Vital Earth Resources
706 East Broadway, Gladewater, Texas 75647
(903) 845-2163 FAX: (903) 845-2262

2014 Crop Results

Vitazyme on Corn

Five Trials in Mexico

Researcher: unknown *Research organization*: Quimica Lucava

Experimental design: All trials utilized a split field, with Vitazyme applied to a portion to determine effects of the product on yield.

1. Control **2. Vitazyme (2X)**

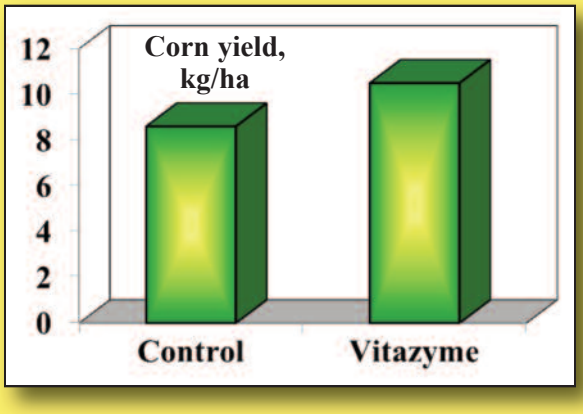
Fertilization: unknown

Vitazyme application: (1) 0.25 liter/ha on the seeds at planiting; (2) 1 liter/ha sprayed on the plants and soil 30 days later.

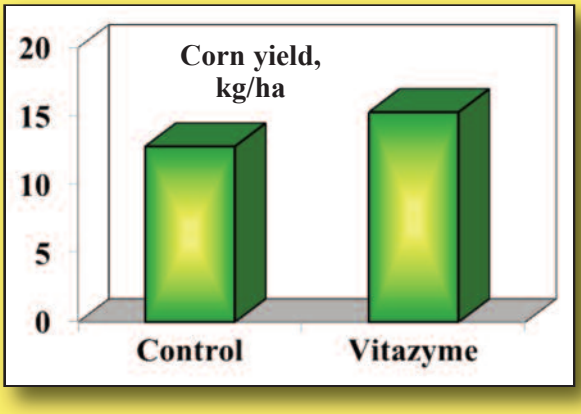
El Monte, Jalisco, Mexico

Treatment	Corn yield	Yield change
	tons/ha	
Control	8.6	—
Vitazyme	10.5	1.9 (+22%)

Increase in corn yield with Vitazyme: 22%



La Mesita, Jalisco, Mexico



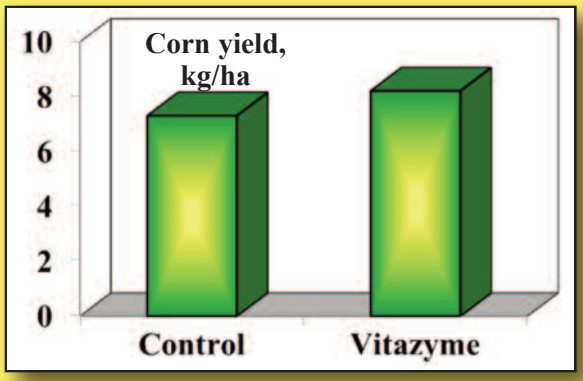
Treatment	Corn yield	Yield change
	tons/ha	
Control	12.8	—
Vitazyme	15.3	2.5 (+20%)

Increase in corn yield with Vitazyme: 20%

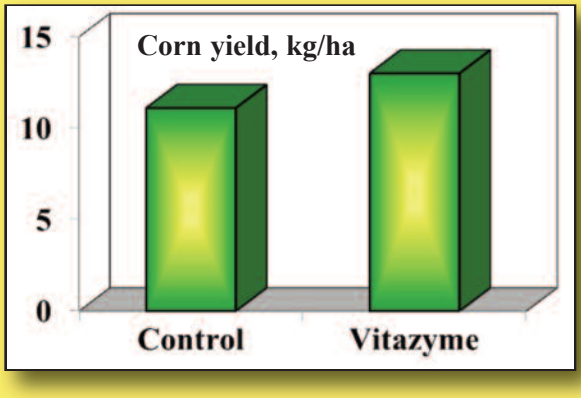
El Llano, Jalisco, Mexico

Treatment	Corn yield	Yield change
	tons/ha	
Control	7.30	—
Vitazyme	8.21	0.91 (+12%)

