



VITAZYME®

2000 Field Trial Results

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

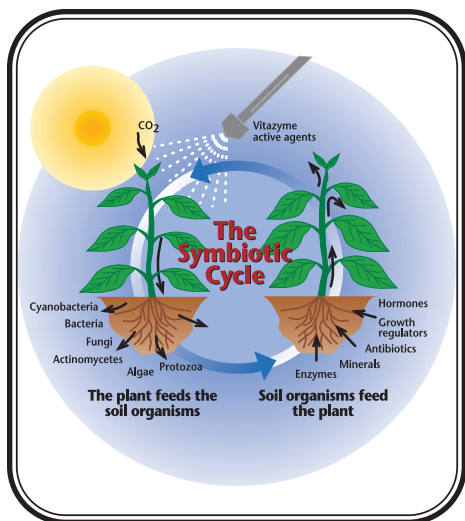
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For six years now Vitazyme has been rigorously tested in field, orchard, and horticultural situations over a great many soil, climatic, and management variables. As in previous years, the results for 2000 have been excellent, especially in areas of cold and moisture stress in the Northeast. It did very well, as usual, under the desertic conditions of California, Idaho, and other areas of the West.

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,

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.

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% →						

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 carbon compounds to increase the transfer of carbohydrates, proteins, and other growth substances into the root zone. These active agents may enter the plant through either the leaves or the roots. Root growth and exudation are both enhanced. This enhancement activates the metabolism of the teeming population of rhizosphere organisms to a higher level, triggering a greater synthesis of growth-benefiting compounds and a faster release of minerals for plant uptake. The plant-microbial symbiosis is stimulated.

Very small amounts of these metabolic triggers in Vitazyme are needed to greatly improve plant and rhizosphere microbe response. This is because of the **enzyme cascade effect**. Successive tiers of enzymes are activated in plant and microbial tissues to 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.

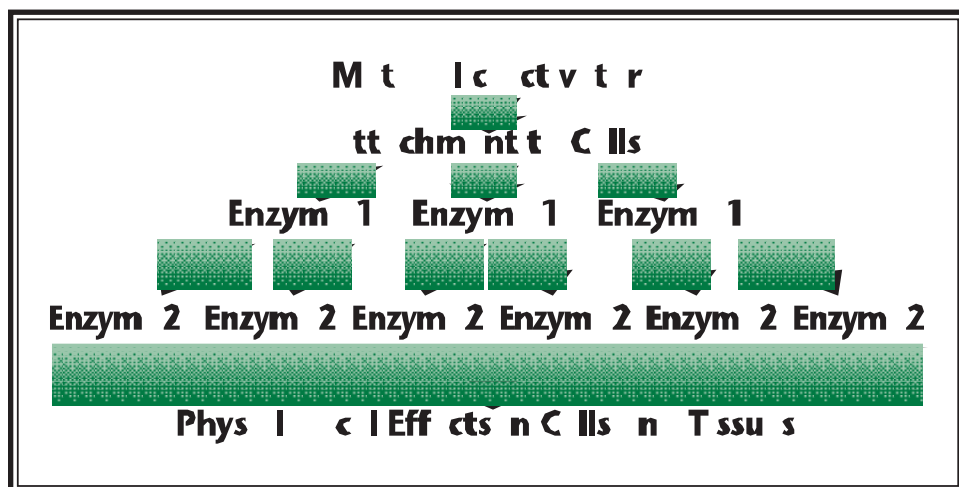
1 If possible, analyze the soil at a reputable laboratory and correct mineral deficiencies and imbalances with expert consultation.

2 Reduce nitrogen fertilizer applications for non-legumes using this test: 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 the Year 2000

This booklet summarizes the most aggressive effort to date at proving Vitazyme capabilities under a great variety of soil, climatic, and management conditions. Results were highly positive in most places, especially in areas where crop stresses from excessive rains (such as New York) or desertic conditions (such as California, Idaho, and Texas) were prevalent. Record heat and drought during the Texas summer prompted Vitazyme benefits of stress reduction to boost cotton yields by 10 to 20%, and improve fiber quality as well. In Idaho, field bean yields increased 10% or more with Vitazyme, with returns on investment up to 21:1. One winter wheat test near Twin Falls produced 50% more grain with Vitazyme! Roses in east Texas responded excellently in the greenhouse, giving a 61% greater plant height, while field grown roses also responded well. Several tests on ornamentals in Texas showed excellent responses, such as boxwood, azalea, mondo grass, hawthorne, and aloe vera.

California's high value crops produced some dramatic yield and income improvements for a number of crops. A Boghosian Brothers overhead trellis vineyard increased yield by 36% with Vitazyme, along with a 3% improvement in grape density. New growth of new

grape plantings also responded exceptionally well. An organic celery test at Ventura garnered 37% more yield of larger plants, a \$4,757/acre income improvement. Broccoli increased in head weight by 53%, netting \$7,755/acre more income, followed closely by Romaine lettuce that produced a 16% yield increase, or \$3,151/acre more income with Vitazyme. Winter forages in desert soils at Newberry Springs gave an outstanding 19% yield increase from Vitazyme, and a new walnut planting did very well, with very few trees lost. Basil yield increased from 17 to 21%.

In the waterlogged and cool Northeast, corn for silage responded admirably in replicated tests, producing yield increases of up to 14% and even greater digestibility improvements. Potatoes in New York showed greater tuber yields of 15% versus the control (\$308/acre), while in less soggy northern Maine potato yields increased 7 to 9%, up to \$267/acre more return for two applications. Most of this increase was due to more tubers per plant, which tended to be more uniform in size than the controls. Soybeans in New York showed yield responses to Vitazyme, likely related in part to observations of fungal disease suppression as seen in some trials. Some tomato growers using Vitazyme had ripe fruit long before any others. An onion test

near Fulton showed a 66% yield increase. In the weather-blessed midsection of the Ination, corn, alfalfa, and soybeans, fields responded well to Vitazyme. Corn at Cedar Falls yielded 7% more, and "tray tests" showed better water efficiency with the product. At Iowa State University, Ames, the corn yield increased 5%. Navy beans in southern Minnesota produced an excellent 24% yield increase (\$123/acre more). Alfalfa yield improved by 11% at Cedar Falls, Iowa, and protein increased by 1 percentage point. At one location in Iowa and one in Kentucky yields were at record levels, and no response was detected, although soil benefits will still accrue to the next crop. In the Caribbean, tomatoes, peppers, and cucumbers in tests by Caribbean Chemical all did extremely well with Vitazyme. The product has now been formally launched in the Caribbean.

It is apparent as a result of these 200 studies that Vitazyme produces substantial improvements in crop yield and quality over a wide variety of crops, climates, and management schemes. Return on investment can be as high as 600:1 for high value crops, and seldom drops below 2:1 for low return crops such as corn and wheat, even during times of very low commodity prices.

Vitazyme Field Tests for 2000

Soil Foodweb Analysis of Vitazyme Effects On a Tomato Crop

Research location: Sunbow Farms, Corvallis, Oregon

Experimental setup: Four 100-ft long rows, spaced 3 ft apart, were transplanted on June 3, 2000 (seeded April 5). The varieties Heinz (paste type), Celebrity, and Abe Lincoln (medium-large types) were used, and rows were divided into replicates of about 15 ft long. Five replicates for the control and Vitazyme treatments were selected, using 15-ft row sections randomly selected from the eastern side (three sections for each treatment) and western side (three sections for each treatment).

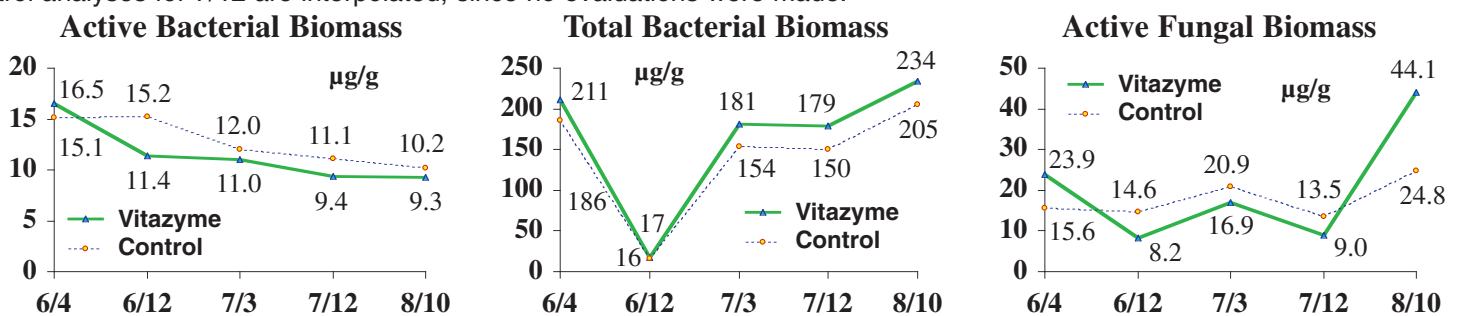
Soil sampling, laboratory analyses, and Vitazyme applications: All samples were analyzed for the following:

- (a) Total and active bacteria (b) Total and active fungi (c) Protozoa (d) Nematodes (e) Mycorrhizal fungi

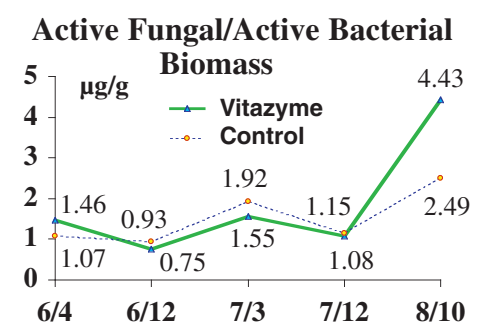
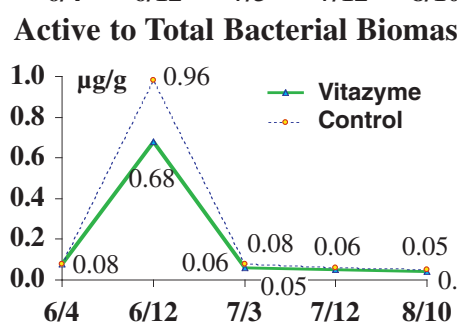
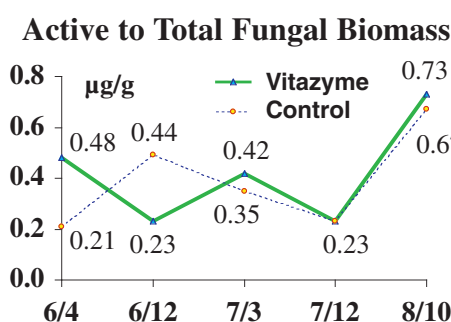
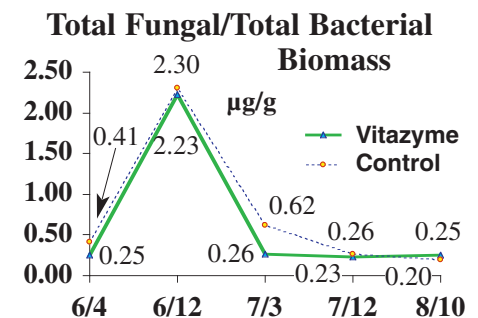
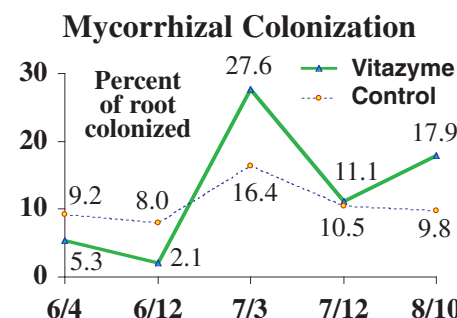
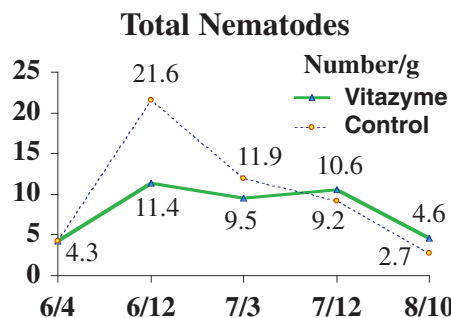
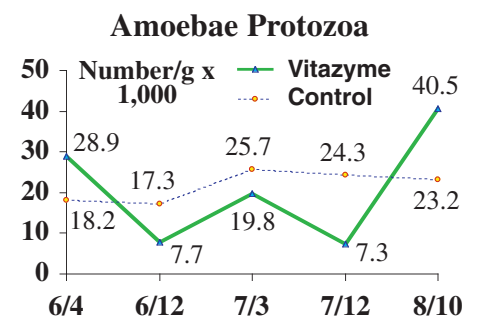
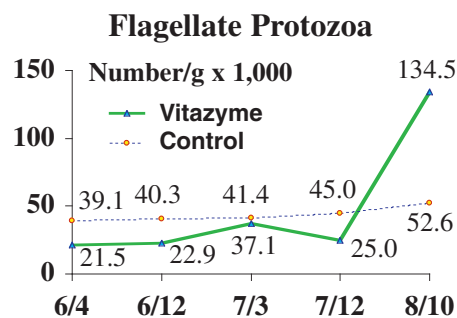
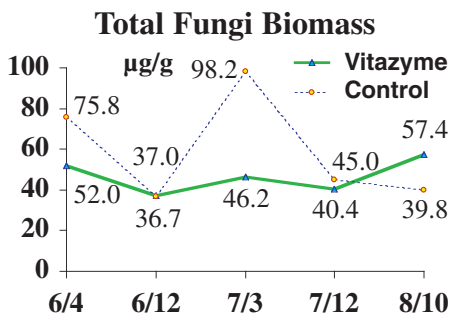
June 4: soil samples collected for analysis (all plots)
 June 4: Vitazyme sprayed at 200 ml/plant of a 0.5% solution
 June 12: soil samples collected for analysis (all plots)
 July 3: soil samples collected for analysis (all plots)

July 3: Vitazyme sprayed at 200 ml/plant of a 0.5% solution
 July 12: soil samples collected for analysis (Vitazyme plots only)
 August 3: Vitazyme sprayed at 200 ml/plant of a 0.5% solution
 August 10: soil samples collected for analysis (all plots)

Results of analyses: All laboratory analyses were performed at the Soilfoodweb laboratory at Corvallis, Oregon. The control analyses for 7/12 are interpolated, since no evaluations were made.



(Continued on the next page)



Analysis of the data:

June 4

The control treatments in general had better roots, as discovered before the first Vitazyme application on June 4.

June 12

Vitazyme had lower levels of active bacterial and fungal biomass, but about the same total biomass of each. There were fewer ciliate protozoa, indicating improved aeration and soil structure with Vitazyme. With Vitazyme there was less mycorrhizal colonization.

July 3

The Vitazyme treated soil had more total bacterial biomass, and a greater mycorrhizal population of the tomato roots (27.6% vs. 16.4%). The total fungal/total bacterial ratio was lower with Vitazyme, a favorable response.

July 12

A good number of bacteria-feeding nematodes was detected with Vitazyme, though fungi, bacteria, and mycorrhizae numbers were rather low. Active fungi to active bacteria ratios for the Vitazyme treatment were moving towards a good ratio, although nitrogen release was low, typical of the warm and dry summer period.

August 10

Warmer midsummer temperatures allowed intensive Vitazyme activity, with stronger responses than earlier in the season:

- Total bacterial biomass (234 vs. 205 µg/g)
- Active fungal biomass (44.1 vs. 24.8 µg/g)
- Total fungal biomass (57.4 vs. 39.8 µg/g)
- Flagellate protozoa (134.5 vs. 52.6/g)
- Total nematode numbers, mostly beneficial (4.8 vs. 2.7/g)
- Mycorrhizal colonization (17.9 vs. 9.8%)
- Total fungal to total bacterial biomass (0.25 vs. 0.20)
- Active fungal to active bacterial biomass (4.43 vs. 2.49)
- Plant-available N-supply from predators (230 vs. 105 lb/acre)

Plant Available N-Supply from Predators

Time	Control	Vitazyme
lb N/acre		
6/4 (pre-treatment)	169	140
6/12	161	121
7/3	204	174
7/12	—	133
8/10	105	230

Conclusions: Starting with inferior roots at the beginning of the test period, the soil foodweb composition and performance improved over the course of the growing season for these tomatoes as the three Vitazyme applications had their effect. By August 10 a more favorable level of fungi to bacteria had developed, flagellate protozoa had increased, mycorrhizae colonization was nearly double the control, and plant-available nitrogen had suddenly shot up. It is very likely that these effects of Vitazyme on the soil foodweb can explain many of the benefits to plant growth noted with its use.

Alfalfa

Agricultural Custom Research and Educational Services

Location: Cedar Falls, Iowa
Planting date: April 28, 1999

Variety: Viking
Seeding rate: 16 lb/acre

Row spacing: 7 inches
Fertilization: none

Soil type: Aredale loam (66% sand, 21% silt, 13% clay)

Experimental design: Plots of 15 x 30 feet (0.010331 acre) were placed in a Latin square design. Three treatments and a control were placed on the area, with four replicates, giving a total of 16 plots.

1. Control 2. Vitazyme once 3. Vitazyme three times 4. Experimental product [EP] three times

Original plans were to collect yield data in 1999, but a herbicide application in the spring of 1999 severely set back the plants. Thus, the plants were allowed to recover the remainder of 1999 and the applications were reinstated the spring of 2000.

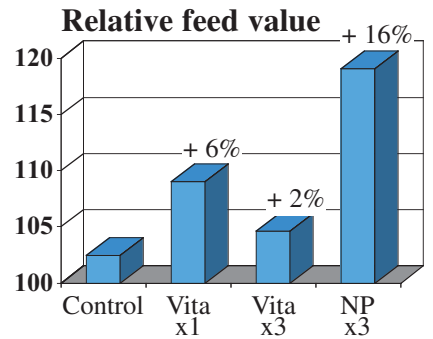
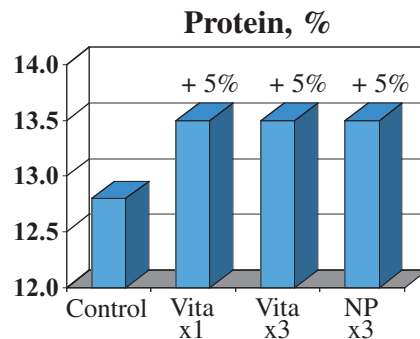
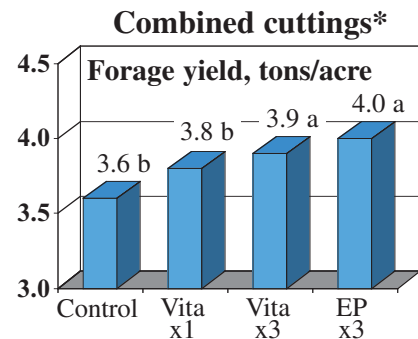
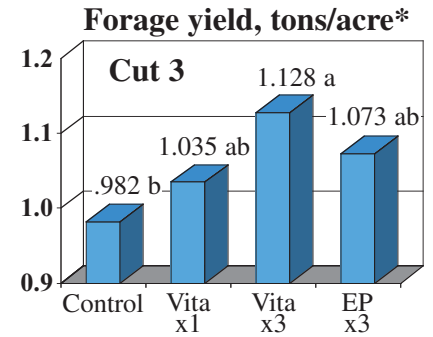
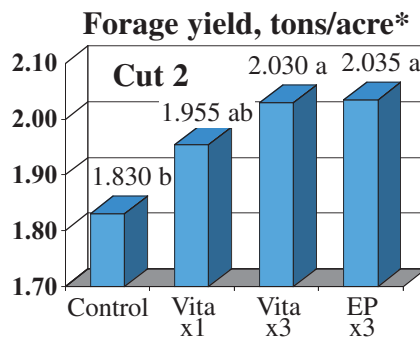
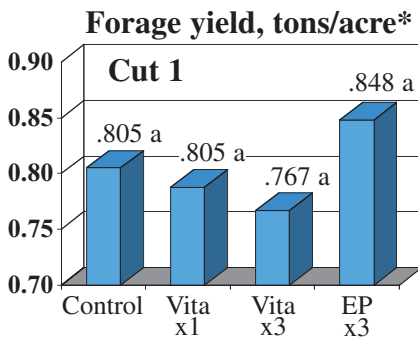
Vitazyme applications: In 1999: Vitazyme at 13 oz/acre on Treatments 1 and 3 after planting; EP at 13 oz/acre on Treatment 4 after planting. Applications in 2000 are shown below.

	Vitazyme at spring greenup (April 26)	Vitazyme after cut 1 (June 6) ¹	Vitazyme after cut 2 (July 18) ²	EP at spring greenup (April 26)	EP after cut 1 (June 6) ¹	EP after cut 2 (July 18) ²
Control	—	—	—	—	—	—
Treatment 2	13 oz/acre	—	—	—	—	—
Treatment 3	13 oz/acre	13 oz/acre	13 oz/acre	—	—	—
Treatment 4	—	—	—	13 oz/acre	13 oz/acre	13 oz/acre

¹ Four days after the cut 1 harvest, at 4:30 p.m.; ² five days after the cut 2 harvest, at 8:40 a.m.

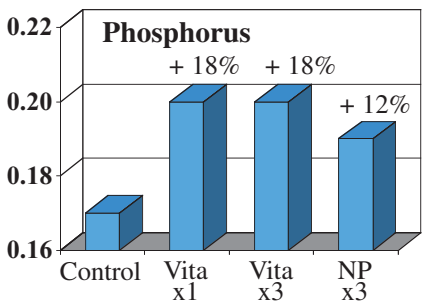
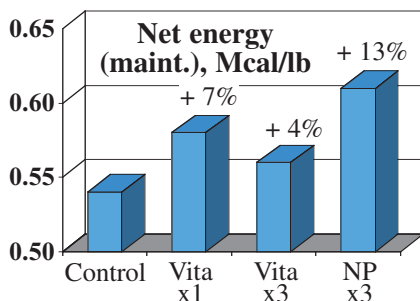
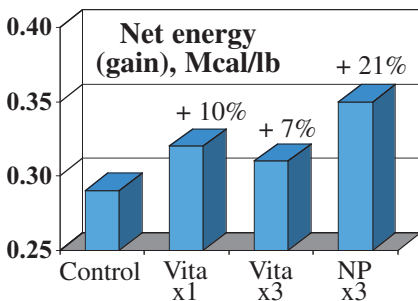
Harvest dates and method: A Kinkaid plot combine was used to harvest a 4.25-foot swath down the middle of each plot on these dates: June 8, July 13, and October 12, 2000. Samples of forage from each plot were saved for quality analysis later.

Yield results: All forage yield results are expressed in terms of dry matter.



*Means followed by the same letter are not significantly different at P=0.10 according to Duncan's New Multiple Range Test. LSD_{0.1}(cut 1)=0.123; LSD_{0.1}(cut 2)=0.168; LSD_{0.1}(cut 3)=0.106; LSD_{0.1}(total)=0.33.

Quality results: The third cutting showed quality improvements with these materials, as detected from analyses by the Soil and Forage Laboratory at the University of Wisconsin, Madison, Wisconsin.



Conclusions: Vitazyme applied three times—at spring greenup and after each cutting — significantly increased alfalfa yield (P=0.1; 8%). Forage quality was also improved somewhat in terms of protein, energy, and mineral content for the third cutting. One application of Vitazyme at spring greenup increased yield an insignificant 6%, but quality was increased about the same as for three applications. All three treatments reduced the fiber content and increased protein by 0.7 percentage point.

Alfalfa (Tray Study)

Agricultural Custom Research and Educational Services

Location: Cedar Falls, Iowa

Variety: Unknown

Soil type: Maxfield silt loam, surface soil

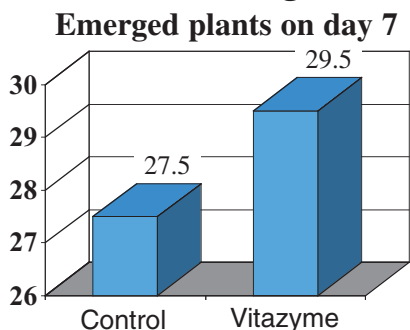
Tray size and type: 10 x 21 inches, slotted tray inside a solid tray, and a paper liner below

Experimental design: Trays were placed under full-spectrum grow-lights that shone 14 hours per day, with an air temperature of 65 to 85°F. Each tray had 6,000 grams of the sieved silt loam soil, which formed a two-inch layer in which two furrows were made. Twenty seeds were placed every 2 inches in the two furrows and covered. Then a measured amount of water was added, first to obtain ideal planting conditions, and subsequent waterings were accounted for as well to give a net water usage. Four replicates were used in the study. Measurements were taken 7, 11, and 13 days after planting.

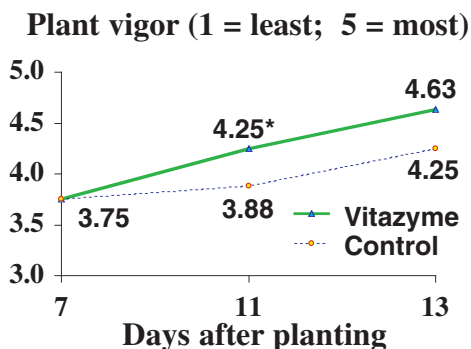
Vitazyme application: The equivalent of 13 oz/acre Vitazyme was applied to the soil surface at planting.

