



1996 Field Trial Results

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

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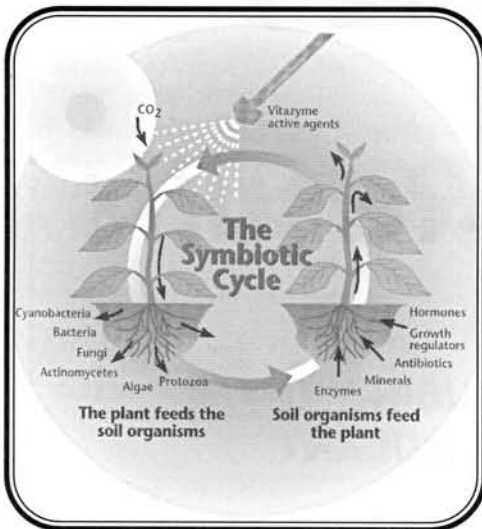
1996 Vitazyme Field Trial Results

In its second major year of testing, Vitazyme has performed very well as the data and pictures within this booklet illustrate. These studies follow on the heels of some excellent data generated during 1995, which are published in part in *The Vital Earth News - Agricultural Edition* (summer, 1996, Vol. 1, No. 1).

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 sub-

stances which are absorbed by the roots and transported to the leaves. The acids help dissolve essential minerals, and reduced iron releases anionic elements. Organism types include mycorrhizae, cyanobacteria, and various other bacteria, fungi, and actinomycetes.

Vitazyme contains "metabolic triggers" that stimulate the plant to photosynthesize better, fixing more sunlight energy in the form of carbon compounds to increase the transfer of carbohydrates, proteins, and other growth sub-

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 much N:			← 30-40% →			← 40-60% →			← 60-80% →				

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

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

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

Vitazyme should be used within the context of a complete crop management system, never by itself. Vitazyme will optimize your existing program by enabling the plant to grow better, thus increasing productivity. Follow this easy-to-use five-point program.

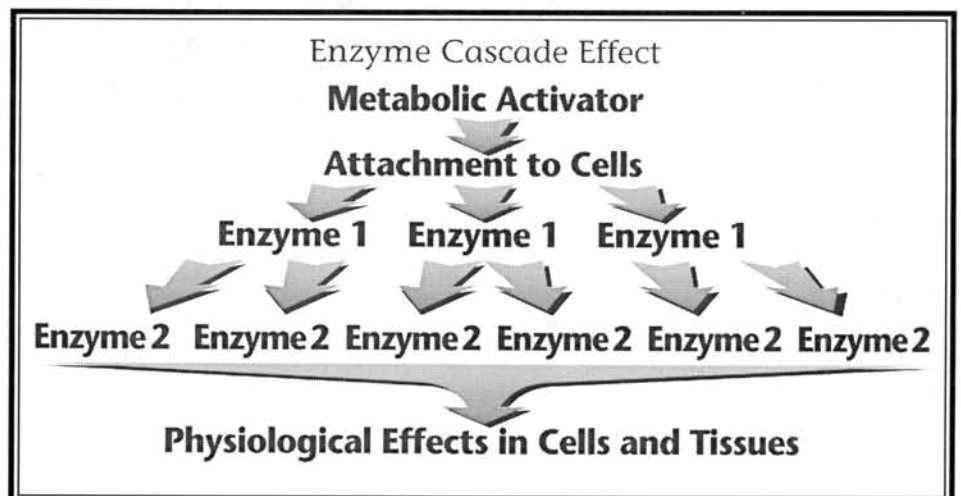
1. If possible, analyze the soil at a reputable laboratory and correct mineral deficiencies and imbalances with expert consultation.
2. Reduce nitrogen fertilizer applications for non-legumes using this test:

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 transplants 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, or else apply the solution directly on the seed row with a planting attachment. Dip or spray transplant roots with a 1% or 2% solution.

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

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



Vitazyme Field Tests for 1996

Alfalfa Hay

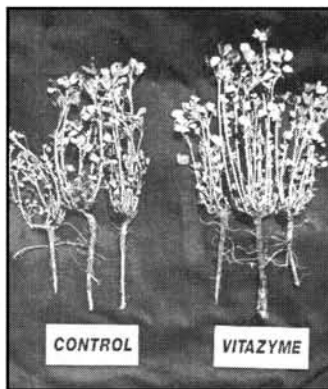
Location: Pella, Iowa **Variety:** Prairie Rose (Wilson Seeds)
Seeding date: spring, 1994 (1996 was the second year of harvest)
Experimental design: A 20-acre alfalfa field was divided into two equal 10-acre parts, half treated with Vitazyme and half not treated.

1. Control (no Vitazyme) - 10 acres
2. Vitazyme - 10 acres

Vitazyme application: At spring greenup (April 19), Vitazyme was sprayed on the leaves and soil at 13 oz/acre to the treated half of the field. About 7 to 10 days after the first cutting, a second application of 13 oz/acre was made.

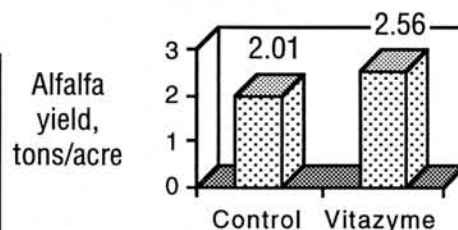
Yield results: A round baler was used to bale the hay. Records were kept on the first two cuttings. Each bale averaged 1,825 lb; the value of the hay was \$60.00/ton.

Other observations: On August 9 1996, the leaf chlorophyll of the Vitazyme-treated alfalfa measured 50.1 SPAD units, versus 46.9 units for the control. Root development was greater with Vitazyme treatment as well.

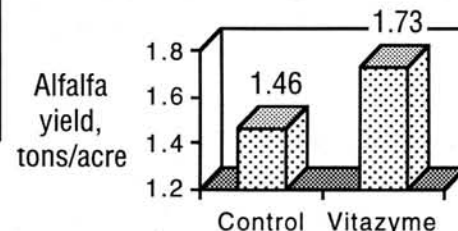


Note the bigger crowns and larger root systems on the treated plants.

