Cotton

Farmer: Richard Schweers
Variety: unknown
Test cooperater: Clyde Muennink
Planting date: unknown
Location: Hondo, Texas

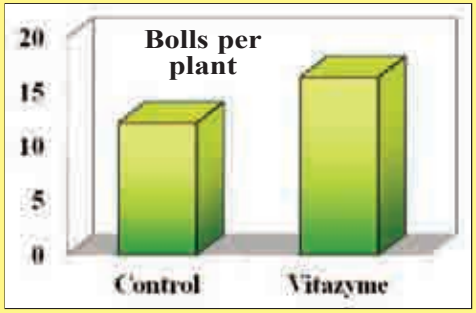
Experimental design: A cotton field had two 6-acre areas separated for a test to compare Vitazyme treatment with an untreated control. The purpose of the test was to evaluate the effects of the product on cotton growth parameters.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: 13 oz/acre at mid-bloom
Harvest date: unknown
Growth parameters: Near harvest, the county agricultural extension agent assisted in evaluating the number of bolls per plant. After harvest, the roots from 19 plants of each treatment were dug and cut off at the soil level, then dried and weighed.
Conclusion: This cotton trial in south central Texas revealed that Vitazyme substantially improved the boll number per plant (34%), a direct reflection of a much greater root system (44%) as evidenced by dry root weight. The yield of the cotton could not be evaluated due to harvesting limitations. Vitazyme is shown by this study to have great potential in improving cotton yields for Texas farmers.

Bolls Per Plant

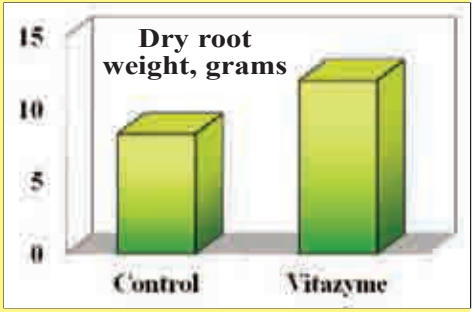
Treatment	Bolls	Change
	bolls/plant	bolls/plant
Control	12.2	—
Vitazyme soak	16.4	4.2 (+34%)



• Increased bolls with Vitazyme: 34%

Dry Root Weight

Treatment	Weight	Change
	grams	grams
Control	8.31	---
Vitazyme	12.00	3.69 (+44%)
Main effects P	0.0223*	
Model P	0.0223*	
CV	46.9%	
$LSD_{0.05}$	3.13g	



• Increase in root weight with Vitazyme: 44%

Vital Earth Resources
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2009 Crop Results

Vitazyme on Cotton

Researchers: Wang Zhongyan, Peng Juneal, Cai Jinshu, Yi Chun, Xino Wenzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute; Liu Shibin, Zheng Jinping, and Song Jianping, Changde Jinshi Agricultural Bureau

Location: Xinzhou, Jinshi, Hunan, China

Variety: Jingfeng 1

Planting date: April 14, 2009

Experimental design: A two treatment design with three replications was placed with a cotton field, each plot being 0.4 heaters. The purpose of the study was to evaluate the efficacy of this product to promote cotton growth, yield, and income.

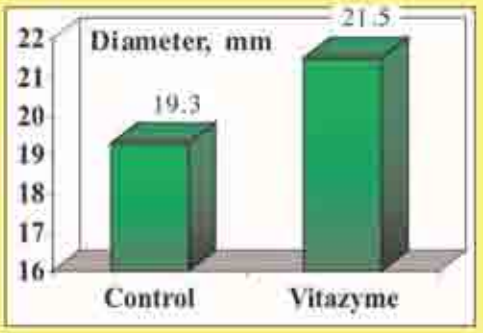
1. Control **2. Vitazyme**

Fertilization: unknown

Vitazyme application: (1) a seed soak of 5% Vitazyme for 5 minutes (April 14); 1.0 liter/ha sprayed on the leaves and soil at early flowering (July 10)

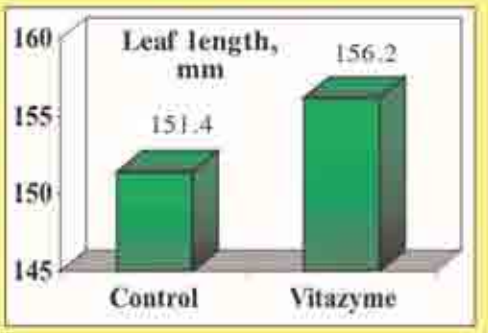
Growth results: The researchers observed stronger growth, thicker stems, larger leaves, more bolls, and a larger boll size with Vitazyme than with the control treatment.

Stem Diameter



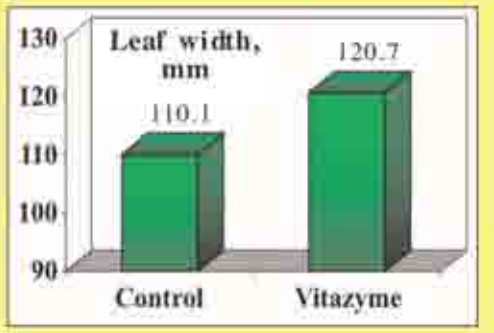
Increase in stem diameter with Vitazyme: 11%

Leaf Length



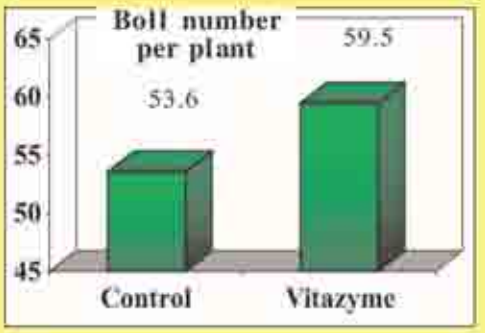
Increase in leaf length with Vitazyme: 3%

Leaf Width



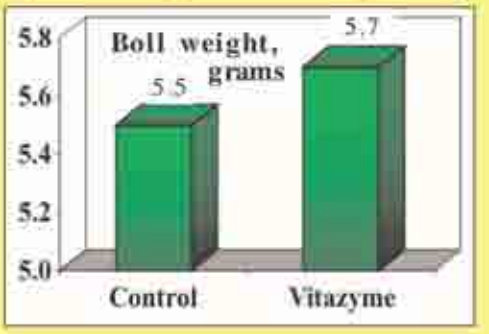
Increase in leaf width with Vitazyme: 10%

Bolls Per Plant



Increase in bolls per plant with Vitazyme: 11%

Average Boll Weight



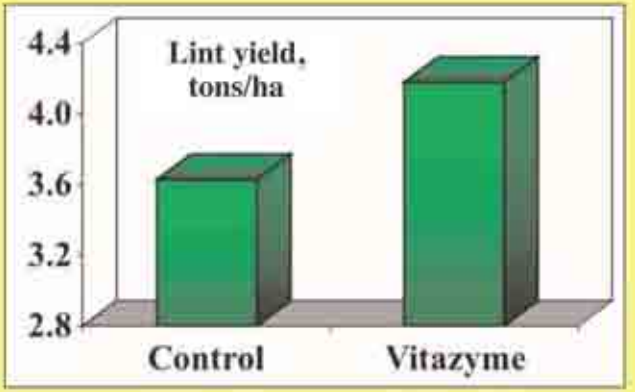
Increase in boll weight with Vitazyme:4%

Harvest date: unknown

Yield results:

Treatment	Yield	Change
	--------- tons/ha	----------
Control	3.63	—
Vitazyme	4.18	0.55 (+15%)

Increase in lint yield with Vitazyme: 15%



Income results:

Treatment	Income	Change
	--------- RMB/ha	----------
Control	20,328	—
Vitazyme	23,408	3,080 (+15%)

Increase in cotton income with Vitazyme: 15%

Conclusions: This cotton trial in China revealed that Vitazyme greatly improved cotton growth in terms of stem diameter (11%), leaf length (3%), leaf width (10%), bolls per plant (11%), and boll weight (4%). These improvements led to a yield increase of 15% above the untreated control, and an income increase of 15%. These results show the great utility and profitability of this product for cotton in China.

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2007 Crop Results

Vitazyme on Cotton

Farmer/Researcher: Blaine Middleton
Variety: Delta-Pine 164 P2R
Planting rate: 60,000 seeds/acre
In-row spacing: 4 plants/foot
Planting date: May, 2007
Location: Lamesa, Texas
Soil type: Amarillo sandy loam and a lacustrine soil
Row spacing: 36 inches
Watering: center-pivot irrigation

Experimental design: A cotton field circle was divided into Vitazyme treated and untreated areas, with 10-acre side-by-side strips selected for a comparison of cotton yield.

1. Control **2. Vitazyme**

Fertilization: 600 lb/acre of 6-15-5-2% N-P_2O_5-K_2O-S preplant dry; 200 lb/acre of 33% nitrogen, side-dressed on July 3

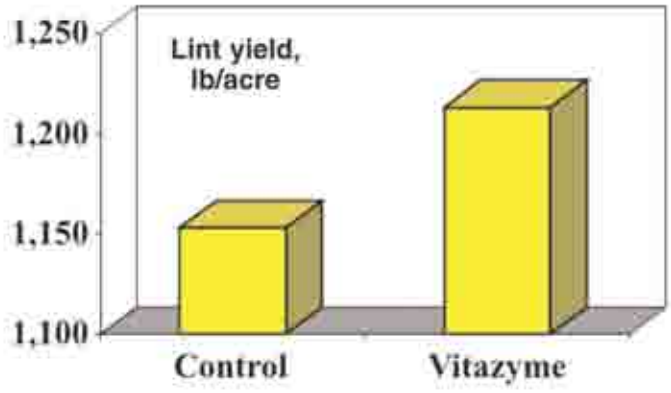
Vitazyme application: (1) 13 oz/acre at planting on the seeds; 13 oz/acre on the leaves on July 2 (first square).

Water treatment: Since the water is salty for this pivot, a Water Aquatron unit was used to electronically treat the water for improved yields.

2007 weather: a very good growing season with about 35 inches of rain for the year

Treatment	Lint yield	Change
	lb/acre	lb/acre
Control	1,153	—
Vitazyme	1,213	60 (+5%)

Increase in lint yield with Vitazyme: 5%



Ethylene, fertilizer, and fungicide treatment: ethylene, Vydate, and 1 lb/acre of 20-20-20% N-P_2O_5-K_2O applied on July 2, with Vitazyme

Harvest date: November, 2007

Yield results:

Conclusions: This cotton trial with Vitazyme on sandy loam soils in west Texas, using electronically treated irrigation water, provided a 5% lint increase with a seed treatment and a foliar application at first square. No seed yield had yet been determined when this report was submitted.

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2007 Crop Results

Vitazyme on Cotton

Texas A&M University

Researcher: Josh Bynum and Tom Cothren, Ph.D. *Location*: Texas A&M University, Department of Soil and Crop Sciences, College Station, Texas
Variety: Delta and Pine 164 Bollgard II/RR Flex
Soil type: Weswood silt loam (pH, 8.1) *Previous crop*: cotton
Planting depth: unknown *Planting rate*: 52,000 seeds/acre
Row spacing: 40 inches *Planting date*: April 28, 2007 *Tillage*: conventional

Experimental design: A site at the university's research field was selected that corresponded to the same location as an identical study in 2006. Plots were 13.3 (four rows) x 32 feet with a split-plot design, placing Vitazyme treatments in the whole plots, and nitrogen rates in the subplots. The two center rows of the four rows in each plot were harvested for lint yield determinations. Because there were about 30 lb/acre of residual nitrogen in the soils at planting and there could be no zero nitrogen rate, the four nitrogen rates ranged from 30 to 120 lb/acre. The purpose of the study was to evaluate the effects of Vitazyme on lint yield and quality, as well as various growth parameters, at four nitrogen levels.

1. **Control + 30 lb/acre nitrogen**
2. **Vitazyme + 30 lb/acre nitrogen**
3. **Control + 60 lb/acre nitrogen**
4. **Vitazyme + 60 lb/acre nitrogen**
5. **Control + 90 lb/acre nitrogen**
6. **Vitazyme + 90 lb/acre nitrogen**
7. **Control + 120 lb/acre nitrogen**
8. **Vitazyme + 120 lb/acre nitrogen**

Fertilization: 30, 60, and 90 lb/acre of nitrogen applied before planting to appropriate plots to provide totals of 30, 60, 90, and 120 lb/acre nitrogen

Vitazyme application: 13 oz/acre on the seeds at planting (April 24), 13 oz/acre on the leaves and soil at early bloom (June 29), and 13 oz/acre to the leaves 28 days later (July 26)

Weather: Rainfall was above average and temperatures were average during the growing season.

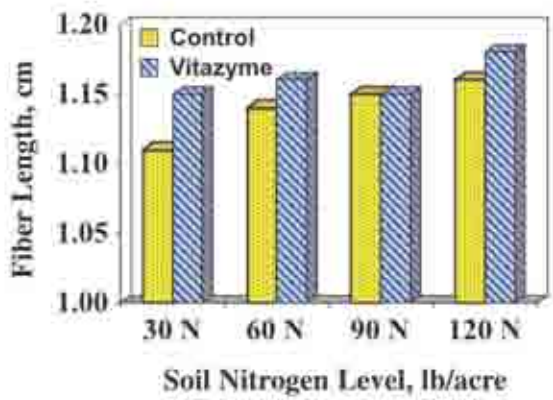
Harvest date: the first week of September (the 30 lb/acre N rate) to about September 19 (the 120 lb/acre N rate)

Lint quality results: Samples of the lint from each plot were sent to a testing laboratory to determine the diameter, length, uniformity, and strength of the fibers. There were no significant differences among the treatments for diameter and uniformity. There were significant difference, however, for fiber length and strength.

Fiber Length

Treatment	Length*	Change**
	cm	cm
1. Control, 30 N	1.11 c	—
2. Vitazyme, 30 N	1.15 b	0.04 (+4%)
3. Control, 60 N	1.14 bc	—
4. Vitazyme, 60 N	1.16 ab	0.02 (+2%)
5. Control, 90 N	1.15 b	—
6. Vitazyme, 90 N	1.15 b	0
7. Control, 120 N	1.16 ab	—
8. Vitazyme, 120 N	1.18 a	0.02 (+2%)

*Means followed by the same letter are not significantly different at P=0.05.
**Comparisons are made at the same nitrogen level.



Effect of Vitazyme on Fiber Length

Treatment	Length*	Change
	cm	cm
Control	1.14 b	—
Vitazyme	1.16 a	0.02 (+2%)

*Means followed by the same letter are not significantly different at P=0.05.

Increase in fiber length with Vitazyme: 2%

Effect of Nitrogen on Fiber Length

Treatment	Length*	Change
	cm	cm
30 N	1.13 c	—
60 N	1.15 b	0.02 (+2%)
90 N	1.15 b	0.02 (+2%)
120 N	1.17 a	0.04 (+4%)

*Means followed by the same letter are not significantly different at P=0.05.
**Comparisons are made with the 30 lb/acre nitrogen rate.

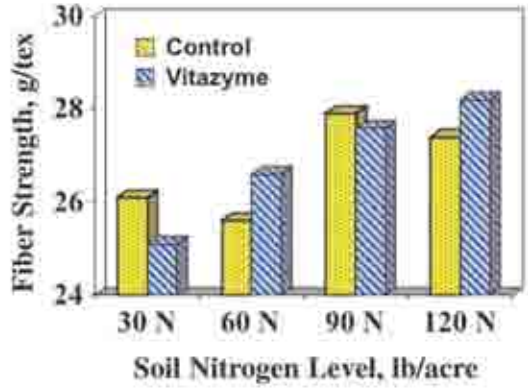
Increase in fiber length with nitrogen: 2 to 4%

Vitazyme increased fiber length significantly at 30 lb/acre nitrogen, and also increased the length at 60 and 120 lb/acre nitrogen. The overall effect was an increase in fiber length across all nitrogen treatments by 2% (0.02 cm). Nitrogen also increased fiber length as rates increased, by 4% (0.04 cm) at the 120 lb/acre rate.