Growth parameters measured: Most differences in growth parameters for the two treatments were not significant, though

Plants Emerged

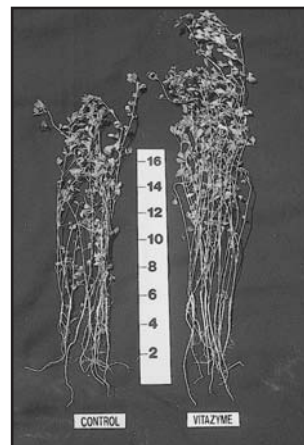


Plant Vigor



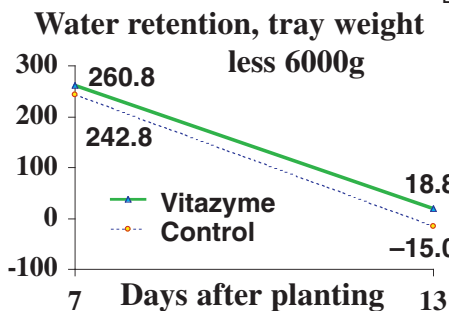
differences did appear and are shown here. A significant difference in plant vigor did occur.

Vitazyme substantially improved alfalfa seedling plant vigor after seven days following planting. The improvement at day 11 was significantly different at P = 0.06.



Alfalfa grown with and without Vitazyme near Watertown, New York, shows excellent root and top stimulation for this new planting.

Soil and Plant Water Retention



* Significantly greater than the control at P = 0.06 according to Duncan's New Multiple Range Test. LSD_{0.10} = 0.29.

The amount of water remaining in the trays, after additions were subtracted, was highest for the Vitazyme trays. This shows that Vitazyme reduced water loss from the soil and plants, and thus improved water use efficiency.

Conclusions: Vitazyme applied to alfalfa in this study showed that the product can significantly improve plant vigor, enhance early plant emergence, and reduce plant and soil water loss, thereby increasing water use efficiency.

• **Plant vigor increase: 10%**

Almonds

Location: Madera, California

Soil type: sandy loam

Varieties: Non Pareil, Carmel, Butte, and Padre

Tree age: blocks 1, 2, 3, and 4 – 20 years; blocks 5 and 6 – 8 years

Tree spacing: Blocks 1, 2, 3, and 4 – 22 ft x 22 ft; Blocks 5 and 6 – 22 ft x 18 ft

Experimental design: Six blocks of almond trees were selected for a comparative test, pitting three low-yielding blocks against three higher-yielding blocks. The three low-yielding blocks were treated with Vitazyme, and the other three left untreated.

Fertility treatments: All areas of the grove were sprinkler irrigated beneath the leaf canopy with "REF water", an electronically treated water using a programmed electronic device that imprints the water with electrons. All areas received 75 lb/acre of N as "UN 32" in April, and again in June. An organism cocktail of "Ceres", plus "Liqui-Comp", a mixture of liquified compost plus microbes, was applied 2 to 3 weeks before both of the UN 32 applications through the sprinkler system. Two applications of 10 lb/acre K₂SO₄ were made in the spring to the leaves using an electrostatic sprayer.

Vitazyme treatments: Vitazyme at 6 oz/acre was sprayed to three blocks on the leaves in May, applied through the sprinkler system at 13 oz/acre in June, and sprayed on the leaves at 6 oz/acre in July.

Harvest date: Non Pareil–September 20; Padre–October 9; Butte–October 16; Carmel–October 30.

Harvest methods: The various blocks and varieties were not separated and weighed at harvest due to the threat of rain and the need to harvest quickly. A rain had fallen on the crop once, and the almonds had been lifted, cleaned, and dropped again for drying before another rainstorm arrived.

Yield results: During harvest (by the farmers themselves), Blocks 2, 4, and 6 produced as many or slightly more almonds than the untreated Blocks 1, 3, and 5, as determined by load counts for each area. This proved that Vitazyme increased almond yield significantly above the normal in these less productive blocks.

Yields for 2000:

Non Pareil and Carmel – 2,875 lb/acre (normal bloom and pollination)

Butte and Padre – 1,805 lb/acre (two week later bloom, and poor pollination due to very rainy weather)

State average yield – 1,292 lb/acre (based on 620,000,000 lb over 480,000 acres)

Quality results: Turnout (percent of meats of the entire crop hauled in) for the two major varieties raised was very high in spite of generally thicker hulls than in 1999. These turnout values were higher than for the usual turnout for 2000.

Non Pareil – 29.56 % Carmel – 29.69 %

Conclusions: In spite of poor pollination of the 2000 crop and adversities during the growing season – and very low statewide average yields (1,292 lb/acre) – the yields were far above this average: 121% for Non Pareils and Carmels, and 40% for Buttes and Padres. **Vitazyme played a significant role in this high yield by boosting yields significantly in the three less productive blocks of the farm. Vitazyme also played a part in maintaining high quality and turnout of the nuts.**

Some comments of Tom Rogers regarding Vitazyme effects on his almonds are as follows:

- “I am very pleased with how Vitazyme performed on our almonds this year.”
- “Vitazyme caused Blocks 2, 4, and 6 to produce as well as – or a little better than – the higher producing Blocks 1, 3, and 5.”
- “The effects of Vitazyme caught our eye.”
- “We plan to use Vitazyme on all of our acres next year.”



Besides increasing the overall yield of almonds by improving nut set, Vitazyme helps the tree fill the nuts more fully to produce larger meats for a higher turnout.



It is clearly evident in this photograph of the Gladewater, Texas, test that the Vitazyme treated rows of aloe vera had substantially more mass.

Aloe Vera

Location: Vital Earth Research Greenhouse, Gladewater, Texas

Variety: Aloe vera L.

Plant size: 4 to 8 inches in height

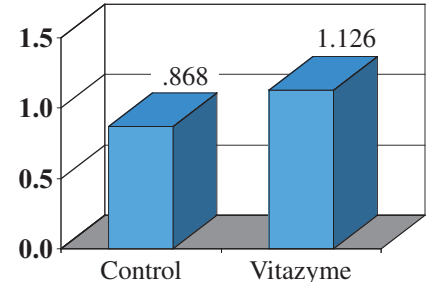
Soil type: Ultra-blend (Canadian peat moss, compost, perlite, aged rice hulls, aged fine pine bark, wetting agent, some fertilizer)

Experimental design: Sixty aloe vera plants were selected from a number of nurse plants in the greenhouse. These were selected to be of equal size for each pair, with each pair being a replicate. One of the pots of each pair received a Vitazyme treatment.

Pot size: 1 gallon

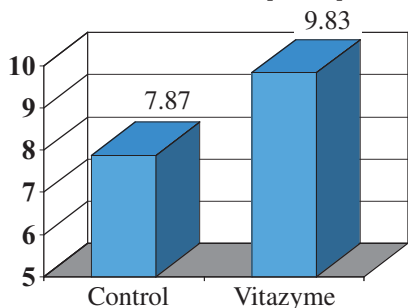
Planting date: December 3, 1999

Plant Fresh Weight
Fresh weight per pot, lb



*Significantly greater than the control at P=0.001 (Tukey's Test).

Plant number per pot



*Significantly greater than the control at P=0.01 (Tukey's Test).

1. Control 2. Vitazyme

Vitazyme application: 100 ml/pot of a 0.05% solution on December 6, 1999; 100ml/pot of a 0.1% solution on January 18, 2000; 100 ml/pot of a 0.1% solution in June, 2000; 100 ml/pot of a 0.1% solution on September 27, 2000

Harvest results: On December 19, 2000, the plants were removed from the pots and the roots were washed free of potting mix. The plants were weighed as fresh, and the number of plants and plantlets were weighed for each pot. A statistical analysis was performed for the data on the 30 replicates.

Conclusions: In spite of an erratic Vitazyme application schedule, the aloe vera in this study responded very well in terms of fresh weight (+30%) and the number of total plants per pot (+25%). Had Vitazyme been applied regularly every one to two months the growth responses would very likely have been better.

• **Increase in plant number: 25%**

• **Fresh weight increase: 30%**

Bananas

Location: Gladewater, Texas

Planting date: summer, 1998

Experimental design: Two banana plants of approximately equal size were planted about six feet from each other in the front of the Vital Earth Resources Research Center. During the summer of 2000 the smaller of the two plants was sprayed periodically with a 1% Vitazyme solution on the leaf surfaces. **1. Control 2. Vitazyme**

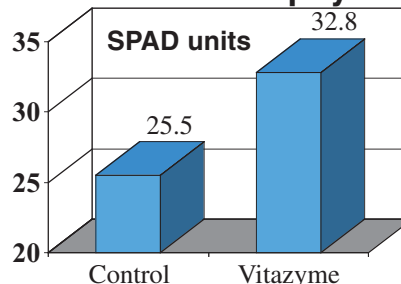
Shortly before a killing frost, an evaluation was made of growth parameters of the two plants

Vitazyme application: leaf spray application of a 1% solution three times from mid-July to October

Leaf chlorophyll: On November 13, 2000, a Minolta SPAD chlorophyll meter was used to noninvasively measure the chlorophyll in 30 randomly selected positions for each of the two plants. These values were then averaged.

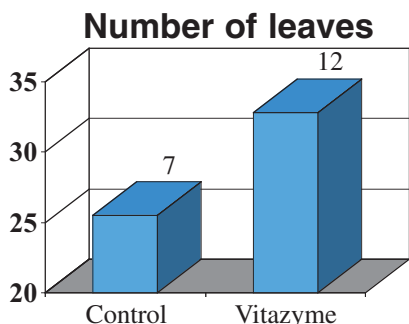
Soil type: very fine sandy loam

Leaf Chlorophyll



The Vitazyme treated banana plant in the foreground was initially the smaller of the two, but after three summer sprays it was noticeably taller than the control, with more leaf area and chlorophyll.

(Continued on the next page)



Total leaves: On November 13, 2000, the total leaves for each plant were counted.
Conclusions: In spite of the Vitazyme treated plant being the smallest initially, this plant quickly accelerated in growth after being treated. Leaf chlorophyll increased to fix more carbon and enhance plant growth such that the total leaf number by mid-November was 71% higher for the Vitazyme treated plant. While a single replicate does not prove such growth increases, yet these results give a strong indication of how well Vitazyme can improve banana growth in a plantation setting.

- **Increase in leaf chlorophyll: 7.3 SPAD units**
- **Increase in leaves: 71%**

Basil

Location: Terra Bella, California

Planting date: June 15, 2000

Variety: Unknown

Experimental design: A 40-acre field of uniform soils was divided into four equal 10-acre sections. The four treatments were as follows: 1. Control 2. Lase biostimulant 3. Vitazyme (on leaves) 4. Vitazyme (in irrigation water)



Vitazyme treated basil on the right, harvested a short distance from the control plants, reveals excellent responses.

Fertilization: proprietary (the same for all 40 acres)

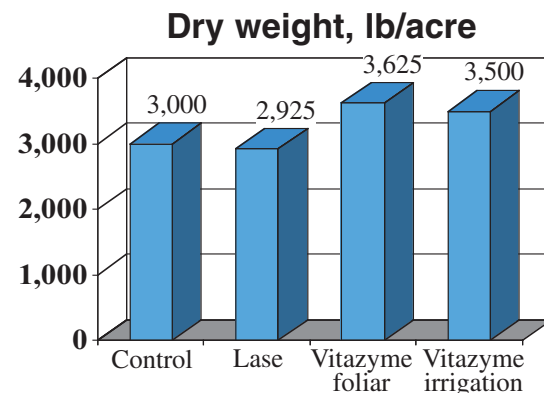
Vitazyme application: 13 oz/acre one time, on the leaves by sprayer (Treatment 3) or through the irrigation system (Treatment 4)

Weed and disease control: proprietary (the same for all 40 acres)

Yield results: All yields are dry weight.

Conclusions: Vitazyme at 13 oz/acre produced a return on investment of from 140:1 (irrigation applied) to 175:1 (foliar applied) for this basil crop. These increases translated to around \$2,000/acre extra income. A second application, applied 30 days after the first one, did not produce measurable yield increases. Fusarium wilt seriously affected all areas.

- **Yield increase, foliar: 21%**
- **Income increase, foliar: \$2,187.50/acre**



- **Yield increase, irrigation: 17%**
- **Income increase, irrigation: \$1,750.00/acre**

Broccoli

Location: Maxwell Ranch, Ventura County, CA

Variety: unknown

Planting date: January 10, 2000 (seeds)

Plot location: Block 40, Row 9

Planting rate: one seed every 5 inches on 40-inch beds

Experimental design: A 20-foot section of row of a broccoli field was treated with Vitazyme three times during the growing season. Near that was a 20-foot section of Vitazyme plus liquid fish. Untreated plants alongside the treated rows served as controls.

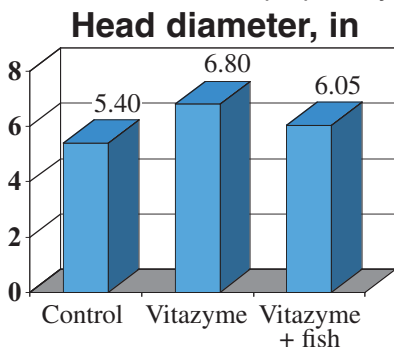
1. Control

2. Vitazyme

3. Vitazyme + fish

Fertilizer treatments: proprietary

Pesticide treatments: proprietary



Fish treatment: 10 gal/acre of actual fish, diluted 10:1, applied three times with Vitazyme (see below)

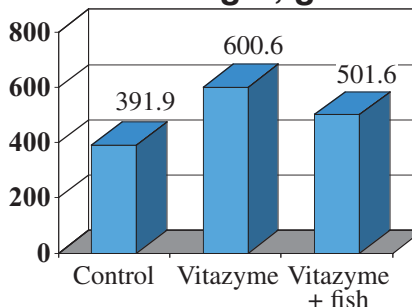
Vitazyme application: Vitazyme was applied three times to the leaves and soil at 13 oz/acre: January 12 (2 days after planting), February 29 (48 days after planting), and March 23 (71 days after planting).

Harvest date: April 13 (92 days after planting). The projected harvest date had been April 3.

Results: Ten representative heads were cut for weighing in each treated and control row with the guidance of the agronomist. Head diameter was also measured.

Conclusions: Vitazyme alone increased yield over the control by 53%, and gave a considerably greater increase than the fish plus Vitazyme. Heads were biggest with Vitazyme alone, one head being 1,123 grams (2.47 lb) and 8.0 inches in diameter! Since larger heads are produced with Vitazyme, it is possible for the grower to the growing cycle.

Head weight, grams



Income

Treatment	Income, \$/acre*	Change
Control	14,547.98	—
Vitazyme	22,303.03	(+) 7,755.05
Vitazyme + Fish	18,627.60	(+) 4,079.62

* Based on the value of broccoli as purchased by major stores in early May, 2000, for resale in eastern Texas: \$0.5375/lb.

- **Head weight increase: 53%**
- **Head diameter increase: 26%**
- **Income increase: \$7,755.05/acre**

Corn (Silage)

Location: Stutzman Research Farm, Arkport, New York

Planting date: unknown

Row spacing: 30 inches

Seeding rate: 32,000 seeds/acre

Experimental design: A field was divided into several sections, each with a different treatment using different products and applications. Only one replicate of each treatment was made. Two of those treatments were as follows:

1. Control

2. Vitazyme on the leaves and soil

Fertilization: unknown

Vitazyme treatment: 13 oz/acre on the leaves and soil at 15 inches plant height

Leaf chlorophyll: On August 11, 1999, 30 representative leaves from each treatment were analyzed with a Minolta SPAD meter, and averaged.

Yield results: Wet silage yields were adjusted

	Control	Vitazyme	Change
	SPAD units		
Leaf chlorophyll	59.0	56.3	(+) 2.7

to 32% moisture.

Silage quality results:

	Control	Vitazyme	Change
	%, as fed		
NDF	57.0	38.5	(-) 18.5 (-32%)
* NDF, as fed = neutral detergent fiber, on an as-fed moist basis.			

	Control	Vitazyme	Change
	%, DM		
DNDF,DM	39.58	40.86	(+) 1.28 (+3%)
* DNDF, DM = the digestible portion of the plant less the grain (vegetative portion only), expressed in terms of dry matter.			

Variety: unknown

Soil type: silt loam

Harvest date: unknown



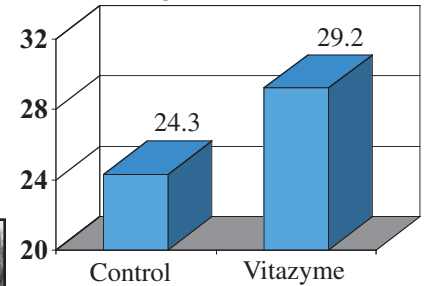
Corn for silage in this replicated trial at Arkport, New York, responded to Vitazyme in terms of yield (14%), dry matter (20%), and digestibility (44%).

	Control	Vitazyme	Change
	%, DM		
DMD	48.23	69.52	(+) 21.29 (+44%)
* DMD, DM = dry matter digestibility, or the % of the silage digested by the cow.			

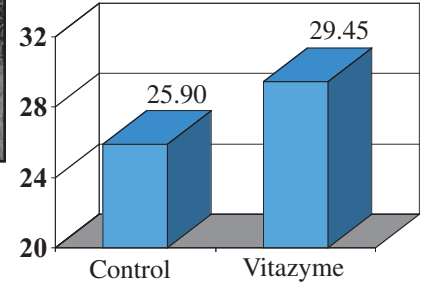
• Dry matter digestibility increase: 44%

• Leaf chlorophyll increase: 2.7 SPAD units

Dry Matter %



Silage yield, tons/acre



• Silage yield increase: 14%

• Dry matter increase: 20%

Conclusions: Vitazyme applied to the leaves and soil of this corn crop substantially improved the leaf chlorophyll content during the growing season, which increased plant growth and final yield of the crop by 14%. Silage quality was also improved, reflected by a 44% improvement in dry matter digestibility compared to the control. The total digestibility of all plant cell material was also increased by 3% with Vitazyme.

Corn (Silage)

Location: Stutzman Research Farm, Arkport, New York

Variety: Golden Harvest 7651 Roundup Ready

Row spacing: 30 inches

Soil type: silt loam

Planting Date: May 25, 2000

Seeding rate: 32,000 seeds/acre

Harvest date: September 27, 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.

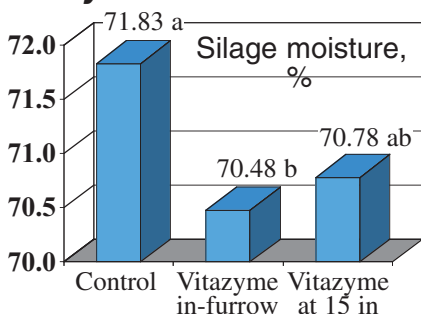
1. Control

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.

Dry Matter/Moisture



Means followed by the same letter are not significantly different at P=0.06 (Tukey's Test).

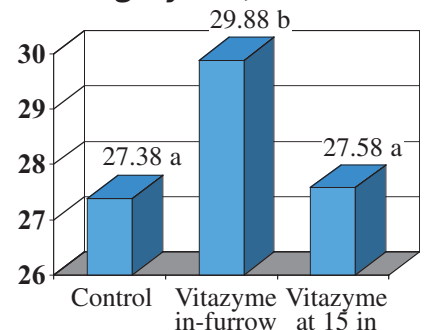
Fertilization: 175 lb/acre N and 120 lb/acre K₂O preplant incorporated and sidedressed, plus 100 lb/acre 5-24-25-micronutrients starter at planting

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

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

Conclusions: Vitazyme applied to the seeds and soil in the furrow at planting provided a significant increase in silage yield (9%), plus improved silage quality in terms of dry matter (5%), NDF, as fed (5%), and IVTD, DM (3%); DNDF, DM was increased by 8% as well. Vitazyme sprayed on

Silage yield, tons/acre



Means followed by the same letter are not significantly different at P=0.06 (Tukey's Test).

the plants and soil at 15 inches in height increased yield (1%), and also significantly increased IVTD, DM (2%) and DNDF, DM (16%); dry matter and NDF, as fed, were also increased by 4% each. **All yield and quality parameters in every case were increased with Vitazyme applied either of the two ways.**

Summary of Silage Quality Parameters, as Affected by Vitazyme*

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

* Bold letters indicate statistically greater values than the control.

¹ Neutral detergent fiber; ² in vitro true digestibility; ³ digestibility of the vegetative portion only.



Note the considerably greater density of roots for the Vitazyme treated silage corn on the right. Rhizosphere stimulation significantly boosted yield by 9%, and quality by up to 16%.

• **Silage yield increase (Vitazyme in-furrow): 9%**

Vitazyme: an excellent addition for better corn silage!

A study on corn conducted on the Chris Wilson Farm, Arkport, New York, by Dale Burdin, Agway, Inc. proved that Vitazyme can substantially improve overall plant size for greater silage production. The treated and control parts of the field were harvested for corn grain, with no discernible yield difference between the areas as detected by the combine yield monitor. This lack of response sometimes occurs with very high nitrogen rates as were used on this field. However, the combine operator noted obviously larger stalks and taller plants where Vitazyme had been applied. Together with the typical improvements in silage digestibility, this test proved that had silage been cut from this field the results from Vitazyme application would have been excellent.

Corn

Iowa State University of Science and Technology

Location: Ames, Iowa (Berkey Research Farm)

Soil type: Clarion clay loam

Depth of Planting: 1.5 inches

Experimental design: A field area was divided into four-row plots that were 10x40 feet (0.009183 acre). Three treatments besides separate controls for each were set up with ten replicates.

Variety: Pioneer 3589

Planting date: April 21, 2000

Previous crop: corn

Population: 30,000 seeds/acre

Row spacing: 30 inches

Harvest date: unknown

Low nitrogen (100 lb/acre) and high nitrogen (150 lb/acre), with six treatments:

- | | |
|-----------------------------|-----------------------------------|
| 1. Control 1 (no Vitazyme) | 4. MC Liquid |
| 2. Vitazyme | 5. Control 3 (no fish + Vitazyme) |
| 3. Control 2 (no MC Liquid) | 6. Fish + Vitazyme |

[MC-Liquid is a distillate of fruit tree cuttings]

Fertility and tillage treatment: Phosphorus and potassium levels were maintained above medium soil test levels. Nitrogen was applied preplant incorporated at 100 and 150 lb/acre of actual N (as urea, 45% N) to the appropriate treatments.

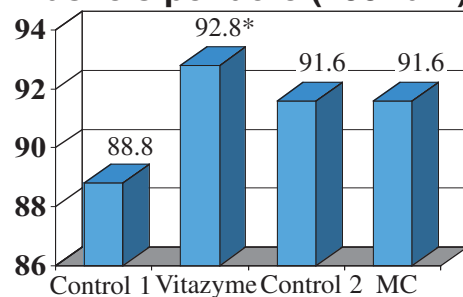
Vitazyme and MC-Liquid applications: (1) seed-row application at 13 oz/acre at planting; (2) soil/foliar application at 13 oz/acre on June 18 at the 8-leaf stage, using 50 gallon/acre of solution

Fish application: 13 oz/acre of liquid fish along with Vitazyme at planting, and also at 13 oz/acre with the soil/foliar application on June 18

Yield results: There was considerable trouble during planting with the seeds getting caught in the corn planter plates with oil in the fish. Major skips in the rows resulted, and populations were reduced by at least 25% in some plots, giving yields of only 60 to 80 bu/acre. Thus, the Vitazyme + Fish results are not evaluated in this report.

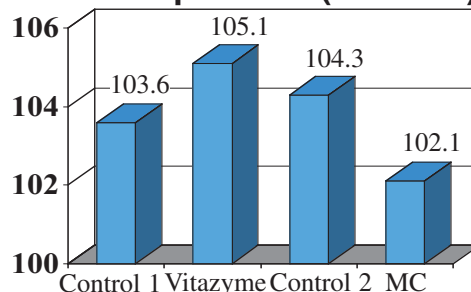
Conclusions: The year began with very low soil moisture reserves. Rainfall was adequate during the early part of the season, but was very restricted late in the season, cutting yields to about half of normal. MC-Liquid did not improve grain yields, but Vitazyme did at both 100 and 150 lb N/acre. The 4.0 bu/acre grain increase at 100 lb/acre N was probably significant, while the 1.5 bu/acre increase at 150 lb/acre was not. Both of these increases show the typically higher yield response of crops to Vitazyme at lower N application levels.

Bushels per acre (100 lb N)



*Significantly greater than the control at P=0.10 (Tukey's Test).

Bushels per acre (150 lb N)



• **Yield increase at 100 lb/acre N: 5%**

• **Yield increase at 150 lb/acre N: 1%**

Corn – Synergism with Humic Acid

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Statistical design: randomized complete block, five replications

Plant species: corn, Mexican flinty yellow dent

Planting rate: seven seeds per pot, thinned to three plants per pot

Humic acid material: Actagro "Liquid Humus", Biola, California

Treatments: Rates are the averages deduced from label directions. All materials were mixed before application to each treatment and applied to the soil soon after planting in 100 ml. of solution per pot.