First Cutting: 27% increase



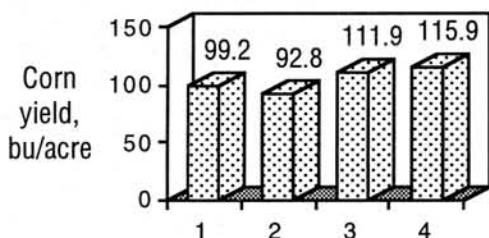
Second Cutting: 19% increase



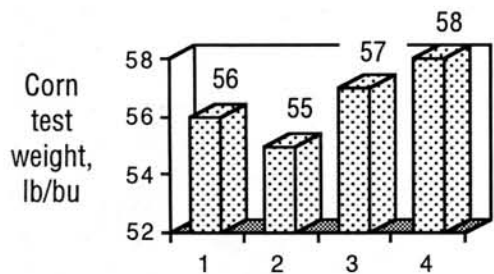
• **Income Increases:** First Cutting: \$32.82/acre Second Cutting: \$16.44/acre

Corn

Corn yield: 25% increase



Corn test weight: 5% increase



Location: Miles, Texas **Seeding date:** Early May
Row spacing: 30 inches **Variety:** Pioneer 3299
Seeding rate: 28,000 seeds/acre
Experimental design: An irrigated (center-pivot) corn field was divided into 0.615-acre strips, and four treatments were placed in these strips:

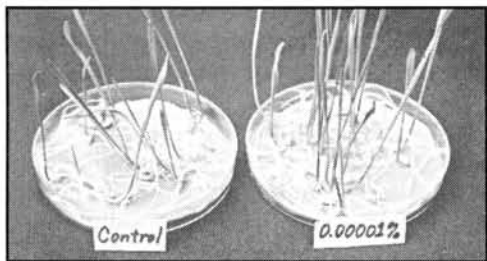
1. Control with fertilizer only
2. Fertilizer plus zinc
3. Fertilizer plus zinc plus another biostimulant
4. Fertilizer plus zinc plus Vitazyme

Fertility treatments: All plots were treated with 95 lb/acre of 10-34-0 (%N-P₂O₅-K₂O) starter fertilizer, placed about two inches deep and to the side of the seed row at planting. In addition, plots 2,3, and 4 received 1 quart/acre of a zinc fertilizer; the control received none. During the growing season all plots were irrigated by a center-pivot system that applied wastewater from the San Angelo sewage treatment facility; amounts of nutrients added are unknown, but certainly significant.

Biostimulant application: Vitazyme and the other biostimulant were mixed with the starter fertilizer and applied in the band alongside the seed row at planting. Vitazyme was applied at 16 oz/acre, and the other biostimulant at 32 oz/acre.
Harvest date: August 15, 1996

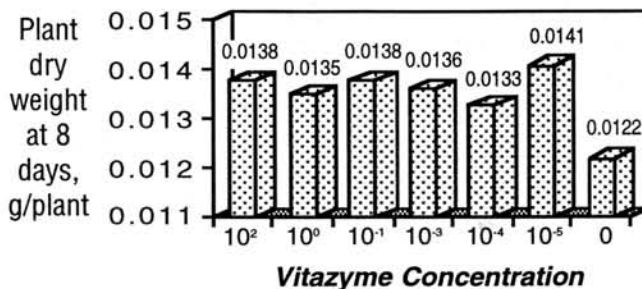
• **Income Increase: \$69.30/acre**

Greenhouse Bioassay With Vitazyme On Cereal Rye



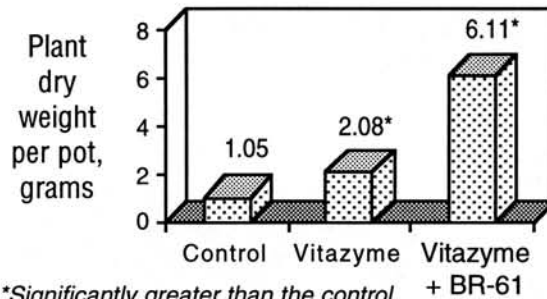
Extremely small amounts of Vitazyme are needed to stimulate growth.

All petri dishes, with blotter paper, were provided 25 rye seeds in 20 ml of solution. The seeds were germinated and grown at about 70° F continuously for 8 days in full sunlight.



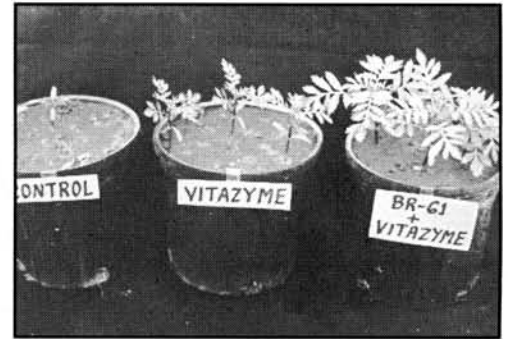
Greenhouse Study With Marigolds

Marigolds were planted in one-gallon pots in a replicated study to discover the best combination of products for the growth of flowers. Vitazyme, a full-spectrum mineral solution (BR-61), and a natural rock powder were tested, alone and in all combinations. Plants in many pots did not survive, but the Vitazyme-only treatment lost none. Where Vitazyme was applied with BR-61 the plants survived and thrived, but BR-61 alone allowed only one pot to survive.



*Significantly greater than the control

This study illustrates how Vitazyme enhances plant utilization of soil minerals.



Note how Vitazyme, combined with nutrients, greatly stimulated growth of these marigolds. BR-61 alone gave growth intermediate to the pots on the right.

Corn

Location: Middle Point, Ohio

Seeding date: May 20, 1996

Seeding rate: 27,000 seeds/acre

Experimental design: A 40-acre field, previously grown to red clover, was divided into two parts: 10 acres Vitazyme treated and 30 acres untreated:

1. Control (no Vitazyme)
2. Vitazyme injected on the seeds at planting

Fertility treatments: At planting, 5 gal/acre of 2-20-18 (% N-P₂O₅-K₂O) + sugar + 1.7 pt/acre Zn + 10 pt/acre Mn were applied directly on the seeds. At ten gal/acre of a 28% N +5% S + sugar solution were applied to the side and below the seed row. When the corn was 12 to 18 inches tall, in late June, 32 gal/acre of 28% N was knifed in between the rows.

Vitazyme treatment: Vitazyme at 13 oz/acre was mixed with the fertilizer solution that was injected directly on the seeds at planting.

Harvest date: November 13, 1996.

Yield analysis: The entire field averaged 140.5 bu/acre (15.5% moisture), and the grower observed a superior yield for the Vitazyme-treated portion of the field.

Quality analysis: Samples of grain were analyzed at the Northeast DHIA Forage Testing Laboratory in Ithaca, New York.



Vitazyme treated corn on the right has larger leaves and stalks than the control row to the left.