Increase in corn yield with Vitazyme: 12%



Camino a la Coronilla, Jalisco, Mexico



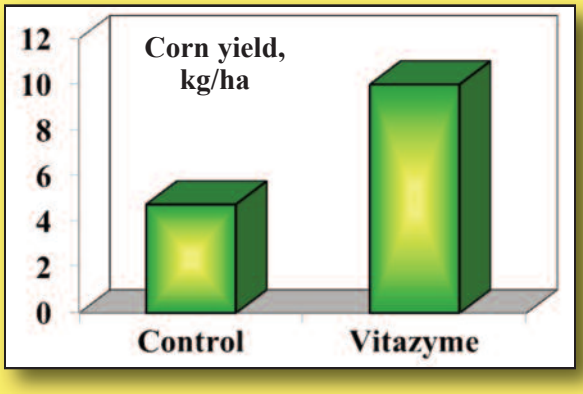
Treatment	Corn yield	Yield change
	tons/ha	
Control	11.1	—
Vitazyme	13.0	1.9 (+17%)

Increase in corn yield with Vitazyme: 17%

San Juan Acozac, Puebla, Mexico

Treatment	Corn yield	Yield change
	tons/ha	
Control	4.75	—
Vitazyme	10.00	5.25 (+111%)

Increase in corn yield with Vitazyme: 111%



Economic Evaluation of All Trials

Income from the average yield increase (2.49 tons/ha) ..... 7,476 pecos
Cost of Vitazyme (1.25 liters/ha) ..... 500 pecos
Cost of application ..... 150 pecos
Profit (income versus costs) ..... 6,826 pecos
Cost:Benefit ratio 13.7:1

Conclusions: These five Mexican corn trials showed excellent yield responses to Vitazyme, when applied to the seeds and later to the leaves and soil. The average yield increase was 2.49 tons/ha, or 36% more than the control plants, giving an overall increase in profit of 6,826 pecos/ha ($546.08/ha). With a cost:benefit rates of 13:7:1, this Vitazyme program is highly recommended for corn growers across Mexico.

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2014 Crop Results

Vitazyme on Corn

University of Missouri - Bradford Research Center

Researcher: Manjula Nathan, Ph.D. *Location*: University of Missouri Bradford Research Center, Columbia, Missouri *Variety*: Dekalb 62-97 *Population*: 32,000 seeds/acre
Row spacing: 30 inches *Planting date*: May 16, 2013

Experimental design: A replicated corn study (six replications), in a randomized complete block design, was established using six-row plots for each treatment, each being 100 feet long (0.03443 acre/plot). The objective of the study was to evaluate the effect of Vitazyme, applied to the seeds and later on the leaves, on leaf nutrient and yield parameters.

1. Control **2. Vitazyme on the seeds and leaves**

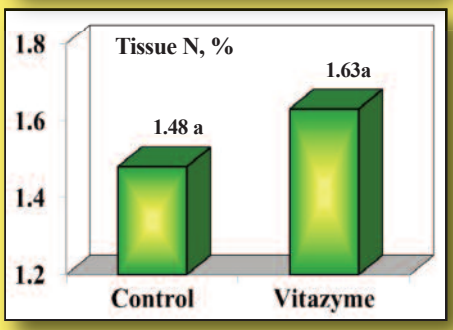
Fertilization: according to soil test recommendations using 160-46-62 lb/acre N-P_2O_5-K_2O before planting

Vitazyme application: (1) 13 oz/acre equivalent on the seeds, mixed thoroughly, just before planting (6.5 oz of Vitazyme applied to 16,000 seeds); (2) 13 oz/acre on the leaves and soil at the 8-leaf stage (knee height) on July 3.

