5. (Product C)	0.75	+0.01 (+2%)
6. (Product D)	0.76	+0.02 (+3%)



Fertigation Application

Plant height

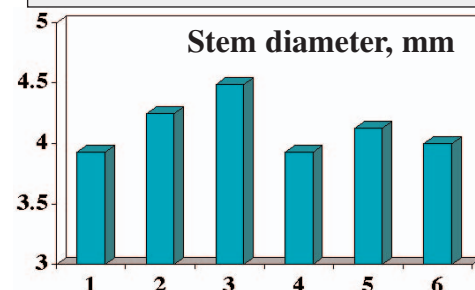
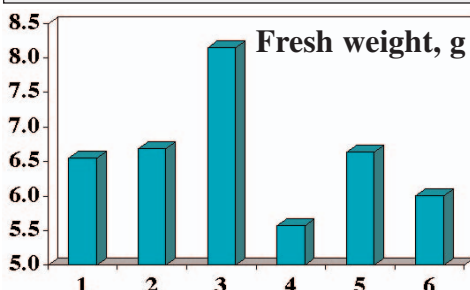
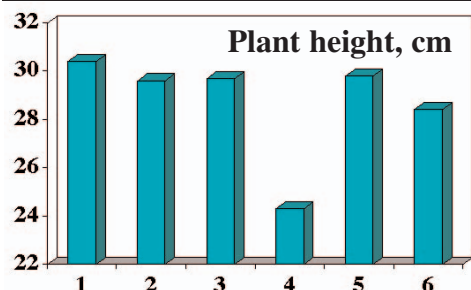
Treatment	Plant Height	Change
	cm	cm
1. Control	30.4	—
2. (Vitazyme)	29.6	-0.8 (-3%)
3. (Product A)	29.7	-0.7 (-2%)
4. (Product B)	24.3	-6.1 (-20%)
5. (Product C)	29.8	-0.6 (-2%)
6. (Product D)	28.4	-2.0 (-7%)

Fresh weight, above-ground portion

Treatment	Fresh Weight	Change
	g	g
1. Control	6.55	—
2. (Vitazyme)	6.69	+0.40 (+6%)
3. (Product A)	8.15	+1.60 (+24%)
4. (Product B)	5.57	-0.98 (-15%)
5. (Product C)	6.64	+0.09 (+1%)
6. (Product D)	6.01	-0.54 (-8%)

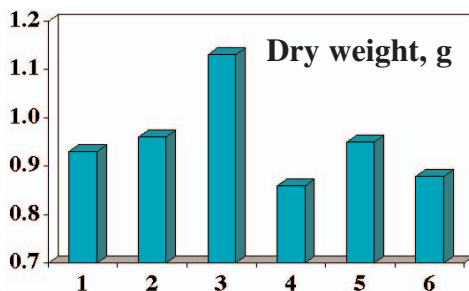
Stem diameter

Treatment	Diameter	Change
	mm	mm
1. Control	3.93	—
2. (Vitazyme)	4.25	+0.32 (+8%)
3. (Product A)	4.49	+0.56 (+14%)
4. (Product B)	3.93	0
5. (Product C)	4.13	+0.20 (+5%)
6. (Product D)	4.00	+0.07 (+2%)



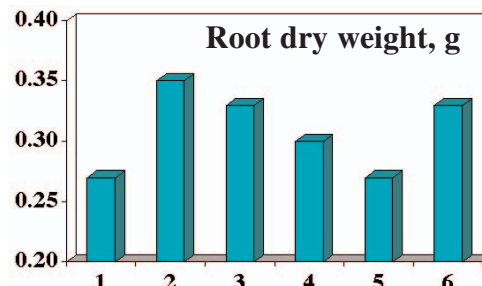
Dry weight, above-ground portion

Treatment	Dry weight mm	Change mm
1. Control	0.93	—
2. (Vitazyme)	0.96	+0.03 (+3%)
3. (Product A)	1.13	+0.20 (+22%)
4. (Product B)	0.86	-0.07 (-8%)
5. (Product C)	0.95	+0.02 (+2%)
6. (Product D)	0.88	-0.05 (-5%)



Root dry weight

Treatment	Root dry weight mm	Change mm
1. Control	0.27	—
2. (Vitazyme)	0.35	+0.08 (+30%)
3. (Product A)	0.33	+0.06 (+22%)
4. (Product B)	0.30	+0.03 (+11%)
5. (Product C)	0.27	0
6. (Product D)	0.33	+0.06 (+22%)



• Increase in root dry weight with Vitazyme: 30%

Conclusions: Vitazyme substantially improved red pepper growth in this Korean study, with both foliar spray and fertigation application. Aerial spraying appeared to give the best responses in this investigation, with an 11% increase in plant height, an 18% increase in fresh weight, and a 14% increase in dry weight . . . all increases greater than for the other four products. Fertigation application of Vitazyme did not increase the above-ground portion of the plant as much as did foliar application, but fertigation caused a remarkable 30% increase in root mass, greater than for any other product. It is not known how much root growth was stimulated by the aerial application, although it was presumably as great as for the fertigation method.