Fiber Strength

Treatment	Strength*	Change**
	g/tex	g/tex
1. Control, 30 N	26.1 abc	—
2. Vitazyme, 30 N	25.1 c	(-) 1.0 (-4%)
3. Control, 60 N	25.6 bc	—
4. Vitazyme, 60 N	26.6 abc	1.0 (+4%)
5. Control, 90 N	27.9 a	—
6. Vitazyme, 90 N	27.6 ab	(-) 0.3 (-1%)
7. Control, 120 N	27.4 ab	—
8. Vitazyme, 120 N	28.2 a	0.8 (+3%)

*Means followed by the same letter are not significantly different at P=0.10.
**Comparisons are made at the same nitrogen level.



Effect of Vitazyme on Fiber Strength

Treatment	Strength*	Change
	g/tex	g/tex
Control	26.8 a	—
Vitazyme	26.9 a	0.1 (+3%)

*No significant difference.

Effect of Nitrogen on Fiber Strength

Treatment	Strength*	Change
	g/tex	g/tex
30 N	25.6 b	—
60 N	26.1 ab	0.5 (+2%)
90 N	27.8 a	2.2 (+9%)
120 N	27.8 a	2.2 (+9%)

*Means followed by the same letter are not significantly different at P=0.10.
**Comparisons are made with the 30 lb/acre nitrogen rate.

Increase in fiber strength with nitrogen: 2 to 9%

Vitazyme did not significantly increase fiber strength above the controls at any nitrogen level, but the single greatest strength was 28.2 g/tex with Vitazyme at the 120 lb/acre nitrogen rate. Increasing nitrogen rates caused an increase in fiber strength by up to 9%.

Statistical summary:
Partial analysis of variance for stand counts, plant height, total nodes, nodes above white flower (NAWF) and lint yield.

		Early Bloom (June 29)		Early Bloom + 28 Days (July 26)			
Factor	**Stand Counts**	**Height**	**Node**	**Height**	**Node**	**NAWF***	**Lint**
	10' row	cm	nodes/plant	cm	nodes/plant	value	lbs/acre
Control	0.6717	0.0001	0.0419	0.0001	0.0002	0.0001	0.0174
Nitrogen	0.8403	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
V*N	0.9253	0.0126	0.0437	0.0046	0.5264	0.0001	0.0014

*Nodes above white flowers.

Mean separation for each factor (Vitazyme and nitrogen) for stand counts, plant height, total nodes, Nawf and lint yield.*

		Early Bloom (June 29)		Early Bloom + 28 Days (July 26)			
Factor	**Stand Counts**	**Height**	**Node**	**Height**	**Node**	**NAWF**	**Lint**
	10' row	cm	nodes/plant	cm	nodes/plant	value	lbs/acre
Vitazyme	41.25 a	70.15 a	14.05 a	77.03 a	17.51 a	5.76 a	979.19 a
No Nitrogen	41.50 a	65.96 b	13.58 b	73.06 b	16.56 b	5.47 b	919.87 b
Nitrogen:							
120 lb/acre	41.63 a	76.96 a	15.05 a	86.45 a	19.13 a	6.75 a	1096.89 a
90 lb/acre	41.63 a	72.04 b	14.45 ab	81.14 b	18.43 b	5.59 b	1053.77 a
60 lb/acre	41.00 a	69.73 c	13.95 b	75.64 c	16.90 c	5.20 c	1046.04 a
30 lb/acre	41.25 a	53.49 d	11.80 c	56.95 d	13.70 d	4.93 d	601.42 b

*Means followed by the same letter are not significantly different at P=0.05.

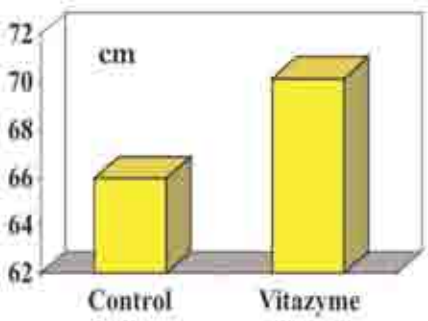
The above tables reveal that both Vitazyme and nitrogen significantly increased all growth and yield parameters for the season. Stand count was not significantly affected by either input. Of considerable interest is the fact that all parameters, except nodes per plant on July 26, showed a significant interaction between Vitazyme and nitrogen: i.e., Vitazyme boosted the response to nitrogen for these parameters.

Overall values for combined treatments were significantly boosted by Vitazyme (except stand count), while nitrogen in most cases increased parameter values, except for yield where only the 30 lb/acre N rate was significantly less than the higher three values.

Effects of Vitazyme Over All Nitrogen Rates

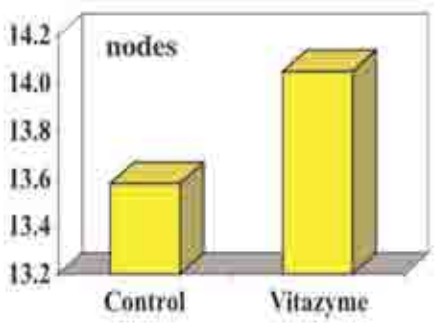
(All increases are significant)

Height, Early Bloom



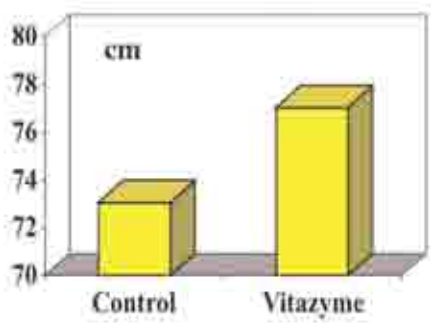
Increase with Vitazyme: 6%

Nodes Per Plant, Early Bloom



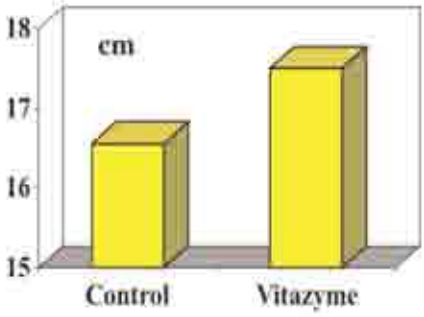
Increase with Vitazyme: 3%

Height, Bloom + 28 days



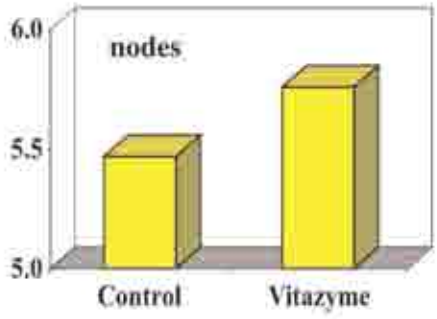
Increase with Vitazyme: 5%

Nodes Per Plant, Bloom + 28 Days



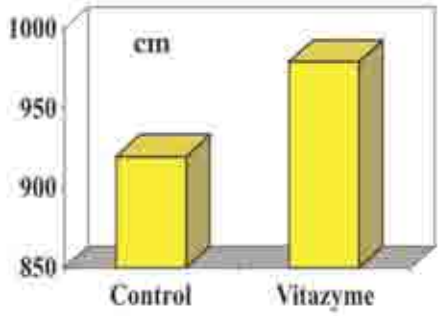
Increase with Vitazyme: 6%

Nodes Above White Flowers, Bloom + 28 Days



Increase with Vitazyme: 5%

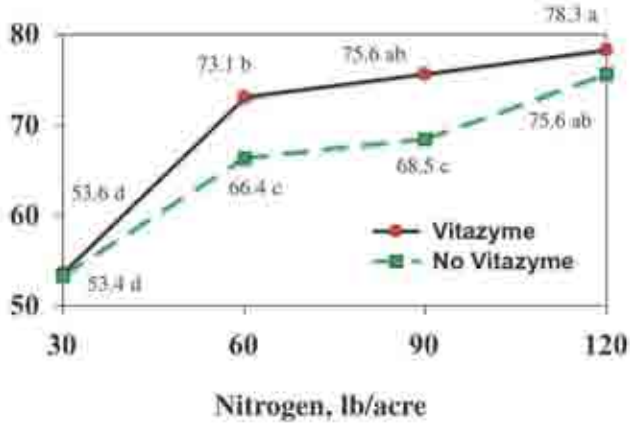
Lint Yield



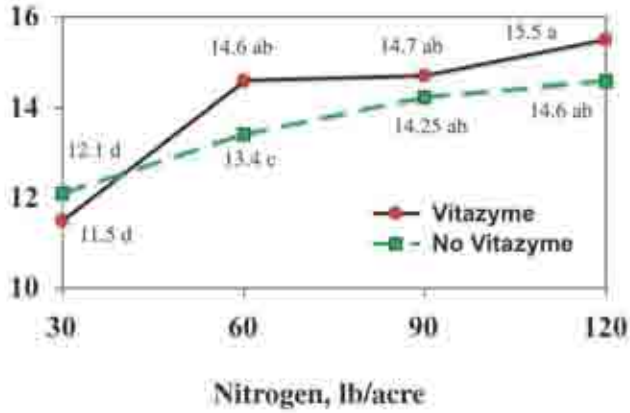
Increase with Vitazyme: 6%

Vitazyme effects at four nitrogen levels: There was no effect of either Vitazyme or nitrogen on any stand counts. For each nitrogen level, different letters indicate significant differences in the means.

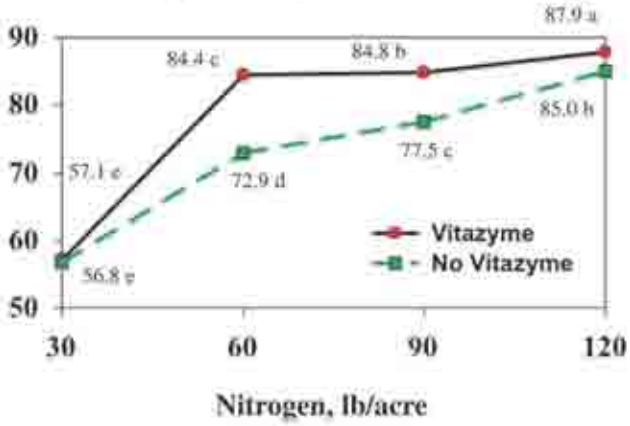
Plant Height (cm) - Early Bloom



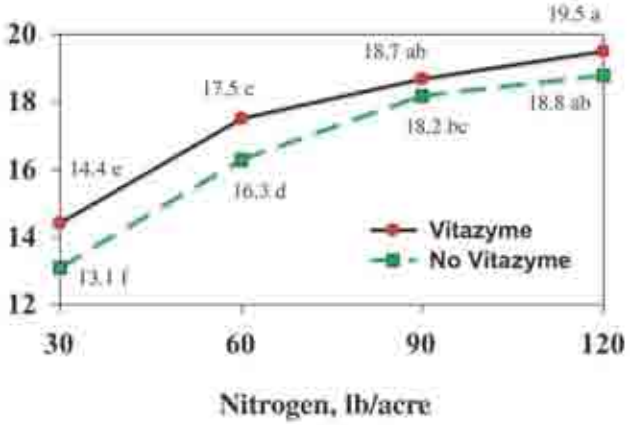
Nodes Per Plant - Early Bloom

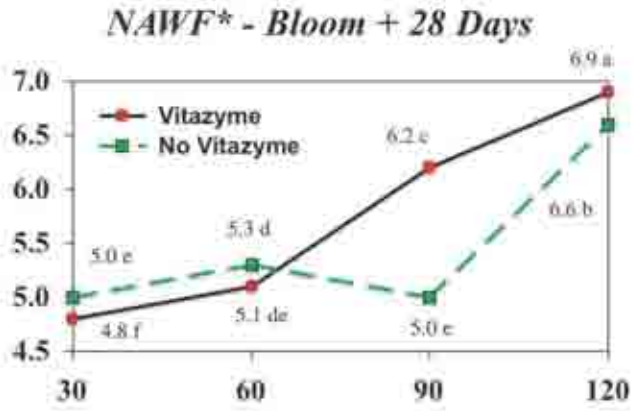


Plant Height (cm) - Bloom + 28 Days



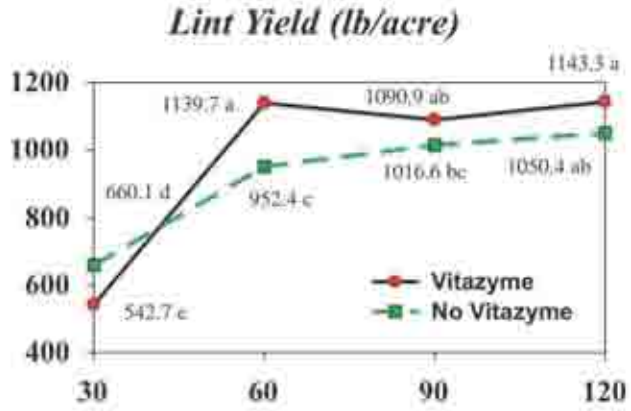
Nodes Per Plant - Bloom + 28 Days





Nitrogen, lb/acre

*Nodes above white flower



Nitrogen, lb/acre

Obvious in all of these six graphs is the effect of Vitazyme to significantly boast cotton growth and yield parameters above the untreated controls, at all but the 30 lb/acre N rate. The yield was somewhat less with Vitazyme at the 30 lb/acre N rate, presumably because the growth and nodes provided by Vitazyme could not be filled by an inadequate nitrogen supply. NAWF (nodes above white flower), a reliable indicator of final lint yield, was significantly greater than the control with Vitazyme at the higher nitrogen rates, and the final yields bore this out. These lint yields for the 60, 90, and 120 lb/acre nitrogen rates are summarized below.

Nitrogen rate	Lint yield		Yield increase with Vitazyme	
	Vitazyme	No Vitazyme		
lb/acre	lb/acre	lb/acre	lb/acre	percent
120	1,143.3	1,050.4	92.9	9
90	1,090.9	1,016.6	74.3	7
60	1,139.7	952.4	187.3	20

Of considerable interest in this table is the fact that, at the 50% nitrogen rate (60 lb/acre), Vitazyme produced nearly an identical yield as did the 100% nitrogen rate (120 lb/acre) with Vitazyme. Moreover, the lint yield with Vitazyme at the 50% nitrogen rate exceeded the lint yield without Vitazyme at the 100% nitrogen rate by 89.3 lb. or 9%. This yield increase despite a reduced nitrogen application shows the capability of Vitazyme within the soil-plant system to promote the improved utilization of nitrogen.

Conclusions: This replicated cotton study at Texas A&M university revealed that Vitazyme significantly impacted all growth and yield parameters in a positive direction. Over all nitrogen levels, these parameters produced the following significant effects at P=0.05:

Height at early bloom 6%
Nodes per plant at early bloom 3%
Height at 28 days after early bloom 5%
Nodes per plant at 28 days after early bloom 6%
Nodes above white flower at 28 days after early bloom 5%
Lint yield 6%

The improved growth parameters translated into a 6% lint yield increase. Especially noteworthy is the fact that, at 60 lb/acre of nitrogen, Vitazyme increased the lint yield by an amazing 20% above the untreated control, this yield about equaling the 120 lb/acre nitrogen rate yield and exceeding the 120 lb/acre nitrogen rate alone by 89.3 lb/acre. This effect demonstrates the ability of Vitazyme to help the plant better utilize nitro-

gen, and allow the grower to reduce nitrogen applications without sacrificing yield ... in this case by reducing such applications by 50%. Yield increase with Vitazyme was 9% at the 120 lb/acre nitrogen rate, and 7% at the 90 lb/acre rate. Nodes above white flower at 28 days after early bloom was an accurate predictor of final lint yield.

Fiber length was significantly enhanced by both Vitazyme (2%) and nitrogen (up to 4%), while fiber strength was improved by up to 9% by nitrogen. Vitazyme with the 120 lb/acre nitrogen rate, however, produced the single greatest fiber strength value of any treatment.

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2007 Crop Results

Vitazyme on Cotton

Farmer/Researcher: Blaine Middleton
Variety: Delta-Pine 164 P2R
Planting rate: 60,000 seeds/acre
In-row spacing: 4 plants/foot
Planting date: May 28, 2007
Location: Lamesa, Texas
Soil type: Pertullis and Amarillo sandy loams
Row spacing: 36 inches
Watering: center-pivot irrigation

Experimental design: A cotton field circle was divided into Vitazyme treated and untreated areas, with 10-acre side-by-side strips selected for a comparison of cotton yield.