Weather during the 2013 growing season: A wet spring delayed planting; otherwise, conditions for growth were favorable except for a short-duration drought in August and early September. Heavy rain after fertilizer application in May could have caused some nitrogen loss.

Tissue nutrient levels: Ear leaf samples were collected July 26 at silking. These samples were analyzed for N, P, K, Ca, and Mg at the University of Missouri.

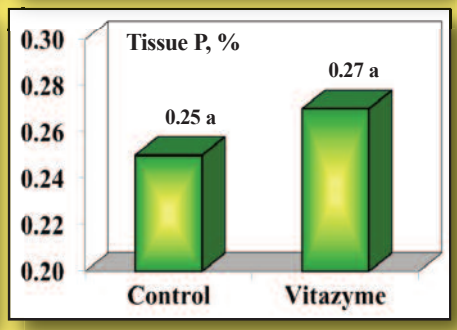
Corn Tissue Nitrogen



P > F = 0.208

Increase in N with Vitazyme: 10%

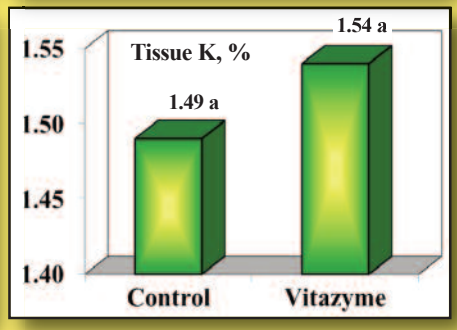
Corn Tissue Phosphorus



P > F = 0.604

Increase in P with Vitazyme: 8%

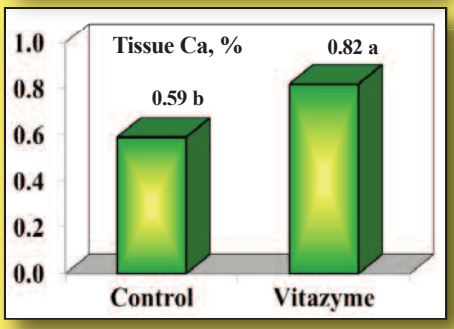
Corn Tissue Potassium



P > F = 0.506

Increase in K with Vitazyme: 3%

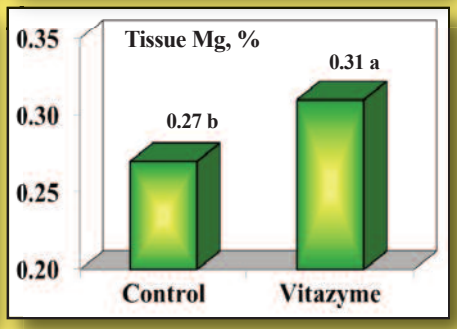
Corn Tissue Calcium



P > F = 0.034

Increase in Ca with Vitazyme: 39%

Corn Tissue Magnesium



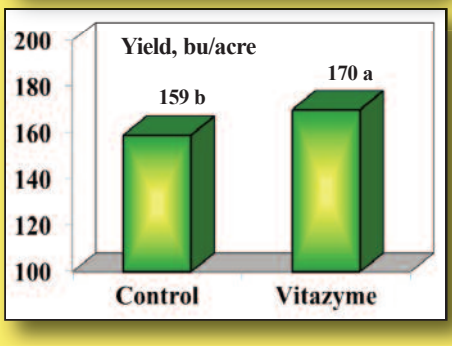
P > F = 0.079

Increase in Mg with Vitazyme: 15%

Vitazyme increased all five tissue elements analyzed, with increases ranging from 3% (K) to 39% (Ca). The Ca and Mg increases were significant, especially Ca (39%), while N, P, and K increases were not significant.