Vitazyme is shown to substantially improve pepper vegetative growth in this study. Since pepper fruit yield is usually proportional to total plant mass, yield increases should be quite large with field applications of Vitazyme.

Potatoes – A testimonial

Location: Bridgewater, Maine

Row spacing: 36 inches

Experimental design: A field was divided into treated and untreated portions.

1. Control

2. Vitazyme

Fertilization: The base saturation balancing (Albrecht) method was used throughout the field, this being the first year on the system.

Vitazyme treatment: (1) 13 oz/acre pre-bloom about June 10, after weed kill on the leaves and soil; (2) 13 oz/acre about July 15, at bloom, on the leaves and soil

Observations:

Wayne: "It was a very good crop, one of the best Kennebec crops we have had!"

Ryan: "The Vitazyme treated tubers had good uniformity of size, had a very good tuber set, and the tuber numbers were much better than usual." There were some "common scab" defects on tubers from two parts of the field, but as one moved from the control to the treated portion of the field the scab problem disappeared.

Variety: Kennebec, for seed

Soil type: gravely loam



Kennebec potatoes grown for seed produced more tubers, and more uniform tubers, when treated with Vitazyme. Besides, common scab was reduced, a very important consideration for seed.

Potatoes



The Vitazyme treated crop had bigger tops but, more importantly, more tubers that were very uniform in size . . . as this photo clearly shows.

Location: Presque Isle, Maine

Row spacing: 36 inches

Experimental design: A strip of a production field was treated with Vitazyme twice, and an adjoining strip was treated with ACA (a 15-0-0%N-P₂O₅-K₂O formulation with Zn-NH₄-acetate).

1. Control 2. ACA 3. Vitazyme

Fertilization: All field areas were treated the same.

Vitazyme treatments:

(1) 13 oz/acre at 4 to 6 inches height on the leaves and soil; (2) 13

oz/acre at blossom on the leaves and soil

Growth responses on August 17:

Vitazyme application resulted in a much greater response of roots, tops,

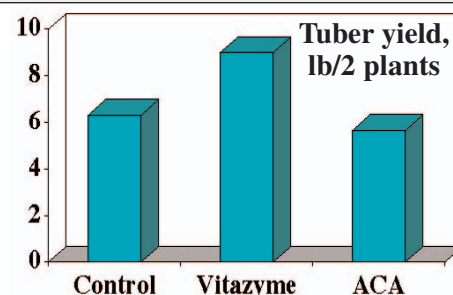
and tubers than for the control or ACA treatments. ACA resulted in a yellowing of some of the top leaves.

Yield results: Judd: "Vitazyme was about 25 cwt/acre better [than the untreated control]."

Alan Perry: "The potato yield difference was probably better than 25 cwt/acre, since the difference was obvious, which usually means from 35 to 50 cwt/acre more yield."

	Control	Vitazyme	ACA
----- tuber wt (lb)/2 plants -----			
Tuber yield*	6.31	8.98 (+42%)	5.66 (-10%)

* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.



Potatoes

Location: Blaine, Maine Variety: Russet Burbank Row spacing: 36 inches Soil type: gravelly loam

Experimental design: A potato field was divided into two parts:

1. Control
2. Vitazyme

Fertilization: the same throughout the field using the base saturation (Albrecht) soil balancing system

Vitazyme treatments: two 13 oz/acre applications on the leaves and soil

Yield results: No large-scale harvest results were determined, but Dennis Kingsberry stated, "The Vitazyme yields were definitely better than the non-treated yields."

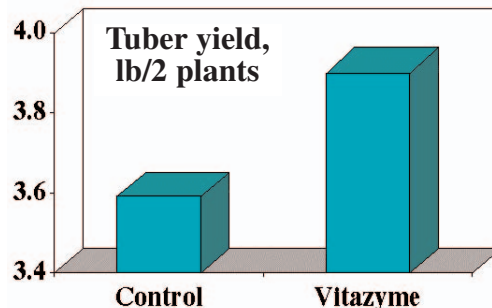
Alan Perry: "The Kinsberry's are very pleased with the results they have had with the Albrecht system and Vitazyme so far. Dennis was very aware of finding more roots in and on the harvesting equipment. He kidded me about the trouble all these roots were causing him. We had two fields this year which yielded over 300 cwt/acre, a very good yield for Aroostook County, an improvement over last year and a big improvement for them. A relative said that one field was the best Russet Burbank field he had seen this year in Maine.

On August 19 samples were taken from one Russet Burbank field, and the potatoes were weighed.

- **Yield increase with Vitazyme: 9%**

	Control	Vitazyme
	tuber wt (lb)/2 plants	
Tuber yield*	3.59	3.90 (+9%)

* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.



Potatoes

Location: Arkport, New York Variety: Redsen Soil type: muck (organic)

Row spacing: 34 inches Planting date: unknown Harvest date: unknown

Experimental design: A muck field of 8 acres was split into three equal sections, and Vitazyme treatments were applied to two of them.