Parameter	Control	Vitazyme	Change with Vitazyme
Moisture, % at harvest	14.9	12.3	-2.6 percentage points
Dry matter, % at harvest	85.1	87.7	+3%
Crude Protein, % (dry)	9.2	9.3	+1%
Acid detergent fiber, %	3.5	5.4	+54%
TDN ¹ , %	88.0	87.0	-1%
Ash, %	1.46	1.70	+16%

¹ TDN = total digestible nutrients.

Conclusions and observations: The Vitazyme treatment in this corn study produced grain that was **considerably dryer** — by 2.6 percentage points — at harvest than the control. The crop apparently **matured faster**. The treated corn also had **more dry matter, slightly more protein**, and a considerably **higher amount of fiber**. This higher fiber content indicates a stronger, more lignified seed coat that will improve storage qualities and resist cracking damage. **Total digestible nutrients** were about the same for each treatment, but the **ash content was considerably higher** for the Vitazyme treatment. To the very

dividing row the **root mass was greater**, as were **leaf size, plant height, and ear size**. On August 1, leaf chlorophyll readings using a SPAD meter revealed that the Vitazyme-treated corn had 57.1 units, versus 53.3 units for the control.



Note how much more length and mass the roots have with Vitazyme, meaning greater water and nutrient uptake.

Corn

Location: Leroy, New York

Variety: DeKalb 446

Seeding date: May 30, 1996

Seeding rate: 26,500 seeds/acre (36-inch rows)

Experimental design: A corn field was divided into two parts, one receiving Vitazyme and the other no Vitazyme. All other treatments were identical.

1. Control (no Vitazyme)

2. Vitazyme injected on the seeds with starter fertilizer at planting

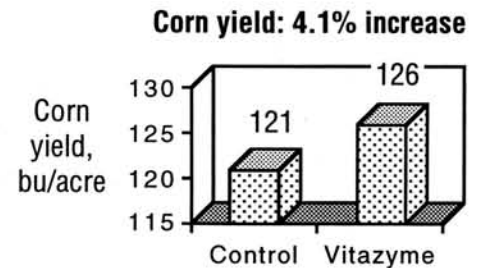
Fertility treatments: All areas received 5 gal/acre 10-20-10 starter fertilizer injected directly on the seeds. On July 15, 20 gal/acre liquid nitrogen (urea ammonium nitrate, 30% actual N) was sidedressed on all areas. Later, 2 qt/acre liquid-Ca (8-0-0-10) plus herbicide (1 qt/acre Marksman) were applied.

Vitazyme treatment: Vitazyme was applied directly on the seeds at 12 oz/acre with the starter fertilizer.

Yield results: Both test areas were sampled using specified harvested areas, with grain samples accurately weighed. Both samples had a test weight of 57 lb/bu.

Quality results: Results are in terms of dry matter of the corn grain.

Parameter	Control	Vitazyme	Change with Vitazyme
Crude Protein, %	8.34	7.40	-11%
Calcium, %	n.d.	0.02	greater
Phosphorus, %	0.26	0.31	+19%
Magnesium, %	0.07	0.11	+57%
Sugar, %	6.73	6.70	0%
Salts, %	0.52	0.66	+30%
Total nutrient elements (REV), ppm	1,197	1,488	+24%
Acid detergent fiber, (ADF), %	2.47	3.01	+22%
Relative feed value (RFV)	453	829	+83%
Dry matter intake (DMI), %	6.72	12.36	+84%
Nitrates	5.91	5.25	-11%
Metabolizable energy (Mcal/kg)	3.15	3.13	-1%



Although the crude protein in the Vitazyme-treated corn was a bit less than the control, its feed value was greater in terms of total nutrient elements, relative feed value, and dry matter intake. Fiber was greater as well, indicating a stronger seed coat for the grain, and nitrates were lower with Vitazyme treatment, a positive nutritional feature. Several minerals were higher for the Vitazyme treated corn, but energy values were about the same for both treatments.

Corn

Location: Pella, Iowa

Seeding date: May 6, 1996

Soil type: silty clay loam

Variety: Wilson 1581

Row spacing: 30 inches

Population: 25,800 seeds/acre

Experimental design: A 20-acre field was divided into two parts:

1. Control (no Vitazyme)

2. Vitazyme on the soil, and on the leaves and soil at 24-inch height

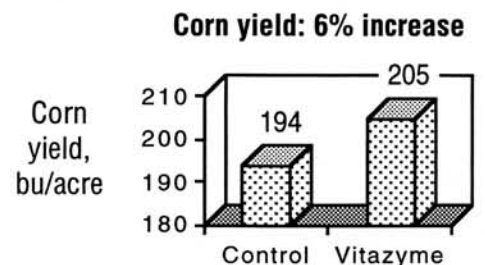
Fertility treatments: All areas were treated with a mixed fertilizer ("Supergrow") giving 130 lb/acre N and 80 lb/acre S. Another 13 lb/acre of N was also applied at planting as a 28% N solution.

Vitazyme application: Vitazyme was sprayed on the soil at 13 oz/acre at planting (May 6), and also at 13 oz/acre when the plants were 24 inches tall.

Harvest date: October 16, 1996

Other observations and conclusions: The Vitazyme treated soybeans had **more leaf chlorophyll** than the control. On August 9, the Vitazyme-treated soybean plants contained **50.1 SPAD units** of chlorophyll, versus **46.9 SPAD units** for the control. During the season the Vitazyme-treated plants had larger roots and a greater stalk size than control plants. Plants were greener and healthier, with fewer gray leaf spot lesions. A reduced moisture level of the grain at harvest (1.4 percentage points) meant **considerable savings in drying costs of \$5.47/acre.**

• **Income Increase: \$38.47/acre**



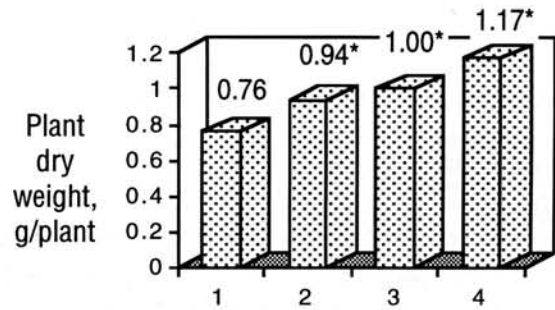
The Vitazyme treated ear is larger and more mature than the untreated control.

Greenhouse Study With Radishes and "Energized Water"

One-gallon pots were thinned to 10 plants/pot, with Vitazyme and energized water applied at planting and weekly at 100 ml of a 0.1% solution, with or without energized water. Harvest occurred at 33 days. Replicates = 6.