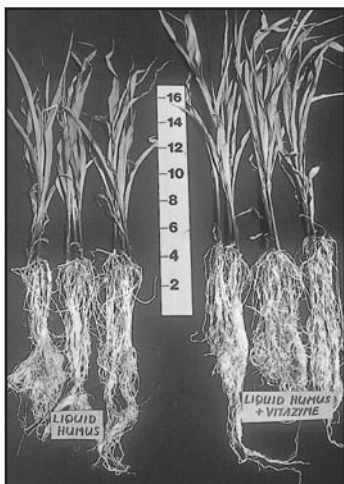
1. Control 2. Vitazyme (13 oz/acre) 3. Liquid humus (4 gal/acre)
4. Liquid humus (4 gal/acre) + Vitazyme (13 oz/acre)

Watering: as needed

Harvest date: April 17, 2000

Greenhouse environment: usually 50° to 60° F at night and 70° to 85° in the day

Data collection: The roots were washed free of soil, and then dried in a drying oven at about 115° F. The dried plants were weighed to the nearest 0.01 gram. Prior to washing, all plant heights were



Vitazyme along with Actagro humic acid greatly stimulated corn root growth, with a consequential significant improvement in leaf growth.

measured with a flexible tape measure to the longest leaf tip. All data were analyzed using Analysis of Variance with CoStat software.

Conclusions: This corn study with Actagro

Liquid Humus, with and without Vitazyme, revealed the following major observations:

1. Plant height was not always correlated with plant dry weight. Vitazyme tended to shorten the plants slightly but increase dry matter accumulation.
2. Root growth with Vitazyme was superior to the humic acid alone.
3. Vitazyme significantly increased corn plant height (15%) and dry weight (18%) above the controls.
4. Liquid humus did not perform well by itself in the

corn study, affecting neither plant height nor dry weight significantly, but **with Vitazyme the Liquid Humus produced a significant increase in corn height (12%) and a great increase in dry weight (40%).**

These data support the many observations made for several years with Vitazyme that the product generates a strong synergism with humus or other organic materials in fertility programs with many crops.

- **Corn height increase with Vitazyme: 15%**

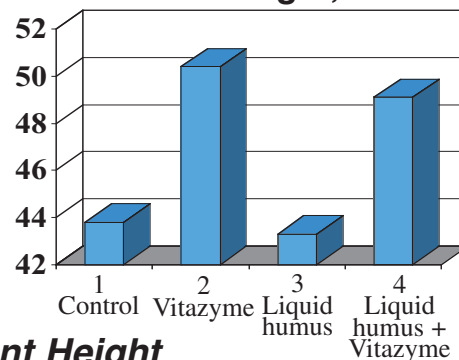
- **Dry weight increase with Vitazyme plus Liquid Humus: 40%**

Pot size: 1 gallon

Planting date: March 17, 2000

Soil type: Bowie fine sandy loam

Plant height, cm

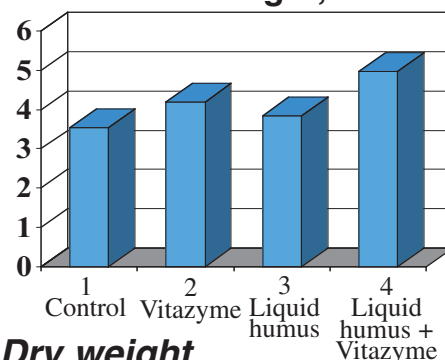


Plant Height

Treatment	Mean height*	Change from control
		cm
2 - Vitazyme	50.4 a	6.6 (+15%)
4 - Liquid humus + Vitazyme	49.1 a	5.3 (12%)
1 - Control	43.8 b	—
3 - Liquid humus	43.3 b	(-) 0.5 (-1%)

* Means followed by the same letter are not significantly different at P = 0.10. LSD_{0.10} = 5.1.

Plant height, cm



Plant Dry weight

Treatment	Mean dry weight*	Change from control
		cm
4 - Liquid humus + Vitazyme	4.97 a	1.43 (+40%)
2 - Vitazyme	4.19 a	0.65 (+18%)
3 - Liquid humus	3.85 b	0.31 (+9%)
1 - Control	3.54 c	—

* Means followed by the same letter are not significantly different at P = 0.10. LSD_{0.10} = 0.63.

Corn and Peas – Synergism with MC and Fish

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Soil: "Cherry Lane" fine sandy loam

Replications: 5

Crops: Mexican white dent corn and Alaska English peas

Pot size: 1 gallon (6 inch top diameter), having 0.000045 acre/pot soil surface

Growing environment: greenhouse, climate controlled to about 60° to 80°F

Product review:

Vitazyme. A biostimulant produced by Vital Earth Resources containing various growth stimulants such as vitamins, growth regulators, hormones, glycosides, and porphyrins and can be used to treat soils, leaves, or seeds

Fish. A liquid enzyme hydrolysate of sharks, from Jedwards International, Quincy, Massachusetts

Treatments

Treatment	Vitazyme ¹	Fish ²	Gel ³	MC Liquid ⁴
1	0	0	0	0
2	X	0	0	0
3	0	X	0	0
4	X	X	0	0
5	0	0	X	0
6	0	0	0	X

¹100 ml of a 0.01% solution applied after planting.

²100 ml of a 0.01% solution applied after planting.

³100 ml of a 0.01% Vitazyme and 0.01% fish solution applied after planting.

⁴100 ml of a 0.01% solution applied after planting.

(Continued on the next page)

MC Liquid. A "ceramic charcoal" produced in Japan, using fruit tree prunings, which reportedly has a unique molecular surface configuration that stimulates organism propagation

Procedure: On November 23, 1999, pots were filled with soil, tagged, and then planted with eight seeds per pot. They were well watered, after which 100 ml of the appropriate substances were added. Plants were thinned to three plants per pot after some growth had occurred. Pots were watered as needed.

The pots were harvested on January 7, 2000, by measuring plant heights and washing the soil from the roots. The plants were then dried in an oven at about 120°F. All dried samples were weighed, and the data were analyzed statistically using CoSTAT software.

Results:

The tallest corn was grown with traces of Vitazyme and Fish in the added solution at planting. The nutrients of Ag Gel stimulated good growth due to the nutrient effect. MC Liquid gave a surprisingly good response, and Vitazyme also did. While fish alone gave little growth increase it greatly boosted corn height along with Vitazyme.

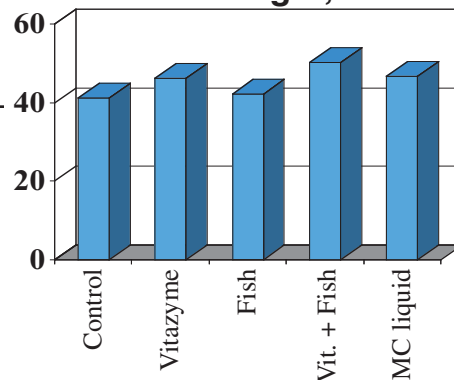
Corn

Plant Height

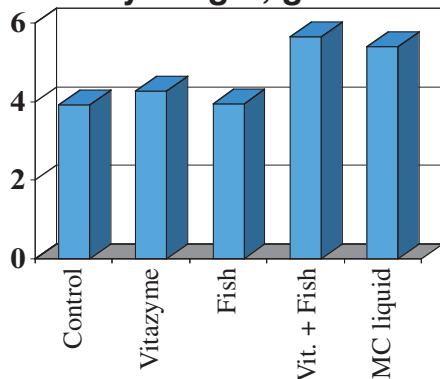
Treatment	Height, cm*	Increase,cm
Vitazyme + Fish	50.1 a	9.0 (+22%)
MC Liquid	46.6 a	5.5 (+13%)
Vitazyme	46.3 ab	5.2 (+13%)
Fish	42.3 bc	1.2 (+3%)
Control	41.1 c	—

*Means followed by the same letter are not significantly different at P = 0.1.

Plant height, cm



Dry weight, grams



Plant Dry Weight

Treatment	Dry weight,g*	Increase,g
Vitazyme + Fish	5.65 a	1.73 (+44%)
MC Liquid	5.40 a	1.48 (+38%)
Vitazyme	4.27 bc	0.32 (+8%)
Fish	3.95 c	0.03 (+1%)
Control	3.92 c	—

*Means followed by the same letter are not significantly different at P = 0.1.

The same effects as noted for plant height were noted for dry weight. Especially significant was the lack of effect from fish alone, but with Vitazyme the effect was a 45% increase in dry weight, double the 22%

increase of plant height. MC Liquid increased dry weight by a surprising 38%, and produced the most massive and fibrous root systems for any treatment. This material, along with fish, deserves more attention to see if it may be a positive synergist with Vitazyme.

English Peas

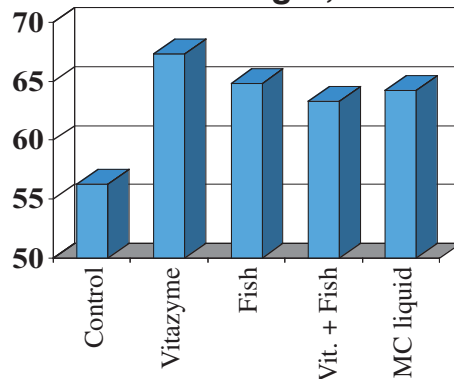
Vitazyme produced the greatest yield increase (+20%) in this trial, although the increase was not significantly greater than for any of the other materials or combinations. The Fish and Vitazyme combination did not outyield each product alone with the peas, a very different outcome than with corn.

Plant Height

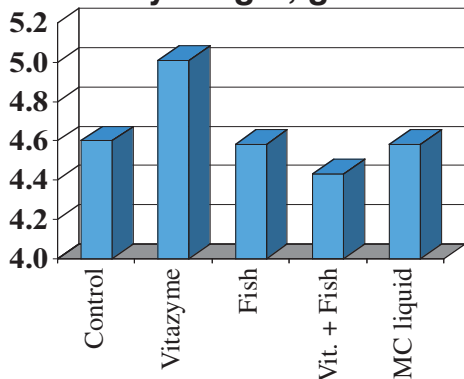
Treatment	Height, cm*	Increase,cm
Vitazyme	67.3 a	11.0 (+ 20%)
Fish	64.8 a	8.5 (+ 15%)
MC Liquid	64.2 a	7.9 (+14%)
Vitazyme + Fish	63.3 a	7.0 (+12%)
Control	56.3 b	—

*Means followed by the same letter are not significantly different at P = 0.1.

Plant height, cm



Dry weight, grams



None of the treatment dry weights were significantly different from one another or the control. However, Vitazyme alone gave the greatest weight increase (+9%), while Vitazyme + Fish gave a slight yield reduction.

Plant Dry Weight

Treatment	Dry weight,g*	Increase,g
Vitazyme	5.01 a	0.41 (+ 9%)
Control	4.60 a	—
MC Liquid	4.58 a	(-) 0.02 (0%)
Fish	4.58 a	(-) 0.02 (0%)
Vitazyme + Fish	4.43 a	(-) 0.15 (-3%)

*Means followed by the same letter are not significantly different at P = 0.1.

Conclusions: In this greenhouse study with biostimulants on corn and English peas, corn responded the best to different treatments, especially to Vitazyme + Fish (a 22% height increase, and a 44% dry weight increase). This synergism was very pronounced,

since both products alone did not increase height or weight by more than 13%. Such a synergism between Vitazyme and Fish did not occur for peas. Vitazyme alone performed best with this legume, although dry plant weight, while 9% greater than the control, was not significantly greater.

Of great interest was the great increase in corn root growth with MC liquid. This material at only 0.01% of the added solution produced a significant 13% height increase for corn, and a very good 38% significant dry weight increase. A significant 14% pea height increase was also noted with MC Liquid, although the material did not significantly stimulate pea dry weight.

Corn

Agricultural Custom Research and Education Services

Location: Cedar Falls, Iowa

Variety: Pioneer 34G130

Planting date: April 28, 2000 (66°F at 2 inches)

Harvest date: September 25, 2000

Previous crop: soybeans

Row spacing: 30 inches

Seeding rate: 29,900 seeds/acre

Soil type: Maxfield silty clay loam (4.8% organic matter, pH 6.8)

Experimental design: A Latin square design was established using four replicates and four treatments. The design was to evaluate Vitazyme alone, a humic acid material alone (Actagro, 22% organic acids derived from leonardite), and the two together, using yield as the main parameter of comparison. Each plot was 40 feet x 15 feet (six rows) wide, or 0.01377 acre.

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

Fertilization: 160 lb/acre of nitrogen as anhydrous-NH₃; no phosphorus and potassium

Weed control: Dual II Magnum at 2 pints/acre

Vitazyme application: (1) 13 oz/acre on the seed at planting; (2) 13 oz/acre at knee height on the leaves and soil

Humic acid treatment: 3 gallons/acre with the seeds at planting

Yield results: At harvest, four rows were harvested from each treatment and weighed.

Income results: A corn price of \$1.75/bu is estimated.

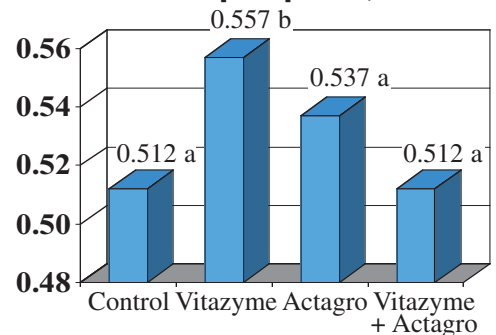
Conclusions: In this study, grain yield was significantly increased with Vitazyme



A universal response of all crops to Vitazyme is increased root mass, especially of the fine feeder roots. The treated corn on the right in this comparison has longer, sturdier main roots as well.

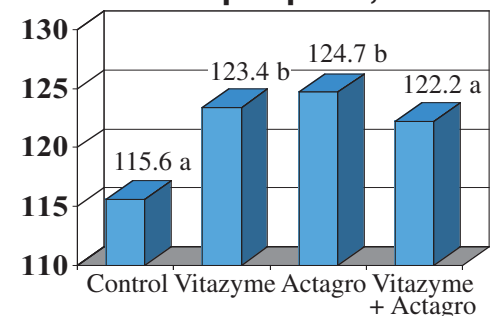
(+7%) and with humic acids (+8%), but not when the two products were combined. The grain per plant was also significantly increased with Vitazyme (+9%), showing that individual corn plants were larger and able to produce larger ears when treated with Vitazyme. This improvement did not occur with the other two treatments. Grain moisture at harvest, plant population, and grain test weight were not affected significantly by any of the treatments, though the product combination increased the test weight by 0.4 lb/bu over the control. Both Vitazyme and humic acids significantly improved corn production, but not a combination of the two, in this Iowa corn study.

Grain per plant, lb



Means followed by the same letter are not significantly different at P=0.11 (Duncan's Test).

Grain per plant, lb



Means followed by the same letter are not significantly different at P=0.15 (Duncan's Test).

• **Yield increase: 7% (Vitazyme only)**

• **Income increase: \$13.65/acre (Vitazyme only)**

Corn (Tray Study)

Location: Cedar Falls, Iowa

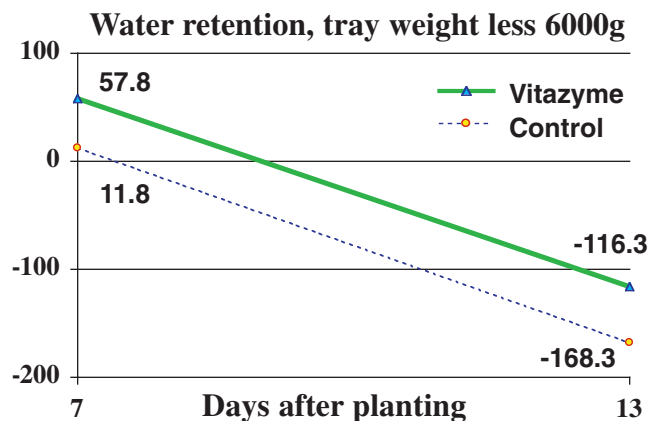
Variety: Pioneer 33A14

Soil type: Maxfield silt loam, surface soil

Tray size and type: 10 x 21 inches, slotted tray inside a solid tray, and a paper liner below

Experimental design: Trays were placed under full-spectrum grow-lights that shone 14 hours per day, with an air temperature of 65 to 85°F. Each tray had 6,000 grams of the sieved silt loam soil, which formed a two-inch layer in which two furrows were made. Twenty seeds were placed every 2 inches in the two furrows and covered.

Soil and Plant Water Retention



Then a measured amount of water was added, first to obtain ideal planting conditions, and subsequent waterings were accounted for as well to give a net water usage. Typical field water loss is 0.25 to 0.35 in/day. Four replicates were used in the study. Measurements were taken 7, 11, and 13 days after planting.

Vitazyme application: The equivalent of 13 oz/acre Vitazyme was applied to the soil surface at planting.

Growth parameters measured: There were no significant differences between the treatments for plants emerged, plant height, or plant vigor for the 13-day period evaluated. The water retention of the trays differed, but nonsignificantly.

The amount of water remaining in the trays, after additions were subtracted, was highest for the Vitazyme trays. This shows that Vitazyme reduced water loss from the soil and plants, and thus improved water use efficiency.

Corn

Location: Stutzman Research Farm, Arkport, New York

Variety: Golden Harvest h7615 Roundup Ready

Planting population: 30,000 seeds/acre

Experimental design: A randomized complete block design with plots 10 x 50 ft. (0.0115 acre) was set up with four replications and 12 total plots. Three treatments were used.

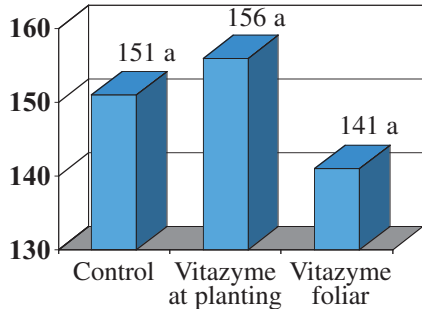
Planting date: May 26, 2000

Row spacing: 30 inches

Soil type: silt loam

1. Control 2. Vitazyme on the seeds 3. Vitazyme on the leaves and soil

Corn yield, bu/acre



*Means followed by the same letter are not significantly different at P=0.10 (Tukey).

two Vitazyme treatments. Nevertheless, yield increased by 5 bu/acre with a seed row application, though a foliar application at 6 oz/acre reduced yield by 10 bu/acre. Neither treatment produced a significant (P=0.10) yield change. Grain moisture and test weight were not significantly affected by these treatments. It is likely that a full 13 oz/acre rate, applied on the seed and also on the leaves and soil, would have produced a sizable and significant yield increase.

Fertilization: 175 lb/acre N and 120 lb/acre K₂O preplant incorporated and sidedressed, plus 100 lb/acre 5-24-25% N-P₂O₅-K₂ + micronutrients starter at planting

Vitazyme treatment: 6 oz/acre on the seeds at planting (Treatment 2); 6 oz/acre sprayed on the leaves and soil with the herbicide

Herbicide application: Roundup (glyphosate)

Harvest date: November 11, 2000

Grain moisture results:

- Grain moisture reduction (Vitazyme foliar): 0.77 point
- Grain moisture reduction (Vitazyme at planting): 0.50 point

Conclusions: Vitazyme was applied in this study at half the recommended rate of 13 oz/acre, and only once in the



Response to Vitazyme in some cases can be quite profound. Application to the seeds at planting in this corn field resulted in dramatic early growth.

- **Yield increase (planting application): 3%**

Corn – with Fish

Location: Vital Earth Resources Research Center, Gladewater, Texas

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

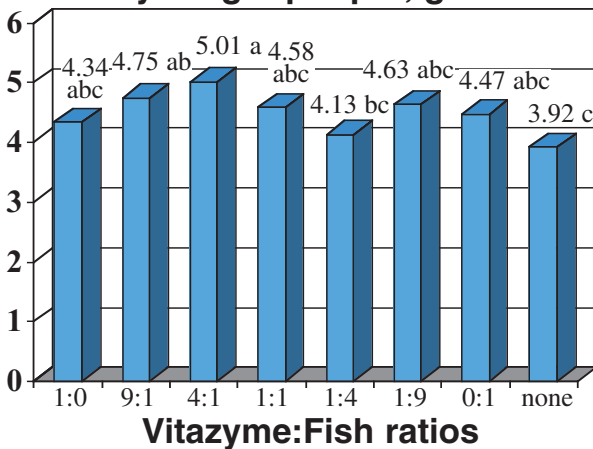
Experimental design: A randomized complete block design with 5 replications was set up in 6-inch pots using a very fine sandy loam soil

Vitazyme and fish applications: Eight treatments were used. The fish was an enzymatically degraded product.

Planting date: January 17, 2000

Variety: Mexican flinty field corn

Dry weight per pot, grams*



* Means followed by the same letter are not significantly different at P=0.1.

Note: For Vitazyme alone the 13 oz/ha rate was used, and for fish alone the 13 oz/acre rate was used. Combinations of the two always totaled 13 oz/acre of the combined products. Enzymatically degraded fish from Jedwards International in New Jersey was used in this study.

Harvest date and analysis: March 1, 2000

Conclusions: In this corn study, although there was no significant increase in corn plant dry weight when fish and Vitazyme were mixed together and applied to the plants versus each material applied separately, there was a visible trend for the fish and Vitazyme combinations of 4:1, 9:1, and 1:9 (Vitazyme:fish) to increase yield above either product alone. Thus, apparently a combination of the two does produce a synergistic effect.

Treatment number	Vitazyme rank	Fish rank	Height* cm
6.	1	9	42.5 a
2.	2	1	41.9 a
7.	3	1	41.7 a
5.	4	4	41.6 a
4.	5	1	41.4 a
1.	6	0	40.7 a
8.	7	0	40.4 a
3.	8	4	39.8 a

* Means followed by the same letter are not significantly different at P=0.1.

Two Vitazyme applications for corn: still probably the best approach

Farmers have tried different application regimes for Vitazyme over the years to maximize its effectiveness. It appears that the standard two applications — one early (on the seeds at planting if possible), and one around knee height up to chest height — work the best, although in some cases a single application at either time has done very well. Applications at any time from before planting to tasseling are effective. The jury is still out on whether certain specific times of application are better than others.

Corn

Location: Waterloo, New York

Planting date: May 31, 2000

Experimental design: A 100-acre field was divided into halves (50 acres each), with half treated with Vitazyme and half left untreated.

Variety: Agway 501

Seeding rate: unknown

Researcher: Jake Gephart, Agway, Inc.

Row spacing: 30 inches

1. Control

2. Vitazyme



This Agway test in New York reveals considerably better stalk and leaf growth. Note in particular the darker leaves of the treated corn on the left.

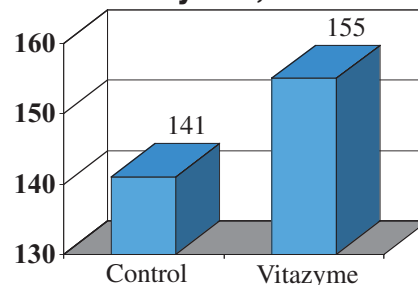
Fertilization: 380 lb/acre of a urea and potash mixture, broadcast before planting and incorporated; 250 lb/acre of 11-37-0% N-P₂O₅-K₂O as a starter

Weed control: Bicep and Prowl tank-mixed
Vitazyme application: 13 oz/acre with the herbicide, at 18-inches corn height

Harvest date: December 3, 2000

Conclusions: Only 13 oz/acre of Vitazyme, applied with the herbicide, resulted in a 10% grain yield increase and a \$24.50/acre income increase. This increase resulted in a return on investment of about 5:1 for this low-value crop. In spite of a very wet and cool year, Vitazyme still produced a very good crop response.

Grain yield, bu/acre



• Income increase: \$24.50/acre

Corn – Synergism with MC and Fish

Location: Vital Earth Resources Research Center, Gladewater, Texas

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

Experimental design: A randomized complete block design with 5 replications was set up in 6-inch pots using a very fine sandy loam soil

Vitazyme and fish applications: Eleven treatments were used.

Note: For Vitazyme alone the 13 oz/ha rate was used, and for MC alone the 13 oz/acre rate was used. Combinations of the two or the three products (for Treatments 9 and 10) always totaled 13 oz/acre of the combined products. MC Liquid is a carbonaceous liquid derived from the burning of fruit tree prunings. Enzymatically degraded fish from Jedwards International in New Jersey was used in this study.

Harvest date and analysis: March 1, 2000. All roots were washed clean of soil, the plants were measured for length of the longest leaf and the three plants for each pot were averaged, and the plants were dried in a drying oven at about 115 degrees F. Dry weights were measured to the nearest 0.01 gram, and the three plants were averaged for each pot. A statistical analysis was performed using Analysis of Variance with CoHort software.