1. Control
2. Vitazyme (16 oz/acre)
3. Vitazyme (7 oz/acre)

Fertility treatments: 1,100 lb/acre of an 8-8-8% N-P₂O₅-K₂O liquid fertilizer (88 lb/acre of each nutrient), placed 2 inches below and 2 inches beside the furrow. Midseason the entire field was sidedressed with 250 lb/acre of urea (115 lb/acre N).

Yield results: At tuber maturity, a field length of 6 rows representative of each treatment was harvested and weighed in a truck. Some soil still clung to the tubers, so may have affected weights somewhat.

Income results: The potato price is estimated at \$0.12/lb.

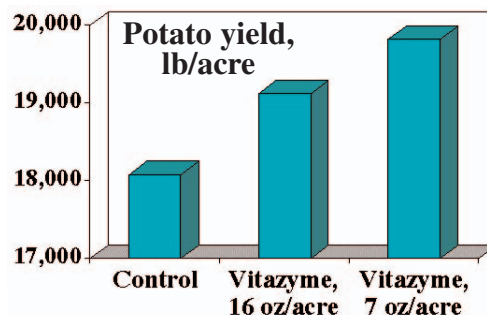
Vitazyme, 16 oz/acre +\$124.80/acre

Vitazyme, 7 oz/acre +\$208.80/acre

Conclusions: In this New York potato trial on muck soils, Vitazyme at both 7 and 16 oz/acre substantially increased tuber yield and income, especially at the 7 oz/acre rate. This rate increased yield by 10% and income by \$208.80/acre.

- **Yield increase with Vitazyme: 6 to 10%**

Treatment	Tuber yield	Yield increase
	----- lb/acre -----	
1. Control	18,080	—
2. Vitazyme, 16 oz	19,120	1,040 (+6%)
3. Vitazyme, 7 oz	19,820	1,740 (+10%)



Potatoes

Location: Presque Isle, Maine Variety: Russet Burbank Soil type: gravelly loam

Row spacing: 36 inches

Experimental design: A large potato field was divided into strips of treated and untreated potatoes.

1. Control
2. Vitazyme, 13 oz/acre
3. Vitazyme, 26 oz/acre

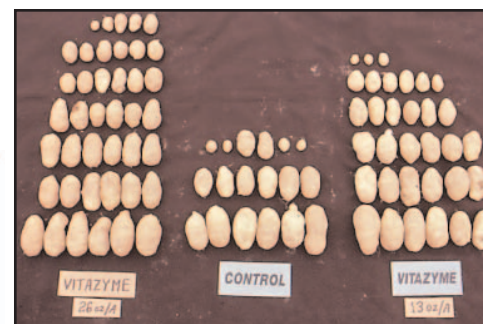
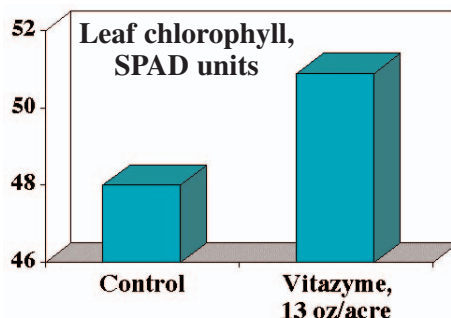
Fertilization: equal over all areas

Vitazyme treatments: one foliar/soil application at 13 oz/acre, or 26 oz/acre at early bloom (at row fill)

Leaf chlorophyll: On August 20, chlorophyll determinations were made on 30 randomly selected leaves for each treatment.

	Control	Vitazyme 13 oz per acre
	----- SPAD units -----	
Leaf chlorophyll	48.0	50.9

* Average of 30 representative leaves per treatment.



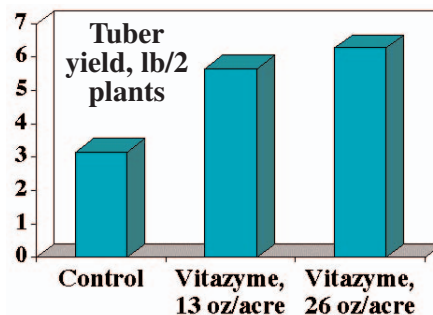
The yield of tubers differed greatly for the samples selected in this Maine potato field. The 26 oz/acre rate yielded the most, followed by the standard 13 oz/acre rate, and finally by the control.

Yield results: On August 20, two average plants from each treatment were selected for tuber yield evaluations.

Alan Perry: "The Vitazyme treatment was obviously better, my guess by more than 50 cwt/acre. The uniformity and type [with Vitazyme] were striking."

	Control	Vitazyme 13 oz/acre	Vitazyme 26 oz/acre
	----- tuber wt (lb)/2 plants -----		
Tuber yield*	3.16	5.66 (+79%)	6.28 (+99%)

* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.



- **Yield increase with Vitazyme: > 50 cwt/acre**

Potatoes

Location: Easton, Maine Variety: Shepody, Russet Burbank Row spacing: 36 inches Soil type: gravelly loam

Experimental design: A large potato field was divided into strips of treated and untreated potatoes.