1. Control
2. Vitazyme
3. Energized water
4. Vitazyme and energized water

This study shows that both Vitazyme and electronically energized water increase radish yield when used alone, but together they remarkably increase the yield (+54%)



Radish yield with Vitazyme and "energized water": 54% Increase

*Significantly greater than the control

Corn

Location: Agri-Research Farm, Danville, Iowa

Variety and rate: Querna 7670, 26,000 seeds/acre

Experimental design: A completely randomized design was established on land that had been cropped to soybeans in 1995. Each plot was 10 ft wide and 40 ft long (four 30-in rows/plot). Each treatment was replicated five times. Four treatments were used:

1. Low nitrogen (80 lb/acre), no Vitazyme
2. Low nitrogen (80 lb/acre), with Vitazyme
3. High nitrogen (120 lb/acre), no Vitazyme
4. High nitrogen (120 lb/acre), with Vitazyme

Soil test data: Organic matter = 3.6%, pH = 6.7, cation exchange capacity = 23.1 meq/100 g, high fertility; soil type: Mahaska silt loam.

Fertility treatments: Nitrogen was applied as urea (46% N) on June 3. For the 80 lb/acre rate 174 lb/acre of urea was applied, and for the 120 lb/acre rate 261 lb/acre of urea was applied.

Weed control: The same herbicides were used for all treatments.

Tillage: The field area was disked before planting.

Vitazyme applications (Treatments 2 and 4):

(1) June 5 — 13 oz/acre applied in the seed row at planting

(2) July 11 — 13 oz/acre sprayed on the leaves and soil when the plants were about 18 inches in height

Comments and conclusions: It will be noted from the above data that at the low N level the percent increase in grain production (22%) was considerably greater than at the high N level (7%). In fact, the grain yield at the low N rate plus Vitazyme equalled the yield of the high N rate without Vitazyme. Such a result illustrates the nature of Vitazyme to apparently improve the efficiency of N utilization for crops.

- **Income Increase: Low Nitrogen: \$82.80/acre**
- **Income Increase: High Nitrogen: \$31.20/acre**

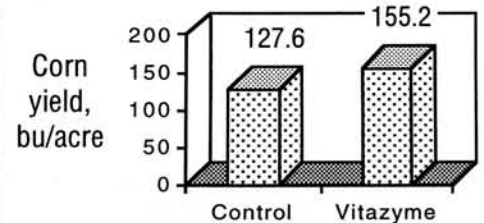
Seeding date: June 5, 1996

Seeding depth: 2 inches

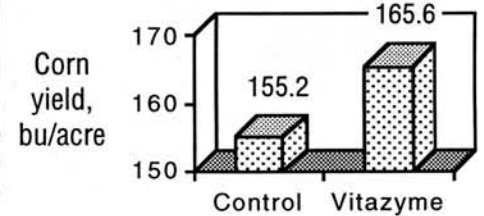


At Danville, Iowa, the low-N corn showed an excellent response to Vitazyme.

Low nitrogen: 22% increase

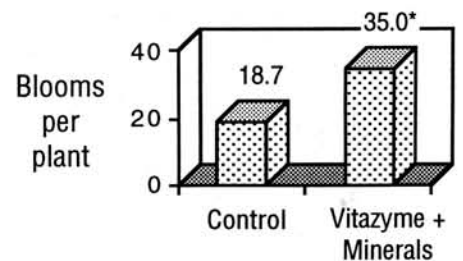
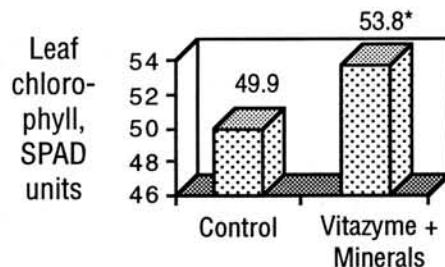


High nitrogen: 7% increase



Greenhouse Study With Mums

A replicated study to compare bud development and flowering of mums utilized a control (no additions) and Vitazyme (0.1%) plus a full-spectrum nutrient solution (Vital Earth BR-61) and a ground rock powder. The foliage of blossoming plants was initially pruned to allow new bud development.



*Significantly greater than the control

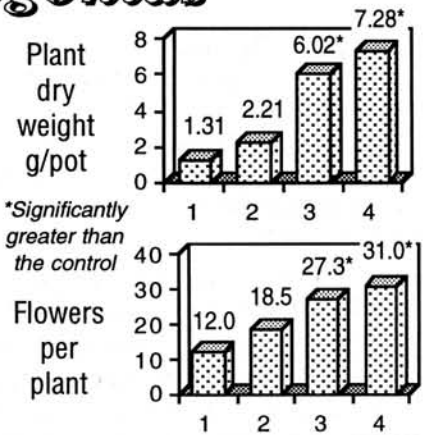
Greenhouse Study With Begonias

A replicated trial with begonias in one-gallon pots compared no treatment with Vitazyme alone (0.1%), a full-spectrum nutrient solution (Vital Earth BR-61), and the two combined. **Vitazyme enhanced the utilization of the nutrients by producing larger plants and more flowers, but by itself produced a minimal response.**

1. Control
2. Vitazyme
3. BR-61
4. Vitazyme + BR-61



When Vitazyme was added to the nutrients of BR-61, growth of these begonias was greatly stimulated.



Corn



In this Iowa plot study, the greater growth and yield caused by Vitazyme gave a 5% yield increase at low-N levels.

Location: ACRES Research Farm, Cedar Falls, Iowa

Seeding date: May 21, 1996

Variety and rate: CFS 6326, 29,900 seeds/acre

Seeding depth: 1.5 inches

Seeding method: John Deere 6-row Maxemerge planter

Experimental design: A randomized complete block design was established on land that had been cropped partly to soybeans and partly to corn in 1995. Each plot was 15 ft wide and 180 ft long (six 30-in rows/plot), the length divided into six 30-foot subplots to improve precision in the analysis. Each treatment was replicated five times. Four treatments were used:

1. Low nitrogen (80 lb/acre), no Vitazyme
2. Low nitrogen (80 lb/acre), with Vitazyme
3. High nitrogen (120 lb/acre), no Vitazyme
4. High nitrogen (120 lb/acre), with Vitazyme

Tillage: The area was disked and field cultivated on May 19, 1996.

Fertility treatments: Nitrogen was applied as a 28% nitrogen solution on May 17, 1995.

Weed control: The same herbicides were applied to all areas.