1. Control **2. Vitazyme**

Fertilization: 600 lb/acre of 6-15-5-2% N-P_2O_5-K_2O-S preplant dry; 200 lb/acre of 33% nitrogen, side-dressed on July 3

Vitazyme application: (1) 13 oz/acre at planting on the seeds; 13 oz/acre on the leaves on July 2.

Water treatment: Since the water is salty for this pivot, a Water Aquatron unit was used to electronically treat the water for improved yields.

2007 weather: a very good growing season with about 35 inches of rain for the year

Ethylene, fertilizer, and fungicide treatment: ethylene, Vydate, and 1 lb/acre of 20-20-20% N-P_2O_5-K_2O applied on July 2, with Vitazyme

Harvest date: November 13

Yield results:

Treatment	Lint yield	Change	Seed yield	Change
	lb/acre	lb/acre	lb/acre	lb/acre
Control	1,351	—	2,184	—
Vitazyme	1,396	45 (+3%)	2,345	161 (+7%)

Increase in lint yield with Vitazyme: 3%

Increase in seed yield with Vitazyme: 7%

Conclusions: This cotton trial with Vitazyme on sandy loam soils in west Texas, using electronically treated irrigation water, revealed a 3% lint and 7% seed increase with a seed treatment and a foliar application at early bloom.

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2007 Crop Results

Vitazyme on Cotton

Texas A&M University

Researcher: Josh Bynum and Tom Cothren, Ph.D. and Crop Sciences, College Station, Texas
Location: Texas A&M University, Department of Soil
Variety: Delta and Pine 164 Bollgard II/RR Flex
Soil type: Weswood silt loam (pH, 8.1)
Previous crop: cotton
Planting depth: unknown
Planting rate: 52,000 seeds/acre
Row spacing: 40 inches
Planting date: April 28, 2007
Tillage: conventional

Experimental design: A site at the university's research field was selected that corresponded to the same location as an identical study in 2006. Plots were 13.3 (four rows) x 32 feet with a split-plot design, placing Vitazyme treatments in the whole plots, and nitrogen rates in the subplots. The two center rows of the four rows in each plot were harvested for lint yield determinations. Because there were about 30 lb/acre of residual nitrogen in the soils at planting and there could be no zero nitrogen rate, the four nitrogen rates ranged from 30 to 120 lb/acre. The purpose of the study was to evaluate the effects of Vitazyme on lint yield and quality, as well as various growth parameters, at four nitrogen levels.

1. **Control + 30 lb/acre nitrogen**
2. **Vitazyme + 30 lb/acre nitrogen**
3. **Control + 60 lb/acre nitrogen**
4. **Vitazyme + 60 lb/acre nitrogen**
5. **Control + 90 lb/acre nitrogen**
6. **Vitazyme + 90 lb/acre nitrogen**
7. **Control + 120 lb/acre nitrogen**
8. **Vitazyme + 120 lb/acre nitrogen**

Fertilization: 30, 60, and 90 lb/acre of nitrogen applied before planting to appropriate plots to provide totals of 30, 60, 90, and 120 lb/acre nitrogen

Vitazyme application: 13 oz/acre on the seeds at planting (April 24), 13 oz/acre on the leaves and soil at early bloom (June 29), and 13 oz/acre to the leaves 28 days later (July 26)

Weather: Rainfall was above average and temperatures were average during the growing season.

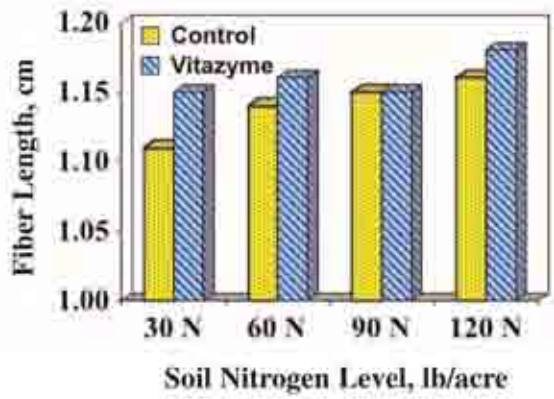
Harvest date: the first week of September (the 30 lb/acre N rate) to about September 19 (the 120 lb/acre N rate)

Lint quality results: Samples of the lint from each plot were sent to a testing laboratory to determine the diameter, length, uniformity, and strength of the fibers. There were no significant differences among the treatments for diameter and uniformity. There were significant difference, however, for fiber length and strength.

Fiber Length

Treatment	Length*	Change**
	cm	cm
1. Control, 30 N	1.11 c	—
2. Vitazyme, 30 N	1.15 b	0.04 (+4%)
3. Control, 60 N	1.14 bc	—
4. Vitazyme, 60 N	1.16 ab	0.02 (+2%)
5. Control, 90 N	1.15 b	—
6. Vitazyme, 90 N	1.15 b	0
7. Control, 120 N	1.16 ab	—
8. Vitazyme, 120 N	1.18 a	0.02 (+2%)

*Means followed by the same letter are not significantly different at P=0.05.
**Comparisons are made at the same nitrogen level.



Effect of Vitazyme on Fiber Length

Treatment	Length*	Change
	cm	cm
Control	1.14 b	—
Vitazyme	1.16 a	0.02 (+2%)

*Means followed by the same letter are not significantly different at P=0.05.

Increase in fiber length with Vitazyme: 2%

Effect of Nitrogen on Fiber Length

Treatment	Length*	Change
	cm	cm
30 N	1.13 c	—
60 N	1.15 b	0.02 (+2%)
90 N	1.15 b	0.02 (+2%)
120 N	1.17 a	0.04 (+4%)

*Means followed by the same letter are not significantly different at P=0.05.
**Comparisons are made with the 30 lb/acre nitrogen rate.

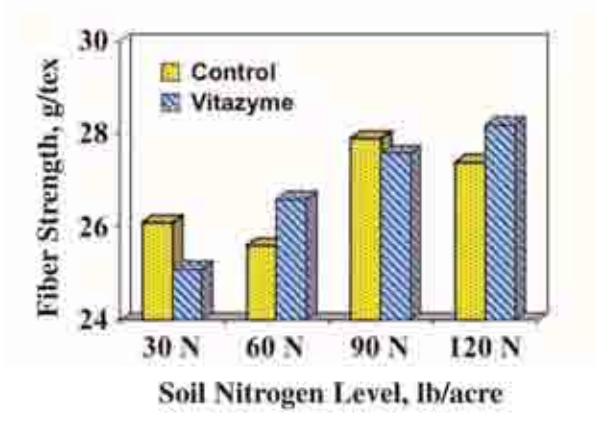
Increase in fiber length with nitrogen: 2 to 4%

Vitazyme increased fiber length significantly at 30 lb/acre nitrogen, and also increased the length at 60 and 120 lb/acre nitrogen. The overall effect was an increase in fiber length across all nitrogen treatments by 2% (0.02 cm). Nitrogen also increased fiber length as rates increased, by 4% (0.04 cm) at the 120 lb/acre rate.

Fiber Strength

Treatment	Strength*	Change**
	g/tex	g/tex
1. Control, 30 N	26.1 abc	—
2. Vitazyme, 30 N	25.1 c	(-) 1.0 (-4%)
3. Control, 60 N	25.6 bc	—
4. Vitazyme, 60 N	26.6 abc	1.0 (+4%)
5. Control, 90 N	27.9 a	—
6. Vitazyme, 90 N	27.6 ab	(-) 0.3 (-1%)
7. Control, 120 N	27.4 ab	—
8. Vitazyme, 120 N	28.2 a	0.8 (+3%)

*Means followed by the same letter are not significantly different at P=0.10.
**Comparisons are made at the same nitrogen level.



Effect of Vitazyme on Fiber Strength

Treatment	Strength*	Change
	g/tex	g/tex
Control	26.8 a	—
Vitazyme	26.9 a	0.1 (+3%)

*No significant difference.

Vitazyme did not significantly increase fiber strength above the controls at any nitrogen level, but the single greatest strength was 28.2 g/tex with Vitazyme at the 120 lb/acre nitrogen rate. Increasing nitrogen rates caused an increase in fiber strength by up to 9%.

Effect of Nitrogen on Fiber Strength

Treatment	Strength*	Change
	g/tex	g/tex
30 N	25.6 b	—
60 N	26.1 ab	0.5 (+2%)
90 N	27.8 a	2.2 (+9%)
120 N	27.8 a	2.2 (+9%)

*Means followed by the same letter are not significantly different at P=0.10.
**Comparisons are made with the 30 lb/acre nitrogen rate.

Increase in fiber strength with nitrogen: 2 to 9%

Statistical summary:

Partial analysis of variance for stand counts, plant height, total nodes, nodes above white flower (NAWF) and lint yield.

		Early Bloom (June 29)		Early Bloom + 28 Days (July 26)			
Factor	**Stand Counts**	**Height**	**Node**	**Height**	**Node**	**NAWF***	**Lint**
	10' row	cm	nodes/plant	cm	nodes/plant	value	lbs/acre
Control	0.6717	0.0001	0.0419	0.0001	0.0002	0.0001	0.0174
Nitrogen	0.8403	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
V*N	0.9253	0.0126	0.0437	0.0046	0.5264	0.0001	0.0014

*Nodes above white flowers.

Mean separation for each factor (Vitazyme and nitrogen) for stand counts, plant height, total nodes, Nawf and lint yield.*

		Early Bloom (June 29)		Early Bloom + 28 Days (July 26)			
Factor	**Stand Counts**	**Height**	**Node**	**Height**	**Node**	**NAWF**	**Lint**
	10' row	cm	nodes/plant	cm	nodes/plant	value	lbs/acre
Vitazyme	41.25 a	70.15 a	14.05 a	77.03 a	17.51 a	5.76 a	979.19 a
No Nitrogen	41.50 a	65.96 b	13.58 b	73.06 b	16.56 b	5.47 b	919.87 b
Nitrogen:							
120 lb/acre	41.63 a	76.96 a	15.05 a	86.45 a	19.13 a	6.75 a	1096.89 a
90 lb/acre	41.63 a	72.04 b	14.45 ab	81.14 b	18.43 b	5.59 b	1053.77 a
60 lb/acre	41.00 a	69.73 c	13.95 b	75.64 c	16.90 c	5.20 c	1046.04 a
30 lb/acre	41.25 a	53.49 d	11.80 c	56.95 d	13.70 d	4.93 d	601.42 b

*Means followed by the same letter are not significantly different at P=0.05.

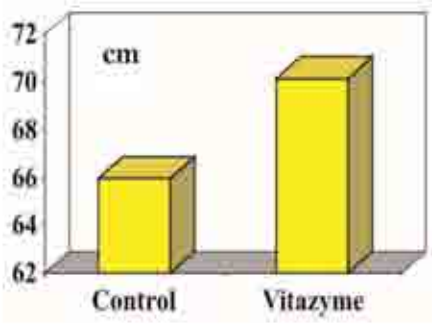
The above tables reveal that both Vitazyme and nitrogen significantly increased all growth and yield parameters for the season. Stand count was not significantly affected by either input. Of considerable interest is the fact that all parameters, except nodes per plant on July 26, showed a significant interaction between Vitazyme and nitrogen: i.e., Vitazyme boosted the response to nitrogen for these parameters.

Overall values for combined treatments were significantly boosted by Vitazyme (except stand count), while nitrogen in most cases increased parameter values, except for yield where only the 30 lb/acre N rate was significantly less than the higher three values.

Effects of Vitazyme Over All Nitrogen Rates

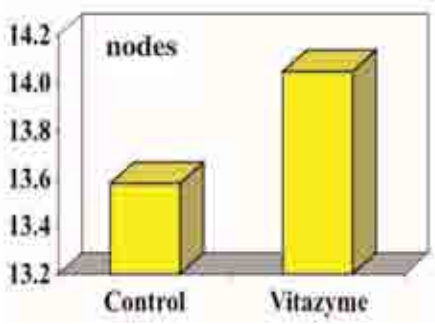
(All increases are significant)

Height, Early Bloom



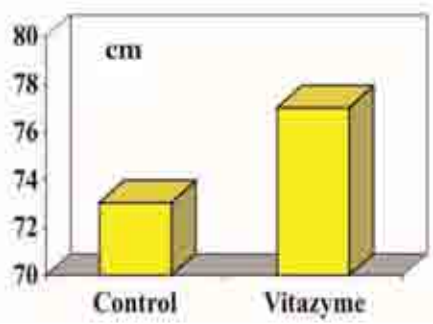
Increase with Vitazyme: 6%

Nodes Per Plant, Early Bloom



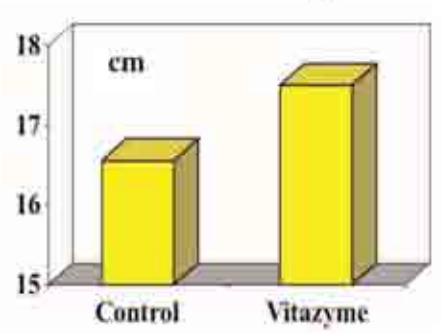
Increase with Vitazyme: 3%

Height, Bloom + 28 days



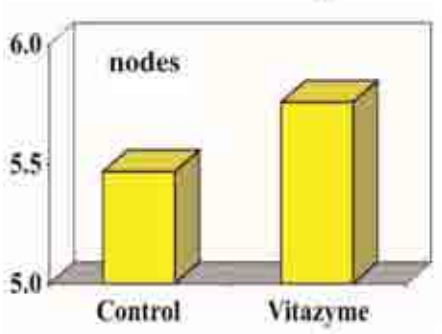
Increase with Vitazyme: 5%

Nodes Per Plant, Bloom + 28 Days



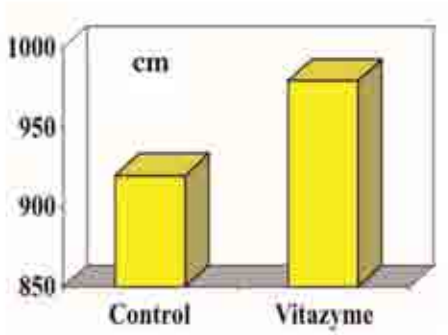
Increase with Vitazyme: 6%

Nodes Above White Flowers, Bloom + 28 Days



Increase with Vitazyme: 5%

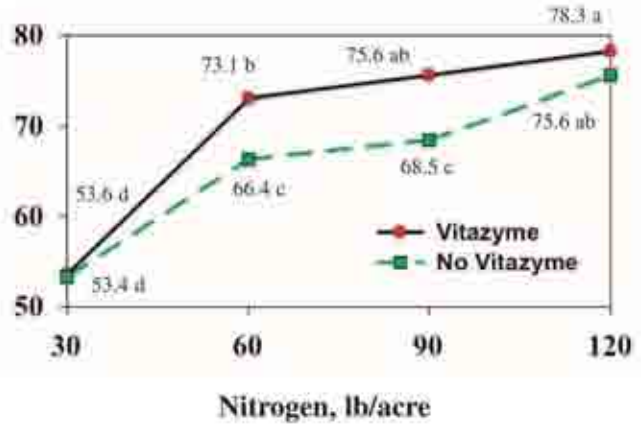
Lint Yield



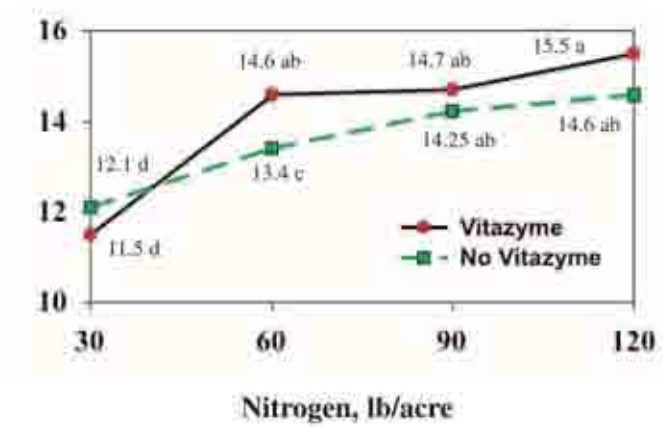
Increase with Vitazyme: 6%

<u>*Vitazyme effects at four nitrogen levels*</u>: There was no effect of either Vitazyme or nitrogen on any stand counts. For each nitrogen level, different letters indicate significant differences in the means.