1. Control
2. Vitazyme (one or two treatments)

Fertilization: the same fertility program over all areas of the fields

Vitazyme treatments:

Shepody: Strip 1, 20 oz/acre on July 2 on the leaves and soil
Strip 2, 13 oz/acre on July 27, and 13 oz/acre on August 7 on the leaves and soil

Russet Burbank: 13 oz/acre on June 20, and 13 oz/acre on August 7

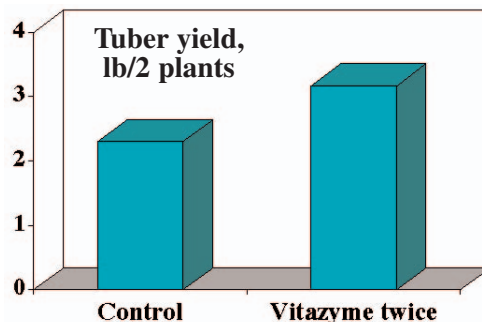
Yield results: On August 19 the following yield differences were noted. There was much better growth of roots, tops, and tubers for Vitazyme than for the control treatments.

Russet Burbank

	Control	Vitazyme
	tuber wt (lb)/2 plants	
Tuber yield*	2.30	3.17 (+38%)

* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

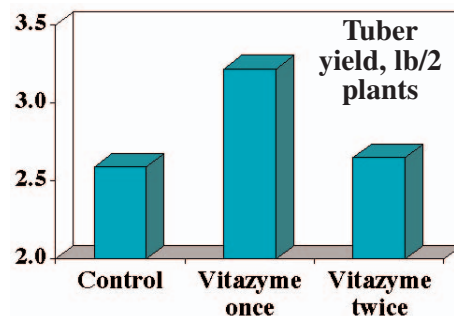
- **Yield increase with Vitazyme: 38%**



Shepody

	Control	Vitazyme 13 oz/acre	Vitazyme 26 oz/acre
	----- tuber wt (lb)/2 plants -----		
Tuber yield*	2.59	3.22 (+24%)	2.65 (+2%)

* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.



- **Yield increase with Vitazyme: 24%**

Conclusions: Mike Adams: "The Shepody's were at least 50 cwt/acre better than the non-treated. There was better size and more uniformity in size."

Clinton Adams: "The Vitazyme treated tubers had better, more uniform size."

Radishes

Research organization: Dae Yu Company

Location: Kyungju City, Kyungbuk, Korea

Soil type: clay loam

Plant number: 90

Researcher: unknown

Variety: Changsung

Planting date: September 20, 2000

Experimental design: This plot study involved five treatments with three replicates, using 90 plants (6 plants per plot). The five treatments are as follows:

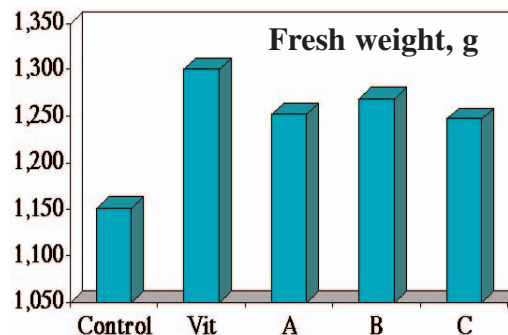
1. Control
2. Vitazyme
3. Product A
4. Product B
5. Product C

Fertilization: unknown

Vitazyme application: A 1:250 solution (0.4%) of Vitazyme was applied as a foliar spray on the leaves and soil on October 7, 14, and 21.

Data collection: Leaf and root measurements were taken on November 21.

Parameter	Control	Vitazyme	Product A	Product B	Product C
	----- g -----				
Fresh weight of Leaves and roots	1,151.2	1,301.1	1,252.2	1,269.2	1,247.3
Change vs. control	—	+149.9 (+13%)	+101.0 (+9%)	+118.0 (+10%)	+96.1 (+8%)



Conclusions: Vitazyme on these radishes increased fresh weight by 13%, more than with the other three products. This response should be highly profitable for the grower.

- **Increase in radish yield with Vitazyme: 13%**

Roses – A testimonial

Researcher: Blanca Alvarado, Summer Zone, Quito, Ecuador

Cooperator: Ing. Juan Pineida

Company: Florecal, S.A., Cayambe, Ecuador

Variety: Emma

Location: production greenhouse

Experimental design and results:

“Vitazyme was applied at Florecal S.A., located in Cayambe at 2847m above sea level. The temperature in the greenhouse during the application was 18°C with a relative humidity of 45%.

The product was applied in a drench with 30 liters of water per bed (30 m), with 1.55 cc of Vitazyme per bed each week.

The test was done on the rose variety Emma. These plants presented leaf yellowing. After 45 days from the beginning of the test we could find the following:

- Increase of the basal stem number
- More resistance to stress (temperature and chemical products)
- Increase of the root mass

Ing. Juan Pineida
Florecal, S.A.

Roses, and Mycorrhizae

Research organization: Summer Zone, Quito, Ecuador

Cooperators: Harold Zuniga and Emerson Salazar, Jumbo Roses, Pichincha, Tabacundo, Ecuador

Variety: Forever Young

Stage: Mature

Soil type: clayey

Trial initiation: March 1, 2001

Growth pattern: raised beds in a production greenhouse

Experimental design: Six treatments were selected,

and each placed on four adjoining beds in the greenhouse. Each bed comprised 41.7 m², so each treatment was 167 m². For the five Vitazyme and mycorrhiza treatments the total area was 835 m²; the control treatment comprised the area on either side of the five treatments.