Vitazyme applications (Treatments 2 and 4):

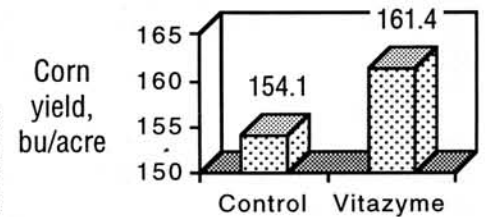
- (1) May 21 — 13 oz/acre applied directly on the seeds at planting
- (2) July 2 — 13 oz/acre sprayed on the soil using drop nozzles, treating the center four rows of each plot; the corn was 23 inches tall (7 leaves)

Comments and conclusions: This study illustrates when nitrogen is more limiting the crop response is generally greater; i.e., Vitazyme appears to make the plant use fertilizer and soil N more efficiently. At 80 lb/acre of N, Vitazyme increased the corn yield by 5%, but Vitazyme had little effect at the 120 lb/acre N level.

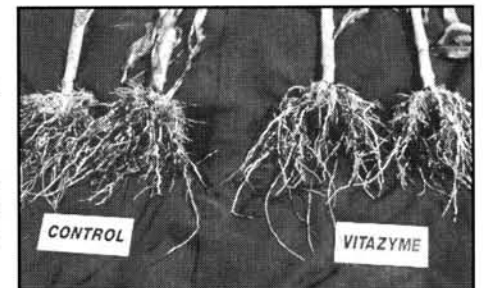
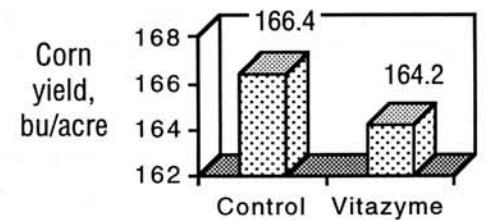
Nitrogen savings: \$10.80 at the low N rate.

- **Income Increase: Low Nitrogen: \$32.70/acre**
- **Income Decrease: High Nitrogen: \$6.60/acre**

Low nitrogen: 5% increase



High nitrogen: 1% decrease



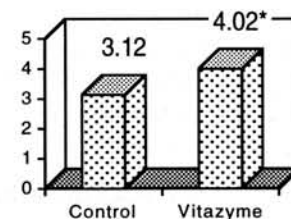
Corn roots responded excellently to Vitazyme applied directly to the seeds at planting.

Greenhouse Study With Corn

One-gallon pots were thinned to three plants/pot, with Vitazyme applied at planting and weekly at 100 ml of a 0.1% solution. Harvest occurred at 33 days.

Replicates = 6.

Plant dry weight, g/plant



*Significantly greater than the control

Cotton

Location: Tulia, Texas

Variety: Paymaster HS-200

Planting date: May 6, 1996

Seeding rate: 21 lb/acre

Experimental design: Two fields were divided into two sections, one a control (untreated) area and one a treated area. Areas of both fields were equal in size and contained equivalent soils and cropping history. Huseman Farm: 96 rows/plot; McCormick Farm: 48 rows/plot. All areas were irrigated with a center pivot system.

1. Control (no Vitazyme)

2. Vitazyme applied twice

Fertility treatments: Composted manure at 2 tons/acre was applied over all areas in October of 1995.

Vitazyme application: Immediately after planting, 13 oz/acre of Vitazyme was sprayed over the soil of treatment 2. A second application at 13 oz/acre was made to the foliage about two weeks after first bloom.

Harvest date: November 10, 1996

Yield results: Ginned cotton and quality data for each plot were obtained from the Lakeview, Texas, Gin.

Quality results:

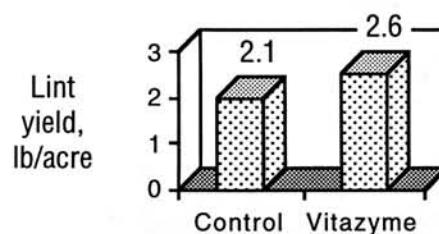
Parameter	Huseman Farm		McCormick Farm	
	Control	Vitazyme	Control	Vitazyme
Grade	2.3	2.1	2.2	2.2
Color	1.0	1.1	1.0	1.0
Leaf trash	2.4	1.1	1.0	2.3
Staple length	36.0	36.1	34.0	34.1
Mic	41.3	40.4	49.8	50.6
Fiber Strength	27.2	27.5	27.8	27.9
Uniformity	82.3	82.0	82.4	81.4
Loan price, ¢/lb	53.46	53.50	49.64	51.00

Once all of the quality characteristics were considered, the Vitazyme-treated cotton commanded a slightly higher government loan price at both farms.

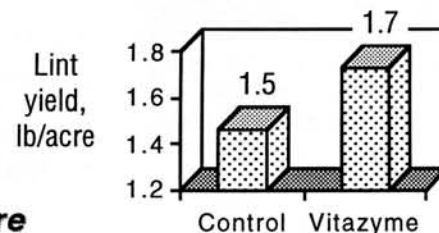
• Income Increases:

Huseman Farm: \$114/acre McCormick Farm: \$52/acre

Huseman Farm: 10.5% increase



McCormick Farm: 9.1% increase



Cotton

Location: Brownfield, Texas

Variety: Paymaster HS-200

Planting date: May 20

Seeding rate: 24 lb/acre (40-inch row spacings)

Experimental design: Two fields 1/2 mile apart were selected that had similar soils and cropping history. One field (31 acres) was the Vitazyme treated field, and the other field (45 acres) the control field. Both fields had grown blue corn in 1995.

1. Control (no Vitazyme)

2. Vitazyme

Fertility treatments: Both fields received 10 tons/acre of manure before planting, and all areas received 20 lb/acre of feather meal in the row at planting.

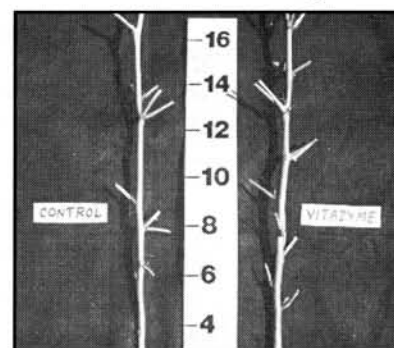
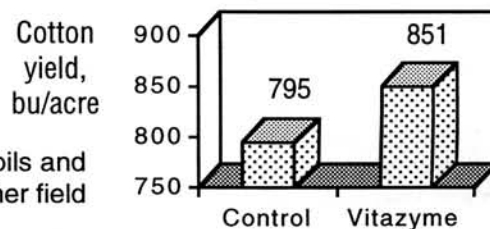
Vitazyme application: Vitazyme was applied at 4 oz/acre directly on the seeds in the furrow at planting. Another 4 oz/acre was applied by sprayer in about 4 gallons of water on July 20, and again on August 1, for a total of 12 oz/acre.