Planting date: January 17, 2000

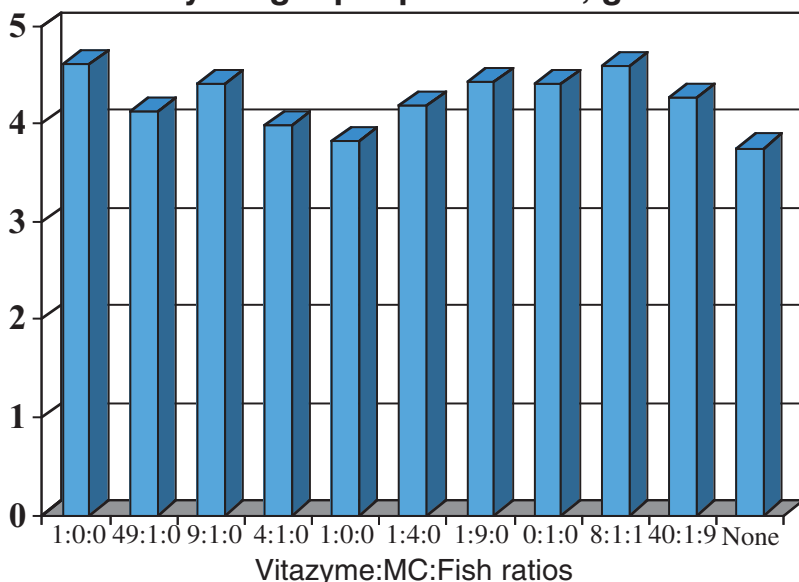
Variety: Mexican flinty field corn

Treatment number	rank	Vitazyme	MC parts	Fish	Dry wt.* grams
1.	1	1	0	0	4.60 a
9.	2	8	1	1	4.58 a
7.	3	1	9	0	4.43 ab
3.	4	9	1	0	4.41 ab
8.	5	0	1	0	4.41 ab
10.	6	40	1	9	4.26 ab
6.	7	1	4	0	4.19 ab
2.	8	49	1	0	4.13 ab
4.	9	4	1	0	3.99 ab
5.	10	1	1	0	3.83 b
11.	11	0	0	0	3.75 b

* Means followed by the same letter are not significantly different at P=0.1.

There were no significant differences in the height of the plants among the eleven treatments.

Dry weight per pot of corn, grams



Conclusions: In this corn study there was no significant improvement in corn plant dry weight with any product combinations over Vitazyme alone. In fact, Vitazyme by itself produced the highest overall yield, followed by Vitazyme plus MC and fish in an 8:1:1 ratio. MC alone produced less dry matter alone than did Vitazyme alone (Treatments 1 and 8). Only the control and Treatment 5 (Vitazyme and MC at 1:1) were significantly less than Vitazyme alone and the Vitazyme:fish:MC combination of Treatment 9.

This research lends credence to the theory that MC Liquid is not a synergist with Vitazyme, nor is it a superior biostimulant to Vitazyme. The ability of this material to produce superior roots and overall growth in a previous study has not been duplicated in this study.

Cotton

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

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

Researchers: Craig Rothrock, Ph.D., University of Arkansas, Fayetteville, Arkansas; Kathy McLean, Ph.D., Auburn University, Auburn, Alabama; Peggy Thaxton, Ph.D., Texas A&M University, College Station, Texas; William Batson, Ph.D., Mississippi State University, Mississippi State, Mississippi; Bonney Ownley, Ph.D., and Melvin Newman, Ph.D., University of Tennessee, Knoxville, Tennessee; Kyle Rushing, Ph.D., and Tim Cavanaugh, Ph.D., Gustafson, Plano, Texas

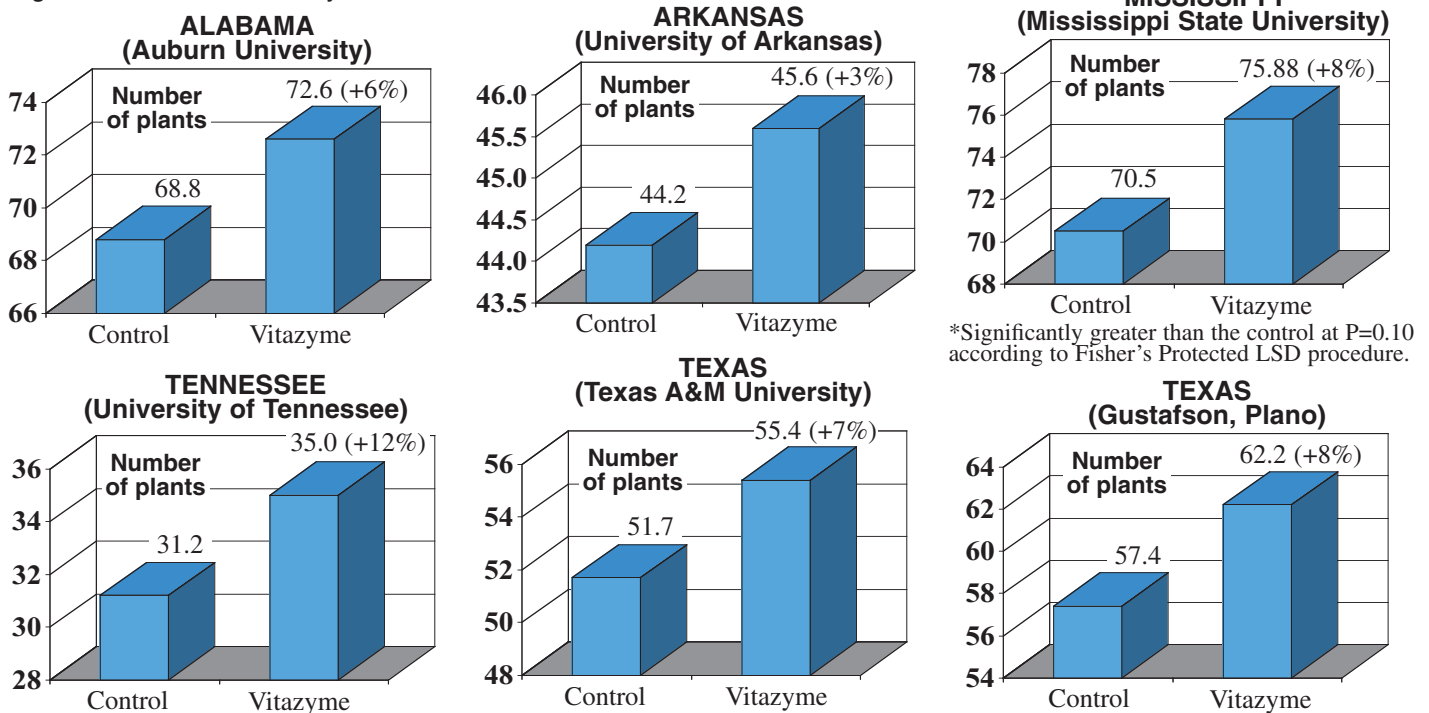
Experimental design: Two lots of a cotton variety (2,500 grams in each) were sent to Vital Earth Resources from Dr. Batson, for treatment with Vitazyme. The two treatments were as follows:

(1) Lot 1. **Regular Vitazyme** (10%), with seeds soaked for five minutes and then air dried.

(2) Lot 2. **Autoclaved Vitazyme** (10%), with seeds soaked for five minutes and then air dried. [The Vitazyme was autoclaved at 15 lb/in² pressure for 15 minutes at 121°C and autoclaved again one day later.] All beakers and items were sterilized with 3% H₂O₂ before using the autoclaved product.

These seeds were returned to Dr. Batson in Mississippi and sent to the researchers for growth studies at the various stations. The seeds were planted in the field 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 product to enhance seed germination compared to other products and the control.

All data shown below are for the control versus non-autoclaved Vitazyme. Autoclaved Vitazyme did not give positive effects, though it did in the 1999 study.



Conclusions: Vitazyme enhanced cotton seedling germination and seedling survival compared to the control by 7% over six test sites. Only one of these sites gave significant results, but the trend for all of them was positive. Due to unknown variables nearly all products used in the S-269 evaluations this year gave mediocre responses, unlike in 1999. This trend of results shows that Vitazyme, through its rhizosphere colonization effects, inhibits the growth of various fungal and other soilborne diseases so that fewer seedlings fell prey to these serious pathogens.

The non-autoclaved Vitazyme gave seedling responses in this study, while the autoclaved product did not. Thus, it is assumed that microorganisms in the material are in some way assisting this beneficial response to seedlings. However, the data from 1999 showed relatively equal responses of seedlings for both autoclaved and non-autoclaved Vitazyme. The reasons for this discrepancy for the two years are not understood.

Cotton

Location: Tulia, Texas

Variety: HS 2200 (Paymaster Roundup Ready)

Planting date: May 6, 2000

Soil type: sandy loam

Row spacing: 38 inches

Harvest date: October 5, 2000

Experimental design: A field of 33 acres was divided into two equal portions of 16.5 acres each, one treated with Vitazyme and the other left untreated.

1. Control

2. Vitazyme

Fertilizer treatment: Last October (1999), 2 tons/acre of steer compost was applied over the entire area.

Vitazyme treatment: 13 oz/acre banded on the soil of the seed row at planting, and 13 oz/acre at early bloom

Irrigation: row irrigation one time shortly after plant emergence

Growth observations: On October 2, 2000, it was apparent that the Vitazyme treated plants were superior in several ways:

- Bigger stems
- Larger root systems
- More bolls, and larger bolls
- Taller plants on average
- Darker green leaves (more chlorophyll)

Quality results: Samples of ginned cotton were evaluated for each side, and the values were averaged for each treatment.

Treatment	Strength ¹	Uniformity ²	Length ³	Length	Color ⁴	Micronaire ⁵	Loan Value
	grams/tex	%	staple	in	grade		\$/lb
Control	24.9	79.1	30.3	0.894	11.3	42.7	0.4228
Vitazyme	26.0	79.6	30.9	0.931	11.0	42.3	0.4418
Change	+4%	+1%	+2%	+4%	—	-1%	+\$0.019/lb

¹ Both figures are low; 29 is a good value.

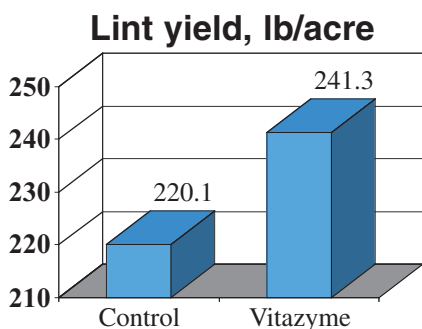
² Uniformity is the percentage of fibers that break at the given strength.

³ Values of 30 = 7/8 in, and 31 = 15/16 in.

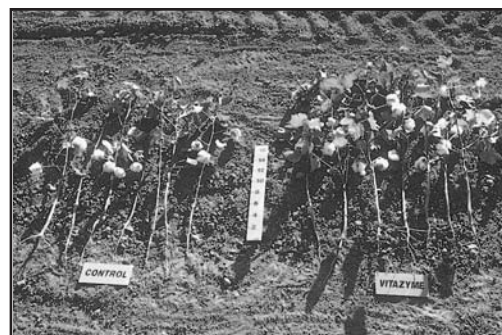
⁴ A value of 11.0 is white, and 12.0 is light spotted.

⁵ A measure of fiber "hollowness", and thus desirability for spinning. Values should be between 3.5 and 4.9.

Income results: Values below are based on a loan value of \$0.4418/lb for the Vitazyme treatment, and \$0.4275/lb for the control treatment.



Conclusions: The year was extremely dry, and thus yields were low in this field that received only one irrigation. The yield and income increases were similar to those obtained in previous studies in west Texas, which showed a 10% yield increase and a profitable \$13.55/acre income increase. This income increase was due in part to improvements in fiber quality – color, strength, and length – which was reflected in a higher loan value.



At Tulia, Texas. cotton growth with Vitazyme under minimal irrigation still produced better roots and leafier tops, and a 10% greater lint yield. Lint quality was also improved.

• **Lint yield increase: 10%**

• **Income increase: \$13.55/acre**

Cotton



Cotton treated twice with Vitazyme in this Littlefield, Texas, study reveals larger roots and tops with more bolls, that led to a 20% greater yield and over \$55/acre more income.

Location: Littlefield, Texas **Variety:** Paymaster HS-26, Roundup Ready
Soil type: medium sandy loam **Planting date:** May 29, 1999
Experimental design: A center pivot area was divided into two portions, one half treated with Vitazyme and the other left untreated.

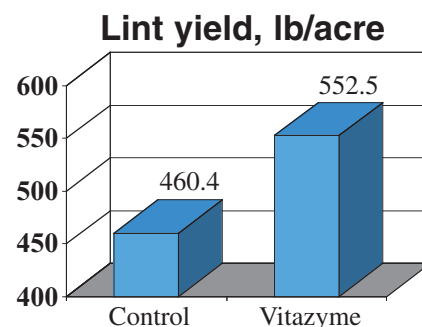
1. Control

2. Vitazyme

Fertilization: 55 lb/acre N, 40 lb/acre P₂O₅, and trace elements applied before planting and incorporated

Vitazyme application: 13 oz/acre in a 12-inch band over the rows at planting, and 13 oz/acre sprayed over the leaves and soil near early bloom with the first boll weevil spray

Irrigation and weather: Before planting: two irrigations at 1.5 inches each time; after planting: five irrigations at 1.0 inch each time after the June wet period. The



growing period from July through harvest was extremely dry.

Harvest date: November 19 to 23, 2000 (for the Vitazyme treatment; the control was harvested two weeks earlier)

Yield results: The control side of the center pivot was harvested, after which protracted rain fell for about two weeks. Some cotton in the Vitazyme treatment was subsequently lost before harvest.

Income results: The protracted rain during harvest reduced the cotton quality so the final price was less than could have been. The projected sale price should be \$0.55 to \$0.60/lb.

Conclusions: Two applications of Vitazyme to this cotton crop substantially increased lint yield (20%) and income (\$55.26/acre). This increase represented about a 6:1 return: cost ratio for the investment in this product. Had the weather not adversely affected the treated half of the test area the returns and return ratio would have been even greater.

• **Lint yield increase: 20%**

• **Income increase: \$55.26/acre**

Cotton

Nematode counts with Temik vs. Vitazyme

Location: Texas A&M University Agricultural Research and Extension Center, Lubbock, Texas

Research sites: Lamesa, Denver City, and Gomez, Texas

Variety: unknown

Planting date: see below

Planting rate: unknown

Row spacing: 40 inches for Lamesa and Gomez; 36 inches for Denver City

Experimental design: At three locations in west Texas, replicated and randomized plots were set up with three treatments. Four replicates were used.

	1. Control	2. Temik	3. Vitazyme
Location			
Lamesa, Texas	4 rows x 296 to 577 ft (center pivot)		May 8, 2000
Denver City, Texas	2 rows x 150 ft (center pivot)		May 23, 2000
Gomez, Texas	2 rows x 37 ft (center pivot)		May 5, 2000

Nematode egg and juvenile counts were made from samples collected midseason, and these samples were analyzed at the Texas A&M research station in Lubbock. Yield analyses were made later in the fall using a four row stripper having a MicroTrak yield monitor.

Fertilizer treatment: unknown

Vitazyme treatment: 13 oz/acre in the seed row at planting; 13 oz/acre sprayed at pinhead square

Temik treatments: Temik 15 G at 5 lb/acre in the furrow

Thrip control: Orthene 90S about three weeks after planting

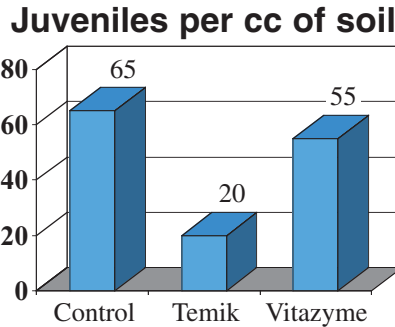
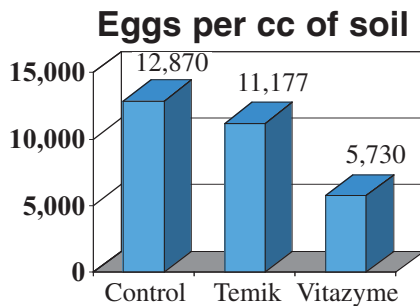
Growth observations: On October 2, observations on roots

Nematode counts: Samples of soil and roots were collected midseason on July 17, August 3, and July 25 for the three locations, respectively, for analyses of *Meloidogyne* spp. eggs, and second stage juveniles (j2) for all three sites. Because of high variability of egg and juvenile populations none of the means are statistically different.

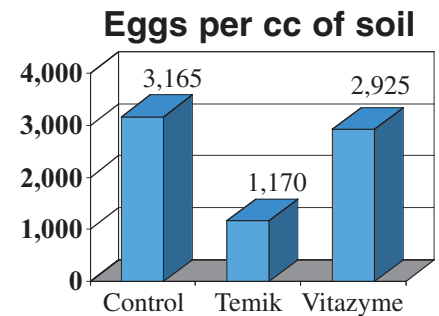


A Texas A&M University study revealed that Vitazyme and Temik gave similar results on nematode counts for cotton, though data were not statistically significant.

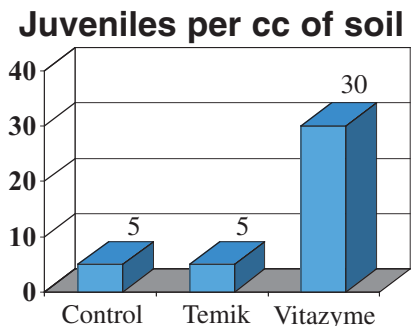
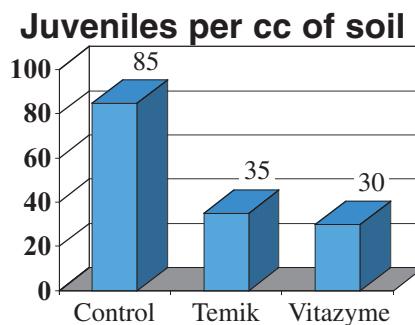
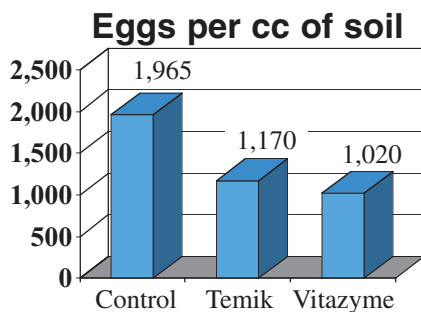
Lamesa plots



Denver City plots



Gomez plots



Nematode Count Summary – Three Sites

	Eggs	j2
Temik	-38%*	-43%
Vitazyme	-37%	-40%**

* Average of the Lamesa and Gaines plots, leaving out an anomalously high 85% value for the Chavez plots.

** Average of the Lamesa and Chavez plots, leaving out an anomalously high 500% value for the Gaines plots.

Conclusions on the nematode data: Both Vitazyme and Temik generally reduced nematode juvenile and egg numbers, though not significantly, at these three sites in west Texas. Both materials appeared to do equally well in reducing nematode pressure on cotton roots.

Yield results: None of the data showed significant yield responses at P = 0.05 for either Temik or Vitazyme, though the control plots were the highest yielders at Lamesa and Denver City. At Gomez the Temik treatment yielded the most.

Celery

Location: Gene Jackson Farm, Duda Ranch, Ventura, California

Row spacing: 40 in center, 2 rows 8 in apart

Irrigation: furrow

Experimental design: An 8-acre field was planted to celery transplants which had been grown in a Duda field near Santa Maria. Three rows (700 feet long) were selected for the experiment:

Variety: proprietary

Harvest date: December 7, 2000

1. Control

Vitazyme application: 13 oz/acre two times during the growing season, on September 11 and October 31

Fish application: 10 gal/acre

Fertilization: proprietary

Yield results: The Duda field manager selected a 30-foot section for each of the three treatments, each next to the others. All of the plants from each treatment were weighed to the nearest gram and recorded.

Income results: The value of celery is about \$12/box.

	Control	Vitazyme	Fish
Boxes/30-ft row	2.02	2.93	1.87
Celery value, \$/30 ft	24.24	35.16	22.44
Celery value, \$/acre*	10,558.94	15,315.70	9,774.86

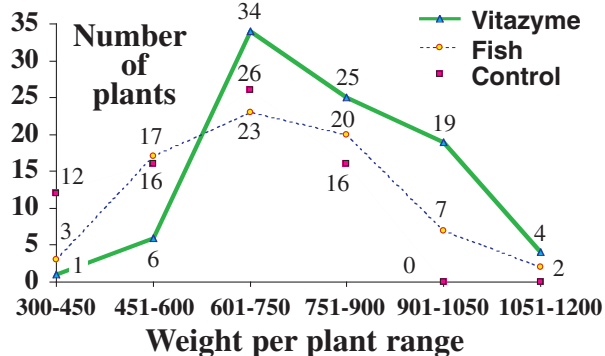
* The field area for each treatment was 100 ft², or 0.002296 acre.

Conclusions: Vitazyme in this test produced a substantial increase in the weight per plant (11%) by stimulating photosynthesis throughout the growth period. Because of a greater number of plants in the row section the total yield was 37% higher for Vitazyme vs. the control, and income was substantially greater. The fish treatment produced the least yield per plant and overall yield.

2. Vitazyme

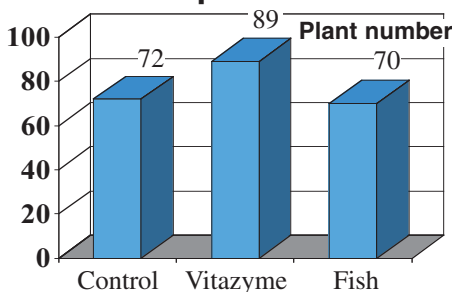
3. Fish

Plant Weight Distribution

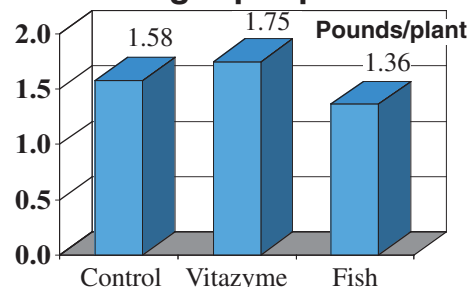


Weight per plant range

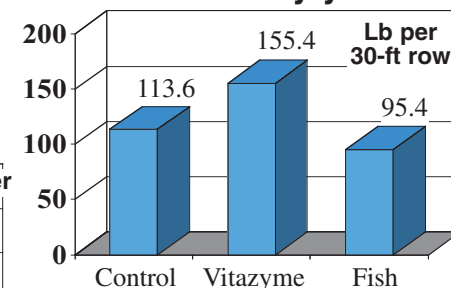
Plants per 30-ft row



Weight per plant



Total celery yield



- **Total yield increase: 37%**
- **Weight/plant increase: 11%**
- **Income increase (vs. control): \$4,756.76/acre**

Cucumbers

Location: Aranguuez, Trinidad, West Indies

Variety: Atlantis

Planting date: February 15, 2000

Harvest date: March 21, 2000

Experimental design: Two plots were prepared for this study, each 100 x 20 feet, one untreated and the other Vitazyme treated.

1. Control

2. Vitazyme

Fertility treatments: unknown

Vitazyme treatments: Three treatments were applied, at 30 ml/gallon (1%, or 3.22 liters/ha), spaced 2 to 3 weeks apart.

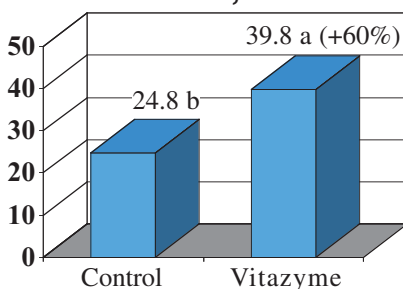
Growth results: Two sets of leaves were chosen from each treatment, one set from 10 randomly selected plants which was the fourth leaf from the root, and another set which was the fifth leaf from the growing point. Then the area of each leaf was calculated.

Yield results: Cucumbers were harvested and tabulated from the respective plots on March 21, 23, 25, 27, 29, and 31, and April 2 and 4, 2000. **The treated cucumbers ...**

- (a) ... were more uniform in size than the untreated ones.
- (b) ... had less rejected fruit than the untreated plot.

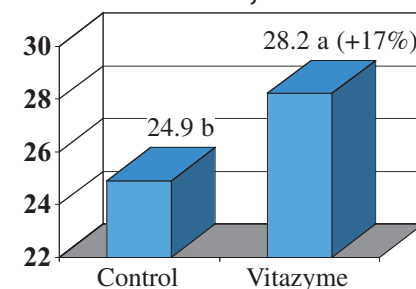
Conclusions: Vitazyme produced much greater leaf size (60%) in this cucumber test than did the control treatment. This larger leaf size translated into greater yield later during this study, when Vitazyme displayed a 52% increase of higher quality fruit.

Area of fourth leaf from bottom, in²



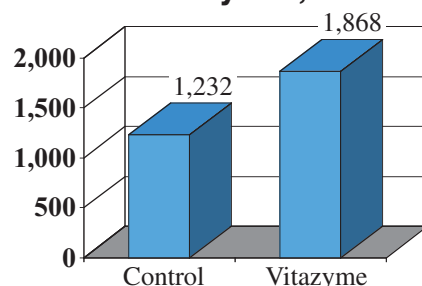
*Significantly greater than the control at P=0.05 (Tukey's Test).

Area of fifth leaf from bottom, in²



*Significantly greater than the control at P=0.07 (Tukey's Test).

Fruit yield, lb



- **Yield increase: 52%**

Field Beans

Location: Twin Falls, Idaho

Variety: Small red beans

Soil type: good quality, with 25% low-productivity "white" soils; Portneuf silt loam

Planting date: June 19, 2000

Experimental design: A field of small red beans was treated conventionally except for a strip through the center of the field that received Vitazyme.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: The seeds were treated with a 5% Vitazyme solution before planting, plus 13 oz/acre sprayed on the soil after planting, and another 13 oz/acre sprayed on the leaves and soil at early bloom.