Fertilization: Nitrofoska at 2 kg/bed at the start of the experiment

Vitazyme application: 1.5 l/ha/month every week (1.55 ml/bed/wk) for Treatments 3, 4, and 5, and 9.75 ml/ha/month (10 ml/ha/week) for Treatment 6, applied by a sprayer

Mycorrhiza application: applied to the beds at 2.25 kg/bed at the start of the experiment.

Growth results: Evaluations were made at the start of the experiment, on March 1, and 66 days later, on May 5, 2001, for five parameters. Ten plants were evaluated for each treatment at each date.

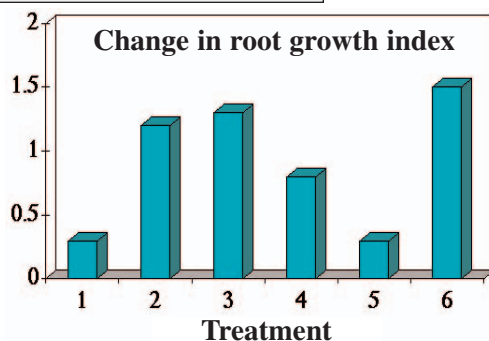
Treatment	Fertilizer ^a	Vitazyme ^b ml/bed/week	Mycorrhiza ^c
1	X	0	0
2	X	0	X
3	X	1.55	X
4	0	1.55	X
5	X	1.55	0
6	X	10	X

^a Nitrofoska Perfect (15-5-20-2-20-2% N, P, K, Mg, S, and Ca) was applied at 2 kg/bed at the start of the experiment.

^b The 1.55 ml/bed/week rate is equivalent to 1.5 l/ha/month, applied as a spray on the leaves and soil surface; the 10 ml application for treatment 6 was 6.5 times the normal rate.

^c Mycorrhizal fungi were applied at 2.25 kg/bed at the beginning of the crop cycle.

All treatments showed improvements in root growth, but all but Treatment 5 showed great improvements. Especially good roots were noted three months after adding mycorrhizae, Vitazyme plus mycorrhizae, and the high Vitazyme rate.



Treatment	Root growth index*		
	Control	Vitazyme	Change
1. Fert only	1.6	1.9	+0.3
2. Fert + Myc	1.4	2.6	+1.2
3. Fert + Vita + Myc	1.5	2.8	+1.3
4. Vita + Myc	1.6	2.4	+0.8
5. Fert + Vita	1.7	2.0	+0.3
6. Fert + Vita (6.5x) + Myc	1.2	2.7	+1.5

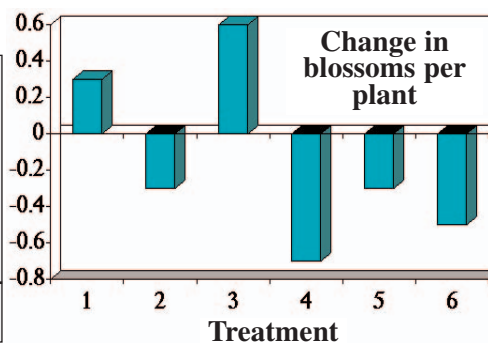
* Values were obtained by multiplying the percentage of good, average, or poor roots times 3, 2, and 1, respectively, and adding these values.

Root Growth

Blossoms

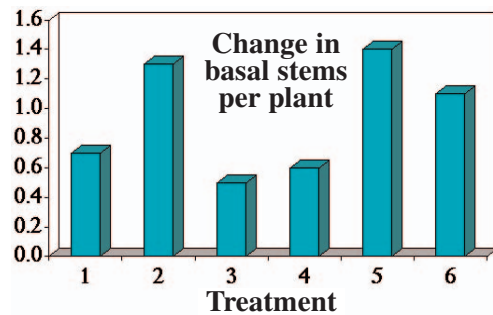
Treatment	Blossoms per plant*		
	Control	Vitazyme	Change
1. Fert only	0.3	0.6	+0.3
2. Fert + Myc	0.5	0.2	-0.3
3. Fert + Vita + Myc	0.4	1.0	+0.6
4. Vita + Myc	1.2	0.5	-0.7
5. Fert + Vita	0.3	0.0	-0.3
6. Fert + Vita (6.5x) + Myc	0.9	0.4	-0.5

* Calculated by totaling the blossoms for 10 plants and dividing them by 10.



There was relatively little change in blossoming of each treatment in this study, though there were some minor fluctuations, of +0.6 for Treatment 3 to -0.7 for Treatment 4. It is suspected that more time was needed for flowering effects in response to the treatments to be noted.

All treatments showed an increase in basal stems, but especially Treatments 2 (fertilizer and mycorrhizae), 5 (fertilizer and Vitazyme), and 6 (fertilizer + 6.5x Vitazyme and mycorrhizae). It is not known why Treatments 3 and 4 were less aggressive in stimulating new stems than the other treatments.