Harvest date: The Vitazyme field was harvested October 30 and November 25, while the control field was harvested October 25 and November 14.

Other observations: During the growing season the Vitazyme-treated cotton had slightly **larger leaves and more total leaf area with shorter internodes**. No quality differences of the cotton from the two treatments were apparent.

• Income Increase: \$56.00/acre

Cotton yield: 7% increase



Notice the shorter internode length resulting from Vitazyme, leading to more flowers and bolls per plant.

Kidney Beans

Location: Oakfield, New York

Variety: California light red kidney beans

Seeding date: May 27, 1996

Seeding rate: 60 lb/acre

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

1. Control (no Vitazyme)
2. Vitazyme applied to the seeds at planting

Fertility treatments: 4 gal/acre Growers 10-20-10 plus 8 oz/acre humate on the seeds at planting; at early bloom, 2 gal/acre Growers 10-20-10 foliar; at drydown, 1 gal/acre liquid-Ca [Ca(NO₃)₂].

Vitazyme application: Vitazyme was applied at 12 oz/acre directly on the seeds at planting along with the starter fertilizer. At early bloom, 6 oz/acre was applied foliar along with the Growers 10-20-10.

Harvest date: mid-October

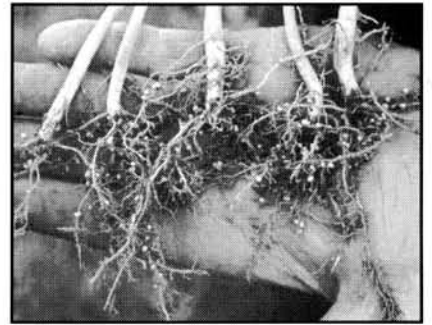
Yield results: No yield check was made, but the field averaged about 27 bu/acre.

Seed quality analysis: Bean samples from both treatments were sent to the Northeast DHIA Forage Testing Laboratory in Ithaca, New York.

Parameter	Control	Vitazyme	Change with Vitazyme
Moisture, %	15.4	13.3	-14%
Dry matter, %	84.6	86.7	+2%
Crude Protein, %	22.8	22.1	-3%
Acid detergent fiber, %	6.8	9.5	+40%
Crude fat, %	1.6	1.4	-13%
NSC ¹ , %	62.6	60.4	-4%
TDN ² , %	81.0	79.0	-2%
Ash, %	4.10	5.69	+39%

¹ NSC = a measure of total simple and complex carbohydrates.

² TDN = total digestible nutrients.

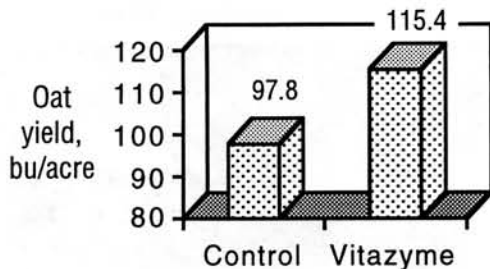


Excellent nodulation was encouraged by Vitazyme application to these kidney beans.

Conclusion: The Vitazyme-treated kidney beans were **drier** by 2.1 percentage points at harvest, indicating faster **maturity** and quicker dry-down of the crops. **Dry matter** was slightly higher with the Vitazyme treatment, but the **ash** (mineral content) of this dry matter was much higher (39%). **Protein, fat, TDN, and NSC** were all slightly lower with the Vitazyme treatment, but the **fiber** content was 40% higher, indicating a much stronger, heavily lignified seed coat.

Oats

**Oat yield with Vitazyme:
18% increase**



Location: Pella, Iowa

Variety: Prairie Brand

Soil type: silty loam

Seeding date: April 9, 1996

Seeding rate: 3 bu/acre (7-inch rows)

Experimental design: A 13-acre field was divided into two equivalent parts:

1. Control (no Vitazyme) - 3 acres
2. Vitazyme - 10 acres

Fertility treatments: On the 13-acre field, used for corn in 1995, 200 lb/acre of 21-0-0-24 (% N-P₂O₅-K₂O-S), 150 lb/acre of K₂O, (as KCl), and 5 lb/acre of boron were applied and worked into all areas.

Vitazyme application: At planting, Vitazyme was sprayed on the soil at 13 oz/acre.

Harvest date: July 26, 1996

Conclusions: Seldom do yields of oats in Iowa exceed 100 bu/acre, but with Vitazyme this yield barrier was broken. The application proved to be highly profitable.

• **Income Increase: \$69.30/acre**

Onions

Location: Arkport, New York

Variety: Lexington

Seeding date: May 27, 1996

Seeding rate: 160,000 seeds/acre, in double rows

Experimental design: An onion field with muck soils was selected that was divided into two parts:

1. Control (no Vitazyme)
2. Vitazyme injected on the seeds at planting

Fertility treatments: All areas received 750 lb/acre of 10-20-20 (75 lb/acre N, 150 lb/acre P₂O₅, 150 lb/acre K₂O) at planting, and 250 lb/acre urea (115 lb/acre N) sidedressed in mid-July.

Vitazyme treatment: 13 oz/acre of Vitazyme was injected on the seeds at planting.

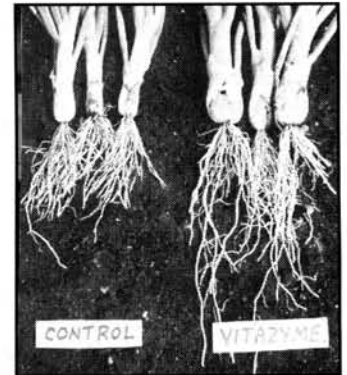
Harvest date: Due to a late planting date and a lack of adequate growing degree days, the onions were never harvested before severe cold froze the bulbs.

Bulb quality analysis: Samples of onions from the Vitazyme treated and control areas were analyzed at the Northeast DHIA Forage Testing Laboratory in Ithaca, New York.

Parameter	Control	Vitazyme	Change with Vitazyme
Moisture, %	93.5	92.3	-1%
Dry matter, %	6.5	7.7	+18%
Crude Protein, %	10.7	11.3	+6%
Acid detergent fiber, %	17.5	12.2	-30%
Crude fat, %	2.0	1.2	-40%
NSC ¹ , %	64.0	67.9	+6%
TDN ² , %	76.0	76.0	0
Ash, %	5.74	5.87	+2%

¹ NSC = a measure of total simple and complex carbohydrates.