Harvest date: unknown

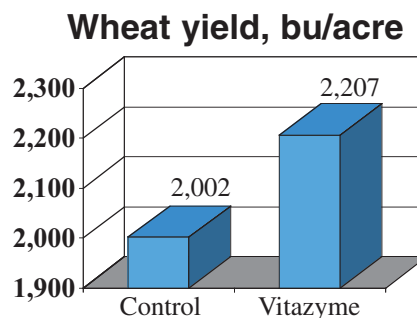
Yield results: Two 2.5-acre strips in the Vitazyme strip were harvested and weighed, and compared to the untreated control yield, from which 18 acres was combined and weighed.

Income results: A value of \$0.18/lb is expected.

Conclusions: Vitazyme applied on the seeds of these red beans before planting, as well as twice on the soil and leaves during the growing season, increased bean yield by 10% and increased income by \$36.90/acre. This improvement amounted to a return on investment of 3.7:1.

• **Bean yield increase: 10%**

• **Income increase: \$36.90/acre**



Field Beans (Organic)

Location: Twin Falls, Idaho

Variety: Great Northern beans

Planting date: June 15, 2000

Soil type and conditions: light to white in color, and a moderate slope; 40% are white, which are areas of poor yield; Portneuf silt loam

Previous crop: field beans

Harvest date: September 25, 2000

Experimental design: A fairly uniform 20-acre field was divided into control (8 acres) and Vitazyme treated (12 acres) areas. Soils in both areas were relatively equivalent, with 40% white soils in each area.

1. Control

2. Vitazyme

Fertilization: beef manure compost with crop residues

Irrigation: furrow irrigation of limited quantity

Vitazyme treatment: 5% Vitazyme solution on the seeds before planting; 12 oz/acre sprayed on the plants and soil pre-bloom

Yield results:

Crop parameter	Control	Vitazyme
Final stand	Very poor on white soils due to poor germination	Good and even on white soils due to good germination
Bean quality	Good quality	Good-Plus quality
Standability	Average on good soils Poor on white soils	Better on good soils Much better on white soils
Windrow size	Average, but light on white soils	More full on all soils
Ease of harvest	Some beans lost on white soils	Hardly any beans lost on white soils
Yield	Average for organic production	Above average for organic production
Crop value*		+ 304.5 lb/acre above the control + \$106.58/acre

* A value of \$0.35/lb was received. Actual yield values for the two treatments have been kept confidential by the grower.

Conclusions: Two applications of Vitazyme to this Great Northern field bean crop produced a sizeable yield increase of higher quality beans, that translated into \$106.58/acre more income. Such an increase produced a 21:1 income increase: product cost ratio. The yield improvement was due in part to better germination and growth on the poor "white" soil of this field, but also due to improved growth throughout the field on all soils.

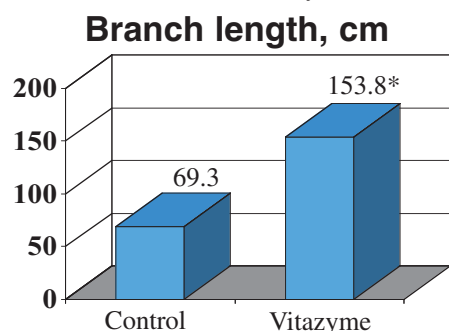
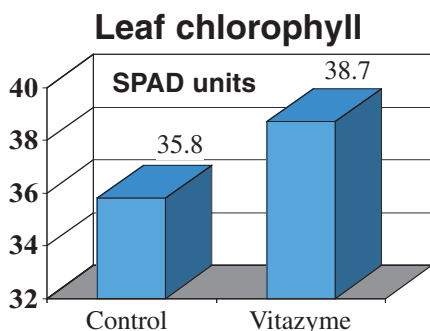
• **Bean yield increase: 304.5 lb/acre**

• **Income increase: \$106.58/acre**

VITAZYME WORKS WELL FOR BOTH CONVENTIONAL AND ORGANIC SYSTEMS OF PRODUCTION.

Farmers interested in helping to rejuvenate the biological activity of soils treated heavily with chemicals should note the excellent responses of broccoli, lettuce, and celery to Vitazyme at Duda Farms, Ventura, California.

Grapes – New planting



*Significantly greater than the control at P=0.11 (Bartlett's Test).

Conclusions: Application of Vitazyme to these newly planted grape plants produced a remarkable improvement in their development, as evaluated by the total length of new growth and the number of branches. Vitazyme stimulated the production of new growing points on the vines, and increased their growth rate dramatically. This growth rate increase was confirmed by the increase in leaf chlorophyll content, which would enhance the rate of CO₂ fixation and improve overall rhizosphere activity. Fulvic acids were also added to the solution, so this test did not absolutely isolate Vitazyme effects. However, past experience has shown that Vitazyme together with other organic amendments will elicit a synergism, which is likely to have occurred in this study.

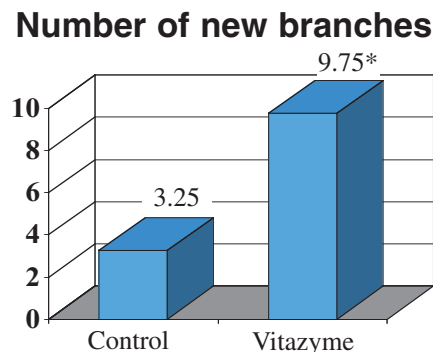
Location: Kerman, California
Variety: Thompson seedless
Planting date: new canes the winter of 1999/2000
Experimental design: A row of eight newly planted grape plants, each about equal in size and vitality, were selected for the study. Every other grape plant in the row received two applications of solution (see below) at one gallon per vine each time for the four treated plants. **1. Control 2. Vitazyme**

Fertility treatments: 0.15 oz of fulvic acid per gallon of water, along with Vitazyme, about July 15 and August 10; one gallon per vine
Vitazyme treatments: 0.15 oz per gallon of water; about July 15 and August 10, along with the fulvic acid; one gallon per vine
Chlorophyll levels: On August 31, the leaves of each treatment were analyzed for chlorophyll using a Minolta SPAD meter. About 10 leaves having the same relative maturity were analyzed from each treatment.

Growth results: On August 31, 2000, measurements were taken of each new branch sprouted on the new plants. The number of



In this California trial with a new grape planting, chlorophyll levels, branch length, and branch number were all significantly stimulated.



*Significantly greater than the control at P=0.10 (Tukey's Test).

Grapes (Raisins)



The overhead trellised grapes of this Boghosian Brothers test proved that Vitazyme could boost yields substantially while increasing Brix.

Location: Fowler, California **Variety:** Thompson seedless **Vine age:** mature
Soil type: sandy loam **Trellis system:** overhead
Spacing: 12 ft between rows, 7 ft in the rows
Experimental design: A 47-acre grape vineyard was divided into two portions: control (9 acres) and Vitazyme treated (38 acres).

1. Control 2. Vitazyme

Fertilization: 40 lb N/acre (as UN-32) through the drip system early in the season, and 20 lb N/acre (as Ca-NH₄NO₃) and soluble K through the drip system at berry softening

Insect larvae control: Kryocide
Fungal control: sulfur every 10 days for powdery mildew control+another fungicide

Irrigation: drip system, at 12 gal/plant three times weekly
Vitazyme treatment: (1) 13 oz/acre foliar 10 days after blossom; (2) 13 oz/acre foliar at berry softening

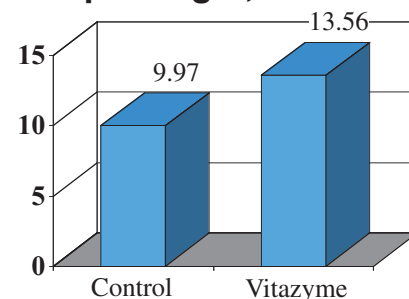
Yield results: The grapes were hand-picked from the overhead trellis and delivered to the Boghosian Brothers raisin processing plant. There they were heat dried for golden raisins.

Income results: The value of the fresh grapes is \$80/ton.

Quality results: Quality of the grapes is related to density, or amount of solids in the fruit. Weights of control and Vitazyme bins were weighed and averaged.

Conclusions: Vitazyme applied twice to the leaves of those overhead trellised grapes produced an excellent 36% yield increase, amounting to \$287.20/acre more income. The Vitazyme treated grapes also contained a higher concentration of sugars and minerals (i.e., more dry matter), which would translate to a higher raisin yield after drydown.

Grape weight, tons/acre



	Control	Vitazyme	Change
	average lb/bin		
Bin weight	1,069	1,101.6	(+) 32.6 (+3%)

	Control	Vitazyme	Change
	\$/acre		
Gross income	797.60	1,084.80	(+) 287.20

- Grape yield increase: 36%
- Grape density increase: 3%
- Income increase: \$287.20/acre

Indian Hawthorne

Greenhouse: Lee Tree Farm and Nursery

Variety: Clara

Planting date: sometime during 1999

Experimental design: Sixty hawthorn shrubs in a greenhouse, approximately equal in size, were selected for the study. Half were treated with Vitazyme and half were left untreated. **1. Control**

2. Vitazyme

Vitazyme treatments: 1% Vitazyme at 2 cups per pot on September 20, 1999; 1% Vitazyme at 100ml per pot on January 20, 2000, and on March 24, 2000.

Chlorophyll levels: On July 11, 2000, the leaves of each treatment were analyzed for chlorophyll using a Minolta SPAD meter. One average leaf from each of 20 plants for each treatment was sampled and analyzed.

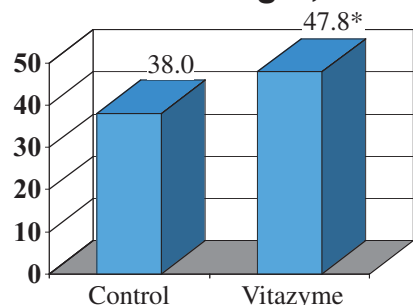
Growth results: On July 11 the length of the longest branch of each plant was measured

Conclusions: These Indian Hawthorne shrubs responded very well to Vitazyme in spite of the fact that the applications were made rather sporadically and infrequently. Ideally the treatments should have been made 30 to 60 days apart. Even so the results of increased growth, plant size, greenness of the leaves, and health were easily visible, and the statistical analysis showed a highly significant improvement in branch length for the treated plants.



Vitazyme on Indian Hawthorne boosted branch length significantly over a 10 month period. Note also especially the leaf area of the two treatments.

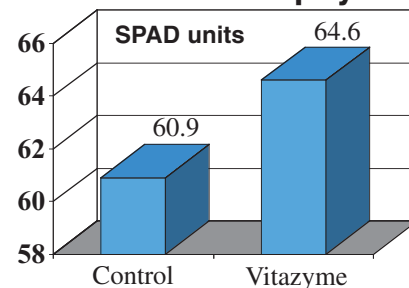
Branch length, cm



*Significantly greater than the control at P=0.001 (Tukey's Test).

	Control	Vitazyme	Change
Branch length	38.0 b	47.8 a	(+) 9.8

Leaf chlorophyll

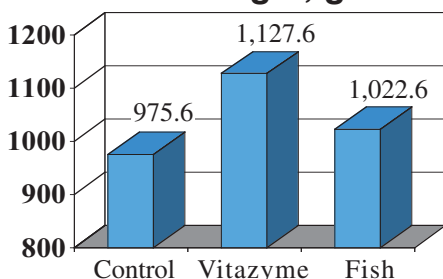


• **Increase in branch length: 26%**

• **Chlorophyll increase: 3.7 SPAD units**

Lettuce

Head weight, grams



Location: Maxwell Ranch, (Duda Farms), Ventura County, CA

Variety: Romaine

Planting date: January 12, 2000 (seeds)

Planting rate: one seed every 10 inches with two rows per bed, on 40-inch spaced beds

Experimental design: A 20-foot section of row of a broccoli field was treated with Vitazyme three times during the growing season. Near that was a 20-foot section of Vitazyme plus liquid fish. Untreated plants alongside the treated rows served as controls. **1. Control**

2. Vitazyme

3. Vitazyme + fish

Fertilizer treatments: proprietary

Fish treatment: 10 gal/acre of actual fish, diluted 10:1, applied three times with Vitazyme (see below)

Vitazyme application:

Vitazyme was applied three times to the leaves and soil at 13 oz/acre: January 12 (the same day as planting), February 29 (46 days after planting), and March 23 (69 days after planting).

Pesticide treatments: proprietary

Harvest date: April 19 (92 days after planting).

Results: Five representative heads were cut for weighing in each treated and control row. The heads were not trimmed as usually done during harvest.

Conclusions: Vitazyme alone increased yield over the control by 16%, which was a bigger increase than the fish plus Vitazyme. The increased income from the three Vitazyme applications was \$3,150.60/acre, a very large return from a very small investment.

Income

Treatment	Income, \$/acre*	Change
Control	20,221.50	—
Vitazyme	23,372.10	(+) 3,150.60
Vitazyme + Fish	21,195.90	(+) 974.40

* Based on the average value of Romaine lettuce as received by the farmer in early May, 2000: about \$0.30/lb.

Total yield

Treatment	Yield, lb/acre*	Change
Control	67,405	—
Vitazyme	77,907	10,502
Vitazyme + Fish	70,653	3,248

* Harvested area per treatment: 0.00015942



Lettuce treated with Vitazyme at Ventura, California, responded very well, increasing in yield by 16% over the control. Heads were larger and denser, and the income generated was much greater than the control.

• **Head weight increase: 16%**

• **Income increase: \$3,150.60/acre**

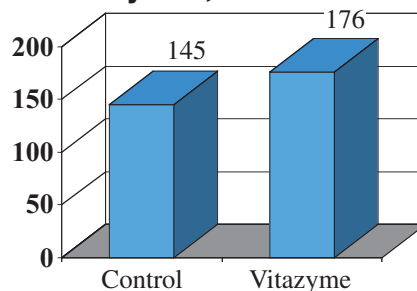
Millet



A millet grower at Meridian, California, performed a Vitazyme study using the following program. One field (the control) did not receive Vitazyme, while a nearby one did.

1. Preplant: Liquid compost (2 gal/acre) + UAN 32
2. Foliar at six leaves: 13 oz/acre Vitazyme + 1 qt/acre Vigorator + 1 pt/acre PHOS
3. Foliar at early boot: 13 oz/acre Vitazyme + 1 qt/acre Vigorator + sulfur
4. Foliar at kernel coloring: ViFinisher + Calcium

Millet yield, boxes/acre



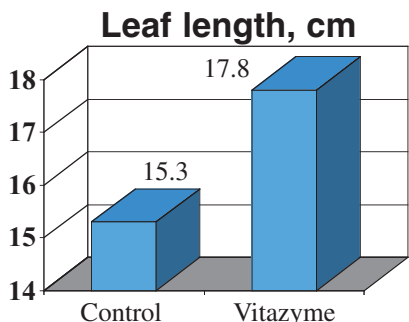
This millet field, grown for bird seed, responded to Vitazyme application with a most excellent yield enhancement of 21%, raising income \$775/acre.

Income results: Millet sells for about \$25.00/box.
Conclusions: Returns from Vitazyme on this millet crop were excellent, about 24:1 for crop increase vs. product cost.

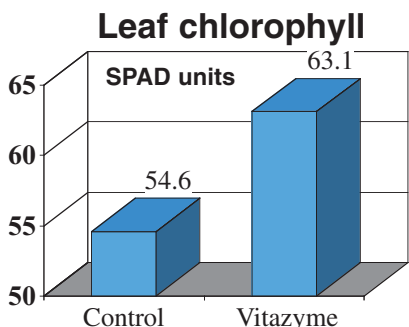
• **Yield increase: 21%**

• **Income increase: \$775.00/acre**

Mondo Grass



*Significantly greater than the control at P=0.0001 (Tukey's Test).



Greenhouse: Lee Tree Farm and Nursery

Location: Grand Saline, Texas

Planting date: sometime during 1999

Experimental design: In a greenhouse where many flats of mondo grass were planted, five flats of 20 four-inch pots each were treated with Vitazyme; others alongside served as controls.

1. **Control**
2. **Vitazyme**

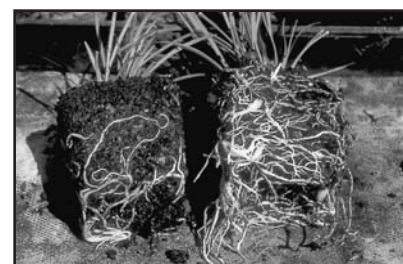
Fertility treatments: unknown

Vitazyme treatments: 0.5% Vitazyme on the leaves and soil on September 20, 1999; 1% Vitazyme on January 20, 2000; 1% Vitazyme on March 24, 2000

Chlorophyll levels: On July 11, 2000, the leaves of each treatment were analyzed for chlorophyll using a Minolta SPAD meter. One average leaf from each of several pots of an average flat from the Vitazyme and control treatments were analyzed, and the values were averaged for each treatment.

Growth results: On July 11, 2000, the longest leaf from each of the 20 pots of the treated and control treatments was measured, and the results were averaged.

Conclusions: Vitazyme greatly increased the leaf chlorophyll content of these Mondo grass plants, resulting in increased overall leaf and root growth. This growth increase was easily visible to the naked eye, and was measured as a highly significant increase (P = 0.0001) in leaf length. The treated plants were more growthy, darker green, and attractive for sale.



Vitazyme applied to Mondo grass in east Texas stimulated considerably more root and leaf growth by boosting rhizosphere activity.

Navy Beans (Organic)

Location: Olivia, Minnesota

Planting date: June 25, 2000

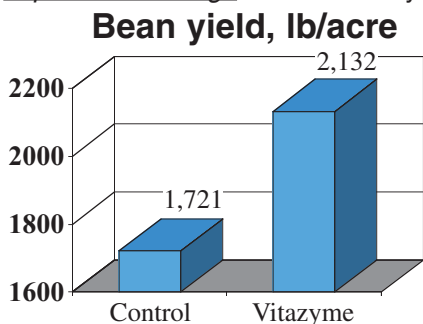
Experimental design: A field of Navy beans was treated with Vitazyme except for a strip that received none.

Variety: Schooner

Row spacing: 30 inches

Soil type: Clarion-Nicollet-Webster silty clay loam

Harvest date: September 21, 2000



1. **Control**
2. **Vitazyme**

Fertilization: fish emulsion and molasses on the seeds at planting, and again on the leaves and soil at early bloom (see below)

Vitazyme treatment: At planting, Vitazyme (13 oz/acre) plus molasses (0.5 gal/acre) and liquid fish (2 gal/acre) were applied. At early bloom (late July) Vitazyme was again applied at 13 oz/acre, along with 0.5 gal/acre liquid fish, on the leaves and soil. This late application was made to both the control and Vitazyme treatments.

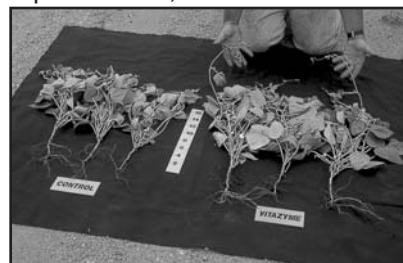
Weed control: cultivation, plus hand weeding

Yield results: Yield checks were made in the check strip, and on either side in the treated areas.

Income results: A value of \$0.30/lb for organically grown Navy beans was expected.

Conclusions: The yield and income increases may have been greater had the control strip not received the benefit of the second Vitazyme application. A dry midsummer reduced yield potential.

• **Income increase: \$123.30/acre**



Very noticeable here is the much greater leaf area of these Vitazyme treated organic Navy beans.

• **Bean yield increase: 24%**

Nursery Crops – Fruit and Ornamental Trees and Shrubs

Nursery: Lang Nurseries

Location: Dansville, New York

Mr. Lang grows a number of different species and varieties of fruit and ornamental tree crops. He sells about 300,000 trees per year. He has used Vitazyme for foliar and dipping applications for some time, and has noted excellent results as revealed below.

Sugar Maples

Mr. Lang purchased 300 three to five-year-old branched, bare-root sugar maple trees the spring of 2000. These 1.5-inch caliper trees are notoriously hard to transplant, and **expected losses are 15 to 20%**. These trees were dipped in a 1% Vitazyme solution and dried, and stored for several days before planting. **At the end of the 2000 growing season there were no tree losses after Vitazyme treatment.**

• **Normal tree loss: 15 to 20%** • **Tree loss with Vitazyme: 0%**

Budded Crops: Apples, Plums, Ornamentals

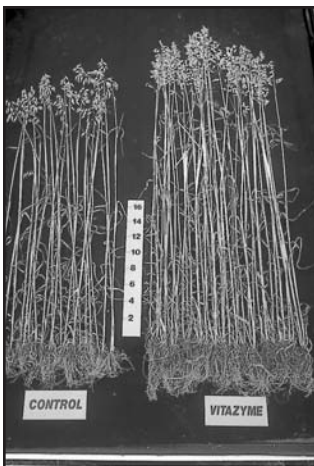
Responses of budded crops were exceptional. These trees are planted and budded in April, and foliar sprayed with Rapid Gro and Vitazyme (0.5 oz/acre) beginning in mid-June. Ten applications were made during the summer and early fall.

Future intentions: Next year Mr. Lang will dip the budded stock as well as the ornamentals in Vitazyme, and will continue to foliar feed as in 2000. **He will give a gallon of Vitazyme in 2001 to each of his customers in order that the vigor and survival of the trees will be insured.**



These young apple trees at Lang Nurseries have received several low-dosage foliar applications of Vitazyme.

Oats



Oats grown in northern Maine gave a 38% yield increase with Vitazyme applied once with the herbicide, at 6-inches height.

Location: Mars Hill, Maine

Planting date: May 29, 2000

Variety: a Manix variety

Previous crop: potatoes

Experimental design: An oats field was divided into two parts, one treated with Vitazyme and the other part left untreated.

1. **Control**

2. **Vitazyme**

Fertilization: 80 to 90 lb/acre of NH_4NO_3

Vitazyme treatment: 13 oz/acre over the leaves and soil at about 6 inches height, along with the herbicide

Harvest date: August 27, 2000

Yield results: At harvest, the field was trimmed on the sides to leave an area on both sides of the treatment boundary which was very similar in yield potential. Five combine widths of the same total length were harvested from each treatment.

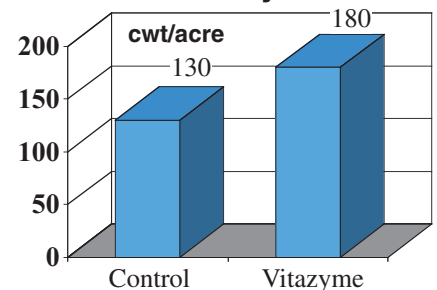
The total yield for this entire harvested length for both treatments was then tallied. Per acre yields were not possible to obtain due to an inability to measure the different lengths of the paired harvested swaths.

Conclusions: Vitazyme treatment at the 6-inch height for this oats crop produced a very good yield increase of 38%. Since oats is oftentimes used as a rotation crop with potatoes on this farm, and is low in monetary return, this yield increase is very meaningful in terms of added income during the rotation year.

• **Grain yield increase: 38%**

Soil type: gravelly loam

Grain yield



Oats (Silage)

Location: Twin Falls, Idaho

Variety: Otanna

Planting date: March 27, 2000

Soil type: light to white, the white soils on about 40% of the area and low in productivity; Portneuf silt loam

Experimental design: A field of oats was divided into two portions, one part receiving Vitazyme and the other portion left untreated.

1. **Control**

2. **Vitazyme**

Fertilization: crop residues and regrowth as green manure, and 1 qt/acre of Soil Tec humic acid

Vitazyme application: on the seeds before planting with a 5% solution, and on the leaves and soil at the early boot stage using 13 oz/acre

Harvest date: June 7, 2000, at the soft dough stage

Yield results: The oats was harvested for silage at the soft dough stage.

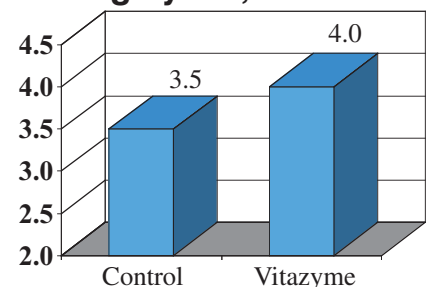
Income results: A value of \$60.00/ton dry matter is estimated for organic oats silage.

Conclusions: This Vitazyme test with oats silage proved that total forage yield can be increased significantly on soils which are in part very poor. Along with a 14% yield increase, the income increased by \$30/acre, giving a very significant return over product costs.

• **Silage yield increase: 14%**

• **Income increase: \$30/acre**

Silage yield, tons/acre



Onions

Location: Fulton, New York

Planting date: May 5, 2000

Experimental design: Four small onion fields in muck were selected for this study. Three of the fields received Vitazyme and one (the control) was left untreated.