Basal Stems

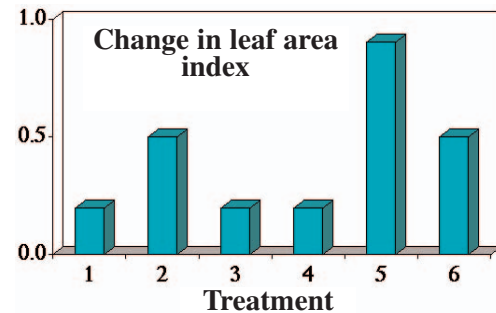
Treatment	Basal stems per plant*		
	March 1	May 5	Change
1. Fert only	2.9	3.6	+0.7
2. Fert + Myc	2.3	3.6	+1.3
3. Fert + Vita + Myc	3.2	3.7	+0.5
4. Vita + Myc	2.9	3.5	+0.6
5. Fert + Vita	2.3	3.7	+1.4
6. Fert + Vita (6.5x) + Myc	3.0	4.1	+1.1

* Calculated by totaling the basal stems for 10 plants and dividing them by 10.

Leaf area

Treatment	Leaf area index*		
	March 1	May 5	Change
1. Fert only	1.2	1.4	+0.2
2. Fert + Myc	1.5	2.0	+0.5
3. Fert + Vita + Myc	1.3	1.5	+0.2
4. Vita + Myc	1.3	1.5	+0.2
5. Fert + Vita	1.4	2.3	+0.9
6. Fert + Vita (6.5x) + Myc	1.7	2.2	+0.5

* Values were obtained by multiplying the percentage of good, average, or poor leaf area times 3, 2, and 1, respectively, and adding these values.



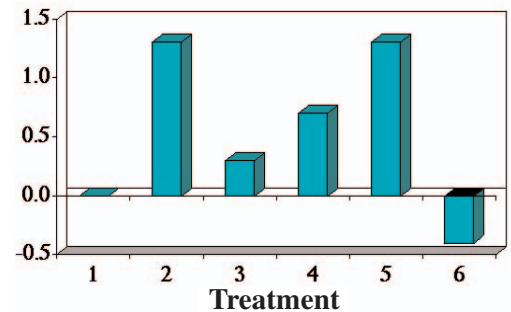
Both Vitazyme and mycorrhizae stimulated leaf area in this study, especially the Vitazyme and fertilizer (Treatment 5). Mycorrhizae (Treatment 2) also stimulated leaf area

quite a lot, as did the high Vitazyme rate and mycorrhizae (Treatment 6). It is not known why Treatments 3 and 4 did not also stimulate leaf growth more than the fertilizer control.

Conclusions: A summary of the responses for each parameter to the various treatments is given below. Overall conclusions from this study are as follows:

- The best overall treatments in terms of total plant response were treatment 5, fertilizer and Vitazyme, and Treatment 2, fertilizer and mycorrhizae. They gave excellent stem, leaf area, and leaf color responses, and fertilizer and mycorrhizae also gave better rooting. The reason why Vitazyme did not show enhanced rooting in Treatment 5 is unknown, since the product normally gives excellent root stimulation.
- Vitazyme and Mycorrhizae produced excellent rooting, especially for the high Vitazyme (6.5x) levels of Treatment 6.
- The high Vitazyme rate of Treatment 6, though producing excellent roots, did not encourage as superb plant growth as did some of the other treatments, so the extra product applied does not appear to be beneficial.
- Vitazyme and mycorrhizae alone (Treatment 4) did not stimulate growth well, but need fertilizer to give maximum benefits.

All but Treatment 6 showed good improvements in leaf color in response to treatment with Vitazyme and mycorrhizal fungi. It is not known why the high Vitazyme level (Treatment 6)



caused a reduction in greenness of the leaves, unless the plant's chlorophyll synthesis machinery was being overstimulated by an excessive application of Vitazyme. Treatments 2 and 5 — mycorrhizae alone and Vitazyme alone plus fertilizer — gave especially good leaf color.

Leaf color

Treatment	Leaf color index*		
	March 1	May 5	Change
1. Fert only	1.2	1.2	0
2. Fert + Myc	1.3	2.6	+1.3
3. Fert + Vita + Myc	1.4	1.7	+0.3
4. Vita + Myc	1.1	1.8	+0.7
5. Fert + Vita	1.4	2.7	+1.3
6. Fert + Vita (6.5x) + Myc	2.5	2.1	-0.4

* Values were obtained by multiplying the percentage of good, average, or poor leaf colorations 3, 2, and 1, respectively, and adding these values.

Treatment	Root growth	Blossoms	Basal stems	Leaf area	Leaf color
	relative response vs. the control (=0)				
1. Fert only	0	0	0	0	0
2. Fert + Myc	++	-	++	+	+++
3. Fert + Vita + Myc	++	+	0	0	+
4. Vita + Myc	+	—	0	0	++
5. Fert + Vita	0	-	++	++	+++
6. Fert + Vita (6.5x) + Myc	+++	-	+	+	-



As clearly seen in this picture, Vitazyme produced darker green leaves and better overall rose plant size than the untreated control plants on the left.