² TDN = total digestible nutrients.



On muck soils, when treated with Vitazyme at planting, these onions produced superior root growth.

Conclusion: Vitazyme treatment provided onions that were considerably higher in **dry matter** (18%), and also slightly higher in **ash** (2%), indicating a greater concentration of both minerals and carbonaceous compounds in the tissue. **Protein** was also 6% higher, and the **fat** lower with Vitazyme application. Total **carbohydrates** were 6% higher with Vitazyme. **Fiber** was 30% less with Vitazyme treatment, most likely indicating a more tender bulb.

Peanuts

Location: St. Kitts, West Indies

Variety: Tennessee red

Seeding date: unknown

Seeding rate: unknown

Experimental design: Two treatments were evaluated:

1. Control (no Vitazyme) - 3 acres
 2. Seeds soaked with Vitazyme before planting
- These two treatments were applied to a divided field.
Rows were spaced 12-inches apart.

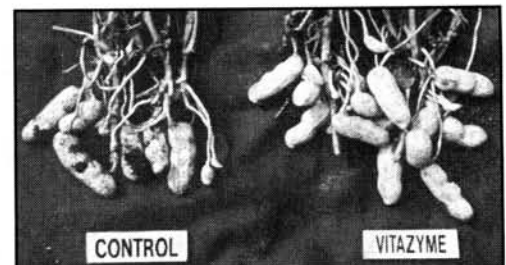
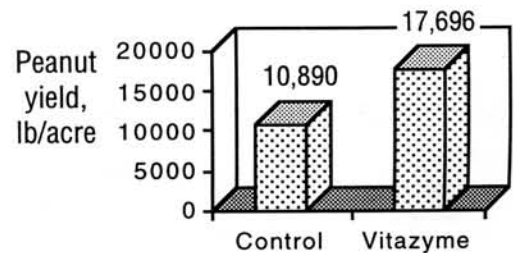
Fertility treatments: none

Vitazyme application: The peanut seeds were soaked for a period of time, and then air-dried for a day before planting.

Harvest date: November 22, 1996

Conclusions: Although the samples collected for yield determinations in this peanut trial were very small, a visual examination of the field before weeds had overtaken the crop revealed that the differences detected by these samples were quite accurate. The weights recorded are from field moist, undried peanuts so are somewhat higher than for a standard dried-down yield calculation.

Peanut yield: 63% increase



In the West Indies, Vitazyme increased peanut production substantially.

Peanuts

Location: Brownfield, Texas

Variety: Valencia

Soil type: silty loam

Seeding date: May 7 (Vitazyme field), and May 2 (control field)

Seeding rate: 90 lb/acre (40-inch row spacings)

Experimental design: Two adjoining fields with similar cropping histories, fertility levels, and soil types were used in this peanut trial. One field received Vitazyme while the other field did not.

1. Control (no Vitazyme)

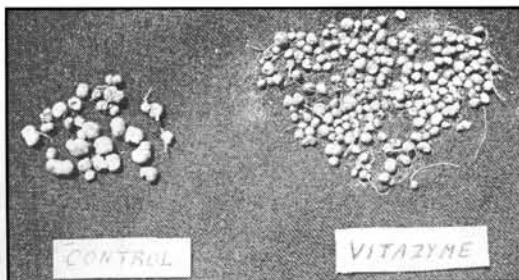
2. Vitazyme

Fertility treatments: Ten tons/acre of manure were applied in 1995 over all areas. The peanuts were inoculated with Rhizobium bacteria at planting for the control using a powder mixed with the seeds; for the Vitazyme treatment, a granulated formulation was used that was spread at 6 lb/acre over the soil before planting. Both fields were irrigated by center pivot systems.

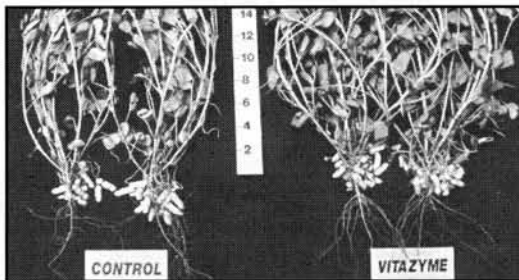
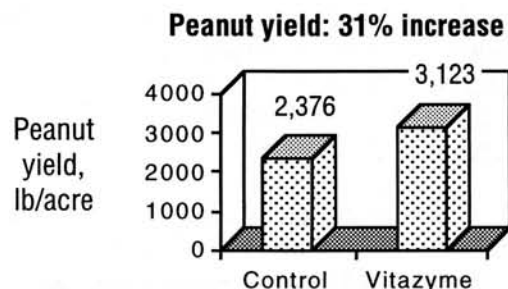
Vitazyme application: At planting, 13 oz/acre of Vitazyme was applied in the seed row.

Harvest date: September 26 (Vitazyme field), and September 20 (control field)

Other observations: The Vitazyme-treated peanuts had **darker leaf color** throughout the growing season, and **greater total leaf area**. **Root mass and peanut number were noticeably greater** for the Vitazyme treatment as well. Of interest is the fact that the plants growing on terrace ridges were quite chlorotic for the control field, but were not detectable for the Vitazyme field, where all plants appeared to be equally green. The quality of the peanuts for both treatments was the same (SMK 69-73, or 69 to 73% "sound, mature kernels").



Nodulation was greatly increased by Vitazyme application to peanuts in West Texas (taken from the plants at the right).



Vitazyme improved chlorophyll development, top growth, and peanut production (31%) in this sandy soil.

• **Income Increase: \$276.39/acre**

Peas

Location: Kast Farms, Inc., Albion, New York

Planting date: May 28, 1996

Variety: Bolero

Seeding rate: 210 lb/acre

Row spacing: 7.5 inches

Previous crops: field corn

Experimental design: A pea field was divided into two portions for this study:

1. Control (no Vitazyme) - 31 acres

2. Vitazyme - 27 acres

Fertility treatments: The control area of the field received 400 lb/acre of 10-20-20 (%N-P₂O₅-K₂O), preplant incorporated. The Vitazyme treated area received 300 lb/acre of high calcium lime, 100 lb/acre of ammonium sulfate, and 100 lb/acre of 10-20-20, preplant incorporated.