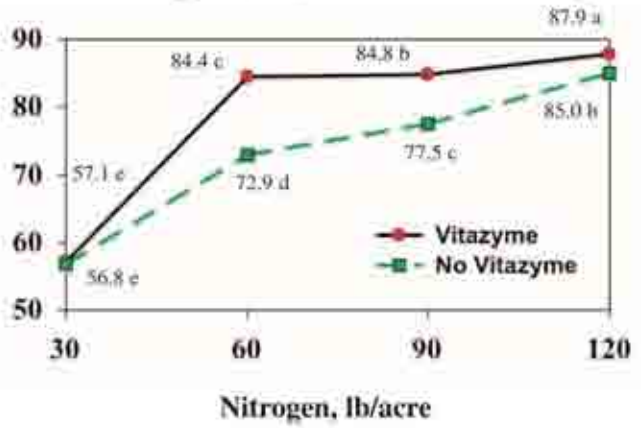
Plant Height (cm) - Early Bloom



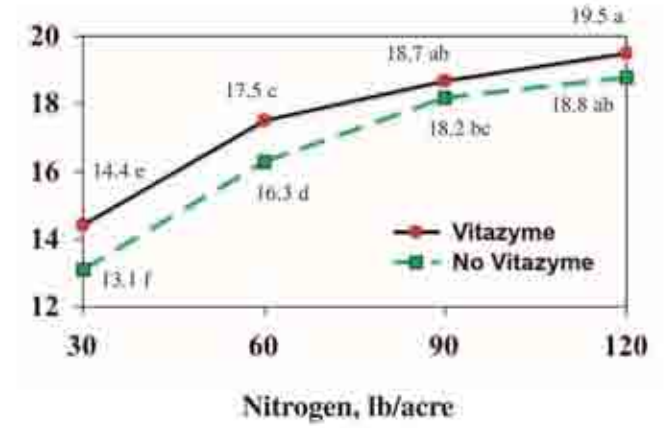
Nodes Per Plant - Early Bloom

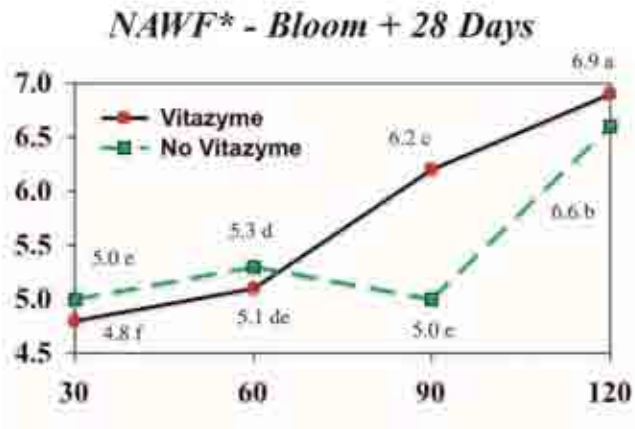


Plant Height (cm) - Bloom + 28 Days

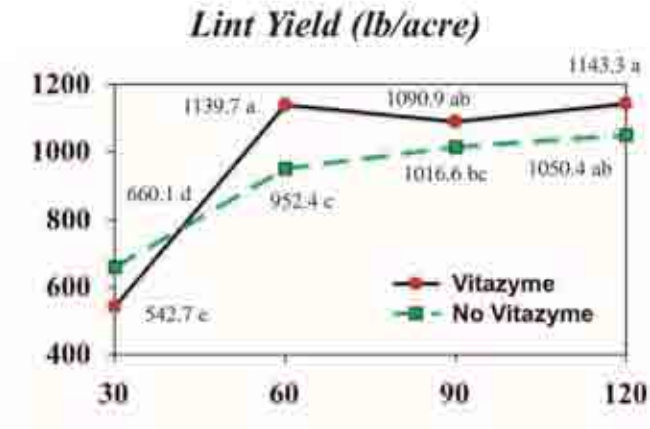


Nodes Per Plant - Bloom + 28 Days





*Nodes above white flower



Obvious in all of these six graphs is the effect of Vitazyme to significantly boast cotton growth and yield parameters above the untreated controls, at all but the 30 lb/acre N rate. The yield was somewhat less with Vitazyme at the 30 lb/acre N rate, presumably because the growth and nodes provided by Vitazyme could not be filled by an inadequate nitrogen supply. NAWF (nodes above white flower), a reliable indicator of final lint yield, was significantly greater than the control with Vitazyme at the higher nitrogen rates, and the final yields bore this out. These lint yields for the 60, 90, and 120 lb/acre nitrogen rates are summarized below.

Nitrogen rate	Lint yield		Yield increase with Vitazyme	
	Vitazyme	No Vitazyme		
lb/acre	lb/acre	lb/acre	lb/acre	percent
120	1,143.3	1,050.4	92.9	9
90	1,090.9	1,016.6	74.3	7
60	1,139.7	952.4	187.3	20

Of considerable interest in this table is the fact that, at the 50% nitrogen rate (60 lb/acre), Vitazyme produced nearly an identical yield as did the 100% nitrogen rate (120 lb/acre) with Vitazyme. Moreover, the lint yield with Vitazyme at the 50% nitrogen rate exceeded the lint yield without Vitazyme at the 100% nitrogen rate by 89.3 lb. or 9%. This yield increase despite a reduced nitrogen application shows the capability of Vitazyme within the soil-plant system to promote the improved utilization of nitrogen.

Conclusions: This replicated cotton study at Texas A&M university revealed that Vitazyme significantly impacted all growth and yield parameters in a positive direction. Over all nitrogen levels, these parameters produced the following significant effects at P=0.05:

Height at early bloom 6%
Nodes per plant at early bloom 3%
Height at 28 days after early bloom 5%
Nodes per plant at 28 days after early bloom 6%
Nodes above white flower at 28 days after early bloom 5%
Lint yield 6%

The improved growth parameters translated into a 6% lint yield increase. Especially noteworthy is the fact that, at 60 lb/acre of nitrogen, Vitazyme increased the lint yield by an amazing 20% above the untreated control, this yield about equaling the 120 lb/acre nitrogen rate yield and exceeding the 120 lb/acre nitrogen rate alone by 89.3 lb/acre. This effect demonstrates the ability of Vitazyme to help the plant better utilize nitro-

gen, and allow the grower to reduce nitrogen applications without sacrificing yield ... in this case by reducing such applications by 50%. Yield increase with Vitazyme was 9% at the 120 lb/acre nitrogen rate, and 7% at the 90 lb/acre rate. Nodes above white flower at 28 days after early bloom was an accurate predictor of final lint yield.

Fiber length was significantly enhanced by both Vitazyme (2%) and nitrogen (up to 4%), while fiber strength was improved by up to 9% by nitrogen. Vitazyme with the 120 lb/acre nitrogen rate, however, produced the single greatest fiber strength value of any treatment.

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2006 Crop Results

Vitazyme on Cotton

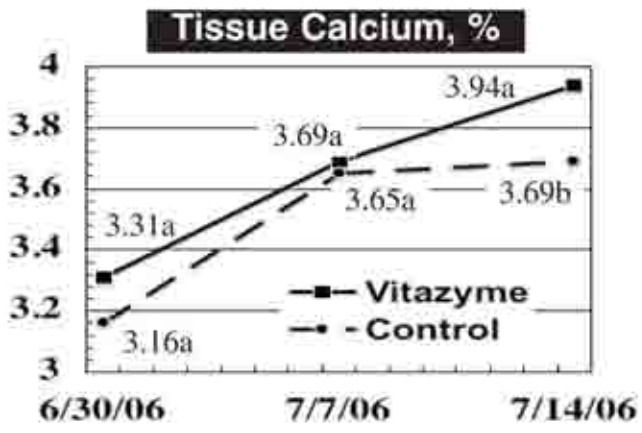
Texas A&M University

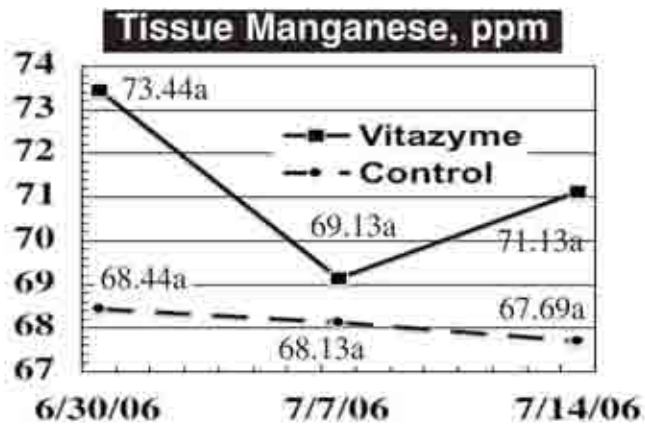
Researcher: Josh Bynum and Tom Cothren, Ph.D. *Location*: Texas A&M University, Department of Soil and Crop Sciences, College Station, Texas
Variety: Delta and Pine 164 Bollgard II/RR Flex
Soil type: Weswood silt loam (pH, 8.1) *Previous crop*: cotton
Planting depth: unknown *Planting rate*: 52,000 seeds/acre
Row spacing: 40 inches *Planting date*: April 17, 2006 *Tillage*: conventional
Experimental design: A site at the university's research field was selected for the study, and plots 13.3 (four rows) x 32 feet were established with a split-plot design, placing Vitazyme treatments in the whole plots, and nitrogen rates in the subplots. The two center rows of the four rows in each plot were harvested for lint yield determinations. Because there were 30 lb/acre of residual nitrogen in the soils at planting and there could be no zero nitrogen rate, the four nitrogen rates ranged from 30 to 120 lb/acre. The purpose of the study was to evaluate the effects of Vitazyme on lint yield and quality, as well as various growth parameters, at four nitrogen levels.

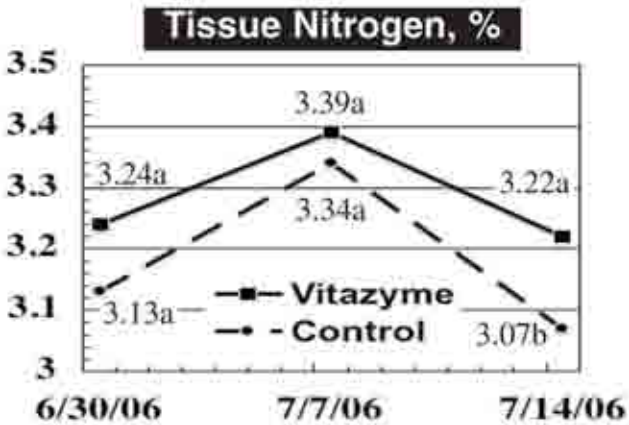
1. **Control + 30 lb/acre nitrogen**
2. **Vitazyme + 30 lb/acre nitrogen**
3. **Control + 60 lb/acre nitrogen**
4. **Vitazyme + 60 lb/acre nitrogen**
5. **Control + 90 lb/acre nitrogen**
6. **Vitazyme + 90 lb/acre nitrogen**
7. **Control + 120 lb/acre nitrogen**
8. **Vitazyme + 120 lb/acre nitrogen**

Fertilization: 30, 60, and 90 lb/acre of nitrogen applied before planting to appropriate plots to provide totals of 30, 60, 90, and 120 lb/acre nitrogen
Vitazyme application: 13 oz/acre on the seeds at planting, 13 oz/acre on the leaves and soil at early bloom (June 26), and 13 oz/acre to the leaves at the cracked boll stage (July 25)
Weather: Rainfall was adequate and temperatures were somewhat above average during the growing season.
Harvest date: the last part of August to September 11, 2006
Foliar analyses: Leaf samples were collected from each plot on June 30, July 7, and July 14 to determine chlorophyll, nitrogen, and elemental levels. Not all results are included below, in particular those that produced no significant increase or interaction.

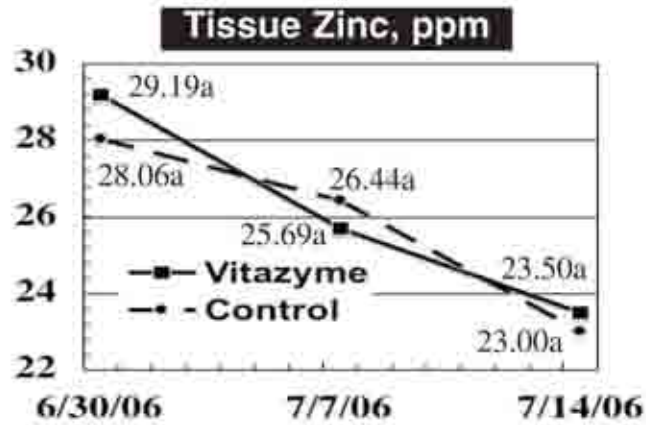
[For all graphs, means followed by the same letter are not significantly different at P=0.05 for the same date.]







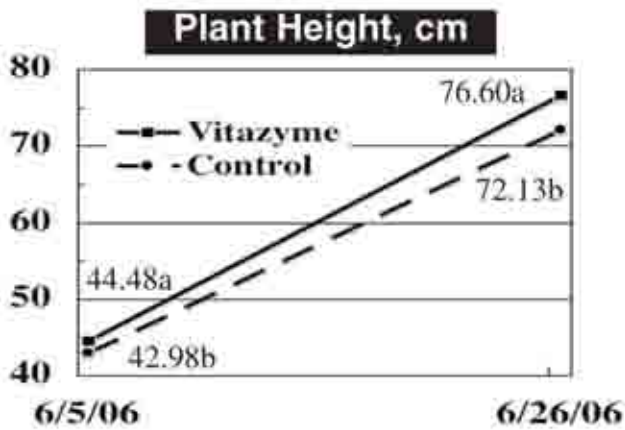
Positive interaction of Vitazyme with fertilizer N (P = 0.0001).



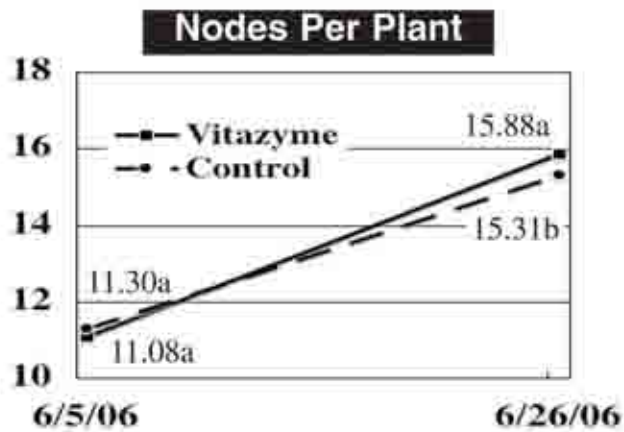
Positive interaction of Vitazyme with fertilizer N (P = 0.0001).

Some of the leaf analysis parameters showed increases and positive interactions with Vitazyme. Nitrogen additions caused many significant increases in leaf elements including chlorophyll, N, K, Ca, Zn, Fe, Cu, and Mn.

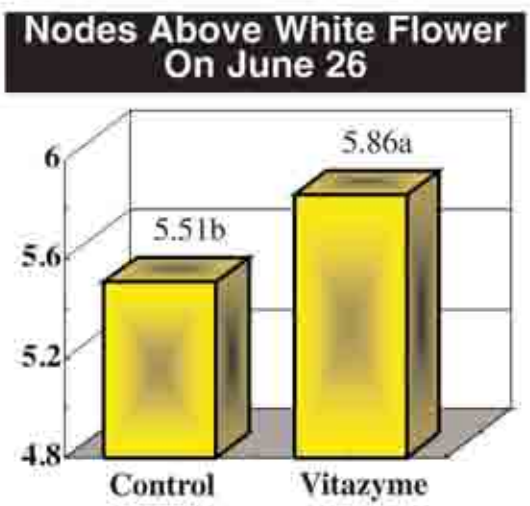
Growth parameters:



Positive interaction of Vitazyme with fertilizer N on June 26 (P = 0.0061).