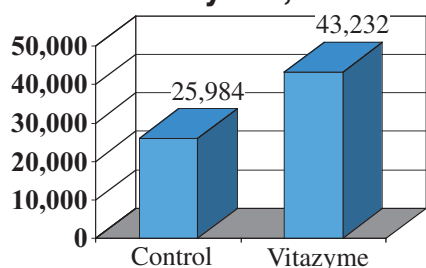
Variety: New York Early

Soil type: muck

In-row spacing: 9 plants/foot (seeded)

Row spacing: 15.5 inches between double rows

Onion yield, lb/acre



1. Control

2. Vitazyme

Fertility treatments: 100 lb/acre N, 80 lb/acre P₂O₅, 120 lb/acre K₂O, plus micronutrients pre-plant; 34 lb/acre N topdressed during growth

Vitazyme treatment: 13 oz/acre in the furrow at planting, along with a fungicide and insecticide

Harvest date: September 8, 2000

Income results: The onion value is about \$4.00/50 lb bag, or \$0.08/lb.

Conclusions and observations: During the



Vitazyme on onions near Fulton, New York, gave much better top growth and row fill to the treated left side.

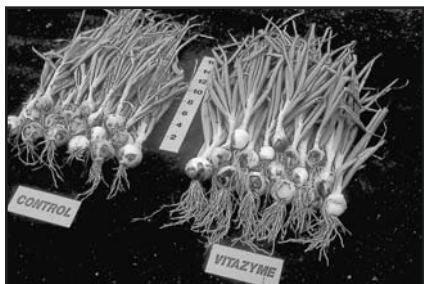
growing season in other fields it was noted that Vitazyme, when applied with other fertility products at planting in the seed row, improved emergence and the resulting plant population. These fields, however, averaged 746.56 cwt/acre, somewhat less than when Vitazyme was used alone.

Vitazyme in this onion test, used one time at planting on the seeds, produced an average yield increase that was 66% above the control fields. This increase translated into a very large income increase of nearly \$1,380/acre.

• **Onion yield increase: 66%**

• **Income increase: \$1,379.84/acre**

Onions – A testimonial



Treated onions grown near Elba, New York, remained alive and upright longer, and yielded better.

Farm: Shuknecht and Sons Farm

Location: Elba, New York

Fertility program: a balanced program with regular use of cover sprays and foliar sprays

Vitazyme application: (1) 13 oz/acre in the furrow at planting, with starter fertilizer and fungicide; (2) 13 oz/acre over the leaves and soil at the 3 to 4-leaf stage; (3) 13 oz/acre over the leaves and soil at bulb initiation.

Time of Vitazyme use: 5 years

Troy: **“We’re very satisfied with Vitazyme. We farm mostly mineral soils, and they are easier to work and have better drainage than when we first started the program. We have had good crops in two difficult years when others didn’t. We grow mostly jumbo-sized onions and Vitazyme really helps them obtain that size. It’s a big benefit.”**

Parsley



Sprayed on the soil surface, Vitazyme greatly promoted early rhizosphere development and emergence.

Location: Vital Earth Research Center, Gladewater, Texas

Planting date: October 31, 2000

Variety: Extra triple curled (Ferry-Morse)

Pot size: 5-gallon (10.5 inch top diameter)

Potting soil: fine sandy loam soil with medium pine bark and some compost

Experimental design: Four pots were filled with potting soil, and about 140 seeds were planted in each pot and covered. Two pots were treated with Vitazyme and two were left untreated.

1. Control

2. Vitazyme

Fertility treatments: Some “Colorscape”

granular fertilizer was mixed with the soil of each pot. Analysis: 19-13-6% N-P₂O₅-K₂O plus Ca, Mg, S, B,Co, Cu, Fe, Mn, Mo, and Zn.

Vitazyme treatment: 100 ml of a 10% Vitazyme solution applied after planting

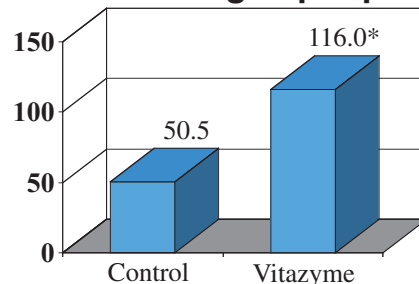
Emergence date: On November 13 the first seedlings from the Vitazyme pots were seen to emerge. The first seedlings from the control pots emerged on November 16.

Parsley growth parameters: On November 28 (29 days after planting) three growth parameters were evaluated: plant height, plant number emerged, and growth stage.

Conclusions: Vitazyme applied to these parsley seeds in pots reduced the time to emergence by three days, increased plant

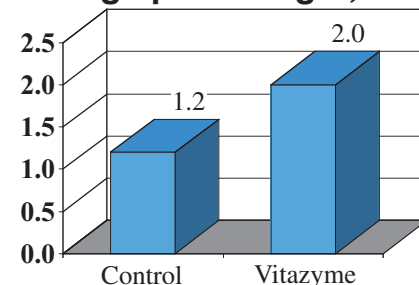
	Control	Vitazyme	Change
Days to emergence	17	14	(-) 3

Plants emerged per pot



*Significantly greater than the control at P=0.06 (Tukey’s Test).

Average plant height, cm*



*Average of the plants over the two pots for each treatment.

(Continued on the next page)

Leaf stage	Control*	Vitazyme*
	% of plants	
Primary leaves	90	30
Secondary leaves	10	70

* Leaf stages were estimated.

height at 29 days after planting by 67%, increased plants emerged at 29 days by 130%, and hastened plant maturity markedly. This biostimulant should be able to stimulate germination and early plant growth for many seeded plants in greenhouse and seedbed situations.

• **Plant emergence increase: 130%**

• **Plant height increase: 67%**

• **Reduction in time to emergence: 3 days**

• **Improvement in plant maturity: 70% vs. 10% secondary leaves**

Peppers – Caribbean Chemical International

Location: Aranguez, Trinidad, West Indies Variety: King Henry Sweet Pepper Transplanting date: August 12, 1999
Harvest date: January 25, February 7, 12, 16, and 24, and March 8 and 20, 2000 Fertility treatments: unknown
Experimental design: A plot of a pepper field was treated with Vitazyme, and an adjoining portion of the field served as a control. The treated plot had 245 pepper plants in an area 10x70 feet.

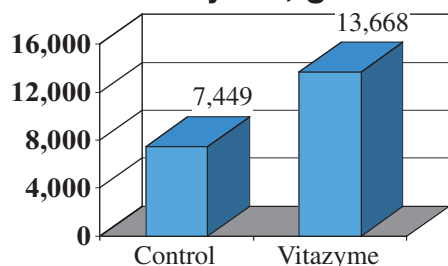
1. Control

2. Vitazyme

Vitazyme treatments: Vitazyme was applied three times at 30 ml/gallon (about 1%, or 3.29 liters/ha) each time on December 16 and December 29, 2000, and January 16, 2000.

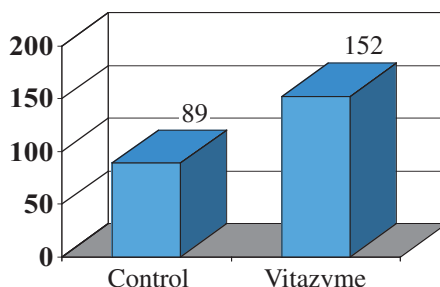
Yield results: Both pepper number and total weight were tabulated over the harvest period for 10 randomly selected plants for the treated and untreated plots.

Total yield, grams



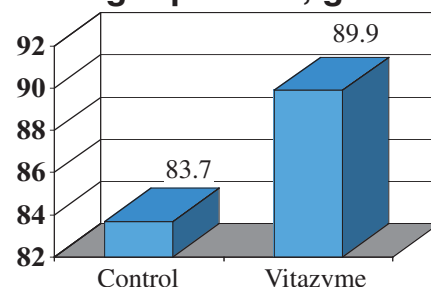
• **Yield increase: 83%**

Fruit Number



• **Fruit number increase: 71%**

Weight per fruit, grams



• **Weight per fruit increase: 7%**

Pistachios – A testimonial

Researcher: Al Simons

Location: Newberry Springs, California

Tree age: 10 years

Soil type: light blow sand with high levels of boron in the subsoil

All areas of a 10-acre pistachio grove were treated with Vitazyme: (a) 13 oz/acre on the soil before bud initiation; (b) 13 oz/acre at bud break; (c) 13 oz/acre at early sizing; (d) 13 oz/acre at nut gel to white

Yield results: **The crop produced the largest size of nuts in the Newberry Springs Pistachio Association, and also the largest crop harvest in the Newberry Springs Pistachio Association.**

Income results: Al Simons: "I estimate that this crop returned 250 times the cost of the Vitazyme. This is based on the data given by the grower when he reordered 4 gallons of Vitazyme for the year 2001."

Plums (for Prunes)

Farm: K and D Farms

Location: Los Banos, California

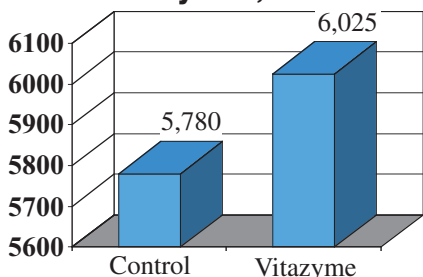
Variety: French prunes

Experimental design: A plum orchard was divided into two parts: Vitazyme treated (55 acres) and untreated (25 acres). The treated portion has received Vitazyme in previous years.

1. Control

2. Vitazyme

Plum yield, lb/acre



• **Yield increase: 4%**

Fertilization: KNIT (14-0-45% N-P₂O₅-K₂O) KNO₃ and KOH (0-30-0) or K₂SO₄ (0-0-50-18[S]) were applied later in the growing season to increase plum size. Potassium also as KTS (K-thiosulfate) was applied foliar at 5 gal/acre several times during fruit filling. Total fertilizers applied: Ca + 32% N (90 lb/acre N); BioK + KTS (40 lb/acre K₂O); foliar K (50 lb/acre K₂O). Both treatments were fertilized the same.

Vitazyme application: 13 oz/acre at 5/8 full fruit size during one of the foliar KTS applications

Harvest date: Vitazyme treatment – August 20, 2000; Control – August 24, 2000.

Plum size: The control and treated plums showed little size difference. Vitazyme gave size 68 fruit vs. 70 for the control, but the treated plums were harvested four days earlier.

Income increase: The value of these plums is \$0.425/lb.

Conclusion: Vitazyme applied only one time to this plum farmer's grove netted a 4% yield increase, which translated to an income increase of \$104.13/acre, giving a highly profitable return on investment of about 12:1.

• **Income increase: \$104.13/acre**

Potatoes

Location: Blaine, Maine

Row spacing: 36 inches

Experimental design: A potato field was divided into two parts, one treated with Vitazyme and the other left untreated.

Planting date: May 29, 2000

Soil type: gravelly loam

Variety: Russet Burbank, for french fries

Previous crop: oats



Root, tuber, and leaf growth were all benefited by Vitazyme in this northern Maine potato trial. More chlorophyll meant more carbon fixation and yield.

1. Control

2. Vitazyme

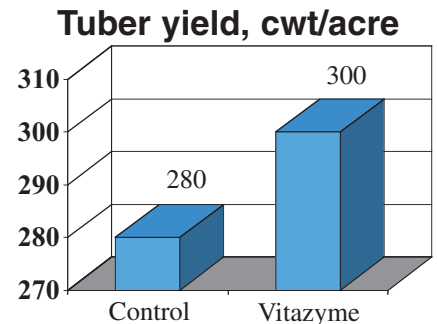
Fertilization: The soil cation balancing system was utilized. Based on a soil test, the following fertilizers were applied: $(\text{NH}_4)_2\text{SO}_4$ – 250 lb/acre; NH_4NO_3 – 410 lb/acre; sulfur – 20 lb/acre; K_2SO_4 – 400 lb/acre; borax(14% B) – 15 lb/acre; $\text{ZnSO}_4(36\%\text{Zn})$ – 35 lb/acre.

Vitazyme application: two 13 oz/acre applications

Top killing date: September 26, 2000

Conclusions: Vitazyme produced a sizable yield increase in this Russet Burbank potato trial.

• Tuber yield increase: 7%



Tim: “The Vitazyme treated tubers look very good. I would like to use it on a larger test. It is hard to see difference on a small test. The potatoes on the Vitazyme had fewer small tubers, which made the crop look much bigger going into storage.”

Dennis: “This was the best field on the farm. It had the best size and the best yield.”

Potatoes

Location: Nampa, Idaho

Soil type: silt loam

Planting date: May 29, 1999

Experimental design: A garden area of about 12 x 40 feet was prepared and planted in raised rows. Each treatment covered half of the prepared area.

Variety: Yukon Gold

Irrigation: sprinkler irrigated periodically

Harvest date: September 15, 1999

1. Control

2. Vitazyme

Fertilization: compost at a liberal rate

Vitazyme application: Seed pieces for the Vitazyme treatment were soaked overnight in a 5% Vitazyme solution. Vitazyme was also sprayed using a 2% solution on the leaves at about 5 inches height.

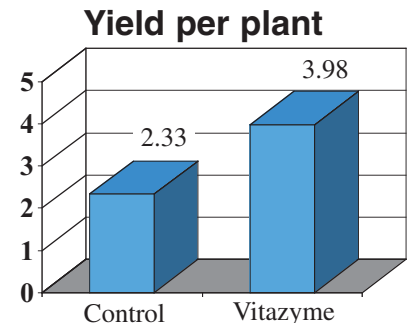
Growth observations: The Vitazyme treated plants grew faster from the beginning.

Observation	Control	Vitazyme
Time to first leaves	16 days	7 days
Leaf area	—	30 to 40% more
Leaf color	Light green	Deep green

Yield results: At maturity 13 hills from each treatment were harvested and weighed.

Conclusions: In this garden trial the Vitazyme treated potato plants performed much better than the untreated plants in terms of germination and early growth, total leaf area and plant size, leaf color, and tuber yield per plant (1.65 lb/plant more). In addition, after digging the Vitazyme

treated plants stayed green for a much longer time than did the control plants. This slower drydown was likely due to thicker cell walls and stronger vascular tissues from greater cellulose, hemicellulose, and lignin deposition.



• Yield increase: 71%

Potatoes – A testimonial

Location: Mars Hill, Maine
2000

Row spacing: 36 inches

Experimental design: A potato field was divided into two parts, one treated with Vitazyme and the other left untreated.

Variety: Kanona

Planting date: June 9,

Previous crop: fallow

Soil type: gravelly loam

1. Control

2. Vitazyme

Fertilizer amount: 1,100 lb/acre of 14-14-14-1.2% N-P₂O₅-K₂O-Mg, with N applied as 50% NH_4NO_3 and 50% $(\text{NH}_4)_2\text{SO}_4$

Vitazyme application: 13 oz/acre twice, the last half of the season after tuber initiation

Top kill date: September 12, 2000

Yield and quality comments:

Neil: “The Vitazyme treated Kanonas definitely had a more uniform size, had more roots, and were definitely better. At harvest the Vitazyme treated area had at least 2,500 cwt more per acre, probably more like 3,500 cwt.”

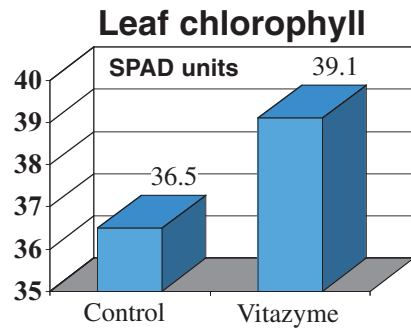
Alan Perry: “This field had the best yield on the farm. Tuber size was extremely uniform, which allowed them to be killed when more than 50% of them (as high as 70%) were chef size (3 to 4 inches in diameter). This helped increase total yield.”

Potatoes

Location: Wayland, New York
In-row spacing: 11.5 inches

Variety: Snowden
Row spacing: 36 inches

Planting date: May 27, 2000
Soil type: Bath gravelly loam



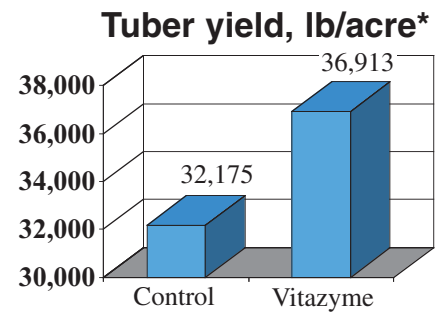
Previous crop: peas underseeded with clover
Experimental design: One portion of a potato field was treated with Vitazyme, on the seeds at planting, while the remainder was left untreated.

1. Control 2. Vitazyme

Fertilizer treatments: 1,000 lb/acre of 12-15-20% N-P₂O₅-K₂O with zinc

Insecticide treatment: Admire insecticide in the row with Vitazyme

Vitazyme application: 13 oz/acre Vitazyme in the furrow at planting



*Area harvested: control – 0.4028 acre; Vitazyme – 0.4069 acre.

• **Tuber yield increase: 15%**



The profound effect that Vitazyme can have on early growth is typified by this field, where a seed application on the left triggered an early growth advantage.

Chlorophyll results: On August 14, 20 representative leaves from each treatment were analyzed for chlorophyll with a Minolta SPAD meter, and the results were averaged.

Yield results: At harvest, four rows were harvested from each treatment and weighed.

Income results: The value of potatoes is about \$6.50/cwt.

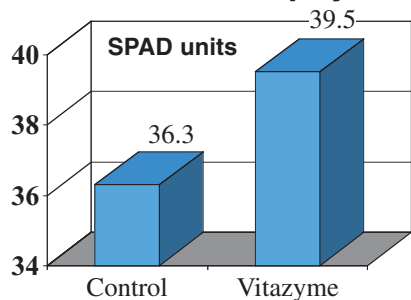
Conclusions: Vitazyme applied at 13 oz/acre only one time — at planting — to these Snowden potatoes produced more intensive growth throughout the season, as evidenced by greater chlorophyll and plant size at midseason compared to the control plants. Final tuber yields reflected this earlier growth response, with Vitazyme increasing the yield by 15% and upping the income by about \$308/acre.

• **Chlorophyll increase: 2.6 SPAD units**

• **Income increase: \$307.97/acre**

Potatoes – A testimonial

Leaf chlorophyll



Location: Mars Hill, Maine

Variety: Monona

Row spacing: 36 inches

Planting date: May 23, 2000

Soil type: gravelly loam

Previous crop: oats underseeded with clover

Top killing date: August 23, 2000

Experimental design: A potato field was divided into two parts, one treated with Vitazyme and the other left untreated.

1. Control 2. Vitazyme

Fertilization: The cation balancing system was used on this field. Fertilizers added were as follows: P₂O₅ – 75 lb/acre; NH₄NO₃ – 300 lb/acre; (NH₄)₂SO₄ –

250 lb/acre; K₂SO₄ – 400 lb/acre; borax – 15 lb/acre; ZnSO₄ – 35 lb/acre; sulfur – 25 lb/acre.

Vitazyme treatment: 13 oz/acre on July 6, with the fungicide (Manzate 75 DF)

Chlorophyll content: On August 18, 2000, chlorophyll readings were made with a Minolta SPAD meter using 20 randomly selected leaves from each treatment.

Yield and quality comments:

Frank: “Very interesting results. Vitazyme gave definitely better roots. The plants looked better all summer, with more even tuber size. I would like a larger test next year.”

The leaf chlorophyll level of the Vitazyme treatment was definitely superior during the growing season, showing that the carbon-fixing potential of the treated plants was greater than the control. This apparent advantage translated into a greater yield and uniformity of the treated tubers.

• **Leaf chlorophyll increase: 3.2 SPAD units**



Note the excellent fine root development of this Vitazyme treated potato plant, resulting from rhizosphere stimulation by the product's powerful agents.

Potatoes

Grower: Semtec

Variety: Nugget

Row spacing: alternate 32 in-36 in (average of 34 in)

Experimental design: A center pivot area of 120 acres, having similar soils throughout, was divided into four equal test areas of 30 acres each. These areas were all treated the same except three areas received an application of a different biostimulant product; one area served as a control.

Location: Center, Colorado

Soil type: loamy sand

Planting date: May 5, 2000

Harvest date: October 12 to 14, 2000

Data collection: Agro Engineering, Alamosa, Colorado

1. Control 2. Vitazyme 3. GroZyme 4. E-2001

Irrigation: total of about 18 inches, every third day at 0.7 inch per irrigation beginning at emergence near the end of May

Fertilization: 140 lb/acre N, no P or K plus some S applied through the irrigation system; 400 lb/acre FeSO₄, 200 lb/acre MnSO₄, 35 lb/acre ZnSO₄, 20 lb/acre CuSO₄, 0.5 ton/acre compost, plus 1 ton/acre gypsum, all mixed and applied before planting and incorporated into the soil

Vitazyme treatment: 13 oz/acre through the irrigation system at planting, with about 0.7 inch of water

Tuber size evaluation: On October 13, Agro Engineering performed a potato size evaluation of each treatment. The tubers were classified according to the ranges listed.

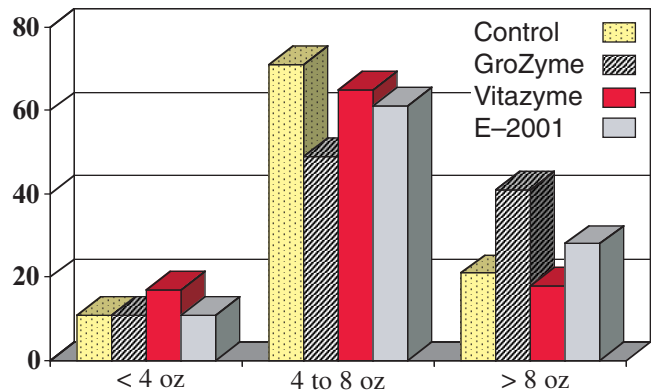
Treatment	Average tuber size oz/tuber
Control	5.5
GroZyme	5.9
Vitazyme	4.9
E-2001	5.3

The Vitazyme treated tubers tended to skin a bit more than the other treatments at harvest, a result of possibly a soil difference or, more likely, the fact that the plants were still actively growing at harvest time. Had their growth been allowed to continue there

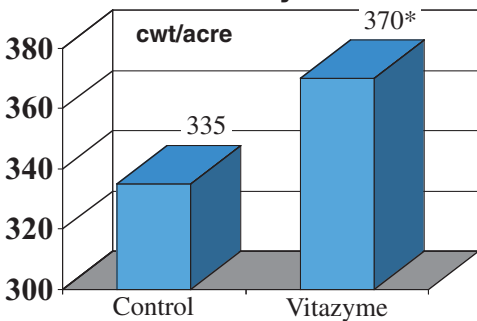
would have been more yield and larger tubers.

Based on field notes of the harvesters, the Vitazyme treated potatoes had **medium-sized tubers**, compared to smaller tubers for GroZyme and generally larger tubers for E-2001. However, the size evaluation indicated the largest number of large (> 8 oz) tubers for GroZyme.

Tuber size distribution, %



Tuber yield



*Significantly greater than the control at P=0.01.

Tuber yield: On October 13, Agro-Engineering evaluated the yield of each treatment using a yield monitor, which determined 2,610 data points for the control and 1,093 data points for the Vitazyme area. No data were supplied for the GroZyme and E-2000 areas, but Agro-Engineering



At Center, Colorado, a sampling of potato plants in July revealed much better rooting and top growth where Vitazyme had been applied only once to this crop: at plant emergence through the irrigation system.

stated that **Vitazyme yields were the highest of all three products tested.**

Income change: A price of \$3.00/cwt is estimated, considering 1999 prices of about \$4.00/cwt and 2000 prices of near \$2.00/cwt.

Conclusions: This large-scale potato trial in southern Colorado proved the effectiveness of Vitazyme in increasing total tuber yield, and in producing a medium sized tuber. At harvest the plants were still growing to some extent. Vitazyme outperformed the other two biostimulants in the study, and increased income by about \$105/acre for a single application applied through the irrigation system.

• **Tuber yield increase: 10%**

• **Income increase: \$105.00/acre**

Potatoes respond well to Vitazyme in 2000

Despite wet and cool conditions for much of the Northeast during 2000, potatoes responded excellently to Vitazyme. Yields increased from 7 to 20% in well-conducted tests in New York and Maine. A Colorado trial saw increases of 10%. In all cases the tubers were more uniform in size, had more fibrous roots, and had larger leaf and stem masses with Vitazyme than with the controls.

Potatoes

Location: Mars Hill, Maine

Variety: Frito Lay 1625

Planting date: Vitazyme area: May 28; control area: May 22.

Row spacing: 36 inches

Soil type: gravelly loam

Previous crop: oats

Experimental design: A field was treated with Vitazyme, while an adjoining field with equivalent soil types and crop history were left untreated.



Notice the better roots and tops with Vitazyme treatment. Tubers were more numerous (30%) and uniform for treated plants, and the yield was 9% higher.

1. Control 2. Vitazyme

Fertilizer treatments: 1,250 lb/acre of a 10-14-17% N-P₂O₅-K₂O fertilizer

Vitazyme treatment: 13 oz/acre on the seed pieces at planting with Admire insecticide; 13 oz/acre on the leaves and soil at blossom time.

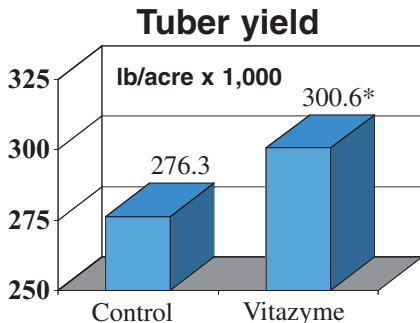
Insecticide application: Admire in the furrow at planting

Chlorophyll levels: On August 18, 20 representative leaves from each treatment were evaluated for chlorophyll using a Minolta SPAD meter.