Vitazyme application: When the peas were 4 to 6 inches tall, 1 gal/acre of Ca (NO₃)₂ + sugar, 12 oz/acre of Vitazyme, and a herbicide were sprayed on the soil and leaves in 20 gal/acre of water. A second Vitazyme application at 12 oz/acre was sprayed on the leaves and soil at early flowering along with 1 gal/acre of 9-18-9 fertilizer in 20 gal/acre of water.

Harvest date: July 24, 1996

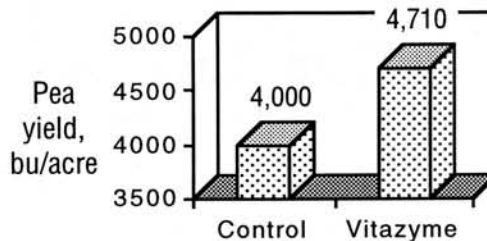
Notes and observations: The comparison in this test involves not just Vitazyme, but to a certain extent the other different fertilizer amendments used with it. The quality and grade of the peas differed somewhat as follows (lower number = higher quality):

Control "Tenderometer" values: 128

Vitazyme "Tenderometer" values: 120

According to the harvesters, the plants of the Vitazyme treatment had a darker green color and were taller than plants in the control treatment.

**Pea yield with Vitazyme:
18% increase**



Snap Beans

Location: Kast Farms Inc., Albion, New York

Variety: Hystyle for processing

Planting date: June 1, 1996

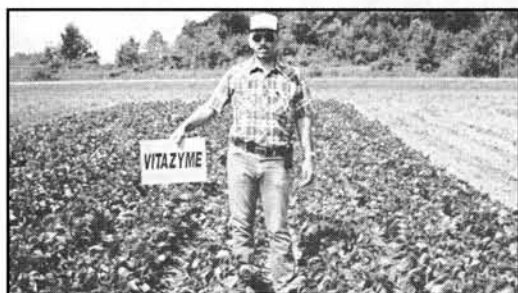
Seeding rate: 120,000 seeds/acre

Row spacing: 30 inches

Previous crops: field corn

Experimental design: A 22-acre field of beans was divided into two parts having roughly equivalent soil types:

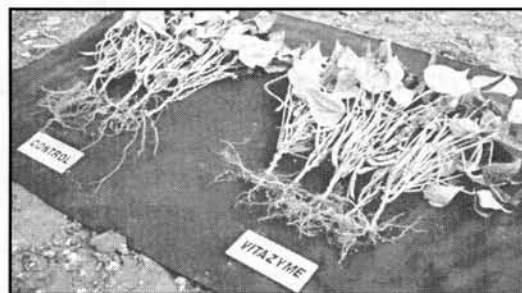
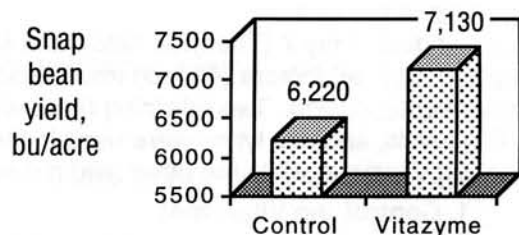
1. Control (no Vitazyme) - 9 acres
2. Vitazyme - 13 acres



This treated strip was saved for plant evaluation; note the plants in the picture to the right.

Fertility treatments: The control area received 1 ton/acre of lime, incorporated before planting, and 350 lb/acre of 10-26-10 (%N-P₂O₅-K₂O) at planting. The Vitazyme area, on the other hand, received as a preplant incorporated application 400 lb/acre of high calcium lime, 200 lb/acre of ammonium sulfate, and 1 gal/acre of Ca(NO₃)₂ + sugar. The Vitazyme area also received 200 lb/acre of 10-26-10 at planting.

Snap bean yield: 15% increase



Larger plants and more beans characterized the snap beans treated with Vitazyme at Kast Farms.

Vitazyme application: Vitazyme at 12 oz/acre was sprayed on the soil along with a herbicide in 20 gal/acre of water.

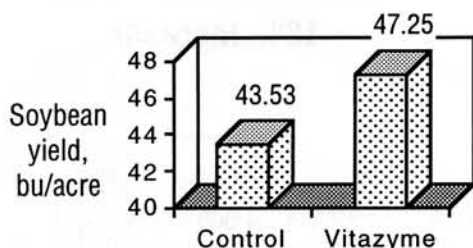
Harvest date: July 30, 1996

Notes and observations: The comparison in this test involves not just Vitazyme, but the other different fertilizer amendments used with it. The quality and grade of the beans was about the same for both treatments, but the harvester operator noted that the Vitazyme treated area had larger plants, on average, than did the control. On July 30, chlorophyll measurements for the two treatments revealed 44.8 SPAD units for Vitazyme and 42.7 SPAD units for the control.

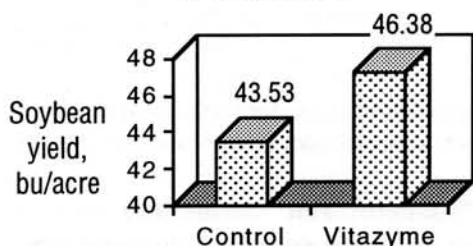
• Income Increase: \$59.15/acre

Soybeans

Soybean yield with Vitazyme once:
8.5% increase



Soybean yield with Vitazyme twice:
6.5% increase



Location: Wakefield, Nebraska

Variety: Rolling Meadows 9529

Experimental design: Three treatments were evaluated:

1. Control (no Vitazyme)
2. Vitazyme sprayed on the soil before planting
3. Vitazyme sprayed on the soil before planting, and to the leaves and soil at the second trifoliolate leaf stage

These three treatments were applied side-by-side in four-row strips, using 30-inch rows, down the length of the 0.5-mile long field. Soils were uniform throughout the test area.

Vitazyme application: For Treatments 2 and 3, Vitazyme was sprayed on the soil along with Roundup herbicide (no-till) on June 1, five days before planting, at 13 oz/acre. Treatment 3 received an additional 13 oz/acre sprayed over the leaves and soil at the second trifoliolate stage (June 26). Treatment 1 received no Vitazyme or other treatment.

Harvest date: October 18, 1996

Yield results: Soybeans for each strip were harvested separately and weighed. There were yield increases over the untreated strip of 3.75 bu/acre for one Vitazyme application, and 2.88 bu/acre for two applications. Seed moisture was about 10% at harvest.

Other observations: Crops throughout eastern Nebraska produced very well during 1996, experiencing relatively little stress. Since Vitazyme works best under moderate environmental stress, improvements in yield during less ideal years would be greater.

• Income Increase: \$24.93/acre