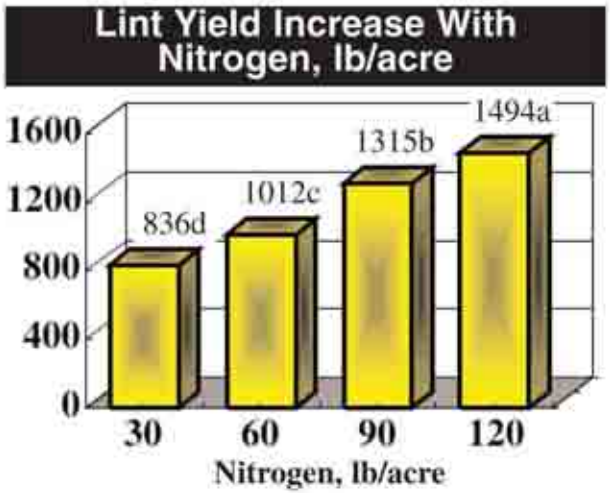


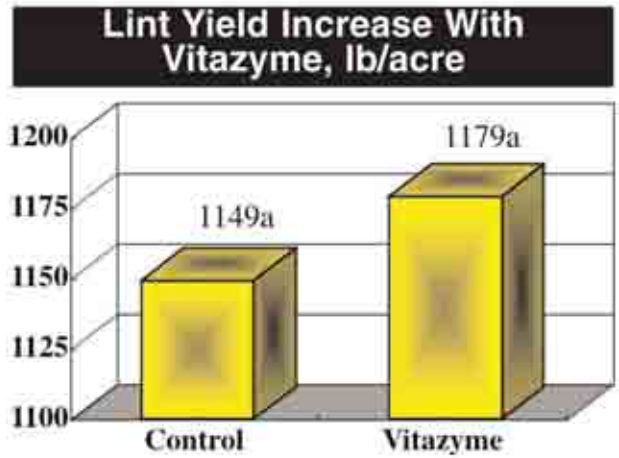
Positive interaction of Vitazyme with fertilizer N on June 26 (P = 0.0006).



Positive interaction of Vitazyme with fertilizer N on June 26 (P = 0.0143).

Vitazyme significantly increased plant height and node number over the period of June 5 to 26. Also, on June 26 the number of nodes above white flower were significantly greater for Vitazyme than for the control. ***"Nodes above white flower" is an indicator of ultimate yield potential for the cotton plant.***





Increase in lint yield with Vitazyme: 3%

Vitazyme increased lint yield in a linear fashion with nitrogen fertilizer additions. With Vitazyme, over all nitrogen levels, the lint yield increased by 30 lb/acre, a 3% increase.

Conclusions: The replicated cotton trial in southern Texas, using four nitrogen levels and Vitazyme or no Vitazyme at each level, revealed that nitrogen uniformly increased the yield of lint, while ***Vitazyme also increased the lint yield (3%)***. While this yield increase was not significant at P=0.05, ***the yield indicator of "nodes above white flower" was significantly greater than the control with Vitazyme, showing the product's potential to significantly improve yields in most situations***. Nitrogen also significantly increased several leaf nutrient elements at three sampling dates, while Vitazyme also significantly increased leaf nitrogen, calcium, and zinc; ***there were positive interactions with nitrogen and Vitazyme for leaf nitrogen and leaf zinc***.

Nodes per plant, plant height, and nodes above white flower — a figure denoting yield potential — were all significantly increased with Vitazyme, and for all three of these growth parameters there were significant positive interactions.

Fiber analyses will be completed in November of 2006 and included with future editions of this report.

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2006 Crop Results

Vitazyme on Cotton, a Seed Germination and Seedling Study

Researchers: S. Umesha[1], P. Hariprasad[2], S.A. Deepak[3], S.T. Girish[4], and Paul Syltie[5]
[1, 2] Department of Applied Botany, Seed Pathology, and Biotechnology, University of Mysore, Manasagangotri, Mysore, India
[3]National Institute for Agro-Environmental Sciences, Tsukuba, Japan
[4]Department of Botany and Microbiology, Yuvaraja's College, University of Mysore, India
[5]Vital Earth Resources, Gladewater, Texas, U.S.A.

Location: University of Mysore, Mysore, India

Variety: LRA-5166 from the seed storage division of the University of Mysore

Experimental design: Various Vitazyme dilutions were prepared for seed soaking, and after drying were used to test seed germination, seedling vigor, seed mycoflora, field emergence, and dry seedling weight. Standard statistical methods were used for analysis of variance, and Duncan's Multiple Range Test at P=0.05 was used to compare treatment means.

Vitazyme treatment: Dilutions were used as follows: o (control), 0.001, 0.01, 0.1, 1, 2, 4, 6, 8, 10. 12. 14, 16, 18, 20, 25, and 30%, prepared with sterile distilled water. Seeds were soaked at 26°C for 6 hours on a rotary shaker at 100 rpm, and then blot dried.

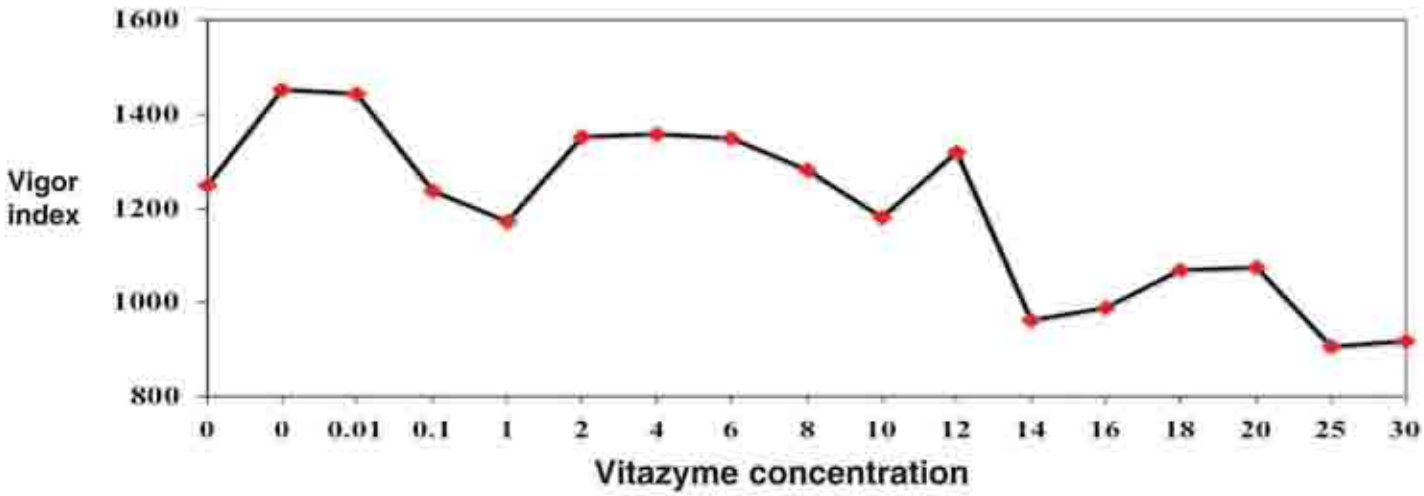
Seed Germination and Seedling Vigor

Methods recommended by the International Seed Testing Association were used. Seeds were rolled up on wet germination sheets and incubated in a seed germinator at 27±2°C. Germination was determined as the percent of seeds sprouted and the vigor index was calculated as (mean root length + mean shoot length)(% germination). There were 4 replicates of 100 seeds each, repeated three times.

Vitazyme Concentration	Germination (%)	MRL (CMS)	MSL (CMS)	Vigor index
Control	63[ab]	8.9±0.3[abcd]	10.9±1.2[abd]	1249[def]
0.001	68[ab]	9.7±0.5[ab]	11.8±0.5[a]	1453[a]
0.01	68[ab]	9.5±0.4[abc]	11.5±0.2[ab]	1444[a]
0.1	60[ab]	9.5±0.4[abc]	11.1±0.4[a]	1236[efg]
1	60[ab]	9.1±0.4[abcd]	10.3±0.3[abdef]	1172[g]
2	66[ab]	10.1±0.3[a]	10.3±0.5[abdef]	1353[bc]
4	68[ab]	9.1±0.3[abcd]	10.9±0.5[abc]	1359[b]
6	67[ab]	9.4±0.4[abc]	10.8±0.1[abcd]	1350[bc]
8	68[ab]	8.7±0.2[bcd]	10.1±0.3[bcdef]	1280[cde]
10	65[ab]	8.0±0.5[d]	10.3±0.3[abcdef]	1182[fg]
12	70[ab]	8.3±0.2[cd]	10.4±0.2[abcde]	1319[bcd]
14	57[ab]	6.8±0.4[e]	10.0±0.3[bcdef]	963[ij]
16	65[ab]	5.8±0.2[ef]	9.3±0.4[def]	990[i]
18	68[ab]	6.2±0.3[ef]	9.4±0.3[cdef]	1070[h]
20	69[ab]	6.1±0.1[ef]	9.4±0.2[cdef]	1075[h]
25	63[ab]	5.5±0.5[f]	8.8±0.2[f]	906[j]
30	63[ab]	5.3±0.5[f]	9.2±0.3[ef]	919[ij]

Values are the means of four replicates of 100 seeds each and repeated thrice.
MRL – Mean root length; MSL - Mean shoot length

Several Vitazyme treatments increased seed germination and vigor versus the control. The 0.001, 0.01, 4, 8, 18, and 20% dilutions gave 68 to 69% responses, compared to only 63% for the control, with vigor indices of up to 1453 (at 0.0001%) versus 1249 for the control. Concentrations of 14% or higher gave a reduced vigor index compared to the control.



Increase in vigor index at 0.001% Vitazyme: 16%

Seed Mycoflora (Fungi)

The Vitazyme concentrations showing the greatest increase in seed quality parameters were selected to use in this study. The soaked seeds were subjected to a standard blotter method for analysis of seed mycoflora. The seeds were incubated at 25±2°C and in 12 hours of light followed by 12 hours of darkness. After 7 days of incubation the fungi were examined with stereo binocular microscopes. Four replicates of 100 seeds each were repeated three times.

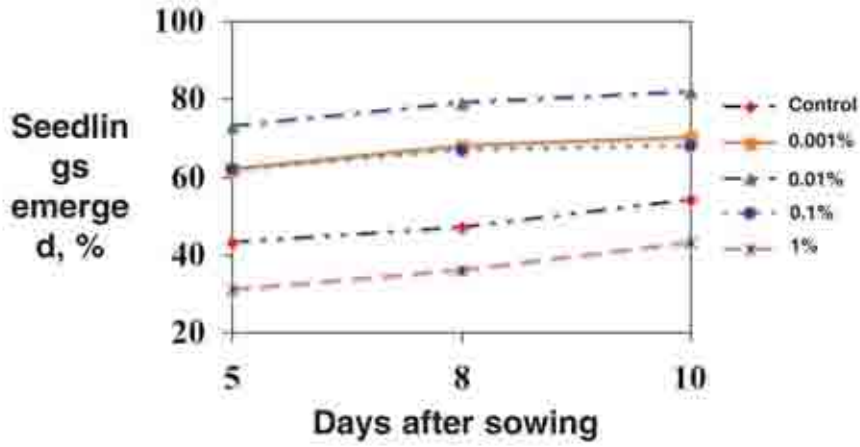
No significant changes were brought by Vitazyme in internal or external seed mycoflora.

Seedling Emergence

The same treatments used for the fungi tests were used in this evaluation. Seeds were sown in 20 x 30 meter plots using normal agronomic practices. Each treatment had four rows (each row a replicate) of 100 seeds each in a randomized block design for two seasons. Seedling emergence was recorded from day 3 to day 16.

Days after sowing	Vitazyme concentration				
	Control	0.001%	0.01%	0.1%	1%
	seedlings emerged (%)				
5	47±1.0[g]	62±2.0[d]	73±1.5[b]	62±1.0[d]	31±1.0[i]
8	47±1.1[f]	68±1.5[c]	79±0.5[a]	67±0.5[c]	36±1.5[h]
10	54±1.0[e]	70±0.5[bc]	82±1.1[a]	68±0.5[c]	43±0.5[g]

Values are the means of four replicates of 100 seeds each and repeated twice.



Only the three lowest concentrations of Vitazyme increased seedling emergence above the control, the best being the 0.01% seed soak. The 1% soak actually reduced emergence.

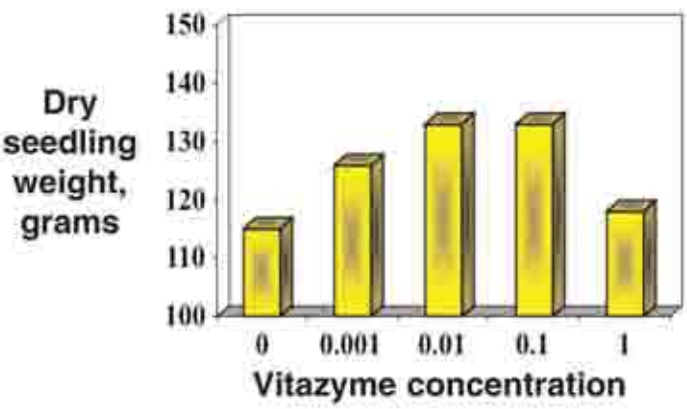
Increase in seedling emergence at 10 days after planting with 0.01% Vitazyme: 22 percentage points

Dry Seedling Weight

Twelve-day-old seedlings were carefully removed from the soil and washed to remove soil particles, oven dried at 60°C for 48 hours, and weighed. Four replicates of 100 seedlings each were repeated three times.

Vitazyme concentration	Dry weight*
%	grams
Control	115±80.4[c]
0.001	126±108.1[ab]
0.01	133±113.2[a]
0.1	133±115.6[a]
1	118±96.5[bc]

*The mean of four replicates of 100 seeds each.



Vitazyme at 0.001, 0.01, and 0.1% gave significant increases in dry seedling weight, but a nonsignificant increase at 1%.

Increase in dry seedling weight (0.01 and 0.1% Vitazyme): 16%

Conclusions: For all parameters measured, Vitazyme significantly improved cotton germination and seedling performance above the untreated control, which received only distilled water. Especially effective were the 0.001 and 0.01% concentrations for germination and seedling vigor. These two concentrations, plus the 0.1 and 1% soaks, were used for the rest of the analyses, and displayed significant improvements in many cases in field seedling emergence and dry seedling weight, especially the 0.001, 0.01, and 0.1% dilutions. These results prove Vitazyme's great effectiveness as a seed treatment for cotton in India and other tropical countries.

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2005 Crop Results

Vitazyme on Cotton

Effects of a Late Application

Farmer/Researcher: W.H. Tackeberry
Location: Kennett, Missouri
Variety: Delta Pine 444, Roundup Ready, Bt
Planting date: May 6 and 7, 2005
Soil type: Dundee sandy loam, low fertility
Irrigation: center pivot

Experimental design: A cotton field was treated the same way throughout the field, including Vitazyme applications, except for one area which received a late Vitazyme application..

1. Vitazyme **2. Vitazyme + a late application**

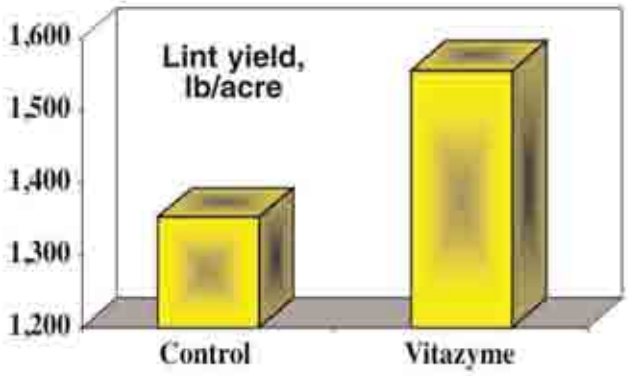
Fertilization: 85-60-0 lb/acre N-P_2O_5-K_2O dry spread after emergence

Vitazyme application: (1) Seed treatment, 5% solution on the seeds before planting; (2) 10 oz/acre banded at planting; (3) 5 oz/acre broadcast sprayed 3 weeks after emergence; (4) 5 oz/acre 3 weeks after application 3; (5) 5 oz/acre 3 weeks after application 4. The test area had an additional 11 oz/acre applied on August 8, just before boll cracking.