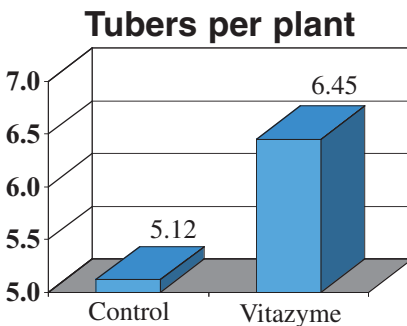
Yield results: Three 10-foot row lengths were dug from each field area. The plant number, total weight, and tuber numbers were recorded. Each plot for both treatments averaged 11 plants.

Income increase: The value of these chipping potatoes is estimated at \$11/cwt if sold in the late winter or early spring.

Conclusions: Vitazyme applied to these FL 1625 potatoes increased the leaf chlorophyll content, and thus photosynthesis, during the growing season. This increase was translated into more total tuber yield and a 30% greater number of tubers for the same number of plants, though the tuber size on average was less (by 14%). The 9% greater yield meant a \$267.30/acre income increase from the two applications, which is a very significant income improvement from the sound investment in Vitazyme.



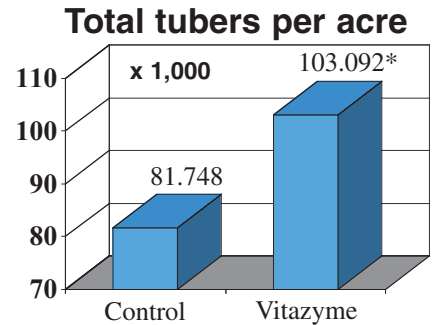
*Significantly greater than the control at P=0.20 (Tukey's Test).



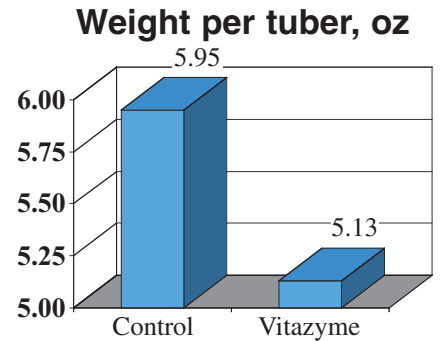
• **Chlorophyll increase: 1.3 SPAD units**

• **Income increase: \$267.30/acre**

• **Weight per tuber decrease: (-) 14%**



*Significantly greater than the control at P=0.09 (Tukey's Test).



These improvements in growth, yield, and income occurred in spite of the fact that the Vitazyme treated potatoes were planted six days later than the control potatoes.

• **Tuber yield increase: 9% (in spite of six days less growth)**

• **Tuber/plant increase: 30% (in spite of six days less growth)**

• **Tuber number increase: 26% (in spite of six days less growth)**

Roses

Nursery: Tate Rose Nursery

Location: Tyler, Texas

Budding date: grafted in May of 1999 on multiflora rose stock that had been planted December and January, 1998/1999

Varieties: Gold Glow (yellow) and Mr. Lincoln (red)

Experimental design: A rose field of 17 acres was selected for this test. In one strip having two rose varieties, an area was selected that received no Vitazyme.

Fertility treatments: minimal

1. Control

2. Vitazyme

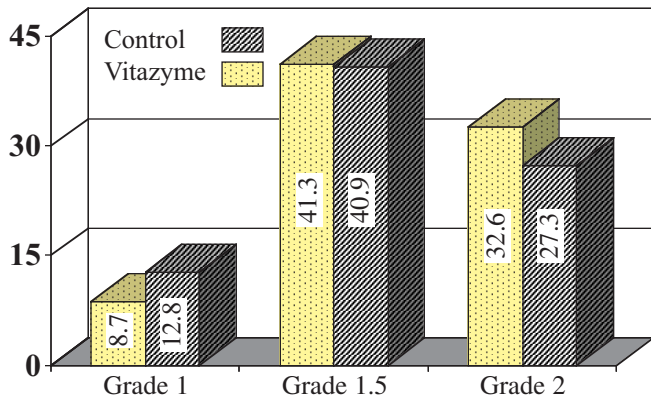
Vitazyme treatments: two 13 oz/acre spray applications on the leaves and soil, on May 3, 2000, and on June 3, 2000

Yellow Roses ["Gold Glow"]

Leaf chlorophyll: On July 11, 2000, chlorophyll measurements were taken with a Minolta SPAD meter, using 30 leaves from each treatment. Then three replicates of the number of buds and blossoms were counted for each treatment, using the same number of plants per ten feet of row for each replicate.

	Control	Vitazyme	Change
Leaf chlorophyll	45.9	49.9	(+) 4.0

Harvest grade, % of total

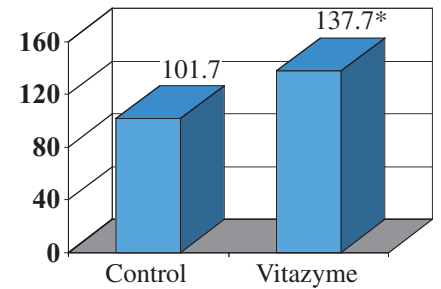


- **Increase in buds and blossoms: 35%**
- **Increase in Grade 1 plants: 47%**

Grades at harvest: On October 27, a few weeks before harvest, the rose grower evaluated the grades of the plants in three representative 50-foot strips for the treated and untreated areas.

Total income: Wholesale nursery prices for rose grades, in lots of 100 to 290 plants: #1-\$3.20; #1.5-\$2.70; #2-\$2.10 per plant.

Buds and Blossoms



*Significantly greater than the control at P=0.11 (Tukey's Test).

	Control	Vitazyme	Change
	\$/acre		
Grade 1	4,176.00	6,120.00	(+) 1,944.00
Grade 1.5	16,718.40	16,576.65	(-) 141.75
Grade 2	10,262.70	8,596.35	(-) 1,666.35
Total	31,157.10	31,293.00	(+) 135.90

Red Roses ["Mr. Lincoln"]

Leaf chlorophyll: On July 11, 2000, chlorophyll measurements were taken with a Minolta SPAD meter, using 30 leaves from each treatment. Then three replicates of the number of buds and blossoms were counted for each treatment, using the same number of plants per ten feet of row for each replicate.

	Control	Vitazyme	Change
	SPAD units		
Leaf chlorophyll	47.4	49.4	(+)2.0

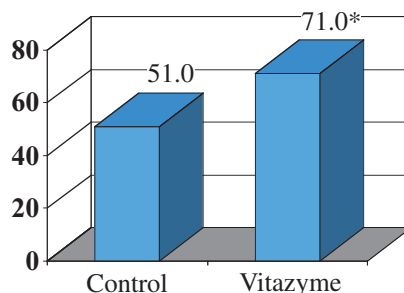
	Control	Vitazyme	Change
	\$/acre		
Grade 1	15,096.00	16,425.60	(+) 1,329.60
Grade 1.5	16,548	17,244.90	(+) 696.60
Grade 2	7,383.60	6,035.40	(-) 1,348.20
Total	39,027.90	39,705.90	(+) 678.00

Grades at harvest: On October 27, a few weeks before harvest, the rose grower evaluated the grades of the plants in three representative 50-foot strips for the treated and untreated areas.

Total income: Wholesale nursery prices for rose grades, in lots of 100 to 290 plants: #1-\$3.20; #1.5-\$2.70; #2-\$2.10 per plant.

- **Increase in buds and blossoms: 39%**
- **Increase in Grade 1 plants: 9%**

Buds and Blossoms

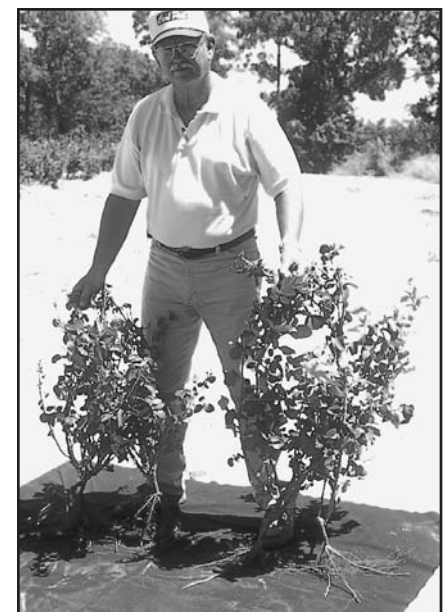
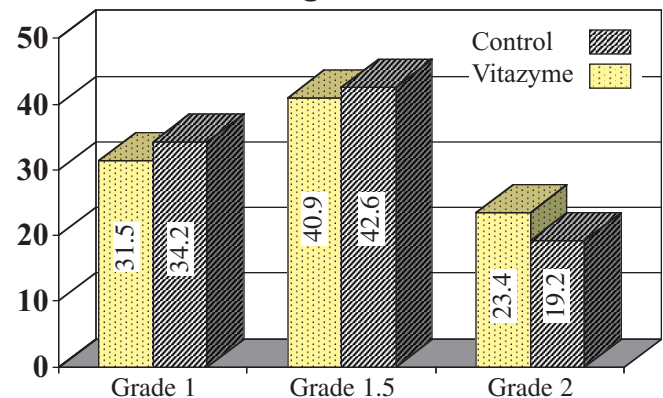


*Significantly greater than the control at P=0.18 (Tukey's Test).

Conclusions: On July 11, the treated plants were notably taller and more full in appearance in the field. The number of buds and blossoms were counted and showed a decided, significant increase over the untreated control plants. All of these factors should relate to better grades of the harvested stock at selling time, and higher returns to the grower.

Vitazyme applied twice during the final year of the growth cycle translated to stronger and larger stems at harvest time. Because of this improvement in grade at harvest, Vitazyme boosted total income somewhat for both varieties. If Vitazyme had been applied throughout the two-year growing cycle it is likely that the income response would have been much greater than revealed in this trial.

Harvest grade, % of total



Roses at a Tate Nursery production field near Tyler, Texas, produced plants somewhat bigger with Vitazyme, with more buds and blossoms during the growing season and better grades.

Roses

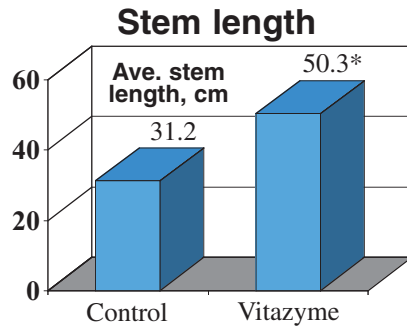
Grower: Tyler Rose Nursery

Location: Lindale, Texas

Variety: Marquis Bocella

Planting date: Cuttings were rooted in small pots about December 24, 1999, and transplanted to one-gallon pots about February 4, 2000.

Experimental design: A production greenhouse for repotted rose cuttings was divided into two parts: one half to the north was treated with Vitazyme and the other half left untreated. Both sides of the center walkway contained the same rose variety of the same maturity. All treatments were the same for both sides except for Vitazyme on half of the plants.



*Significantly greater than the control at P=0.0002.



In a greenhouse setting, Vitazyme stimulated overall top growth of potted roses by 61% in this east Texas trial. Beneficial effects on the right half of this greenhouse are obvious.

1. Control 2. Vitazyme

Fertility treatments: A mixed fertilizer was occasionally applied to both treatments, and the potting soil contained slow-release fertilizers.

Vitazyme treatments: Vitazyme was applied at approximately a 13 oz/acre rate by itself every 21 days, beginning shortly after repotting. Thus, during the 6 weeks of the test the roses received three treatments, but only the first two were involved in the growth stimulation for this study; the last treatment was at the very end.

Fungicide treatments: Fungicides were applied every 5 to 7 days for black spot control.

Growth results: Seven representative plants from each treatment were selected at random, and the length of each stem were determined. There was no significant difference in the number of stems per plant, so these were not analyzed and are not reported here.

Conclusions: Vitazyme applied at three-week intervals greatly increased the growth of these Marquis Bocella roses, as measured by the increase in stem length (+61%) for the 3 to 6-month period after the cuttings were repotted. Such an increase in stem length directly translates to customer appeal and sale value of the plants.

• **Increase in stem length: 61%**

Soybeans (Organic)

[benefit of an early soil application]

Location: Olivia, Minnesota

Variety: Vinton (edible)

Planting date: June 10, 2000

Soil type: Clarion-Nicollet-Webster silty clay loam

Row spacing: 30 inches

Harvest date: October 8, 2000

Experimental design: A soybean field was divided into a treated and untreated area. Both treatments received the second Vitazyme application.



The control portion of a soybean field above received no Vitazyme, and shows openings between rows. Growth is good, but not exceptional.



Just a few rows over from the picture on the left, Vitazyme sprayed over the plants stimulated growth so that in midseason the rows are already filled in.

1. Control 2. Vitazyme

Fertilization: fish emulsion and molasses on the soil before planting and again at early bloom (see below)

Vitazyme treatment: A first planting was destroyed, which had received 2 gal/acre fish emulsion, 0.5 gal/acre molasses, and 13 oz/acre Vitazyme on the seeds at planting. The second planting did not receive the materials again. Because of tillage between plantings the materials were incorporated throughout the seedbed. A second application

of Vitazyme at 13 oz/acre plus 0.5 gal/acre of molasses and 0.5 gal/acre of liquid fish was sprayed on the leaves and soil of both treatments at early bloom.

Yield results: Combine widths of equal number were harvested from both treatments, and the beans were weighed at a local grain elevator.

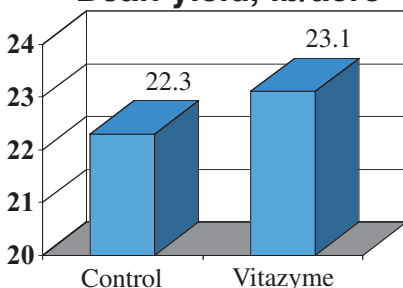
Income increase: A value of \$0.30/lb for organically grown Navy beans is expected.

Conclusions: The growing season had adequate rainfall except towards the end of the growing period, which likely reduced the yield below what might be expected. This study reveals the effectiveness of an initial soil or seed application on top of a later foliar application.

• **Bean yield increase: 4%**

• **Income increase: \$13.60/acre**

Bean yield, lb/acre



Soybeans (Tray Study)

Agricultural Custom Research and Educational Services

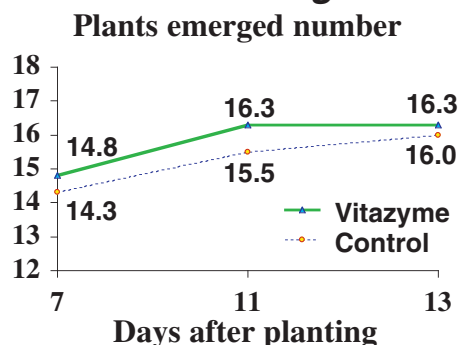
Location: Cedar Falls, Iowa

Variety: Kruger K 242 Roundup Ready

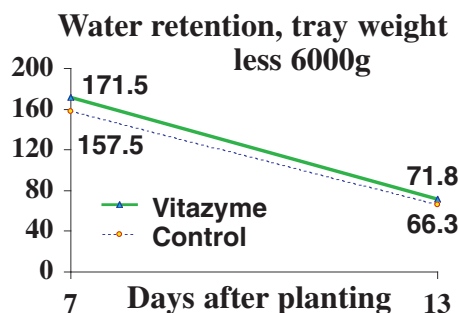
Soil type: Maxfield silt loam, surface soil

Tray size and type: 10 x 21 inches, slotted tray inside a solid tray, and a paper liner below

Plants Emerged



Soil and Plant Water Retention

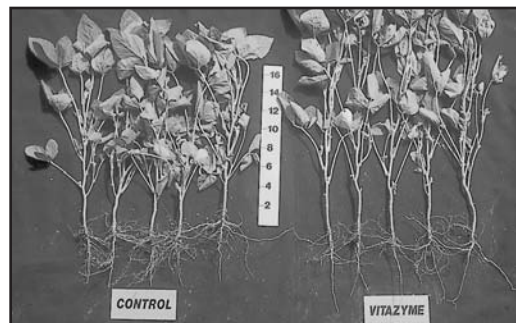


Experimental design: Trays were placed under full-spectrum grow-lights that shone 14 hours per day, with an air temperature of 65 to 85°F. Each tray had 6,000 grams of the sieved silt loam soil, which formed a two-inch layer in which two furrows were made. Twenty seeds were placed every 2 inches in the two furrows and covered. Then a measured amount of water was added, first to obtain ideal planting conditions, and subsequent waterings were accounted for as well to give a net water usage. Typical field water loss is 0.25 to 0.35 in/day. Four replicates were used in the study. Measurements were taken 7, 11, and 13 days after planting.

Vitazyme application: The equivalent of 13 oz/acre Vitazyme was applied to the soil surface at planting.

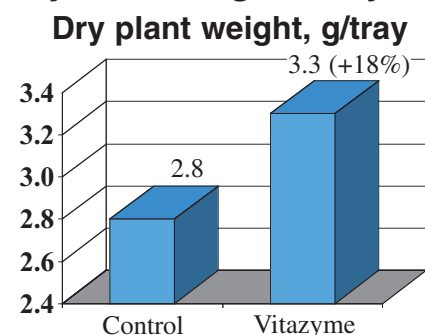
Growth parameters measured: Vitazyme improved seed emergence and early growth vigor slightly throughout the 13-day growth period.

The amount of water remaining in the trays, after additions were subtracted, was highest for the Vitazyme trays. This shows that Vitazyme reduced water loss from the soil and



The differences in soybeans in this side-by-side field sampling are typical from Vitazyme application: more chlorophyll, better roots and nodules, more leaves, and stronger stems.

Dry Plant Weight – Day 13



plants, and thus improved water use efficiency.

At the conclusion of the study the Vitazyme treated seedlings had greater total weight, meaning their growth rate exceeded that of the control for the first 13 days after planting.

Conclusion: Vitazyme improved plant emergence in this soybean tray study. Also, these treated plants made more efficient use of water, and ended up producing greater dry matter (+18%) than the controls.

• **Dry weight increase: 18%**

Soybeans – Vitazyme vs. MC

Location: Ames, Iowa (Berkey Research Farm)

Variety: Latham 64

Population: Unknown

Soil type: Clarion clay loam

Previous crop: corn

Row spacing: 30 inches

Planting date: May 5, 2000

Harvest date: unknown

Experimental design: A field area was divided into four-row plots that were 10x40 feet (0.009183 acre). Two treatments were set up, each with a control, over ten replications.

1. Control 1
2. Vitazyme
3. Control 2
4. MC-Liquid

Fertility treatments: Phosphorus and potassium levels were maintained above medium soil test levels.

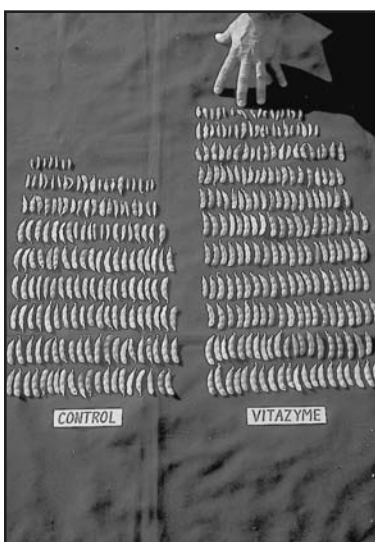
Vitazyme and MC-Liquid applications: (1) seed-row application at 13 oz/acre at planting; (2) soil/foliar application at 13 oz/acre on July 8.

MC-Liquid is a distillate of fruit tree cuttings, which provides various growth regulating compounds.

Conclusions: In this replicated soybean study in Iowa, very dry conditions late in the season greatly reduced the yield potential of this test. Vitazyme increased bean yield only marginally (+ 4%), while MC-Liquid slightly reduced bean yield. Neither of these yield changes were significant.

Yield Results

Treatment	Soybean yield, bu/acre	Change, bu/acre
1. Control 1	21.2	—
2. Vitazyme	22.0	(+) 0.8 (+4%)
3. Control 2	23.6	—
4. MC-Liquid	23.2	(-) 0.4



Soybean pods were taken from five representative plants from the Vitazyme treated and control sides of this Iowa test.

• **Soybean yield increase: 4%**

Soybeans – A testimonial

Location: Waterloo, New York

Soil type: variable

Researcher: Jake Gephart, Agway, Inc

Row width: 30 inches

Varieties: Apk 25b Roundup Ready; Apk 198 Roundup Ready

Experimental design: All fields listed below were totally treated with Vitazyme

Fertilization amount: 250 lb/acre of 6-24-24% N-P₂O₅-K₂O, applied pre-plant, and incorporated

Vitazyme application: 13 oz/acre with Roundup (glyphosate) herbicide, just before canopy row closure

Conclusions:

According to

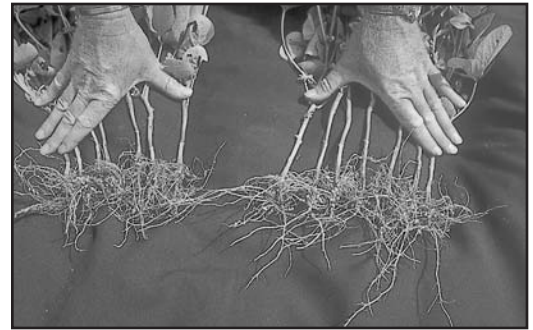
Jake Gephart,

“Although the

beans suf-

fered white

mold disease, the Vitazyme helped save the bean crop.” This benefit was achieved because Vitazyme gave the beans a very vigorous start, enabling them to better resist the mold early on. The very cool and wet growing season gave ample opportunity for fungal diseases to attack the crop in 2000.



As with all crops, soybeans respond to Vitazyme application by producing an excellent increase in root growth.

Field	Area	Planting date	Harvest date	Yield
	acres			bu/acre
1	50	June 26	November 13	65
2	25	June 14	November 11	44
3	14	June 14	November 12	23
4	100	June 15	November 14	53
5	12	June 17	November 16	30

Soybeans

Location: Stutzman Research Farm, Arkport, New York

Planting date: June 1, 2000

Variety: Golden Harvest 2170 Roundup Ready

Row spacing: 30 inches

Soil type: silt loam

Planting population: 196,000 seeds/acre

Experimental design: A randomized complete block design was set up using a plot size of 10 x 50 ft. (0.0115 acre). Three treatments with four replicates (12 total plots) were selected.

1. Control

2. Vitazyme on seeds

3. Vitazyme foliar

Fertilization: Unknown

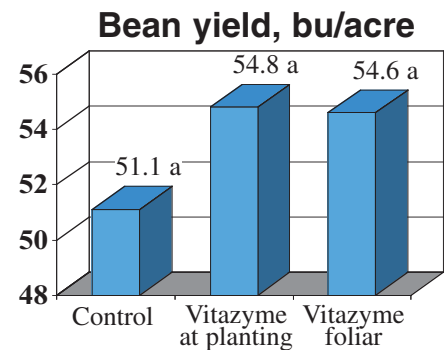
Vitazyme treatments: The seed treatment (Treatment 2) received 13 oz/acre concentrated on the seed row, and the foliar treatment (Treatment 3) was sprayed over the leaves and soil at a plant height of 15 inches.

Harvest date: November 3, 2000

Yield results: The test weight and grain moisture content of the soybeans did not vary much amongst the three treatments. Thus, these data are not included in this report. The soybeans were harvested with a plot combine.

Income results: A price of \$5.00/bu is estimated.

Conclusions: This increase was highly profitable, the cost:benefit ratio being about 3.5:1. If the two applications had been made to the same treatments it is very likely the results would have been significant.



*Means followed by the same letter are not significantly different at P=0.10 (Tukey's Test).

• **Soybean yield increase (on seeds): 7%**

• **Soybean yield increase (on leaves/soil): 7%**

• **Income increase (on seeds): \$18.50/acre**

• **Income increase (on leaves/soil): \$17.50/acre**

Soybeans – A testimonial



Vitazyme enhances overall plant growth through rhizosphere stimulation of bacteria, fungi, algae, protozoa, and other microorganisms. (New York)

Location: Interlaken, New York

Soil type: unknown

Planting date: May 5, 2000

Row width: 30 inches

Experimental design: Vitazyme was applied on a portion of a 75-acre soybean field, while the rest of the field was left untreated.

Fertilization: unknown

Vitazyme application: 13 oz/acre with fertilizer, banded beneath the seeds

Researcher: Jake Gephart, Agway, Inc.

Variety: Asgrow Roundup Ready

Seeding rate: unknown

Harvest date: November 3 and 4, 2000

Yellow streaks developed early on in the plants across the field due to some sort of fungal attack during the cold, wet season. Later, the farmer noticed that the streaks in the field were gone where Vitazyme had been applied. **Vitazyme apparently produced a positive nutritional response with these soybeans that translated into disease resistance for whatever fungal organism was attacking these soybeans.**

Strawberries

Location: Fairfield, California

Variety: unknown

Planting date: fall of 1999

Experimental design: Two fields of 2 and 3 acres of a strawberry operation were used for this study. One was treated with Vitazyme and the other left untreated.