Roots excavated from several rose plants reveal that Vitazyme greatly stimulated root growth versus the control. This leads to better stem and leaf growth and flowering, and ultimately to higher profits.

Roses – A testimonial

Research organization: Gift Flowers

Research coordinator: Blanca Alvarado

Location: Tabacundo, Ecuador

Variety: Helio

Experimental design: A production field of roses raised according to the typical program for Gift Flowers was treated with Vitazyme, and compared to untreated areas.

Vitazyme application: Vitazyme was applied in a drench with 30 liters of water per bed (30 m), with 1.55 cc of Vitazyme per bed each week.

Results:

“A test was done on a rose variety, Helio in the Gift Flowers field. The results in the growth of the root system after 50 days was amazing versus the control!”

Ing. Patricio Martinez
Gift Flowers

Soybeans



Location: Wakefield, Nebraska

Variety: Rolling Meadows 279

Row spacing: 30 inches

Population: 150,000 seeds/acre

Soil type: silty clay loam

Planting date: May 15, 2001

Irrigation: none

Previous crop: corn

Experimental design: A 94 acre field was treated entirely with Vitazyme except for one small 1 acre portion.

1. Control

2. Vitazyme

Fertilization: none

Vitazyme treatment: 20 oz/acre sprayed over the leaves and soil along with Roundup Ultra herbicide on June 12, 28 days after planting

Growing season weather: hot and dry, especially during July and August, but with a very timely 3-inch rain in August

Harvest date: October 5, 2001

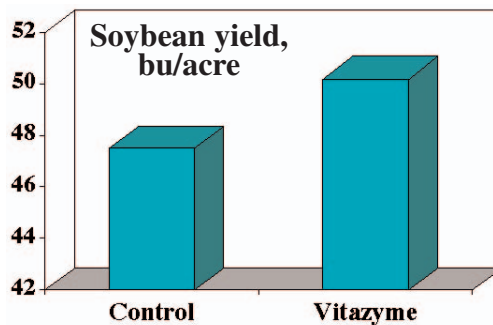
Growing season observations: **“Soon after applying Vitazyme it was obvious to notice that the treated plants were 2 to 3 inches taller, and were bigger and healthier.”** — Blaine Nelson

The typical response of soybeans to Vitazyme treatment is bigger and more fibrous roots, with more leaves having a higher chlorophyll content. Note also more pods on the treated plants.

Yield results: Areas were harvested and weighed on each side of the treatment boundary, and yields were calculated based on field measurements. Bean moisture contents were also determined.

Income results: Estimated value of soybeans, before government payments: \$4.20/bu. 2.7 bu/acre x \$4.20/bu = **\$11.34/acre more income.**

Conclusions: This Nebraska soybean study showed that only one application of Vitazyme can increase yield by 6% on a good year, which was very profitable. Two applications could have further increased the yield, especially during a year that is less than optimal.



	Control	Vitazyme	Change
	----- bu/acre -----		
Bean yield	47.5	50.2	2.7 (+6%)

• **Bean yield increase: 6%**

Moisture content:

	Control	Vitazyme	Change
	----- %H ₂ O -----		
Bean moisture	11.6	11.2	0.4

• **Decrease in bean moisture: 0.4%**

Tomatoes

Producer: OPC Farms, Inc.

Location: Lemoorie, California

Variety: Heinz 410, a round cannery processing type

Planting date: first part of April

Row spacing: 60 inches, 14 inches in the row

Soil type: unknown

Experimental design: A 155-acre field was used, with a 10-acre strip treated with Vitazyme.

Population: about 7,500 plants/acre

1. Control (most of the field)

2. Vitazyme

Fertilizer treatments: Fertilizers were applied according to a soil analysis. Preplant: 500 lb per acre of 3-10-10+Zn (1 gal/acre). Sidedress: 150 lb/acre of UN-32.

Vitazyme treatments: (1) Preplant, before transplanting, shanked in at 13 oz/acre 6 inches on either side of the rows, 2 inches above furrow level; (2) Sidedressed at 13 oz/acre in May, when UN-32 was applied at early blossom

Harvest date: August 2, 2001

Yield results: There was considerable variation in plant population across the field due to insect-borne diseases. Some insects were blown in by high winds from the Sierra foothills during the growing season and caused severe wilt disease and dieback. Thus, no accurate yield results could be obtained.

Quality results: Two major criteria were used to determine tomato quality: (1) color and (2) percent solids. Values from five loads each for the control and Vitazyme areas were used.

Vitazyme produced a deep red internal tomato color which was ideal for processing. The control produced a greener colored tomato that was less desirable.

Income increase: There was a significant improvement in tomato yields with Vitazyme due to an increase in density of the fruit (0.1%).