Sample harvest date: September 22, 2005

Yield and grain moisture results: Two replicates were harvested by hand — 50-foot-long row sections — of the treated and control areas, and lint weight was calculated

	Rep I		Rep II		Average	
Treatment	**Yield**	**Change**	**Yield**	**Change**	**Yield**	**Change**
	lint yield/acre					
Control	1,320	—	1,385	—	1,353	—
Vitazyme	1,560	240	1,550	165	1,555	202 (+15%)



Lint increase with a late Vitazyme application: +15%

Income results: If the farmer received $0.060/lb of lint, then the extra return from the one late Vitazyme application was $121.20/acre.

Increase in income from a late Vitazyme application: $121.20/acre

Conclusions: In this southeastern Missouri study, with both treatments receiving five Vitazyme applications and the treated area receiving a late, pre-boll cracking treatment, the extra Vitazyme produced an extra 202 lb/acre of lint (+15%), which represented about $121.20/acre more income. Vitazyme application this late in the season apparently stimulated additional chlorophyll synthesis, root initiation, and rhizosphere activity to allow the fixation of additional atmospheric carbon for fiber synthesis. This unforeseen response, along with more uniform bolls throughout the late-treated plants, is an indication of yet another highly profitable use for Vitazyme.

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2005 Crop Results

Vitazyme on Cotton

Researcher: Rodney Reed, Ph.D.
Variety: Delta and Pine 655 Bollguard RR
Tillage: no-till for seven years
Previous crop: grain sorghum
Location: Ballinger, Texas
Planting date: June 20, 2003
Row spacing: two rows planted, a row skipped
Irrigation: center pivot (less that optimum)

Experimental design: A uniform field area was divided into twelve plots that were each 30 x 330 feet, with three treatments and four replications, to discover if Vitazyme would enhance cotton yield.

1. Control **2. Vitazyme once** **3. Vitazyme twice**

Fertilizer: unknown.

Vitazyme application: Treatment 2: 3 oz of Vitazyme in 10 gallons of water, sprayed on the leaves at first square (August 1); Treatment 3: the same as Treatment 2 plus another application September 20

Harvest date: November 20, 2003

Yield results: Lint yields were as follows:

Treatment	Lint yield*	Change
	lb/acre	lb/acre
1. Control	1,110	—
2. Vitazyme once	1,150	40 (+4%)
3. Vitazyme twice	1,180	70 (+6%)

*Significant differences were not given in the report.

Lint yield increase (Vitazyme once): +4%

Lint yield increase (Vitazyme twice): +6%

Income results: At $0.60/lb, the Vitazyme treatments gave income increases of from $24 to $42 per acre.

Conclusions: This west Texas replicated cotton trial showed that Vitazyme progressively increased lint yield with one and two applications. Increases were from 4 to 6%, giving income increases of from $24 to $42 per acre. These improvements resulted from applications commencing at pinhead square. Better responses would be expected if treatments had begun closer to planting.

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2002 Crop Results

Vitazyme and Granusol-Mn on Cotton

Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: cotton (not specified) *Soil type*: Bowie very fine sandy loam
Planting date: March 19, 2002 *Pot type*: 1 gallon *Population*: 10 seeds/pot, thinned to 3
Experimental design: A complete block design was set up using eight replicates for each of four treatments. The soil was carefully packed into each pot, watered evenly, and then treated with the materials. Plants were watered on demand, and grown in the greenhouse at about 85°F for a high and 60°F for a low temperature.

1. **Control**
2. **Vitazyme only**
3. **Granusol-Mn only**
4. **Vitazyme + Granusol-Mn**

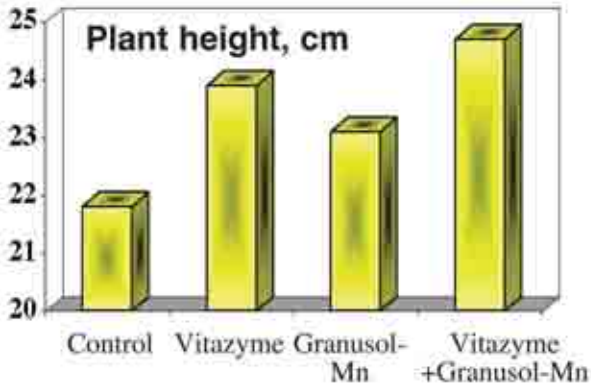
Fertilizer application: Each pot received 0.23 gram per pot of $(NH_4)_2SO_4$ to equal a 100 lb/acre application, or 21 lb/acre of N and 20 lb/acre of S for a "starter" effect.
Vitazyme application: After planting on February 22, 50 ml of a 0.002% Vitazyme solution was applied to the soil surface of each pot for Treatment 2. This application was equal to the amount of Vitazyme contained in the Granusol-Mn of Treatment 4.
Granusol-Mn application: Granusol-Mn granules, a "Sucrate", were applied to the soil surface of the pots of Treatment 3 at 1 gram per pot; this rate equaled 10 lb/1,000 ft^2. The Granusol-Mn for Treatment 4 had been prepared earlier at the facilities of American Minerals. Two ounces of Vitazyme were mixed with the binder of 50 lb of Granusol-Mn during processing, a 0.04 oz/lb rate. At 10 lb/1,000 $ft.^2$ of Granusol-Mn application, this would then give a Vitazyme application rate of about 18 oz/acre. This product was also applied at 1 gram per pot, as for Treatment 3.
Product specifications: **Vitazyme:** a liquid fermentation product of various plant materials, organisms, simple and complex carbohydrates, and other materials to yield a multiple mode of action - multiple active agent metabolic stimulator containing natural growth regulators (triacontanol, etc.), vitamins (B-complex, etc.), enzymes, and other phytoactive substances that are biologically active at very low application rates. Producer: Vital Earth Resources, Gladewater, Texas.
Granusol-Mn: a sucrate carboxylate containing a simple carbohydrate binder, together with various minerals (Mn, 35%; CaO, 11%; Fe, 4%; SO_3, 0.8%; Zn, 0.3%), with granules able to quickly break down in water to supply nutrients to plants. Producer: American Minerals, Dunedin, Florida.
Harvest date: May 7, 2002, 49 days after planting.
Reseeding: Because the original cotton seed planted on February 22 did not germinate well, another source of seeds was found, and the seeds were replanted in the pots on March 19. The treatments which had been applied on February 22 were not reapplied.
Growth observations: Noticeable growth differences occurred between the control plants and plants of the other treatments; the control plants were smaller throughout the test period. Towards the end of the test period several of the plants for Treatments 3 and 4 developed leaf shrinking and dieback. The reason for this problem was not clearly understood, although it could have been due to dripping water from the greenhouse ceiling onto leaf surfaces, causing a susceptibility to fungal infection on affected plants. Seriously affected plants were removed from

the final analysis, and pot values for height and weight were prorated using the surviving plants.

Height results: On May 7 all of the plant roots were washed clean of soil, and each plant was measured for height. An average height measurement was then calculated for the plants of each pot.

Treatment	Plant height*	Change vs. the control
	---------- cm	----------
4. Vitazyme + Granusol-Mn	24.7 a	+ 2.9 (+ 13%)
2. Vitazyme	23.9 a	+ 2.1 (+ 10%)
3. Granusol-Mn	23.1 a	+ 1.3 (+ 6%)
1. Control	21.8 b	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Student-Newman-Keuls Test. $LSD_{0.10}$=1.4 cm.

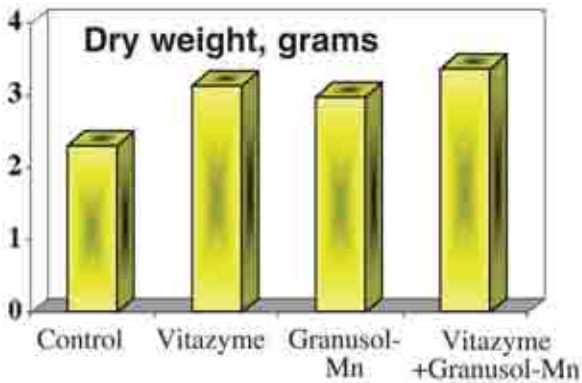


There was no significant difference in the height of the Vitazyme and Granusol treatments, although the combined products produced the tallest plants. All three of the Vitazyme and Granusol treatments were significantly greater than the control at P=0.10.

Dry weight results: The plants were dried in a drying oven at 115° F for one day, and dry weights were taken to the nearest 0.01 gram. These results showed some significant differences among treatment means.

Treatment	Dry weight*	Change vs. the control
	---------- grams	----------
4. Vitazyme + Granusol-Mn	3.36 a	1.05 (+ 45%)
2. Vitazyme	3.13 a	0.82 (+ 35%)
3. Granusol-Mn	2.97 a	0.66 (+ 29%)
1. Control	2.31 b	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Student-Newman-Keuls Test. LSD_{010}=0.45 g.



The dry weight of the cotton plants was significantly increased above the control by both Vitazyme and Granusol alone — 35% and 29% respectively — but especially by the combined Vitazyme and Granusol-Mn (45%). These increases were significant at P=0.001, though the LSD for that level was not calculated.

Conclusions: Both Vitazyme and Granusol-Mn were shown in this cotton study to significantly increase both plant height and dry weight. Of particular note, however, was the marked synergism between Vitazyme and Granusol-Mn, producing the tallest plants of all four treatments (+13%) and the biggest plants (+45%). These conclusions agree with two other studies conducted with Sucrate fertilizers — Granusol Greenup -6+16 on corn, and Southeast mix on wheat — which also showed that Vitazyme and the Sucrate fertilizer together produced better growth, carbon fixation, and nutrient utilization than either product alone.

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2002 Crop Results

Vitazyme on Cotton

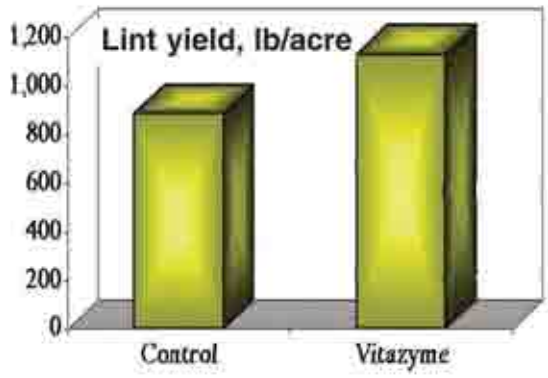
Farmer: George Nickelson, Jr. *Location*: Whitharral, Texas *Row spacing*: 40 inches
Variety: Stoneville 2454, Roundup Ready *Planting date*: May 15, 2002
Soil type: fine sandy loam *Harvest date*: October 3, 2002
Experimental design: A center pivot area was divided into control and Vitazyme treated areas.

1. Control (33 acres) **2. Vitazyme (33 acres)**

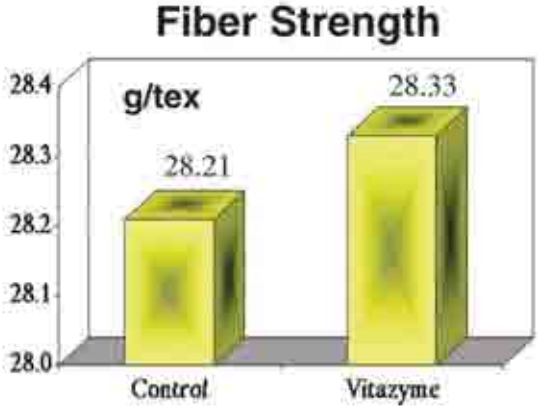
Fertility treatments: A preplant application of N and P were made, and 500 gal of a 11-52-0% N-P_2O_5-K_2O formulation was distributed through the center pivot system for all areas.
Vitazyme application: (1) 13 oz/acre in a 10-inch band behind each row at planting; (2) 13 oz/acre sprayed on the soil and leaves at the pinhead square stage (about July 8)
Weed control treatments: (1) Treflan applied preplant over all areas in April; (2) Roundup (glyphosate) sprayed on all areas on June 20
Nematode control treatments: Temik at 3 lb/acre at planting
Weather during the growing season: relatively moderate with some timely summer rains; not extremely hot
Yield results: These results represent ginned cotton.

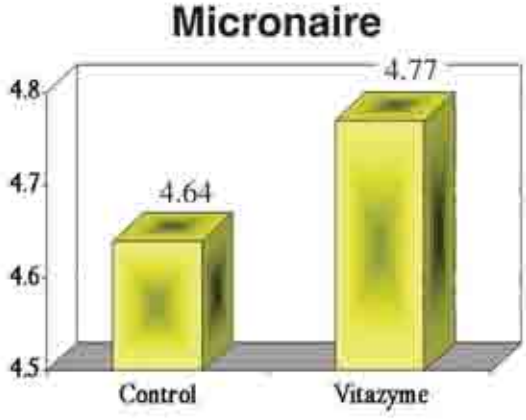
Treatment	Lint yield	Change
	lb/acre	lb/acre
Control	886	—
Vitazyme	1,131	245 (+28%)

Yield increase: 28%



Quality results: An analysis of lint quality at Buster's Gin, Ltd., near Whitharral, Texas, revealed some differences in cotton quality for the two treatments.





Income results: The selling price of the lint, considering loan value, was $0.575/lb.

Treatment	Lint yield	Income	Change	Return per investment
	lb/acre	$/acre	$/acre	approximate
Control	886	509.45	—	—
Vitazyme	1,131	650.33	140.88	17.6:1

Income increase: $140.88/acre

Conclusions: Vitazyme applied twice in this west Texas cotton study revealed that the product initiated a 28% yield increase while improving income, fiber strength, and diameter. The stimulation of rhizosphere and photosynthesis activity thus improved growth substantially to bring about the measured improvements in cotton yield and quality.

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2001 Crop Results

Vitazyme on Cotton

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

Researcher: Terry Wheeler, Ph.D. Location: Gaines and Dawson Counties, Texas

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

Gaines County site

Variety: Paymaster 2326RR + T-22
Planting date: May 16, 2001 Irrigation: center pivot
Soil type: unknown Plant population: standard for the area Row spacing: 36 inches
Experimental design: a randomized complete block design was set up with seven replications, on two rows per treatment that varied from 150 to 187 ft long.

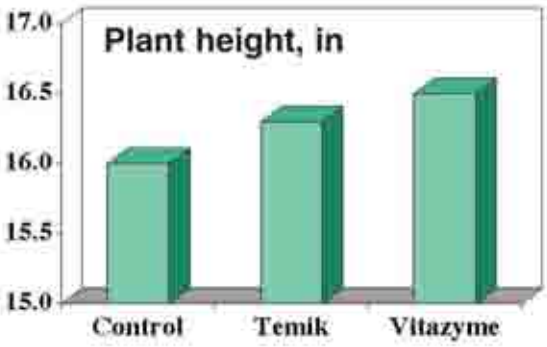
1. Control **2. Temik** **3. Vitazyme**

Fertilization: standard for the area
Vitazyme treatment: (1) 13 oz/acre with the seeds at planting; (2) 13 oz/acre sprayed in 10 gal/acre of water over the leaves and soil at the pinhead square stage on June 22.
Temik treatment: 5 lb/acre in the furrow at planting
Growth results: Planting mapping was performed on September 14.