1. Control (Field A, 2 acres)

2. Vitazyme (Field C, 3 acres)

Fertilization: the same for both fields

Irrigation: the same for both fields

Pesticides: the same for both fields

Vitazyme treatment: 13 oz/acre sprayed two times

Yield results: Actual yields are proprietary, though the increase with Vitazyme was allowed to be released.

Income results: Value per case of strawberries: \$12.00

Plant growth observations:

Grower's comments:

"The plants of Field C [with Vitazyme] were **generally healthier.**"

"The treated berries, even after chemical applications, were **much sweeter** than the controls."

Researcher's comments:

"The application of crop protection chemicals will usually reduce the Brix levels of most crops by 4 to 10 Brix points.

These Vitazyme treated strawberries were exceptionally sweet, even after the application of chemicals to control powdery mildew! Other Vitazyme dealers who received Saechow berries felt that the quality and flavor were outstanding, the best in Northern California.

• Yield increase with Vitazyme: 140 cases/acre

• Income increase with Vitazyme: \$1,680.00/acre

Tomatoes

Caribbean Chemicals International

Location: Aranguez, Trinidad, West Indies

Variety: Gempride

Transplanting date: November 3, 1999

Harvest date: January 19, 2000,

and thereafter

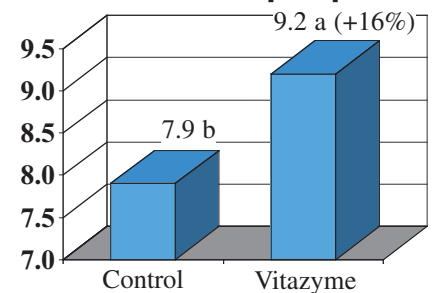
Experimental design: An area of a field comprising 50 "banks", each with about 10 plants each (about 500 plants), was treated with Vitazyme. Plot size was 10x150 ft. An untreated area alongside was the control.

Fertility treatments: equal for all plots

Vitazyme treatments: Vitazyme was applied at 30 ml/gallon (about 1%) on the following dates: November 10, November 25, December 9, and December 29, 1999. These dates were 7, 22, 36, and 56 days after transplanting. Each plant received about 2 tbsp. of the Vitazyme solution when it was applied. The total application (four times) was 3.27 liters/hectare.

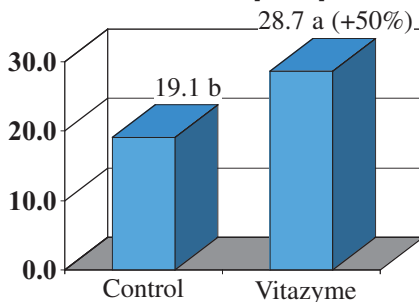
Growth results:

Side shoots per plant



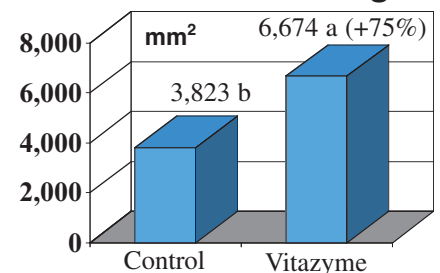
*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).

Blossoms per plant



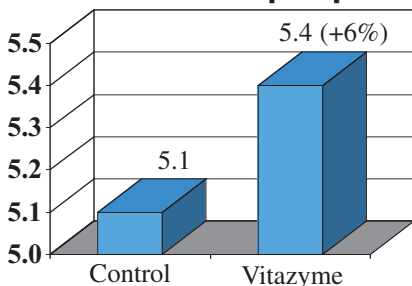
*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).

Leaf area at 8-in height



*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).

Bract flowers per plant



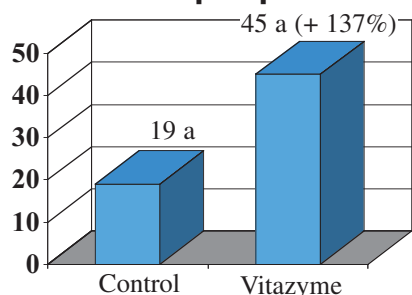
Flowers

An 8-inch X 8-inch frame was placed at random on top of 10 randomly selected plants, and the number of flowers was counted for the control and treated areas.

Side Shoots

The number of lateral shoots was counted on 10 randomly selected plants for both treatments. The control plants had thinner stems on average.

Fruit per plant



No statistical differences appeared due to high variability of only two reps.

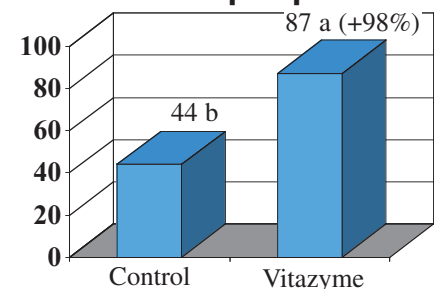
Flowers On a Bract

The number of flowers contained on a bract (cluster of blossoms) was counted for 10 random plants of both treatments. Three of the Vitazyme treated bracts already had some fruit developing at the time of counting.

Leaf Area at 8-inch Height

Ten plants were selected randomly from each treatment, and the leaf area at the 8-inch height was measured.

Flowers per plant



*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).

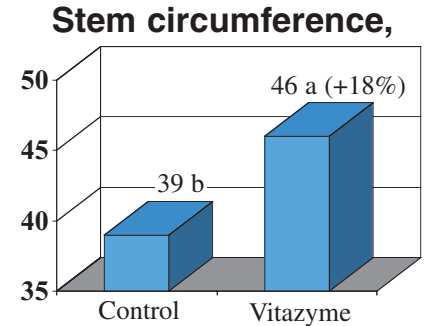
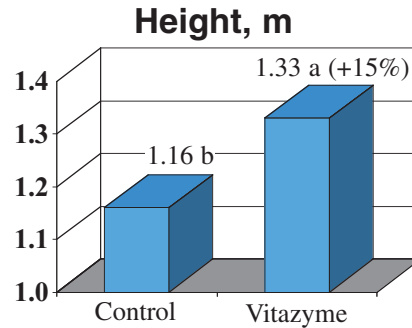
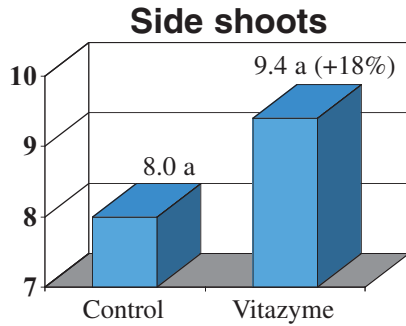
(Continued on the next page)

Fruit and Flowers On Two Plants (see data on page 35)

Two representative plants from each plot were pulled out, and the fruits and flowers were counted for each.

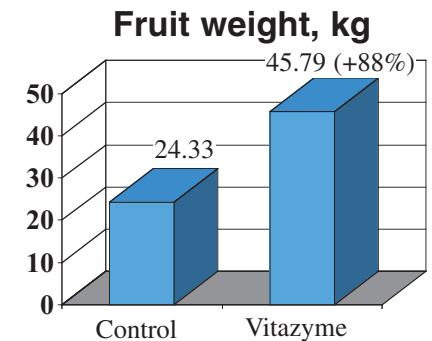
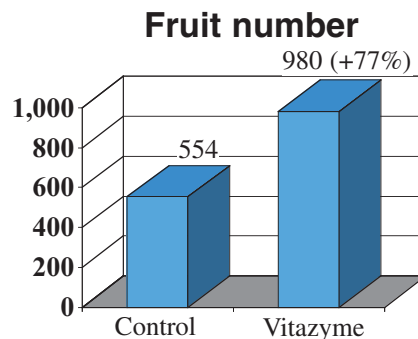
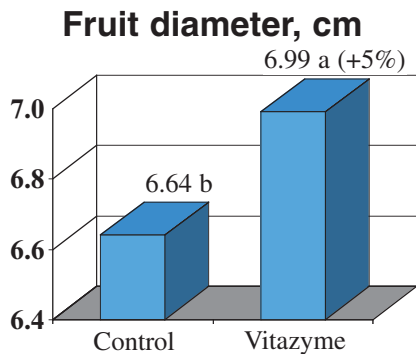
Side Shoots, Plant Height, and Stem Circumference

For 10 randomly selected plants for each treatment at a particular date, the number of side shoots, height, and stem thickness at 1 inch above soil level were measured.

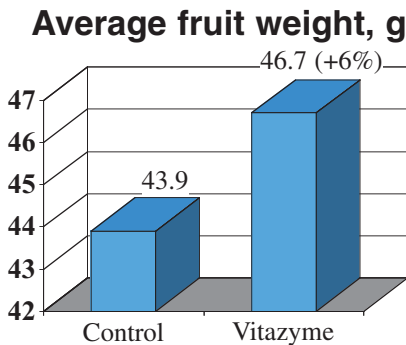


*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).

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*Means followed by the same letter are not significantly different at P=0.05 (Tukey's Test).



Fruit Diameter

For the first harvest five representative fruit were selected from each treatment, and the diameters were measured and averaged.

In-Field "Taste Test"

Participants in this study were given five fruits from each treatment and asked to select the superior flavor of fruit. Vitazyme treated tomatoes received higher taste ratings than did the control tomatoes.

Yield results: Tomatoes were harvested on several dates from the two treatments, and records were kept on fruit weight and number of fruit. From these values the average fruit weights were calculated. Harvest dates were January 19, 25, and 31, February 3, 7, 11, 14, 18, 21, 25, and 28, and March 3 and 8, 2000. Green and small fruit was also tabulated, but are not included in the data on this page.

Conclusions: Vitazyme greatly enhanced tomato production in this Trinidad study. Growth parameters as well as total production were substantially improved, as summarized in the table above.

Parameter	Control	Vitazyme	Increase
Flower number (early)	191.1 b	28.7 a	+50%
Side shoots (early)	7.9 b	9.2 a	+16%
Flowers on a bract (early)	5.1	5.4	+6%
Leaf area at the 8-in height, mm ²	3,823 b	6,674 a	+75%
Fruit per plant	19	45	+137%
Flowers per plant	44 b	87 a	+98%
Plant height, m	1.17 b	1.33 a	+15%
Side shoots (late)	8.0	9.4	+18%
Stem circumference, mm	39 b	46 a	+18%
Fruit diameter, cm	6.64 b	6.99 a	+5%
Taste test	—	Superior	
Total fruit weight, kg	24.333	45.792*	+88%
Total fruit number	554	980*	+77%
Average fruit weight, g/fruit	43.9	46.7*	+6%

Note: Values in bold are significantly greater than the control at P = 0.05.

* No statistics were able to be applied for these values.

Vitazyme application for this tomato crop in Trinidad proved to be highly advantageous, increasing the overall yield by 88%.

• Yield increase: 88%

Tomatoes – A testimonial

Grower: O.P.C. Farms, Inc.

Location: Hanford, California

Variety: 370's (plants)

Soil type: sandy loam

Irrigation: furrow

Experimental design: A production field was separated into control and Vitazyme treated areas.

1. Control

2. Vitazyme

Fertilization amount: according to soil test

Vitazyme application: 13 oz/acre at planting, 13 oz/acre knifed in with fertilizer

Observations: The Vitazyme treated plants displayed superiority to the control plants during the season, with better color and size of the plantings. At harvest the treated area was not kept totally separate from the control area, so accurate yield results were impossible. However, the following observations on the Vitazyme treated tomatoes were made.

- The fruit was bigger.
- The color was more uniform.
- The yield was likely one to two tons/acre greater... possibly more.
- The solids of the fruit were higher.

A repeat of this study will be done in 2001 to obtain production figures.



Tomatoes respond very well to Vitazyme, such as in this field where at-planting and foliar applications contributed to excellent yield increases.

Tomatoes – A testimonial

Research organization: Agway, Inc.

Location: Fredonia, New York

Soil type: clay loam

Experimental design: An entire fresh market tomato production area was treated with Vitazyme and evaluated.

1. Control

2. Vitazyme

Vitazyme applications: 13 oz/acre in the transplant water, and two more 13 oz/acre applications with cover sprays, beginning at fruit set

Fertilization: balanced fertilizer applications with regular cover sprays, especially fungicide sprays after fruit set

Comments: Jim Barber: "The yield was higher than usual. Overall plant health was superior, and quality was consistent throughout the season. This treated crop, although planted later than some other fields in the area, was the first to ripen. Also, this crop continued to yield late in the season when others had quit, with good quality even late in the season."



Vitazyme treated tomatoes at Fredonia, New York, produced an outstanding yield of high quality.

Truck Crops

Testimonial on Flowers, Tomatoes, Peppers, Potatoes, Beets, Carrots, and Sweet Corn

Location: Watertown, New York

Experimental design: Parts of each of the crops were treated with Vitazyme along with the other ingredients shown below. Other areas received only the molasses, whey, and Epsom salts.

Fertilization and Vitazyme treatment: All treated field areas received the following foliar solution per acre three times during the growing season:

1 cup of molasses	13 oz of Vitazyme
1.5 qt of whey	5 gal of water
1 cup of Epsom salts	

Salvia

Salvia flowers were planted in flats in a greenhouse (with grow-lights) in the fall of 1999, and Vitazyme was sprayed on the soil immediately after planting for some of the flats. **The treated plants were excellent, being bigger, stronger, and darker green than the untreated plants.**

Tomatoes

The Vitazyme treated tomatoes ripened earlier than normal ... in July rather than as usual in August, during a year in which the untreated tomatoes did not even ripen due to the cool, wet, cloudy conditions. **Mr. Joanete was the only truck farmer who had ripe tomatoes during this unusual year.**

Peppers

Mr. Joanete usually plants 1,400 bell pepper plants each year, but this year planted only 700. **In spite of half the number of plants, his yield was enhanced so much by Vitazyme that he harvested the same volume of peppers for his produce stand as he usually did with 1,400 plants. Many of the peppers exceeded one pound in weight, whereas in past years he seldom grew one pound fruit.**

Potatoes

The tubers were "nicer than normal, bigger, and gave a heavier yield."

Beets

“My beets were the size of bowling balls!” These huge beets were not saleable, but pointed towards the potential to harvest them much earlier than normal. “Vitazyme has a ‘wicked’ [great] effect on beets.”

Carrots

Vitazyme greatly affects carrots, like it does beets. “My carrots were double the size of normal.”

Sweet Corn

A sample of ears from treated and untreated areas revealed that soluble solids (Brix) of the treated kernels was 26, while solids of the untreated controls was 17. Thus, **the treated corn was noticeably sweeter.**

General comments and conclusions:

“It [Vitazyme] is a good product.” “I swear by it.” “It’s good stuff!” “I could see a big difference.”
Mr. Joaneete will be using Vitazyme on his entire crop in 2001.

Walnuts – A testimonial

Grower: Jack’s Orchard Supply

Location: Chico, California

Planting date: May 17, 2000

We planted 176 walnut trees in May of 2000. This is late by 45 to 60 days of normal planting. At planting we added 6 oz. of Vitazyme to the root dip water. All trees were dipped.

We have received many comments about the vitality, deep green color, and growth of these young walnuts. The most significant hardship with late planted walnuts is getting a good stand. Death losses can be fairly high, so we were very pleased to have lost less than 2% of the total planted trees.

We are a dealer for Vitazyme in the 530 telephone area code, and we are hearing a lot of comment on this product. Growers like how it works. So do we. Try it on strawberries: wow!!!

Cheryl Smith
Jack’s Orchard Supply

• **Death loss for a late planting: < 2%**

Woody Ornamentals — Boxwood, Azalea, and Holly —

Grower: TramTex Nursery

Location: Tyler, Texas

Researcher: Paul W. Sylie, Vital Earth Resources

Test initiation: September 16, 1999

Plants: Wintergreen Boxwood, “Fashion Azalea”, Dwarf Burfordi Holly

Test termination: May 30, 2000

Experimental design: Twenty approximately equal-sized plants were selected for each of the plant types for the three trials. These plants were growing in one-gallon pots and placed in a greenhouse at TramTex Nursery. Ten pots for each plant type served as replicates for the Vitazyme treatment, and ten pots served as controls. Each pot was appropriately labeled. The design was completely randomized.

1. Control

2. Vitazyme

Fertilizer treatments: standard for the greenhouse

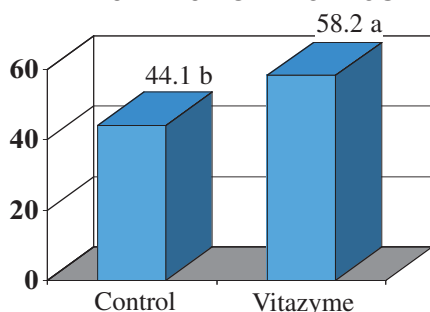
Pesticide treatments: standard for the greenhouse

Vitazyme applications: Vitazyme was applied three times during the course of the study: September 10, 1999 (16 oz of a 1% solution per pot), January 20, 2000 (4 oz of a 1% solution per pot), and March 24, 2000 (4 oz of a 1% solution per pot).

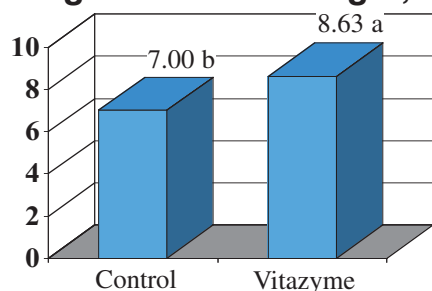
Growth results: Values for maximum branch length and number of branches were determined at the start of the study on September 10, 1999, to establish a baseline of data and permit a calculation of growth increases. Values were determined at the conclusion of the study on May 30, 2000. Increases in branch length and branch number were calculated for this time period.

Wintergreen Boxwood

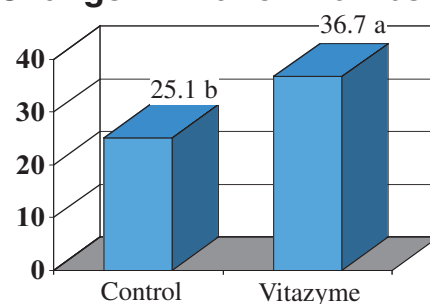
Final Branch Number



Change in Branch Length, in.



Change in Branch Number



In all cases means followed by the same letter are not significantly different at P=0.1.

• **Final branch number increase: 32%**

• **Branch length change: 23%**

• **Branch number change: 46%**



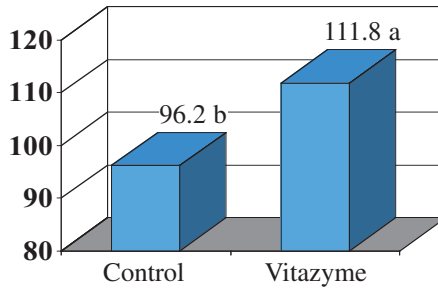
This randomized, replicated trial of woody ornamentals in east Texas proved that Vitazyme can significantly enhance branching and growth of woody ornamentals, even with a suboptimal application schedule.

No significant differences in branch length or branch number as a result of Vitazyme application occurred in this study. It is not known why the holly did not respond like the other two plant species.

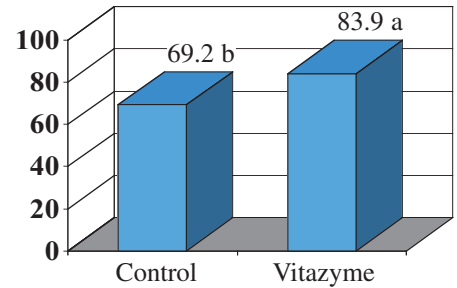
Conclusions: Vitazyme significantly improved plant height and branch number for Wintergreen Boxwood plants, by up to 46% for branch number. Branching was likewise stimulated for azaleas ... by 21%. The holly plants, however, did not respond much to Vitazyme in this study, likely because of applications spaced too far apart. Results for this study would very likely have been much better had Vitazyme been applied more frequently and consistently during the period from September, 1999, to May, 2000. It is apparent that Vitazyme stimulates the formation of new growing points (primordia) at the nodes of woody ornamentals, as it does for other types of plants, and thus improves their appearance to potential customers.

Azalea, var. "Fashion"

Final Branch Number



Change in branch number



In both cases means followed by the same letter are not significantly different at P=0.1.

- **Branch number change: 21%**
- **Final branch number increase: 16%**

Holly, Dwarf Burfordi

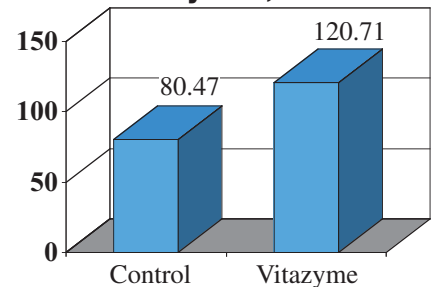
Wheat (Winter)



Wheat treated with Vitazyme in this field shows the potential for the program to greatly enhance yields at very low cost.

Location: Twin Falls, Idaho
Planting date: October 9, 1999
Variety: Stevens soft white winter wheat
Harvest date: August 29, 2000
Experimental design: A wheat field of 40 acres was divided into two 20-acre portions having similar soils. One part was treated with Vitazyme and the other part was left untreated for a control. All fertility and management practices were the same for each portion.

Wheat yield, bu/acre



1. Control
2. Vitazyme

Fertilization: 10 tons/acre manure, 31 lb/acre N, and 39 lb/acre P₂O₅, the fall of

1999; 46 lb/acre N the spring of 2000

Vitazyme application: 26 oz/acre on the leaves and soil along with 1 pint/acre of 0-30-0

Income results: A price of \$1.80/bu is estimated

Conclusions: One application that was twice as concentrated as recommended boosted wheat yield in this Idaho study by 50%. This increase amounted to an excellent income enhancement of \$72.43/acre.

- **Yield increase: 50%**

- **Income increase: \$72.43/acre**

Winter Forage – Barley, Oats, and Wheat

Location: Newberry Springs, California

Planting date: November 11, 1999

Soil type: light blow sand with high levels of boron in the subsoil

Experimental design: A center pivot system was divided into four quadrants. Three (90 acres) were treated with the Vitazyme program and one (30 acres) was left untreated.

Variety: barley, oats, and wheat varieties

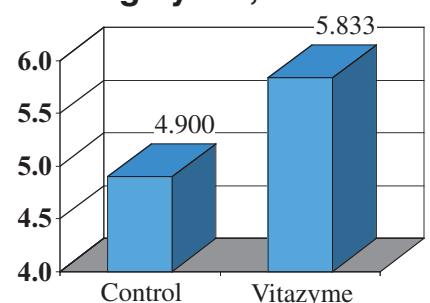
Seeding rate: 150 to 200 lb/acre

1. Control
2. Vitazyme

Fertilization: 18 lb/acre of NH₄NO₃ liquid at the sixth true leaf; 35 lb/acre of NH₄NO₃ liquid two times (sometimes three times) per cutting sequence, giving about 125 lb/acre total of the N fertilizer per crop

Vitazyme treatment: (1) On the seeds at planting at 6.4 oz/acre, with the starter fertilizer; (2) 13 oz/acre sprayed on the leaves and soil twice, after each nitrogen fertil-

Forage yield, tons/acre



(Continued on the next page)

izer application

Harvest date: April 11, 2000, for the Vitazyme treatment; April 14, 2000, for the control

Income results: A value of \$125.00/ton is estimated

Conclusions: This forage trial in the Mojave River drainage basin, with poor desert soils having high yield potential if managed well (12 tons/acre of 20% protein and 60% TDN alfalfa), showed the potential of Vitazyme to substantially increase grass forage yields and income. A 19% yield increase resulted in \$116.63/acre more return, giving a 9:1 return on investment for a Vitazyme seed treatment and two foliar applications.

	Control	Vitazyme	Change
			\$/acre
Crop income	612.50	729.13	(+) 116.63

• **Forage yield increase: 19%**

• **Income increase: \$116.63/acre**

Vitazyme-Fish combinations: do they work?

Over the past two years several field and greenhouse studies have been conducted to evaluate whether or not Vitazyme and liquid fish combinations are synergistic. So far the results are mixed, and seem to depend on local growing conditions and management techniques.

A Vitazyme-fish combination for organically grown sweet corn in Penn Yan, New York, in 1999 caused a whopping 49% yield increase over the control. Trials in 1999 and 2000 on broccoli, lettuce, and celery at Ventura, California, however, did not display this synergism. The Ventura tests

received heavy agri-chemical applications throughout the growing cycle.

A greenhouse study in 1999 and 2000 showed a good synergism between fish and Vitazyme, increasing corn dry weight by 22%, whereas Vitazyme alone showed a 13% weight increase, and fish alone a 3% increase. English peas in this same study displayed no such synergism. Another greenhouse study on corn in 2000 showed small but non-significant increases in dry matter yield from fish plus Vitazyme at 1:9 and 9:1 ratios.

The tentative conclusion from these studies is that Vitazyme and liquid fish appear

to have a definite synergism, but perhaps mainly under management systems where heavy pesticide applications are not made. Vitazyme activity when used alone under those conditions shows no yield-enhancing limitations. These results under different management systems may relate to a more vigorous rhizospheric organism population with organic/non-chemical production, enabling Vitazyme's active agents to stimulate the plant to utilize fish components for intensified nutrient availability and uptake. The only legume used in these studies — English peas — did not show any synergistic effect with the two products.