Increase in yield due to an extra 0.1% solids 2.6087 tons/acre
Value of tomatoes (approximate)
 \$48.00/ton

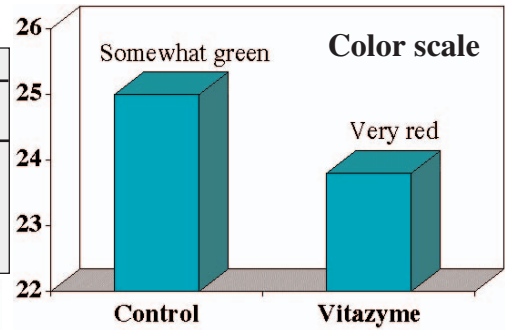
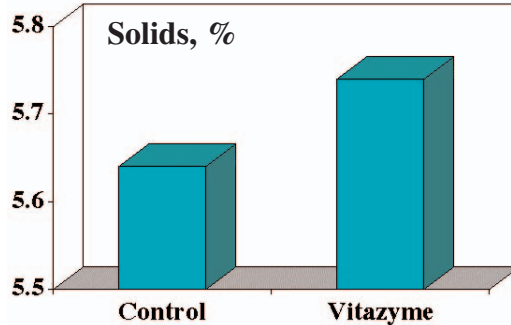
Conclusions: Vitazyme significantly improved tomato quality in this large-scale commercial test. Both color and solids were improved, yielding about 2.61 tons/acre more with \$125/acre more income.

Tomato Color

	Control	Vitazyme	Change
Deepness of red*	25.0	23.8**	1.2

*Tomato color is evaluated by grinding the fruit and evaluating redness of the internal flesh. Green=30, red=24 (the ideal color).

** Significantly different from the control at P=0.10, using a completely randomized design and the Tukey-Kramer Test.



Percent Solids

	Control	Vitazyme	Change
Solids	5.64	5.74*	(+) 0.10

* Significantly greater than the control at P=0.19, using a completely randomized design and the Tukey-Kramer Test.

- Increase in income with Vitazyme: \$125.22/acre
- Improvement in solids: 0.1%
- Improvement in color: 1.2 points

Tomatoes

Daegu University, South Korea

Research organization: Dae Yu Company, Ltd.

Location: Greenhouse at Daegu University, Hayang Eup, Kyungju City, Kyungbuk, Korea

Soil type: "market bed" soil

Transplanting date: January 6, 2001

Experimental design: The pots were placed in a randomized design using three treatments and four replicates (2 plants per plot). The treatments were as follows:

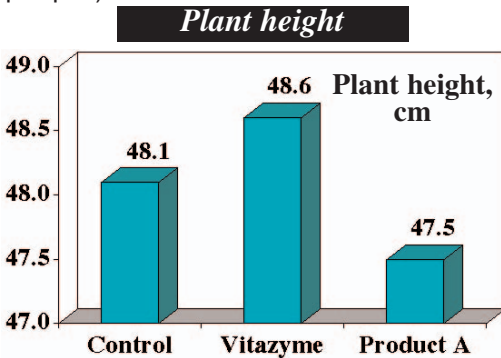
1. Control
2. Vitazyme
3. Product A

Researcher: unknown

Pot number: 26

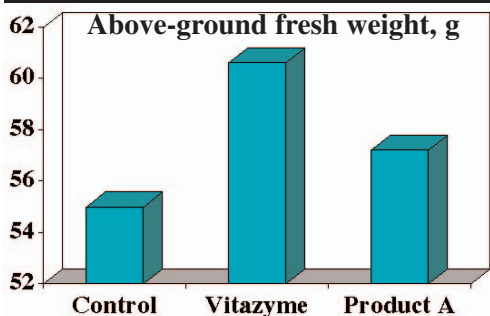
Seeding date: December 22, 2000

Variety: House Doterang



Treatment	Above-ground fresh weight	Change
1. (Control)	55.0	—
2. (Vitazyme)	60.6	+5.6 (+10%)
3. (Product A)	57.2	+2.2 (+4%)

Fresh weight, above-ground portion



Fertilization: unknown

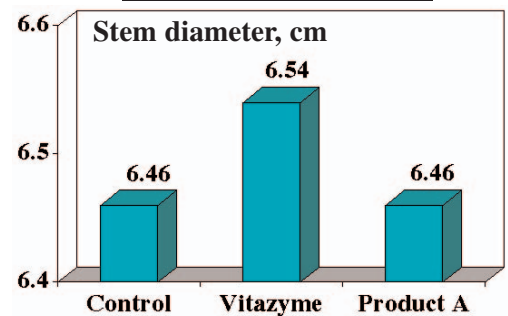
Vitazyme application: A 1:2,000 dilution (0.05%) was used in this study as a foliar spray on February 16 and 26, and March 6.

Data collection: Data were compiled on March 8, 2001.

Conclusions: Tomatoes in this Daegu University replicated trial performed very well with Vitazyme, increasing in fresh above-ground weight by 10% and in root dry weight by 11%. These increases should translate to higher yields and income versus the control and Product A if carried out to plant maturity. Vitazyme stimulates plant metabolism and growth of both leaves and roots through its powerful natural activators.

- Increase in above-ground fresh weight with Vitazyme: 10%
- Increase in root dry weight with Vitazyme: 11%

Stem diameter



Root dry weight

Treatment	Root dry weight	Change
1. (Control)	0.74	—
2. (Vitazyme)	0.82	+0.08 (+11%)
3. (Product A)	0.77	+0.03 (+4%)