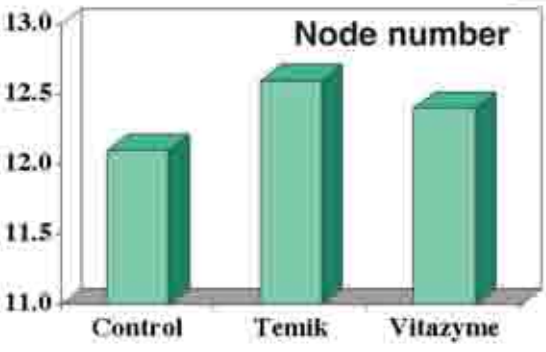
Plant height

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

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



Node number



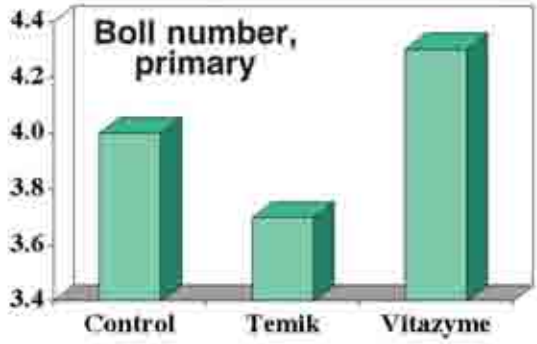
Treatment	Nodes	Change from the control
	number	
Control	12.1	—
Temik	12.6	+0.5 (+4%)
Vitazyme	12.4	+0.3 (+2%)

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

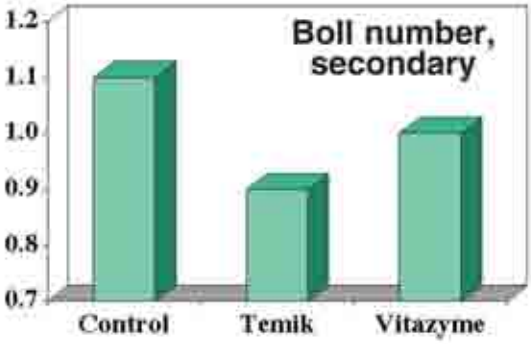
Primary bolls

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

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



Secondary bolls

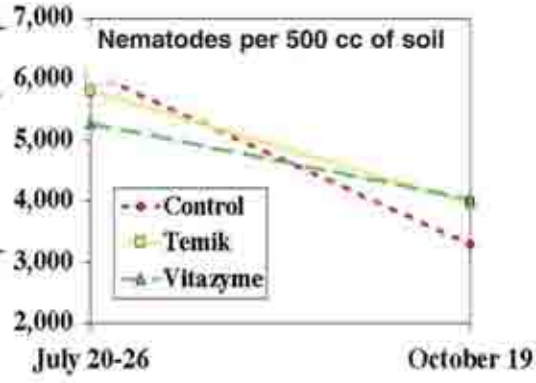


Treatment	Secondary bolls	Change from the control
	---------- number	----------
Control	1.1	—
Temik	0.9	–0.2 (–18%)
Vitazyme	12.4	–0.1 (–9%)

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

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

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



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

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

Denver County site (AGCARES facility)

Variety: Paymaster 2326RR + T-22 *Planting date*: May 10, 2001 *Irrigation*: center pivot

Soil type: unknown *Plant population*: standard for the area *Row spacing*: 40 inches

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

1. Control **2. Temik** **3. Vitazyme**

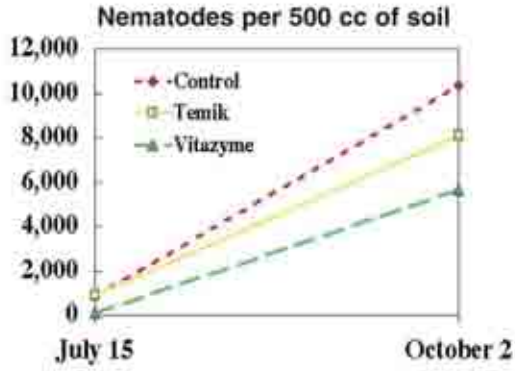
Fertilization: standard for the area

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

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

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

Treatment	Midseason nematodes	Change vs. control	Harvest nematodes	Change vs. the control
	nematodes/500 cc of soil			
Control	840	—	10,350	—
Temik	885	+45 (+5%)	8,115	–2,235 (–22%)
Vitazyme	75	–765 (–91%)	5,640	–4,710 (–46%)



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

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

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

Reductions or increases in nematode numbers vs. the control

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

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1999 Crop Results

Vitazyme on 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 Cavenaugh, 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:

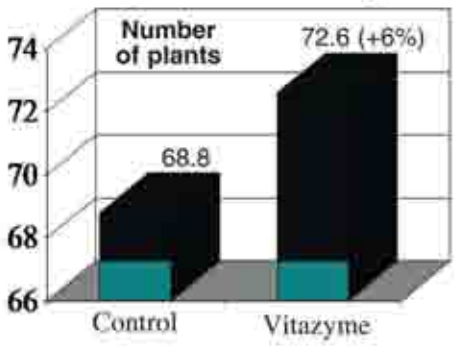
(1) Lot 1. **Regular Vitazyme** (10%), with seeds soaked for five minutes and then air dried.

(2) Lot 2. **Autoclaved Vitazyme** (10%), with seeds soaked for five minutes and then air dried. [The Vitazyme was autoclaved at 15 lb/in^2 pressure for 15 minutes at 121°C and autoclaved again one day later.] All beakers and items were sterilized with 3% H_2O_2 before using the autoclaved product.

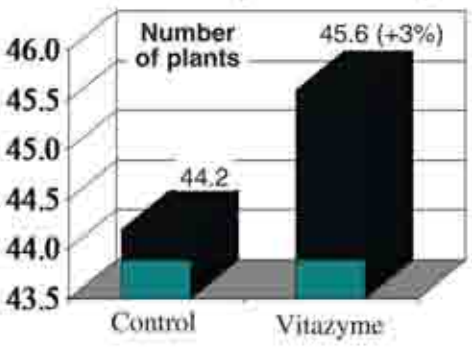
These seeds were returned to Dr. Batson in Mississippi and sent to the researchers for growth studies at the various stations. The seeds were planted in the field in 30 to 40-foot rows, and populations were determined after 28 days of growth. Final stand counts were used to determine the effectiveness 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.

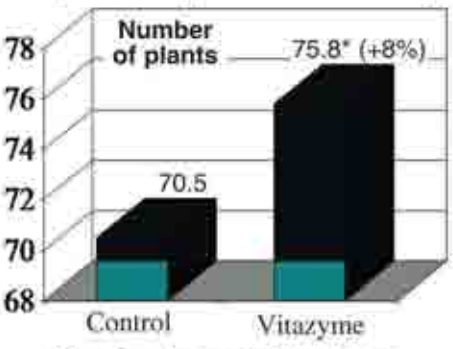
ALABAMA (Auburn University)



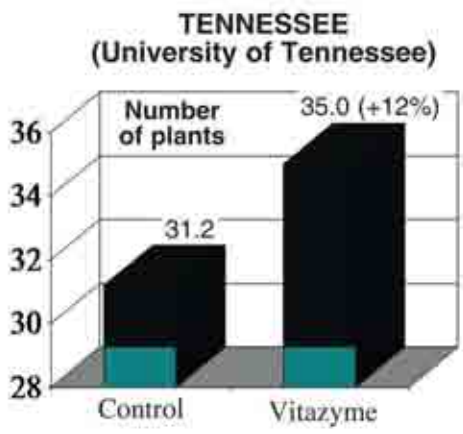
ARKANSAS (University of Arkansas)

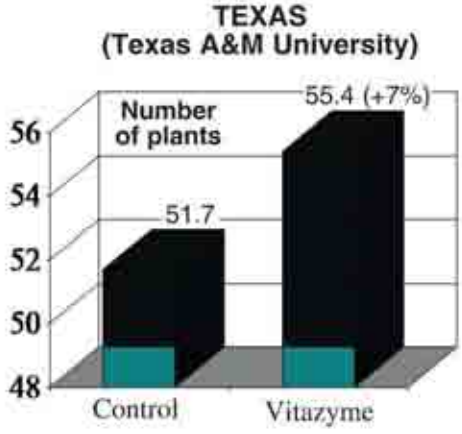


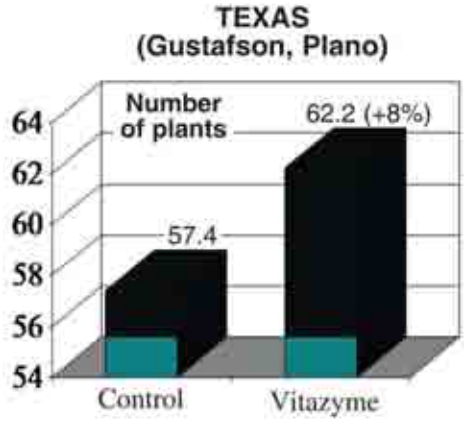
MISSISSIPPI (Mississippi State University)



*Significantly greater than the control at P=0.10 according to Fisher's Protected LSD procedure.







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.

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2000 Crop Results

Vitazyme on Cotton

Nematode counts with Temik vs. Vitazyme

Researcher: Terry Wheeler, Ph.D.
Location: Texas A&M University Agricultural Research and Extension Center, Lubbock, Texas
Research sites: near Lamesa, Denver City, and Gomez, Texas
Variety: unknown
Planting date: see below
Row spacing: 40 inches for Lamesa and Gomez; 36 inches for Denver City
Planting rate: unknown
Experimental design: At three locations in west Texas, replicated and randomized plots were set up with three treatments. Four replicates were used.

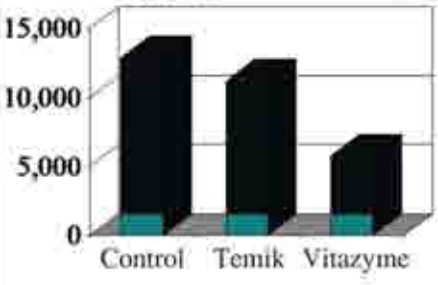
1. Control **2. Temik** **3. Vitazyme**

Location	Plot size and character	Planting date
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 among the replicates, none of the means are statistically different.

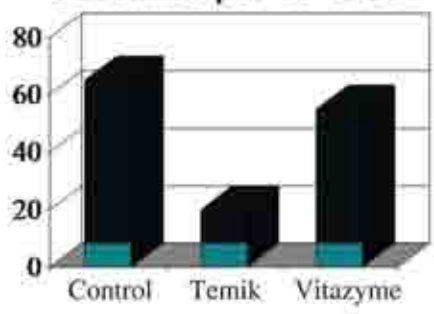
Eggs per cc of soil



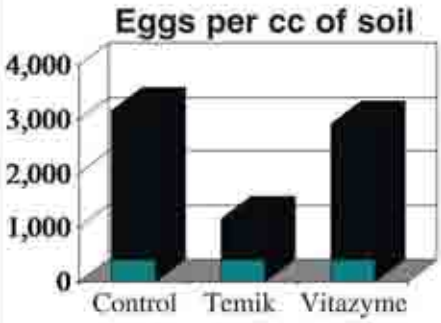
Lamesa plots

Treatment	Eggs	j2
	number/cc of soil	
Control	12,870	65
Temik	11,177 (-13%)	20 (-69%)
Vitazyme	5,730 (-55%)	55 (-15%)

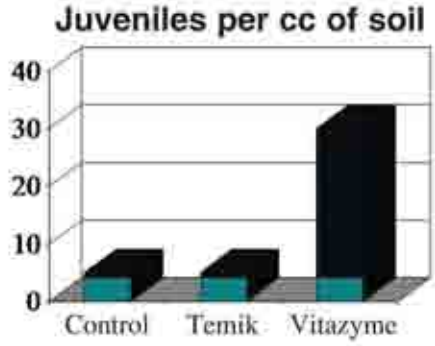
Juveniles per cc of soil



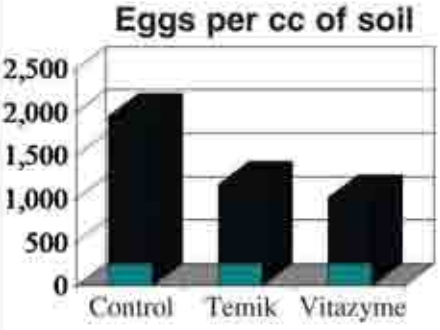
Denver City plots



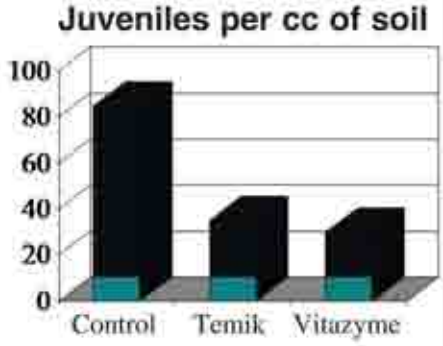
Treatment	Eggs	j2
	number/cc of soil	
Control	3,165	5
Temik	1,170 (-63%)	5 (0%)
Vitazyme	2,925 (-8%)	30 (+500%)



Gomez plots



Treatment	Eggs	j2
	number/cc of soil	
Control	1,965	85
Temik	1,170 (-63%)	35 (-59%)
Vitazyme	1,020 (-48%)	30 (-65%)



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 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.

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2000 Crop Results

Vitazyme on Cotton

Farmers: Driscoll Bryant
Variety: Paymaster HS-26, Roundup Ready
Planting date: May 29, 1999
Location: Littlefield, Texas
Soil type: medium sandy loam

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 P_2O_5, 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

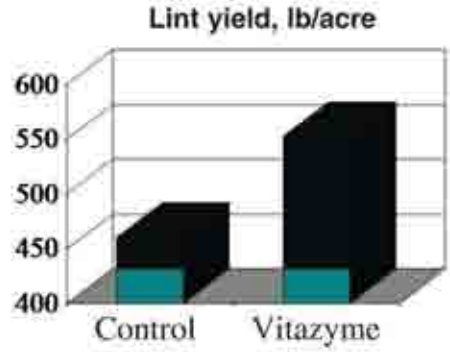
Irrigation and weather: Before planting: two irrigations at 1.5 inches each time; after planting: five irrigations at 1.0 inch each time after the June wet period. The growing period from July through harvest was extremely dry.

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.

	Control	Vitazyme	Increase
		lb	
Lint yield	460.4	552.5	(+) 92.1 (+20%)

Lint yield increase: 20%



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.

	Control	Vitazyme	Increase
		$/acre	
Income	$276.24	$331.50	$55.26

Income increase: $55.26/acre

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.

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1999 Crop Results

Vitazyme on Cotton

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

Coordinator: William Batson, Ph.D., Mississippi State University, Mississippi State, Mississippi
Researchers: Ray Schneider, Ph.D., Louisiana State University, Baton Rouge, Louisiana
Phil Brannen, Ph.D., Gustafson, Plano, Texas
Peggy Thaxton, Ph.D., Texas A&M University, College Station, Texas

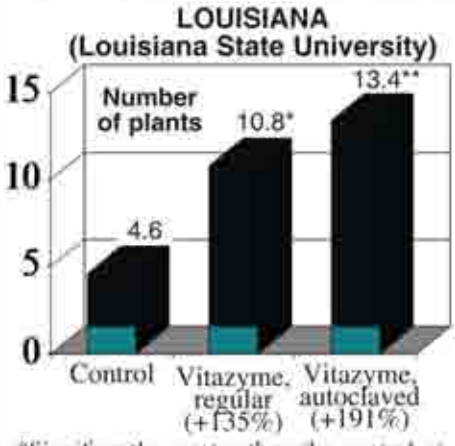
Experimental design: Two seedlots of a cotton variety (2,500 grams in each) were sent to Vital Earth Resources from Dr. Batson, for treatment with Vitazyme. The two treatments were as follows:

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

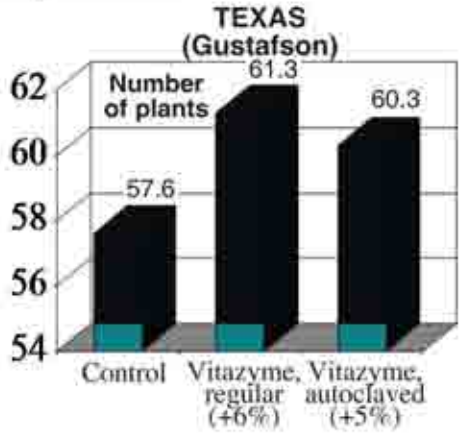
(2) Lot 2. **Autoclaved Vitazyme** (10%), with seeds soaked for five minutes and then air dried. [The Vitazyme was autoclaved at 15 lb/in^2 pressure for 15 minutes at 121°C, and autoclaved again one day later.] All beakers and items were sterilized with 3% H_2O_2 before using the autoclaved product.

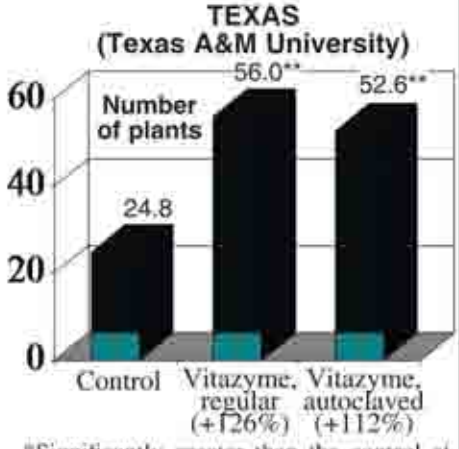
These seeds were returned to Dr. Batson in Mississippi and sent to the researchers for growth studies at the various stations. The seeds were planted in the field. Final stand counts were used to determine the effectiveness of the product to enhance seed germination compared to other products and a control.

Results: Final stand measurements are given below.



*Significantly greater than the control at P=0.06.
**Significantly greater than the control at P=0.04.





*Significantly greater than the control at P=0.01.

Conclusions: This study shows that Vitazyme can enhance the germination and survival of cotton when the seeds are treated before planting. Such an effect was not apparent at all testing sites, however.

It is also noted that the autoclaved Vitazyme performed as well as the non-autoclaved product, proving that the active-ingredients inducing the benefits of Vitazyme are non-microbial in nature. Rather, they are stimulators of microorganisms and cells in the soil and roots.

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1999 Crop Results

Vitazyme on Cotton

Farmer: Mike Hewitt *Location*: Littlefield, Texas *Variety*: Paymaster HS-26
Planting date: May 16, 1999 *Harvest date*: November 15, 1999 *Previous crop*: cotton
Soil type: sandy loam *Row spacing*: 40 inches *Seeding rate*: 16 lb/acre
Irrigation: two times at 1.5 inches each time
Experimental design: A center pivot circle was divided in half, half treated with Vitazyme and half left untreated.

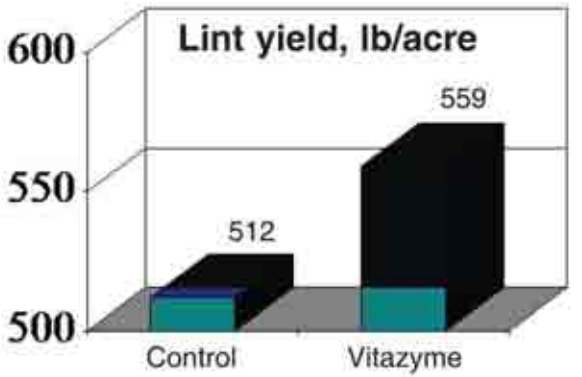
1. Control **2. Vitazyme**

Fertility treatments: a preplant formulation to give 11-52-11-11-5 lb/acre of N-P_2O_5-K_2O-S-Mn; a sidedress application of 150 lb/acre of 32-0-0

Vitazyme application: Vitazyme was mixed with Direx at 13 oz/acre and applied over the seed row in a 10-inch band at planting. A second application was made June 22 at 13 oz/acre, band sprayed over the rows.

Yield results:

Treatment	Lint yield	Increase
	lb/acre	lb/acre
Control	512	---
Vitazyme	559	47(+9%)



Yield increase: 9%

Income increase: Cotton price after payments: $0.60/lb.

Income increase: $28.20/acre

Comments: The weather turned cool early in the fall and did not allow some bolls to mature. Had more warm weather continued there would have been a larger yield increase with Vitazyme, because that treatment produced more late-season balls. This field had a serious boll weevil problem, and a bad worm infestation late in the season.

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1999 Crop Results

Vitazyme on Cotton

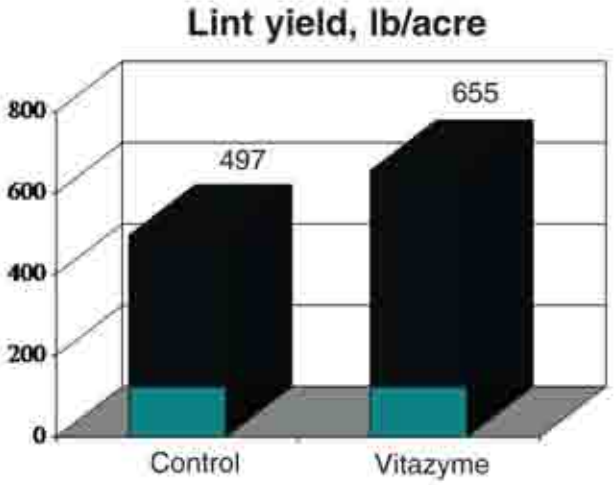
-- Organic, Irrigated --

Farmer: Bob Birkenfeld *Location*: Tulia, Texas *Variety*: Paymaster HS-200
Planting date: May 13, 1999 *Rowspacing*: 40 inches *Seeding rate*: 22 lb/acre
Soil type: sandy loam *Irrigation*: all plots were furrow irrigated
Experimental design: A 32-acre field was divided into two equal parts, 16 acres (64 rows) treated with Vitazyme and 16 acres (64 rows) left untreated.

1. Control **2. Vitazyme**

Fertility treatments: 2 tons/acre of steer compost in October, 1998
Vitazyme application: Vitazyme was sprayed on the soil at 13 oz/acre on May 5, two days after planting, and again at early bloom.
Harvest date: November 6, 1999
Yield results: Ginned cotton and quality data were obtained from the Lakeview Gin near Tulia, Texas.

	Control	Vitazyme	Increase
Total ginned cotton, lb	7,946	10,474	2,528(+32%)
Plot area	16 acres	16 acres	
Yield, lb/acre	497	655	158 (+32%)



Lint increase: 32%

Income results: The price of cotton is estimated at $0.635/lb.

	Control	Vitazyme	Increase
Value of cotton, gross	$315.60/acre	$415.93/acre	$100.33/acre

Income increase: $100.30/acre

Comments: There was very little difference in the quality of the cotton for the two treatments. On September 9, the field showed a decided advantage for the Vitazyme treatment in terms of boll numbers, plant top and root growth, and yield potential.

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1999 Crop Results

Vitazyme on Cotton

Clemson University - Edisto

Researcher: Amad Khalilian, Ph.D. *Location*: Edisto Research and Education Center, Blackville, South Carolina *Variety*: Delta Pine 5415 Roundup Ready *Row spacing*: 38 inches
Plant Population: 3 seeds/foot *Previous crop*: cotton *Insecticide*: 5 lb/acre Temik at planting
Soil: Varina loamy sand *Planting date*: May 14, 1999 *Harvest date*: October 15, 1999
Irrigation: 4 times by traveling gun (June 7, 0.5 in; July 26, 0.5 in; August 2, 0.25 in; August 12, 0.25 in)
Experimental design: A randomized split-plot design was arranged for a municipal solid waste (MSW) compost study, at four rates with and without Vitazyme applied twice. The main plots were eight rows wide, 25.3 x 80 ft (0.0465 acre), and were replicated four times. Subplots were four rows wide. The compost rates were located on the main plots and the Vitazyme rates were on the subplots. Treatments were as follows:

1. Broadcast compost, 4 tons/acre
2. Broadcast compost, 8 tons/acre
3. Broadcast compost, 12 tons/acre
4. Injected compost, 4 tons/acre
5. Injected compost, 8 tons/acre
6. Injected compost, 12 tons/acre
7. No compost
8. Same as 1, with Vitazyme
9. Same as 2, with Vitazyme
10. Same as 3, with Vitazyme
11. Same as 4, with Vitazyme
12. Same as 5, with Vitazyme
13. Same as 6, with Vitazyme
14. Same as 7, with Vitazyme

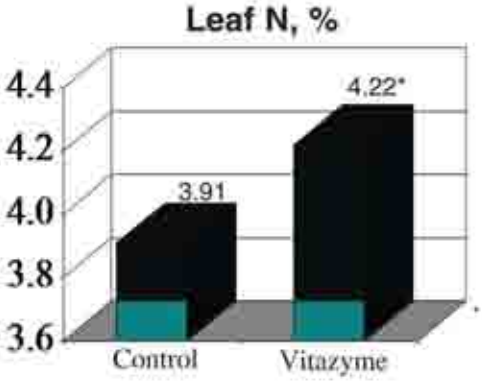
Effects of Vitazyme were separated from compost effects in the statistical analysis.

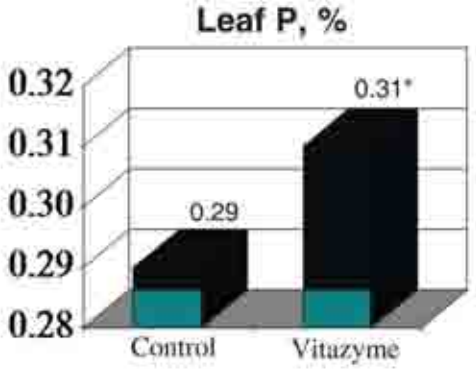
Fertility and tillage treatments: 100 lb K_2O/acre before planting; 90 lb N/acre in increments of 30 lb N/acre, three times during the season
Vitazyme applications: 13 oz/acre on the seeds at planting (May 14); 13 oz/acre on the leaves at first bloom (July 19)
Plant time effects: Leaf samples were collected and analyzed 12 weeks after planting.

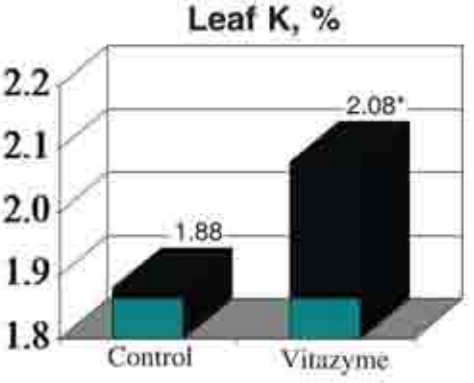
	N*	P*	K*	Ca*	Mg*	S*
	leaf concentration, %					
Control	3.91b	0.29b	1.88b	2.60a	0.52a	0.74a
Vitazyme	4.22a	0.31a	2.08a	2.71a	0.54a	0.77a
Increase	**+8%**	**+7%**	**+16%**	**+4%**	**+4%**	**+4%**

*Means followed by the same letter are not significantly different at P=0.05.

Note: All nutrients measured were increased, with N, P, and K registering significant increases



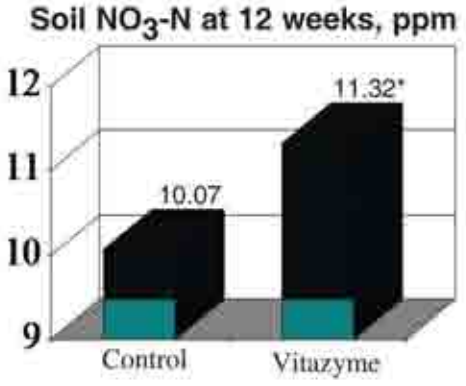


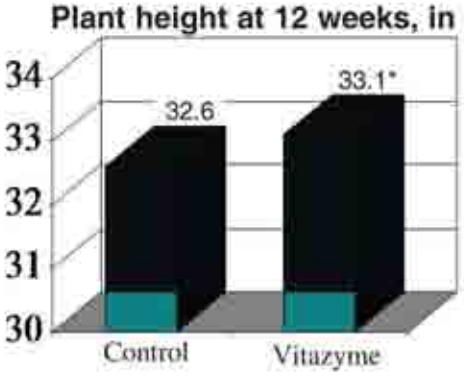


Soil nitrogen effects:

	At 6 weeks*	Increase	At 12 weeks*	Increase
	----------soil NO_3-N, ppm----------			
Control	10.07b	---	5.71a	---
Vitazyme	**11.31a**	**1.25 (+12%)**	**5.73a**	**0.02 (<1%)**

*Means followed by the same letter are not significantly different at P = 0.05.





Plant height effects:

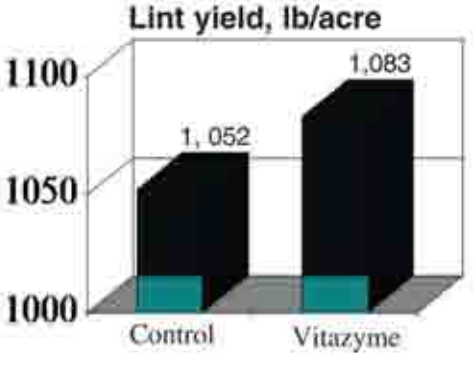
	Plant height at 12 wk, in*	Increase, in
	----------inches----------	
Control	32.6b	---
Vitazyme	**33.1a**	**0.5 (+2%)**

*Means followed by the same letter are not significantly different at P = 0.05.

Yield effects: The two middle rows of the four subplot rows were harvested for a yield check.

	Lint yield*	Increase
	----------lb/acre----------	
Control	1,052b	---
Vitazyme	**1,083a**	**31 (+3%)**

*Means followed by the same letter are not significantly different at P = 0.05.



Conclusions: Vitazyme significantly increased the concentration of leaf tissue N, P, and K, at 12 weeks after planting, while also significantly increasing soil NO_3-N at 6 weeks after planting. Plant height and lint yield were also significantly increased. Soil organic matter percentage and plant population were not affected by Vitazyme. While some treatment means for growth parameters were not significantly greater with Vitazyme, they were all increased to some degree. This shows that the rhizosphere stimulating effects of the product are active in soils with and without added compost, to stimulate nutrient uptake and increase crop yields. The yield increase here produced an income increase of $18.60/acre, assuming a price of $0.60/lb.

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1997 Crop Results

Vitazyme on Cotton

Researcher: Leroy Pelzel
Planting date: May 27, 1997
Planting rate: about 45,000 plants/acre
Row spacing: 40 inches (2 planted, one skipped)
Location: Miles, Texas
Previous crop: sorghum
Soil type: heavy
Experimental design: A field was split into two parts, 25 acres treated with Vitazyme, and 17 areas untreated.

1. **Control (no Vitazyme)**
2. **Vitazyme at planting and at early bloom**

Fertility treatments: At planting, 120 lb/acre of a 15-15-0 (s) liquid fertilizer were applied to the seeds.
Vitazyme application: 13 oz/acre on the seed with the fertilizer at planting, and 13 oz/acre on the leaves and soil at early bloom
Harvest date: October 10 and 17, 1997
Yield results:

	Control	Vitazyme	Increase
Cotton yield (lint)	350 lb/acre	375 lb/acre	25 lb/acre (+7%)

Yield Increase with Vitazyme: 7%

Income results: A final price of about $0.62/lb is anticipated. There was little difference in quality between the two treatments.

	Control	Vitazyme	Increase
Total income	$217.00/acre	$232.50/acre	$15.50/acre

Income Increase with Vitazyme: $15.50/acre

Comments: The 1997 cropping year began with good soil moisture, but late spring and summer were quite dry.

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1997 Crop Results

Vitazyme on Cotton

— Organic, Irrigated —

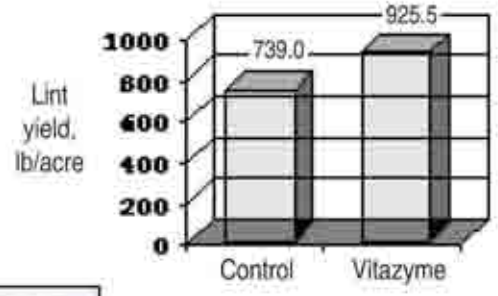
Researcher: Bob Birkenfeld
Location: Tulia, Texas
Planting date: May 14, 1997
Variety: Paymaster HS-200
Row spacing: 40 inches
Seeding rate: 22 lb/acre

Experimental design: A 13.4-acre field was divided into two equal parts: 6.7 acres (32 rows) untreated, and 6.7 acres (32 rows) treated with Vitazyme. The field was row irrigated.

1. Control (No Vitazyme)
2. Vitazyme

Fertility treatments: 2 tons/acre of steer compost in October, 1996
Vitazyme applications: Vitazyme on the seed at planting, and at early bloom, 13 oz/acre each time
Harvest date: November 5, 1997
Yield results: Ginned cotton and quality data were obtained from the Lakeview Gin near Tulia.

	Control	Vitazyme	Increase
Total ginned cotton, lb	4,951	6,201	1,250 (+25%)
Plot area	6.7 acres	6.7 acres	
Yield, lb/acre	739.0	925.5	**186.5 (+25%)**



Yield increase: 25%

Income results: The cotton value, based on the loan price plus $0.06/lb to give the likely sale price, was $0.5860 for the Vitazyme-treated cotton, and $0.5945 for the control cotton.

	Control	Vitazyme
Value of cotton	$439.33/acre	$542.34/acre

Income increase: $103.01/acre

Comments: Both sides of this test field were treated alike throughout the season except that the Vitazyme treated cotton received an irrigation the end of July, which the control area did not receive.