Yield parameter results:

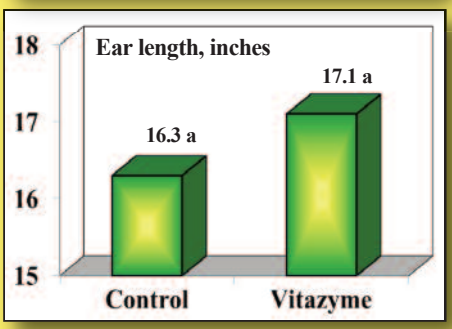
Grain Yield



P > F = 0.99. Two applications of Vitazyme greatly improved corn grain yield, by 11 bu/acre, above the control.

Increase in grain yield with Vitazyme: 7%

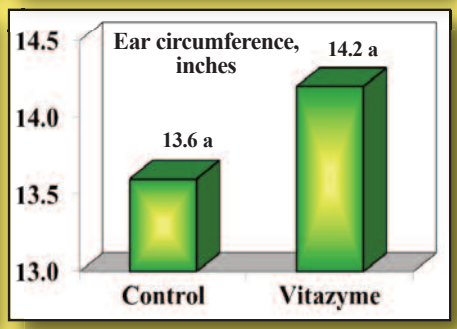
Ear Length



P > F = 0.345

Increase in ear length with Vitazyme: 5%

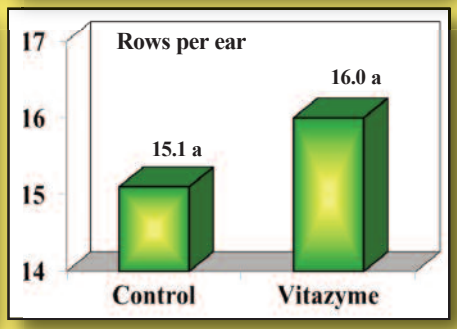
Ear Circumference



P > F = 0.113

Increase in ear circumference with Vitazyme: 4%

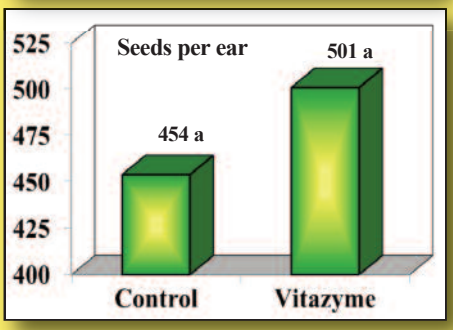
Rows On Ears



P > F = 0.317

Increase in rows on ears with Vitazyme: 0.9 row

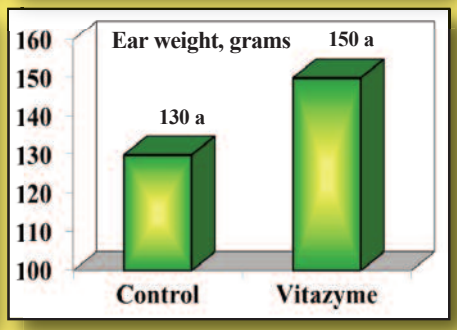
Seeds Per Ear



P > F = 0.172

Increase in seeds per ear with Vitazyme: 10%

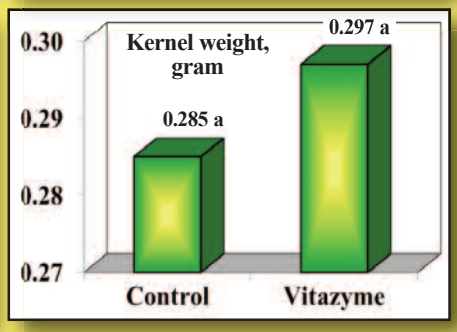
Weight Per Ear



P > F = 0.253

Increase in ear weight with Vitazyme: 15%

Weight Per Kernel



P > F = 0.474

Increase in weight per kernel with Vitazyme: 4%

Conclusions: A replicated corn trial at the University of Missouri in 2013 revealed that Vitazyme, applied on the seeds before planting, and again at 13 oz/acre to the leaves and soil at V8, improved tissue nutrient levels as well as yield and all harvest parameters, several significantly. A summary of these effects is as follows:

Increase with Vitazyme

Yield Parameters		Tissue Parameters	
Grain yield	10%*	Nitrogen	10%
Ear length	5%	Phosphorus	8%
Ear circumference	4%	Potassium	3%
Rows per ear	0.9 row/ear	Calcium	39%*
Seeds per ear	10%	Magnesium	15%*
Weight per ear	15%		
Weight per kernel	4%		

*Significantly greater than the control, at P=0.10 or less.

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2014 Crop Results

Vitazyme on Corn

Agricultural Custom Research and Education Services (ACRES)

Researcher: Bertel Schou, Ph.D. Educational Services
Research organization: Agricultural Research and
Location: Cedar Falls, Iowa
Variety: Pioneer PO453 AM (Roundup Ready)
Planting rate: 38,000 seeds/acre
Planting date: May 8, 2014
Planting depth: 1.5 inches
Soil type: Aredale loam (36% sand, 42% salt, 22% clay, 4.6% organic matter, pH = 6.2, cation exchange capacity = 17.6 meq/100 g)
Soil test results: (Perry Agricultural Laboratory, Bowling Green, Missouri): total exchange capacity = 18.29 meq/100 g, pH = 5.8, organic matter = 2.7%, nitrogen = 74 lb/acre, sulfur (as sulfate) = 36 lb/acre, phosphorus (P) = 131 lb/acre, calcium (Ca) = 2,973 lb/acre, magnesium (Mg) = 707 lb/acre, potassium (K) = 264 lb/acre, sodium (Na) = 80 lb/acre, boron (B) = 3.16 lb/acre, iron (Fe) = 693.6 lb/acre, manganese (Mn) = 118.4 lb/acre, copper (Cu) = 2.8 lb/acre, zinc (Zn) = 5.6 lb/acre; percent base saturations: Ca = 54.3, Mg = 16.10, K = 1.85, Na = 0.95, other bases = 5.80%, H = 21.00.
Row width: 30 inches
Planting conditions: good
Tillage: conventional
Previous crop: soybeans
Experimental design: A small-plot corn study was conducted to evaluate the effect of Vitazyme and seaweed exact, using two applications, alone and in combination, on the yield of corn. There were four replications, with each plot four rows x 30 feet (10.00689 acres/plot); the two middle rows were harvested for analysis. A randomized complete block design was used.

Treatment	In-furrow at planting	Foliar
1. Control	0	0
2. Vitazyme	13 oz/acre	13 oz/acre
3. Seaweed	2 quarts/acre	2 quarts/acre
4. Vitazyme + Seaweed	13 oz/acre + 2 quarts/acre	13 oz/acre + 2 quarts/acre

Fertilization: All areas received 90 lb/acre of urea ammonium nitrate (UAN) on June 9.
Vitazyme application: (1) 13 oz/acre in-furrow at planting (May 8, 2014) using 38 ml/gallon at 10 gallons/acre; (2) 13 oz/acre on the leaves and soil at V6 (July 2, 2014), using 26 ml/gallon at 15 gallons/acre
Seaweed application: obtained from Ocean Organics; (1) 2 quarts/acre applied in-furrow at planting (May 8, 2014), using 189 ml/gallon at 10 gallon/acre; (2) 2 quarts/acre applied foliar after V6 (July 2, 2014) using 126 ml/gallon at 15 gallons/acre
Weather for 2014: Growing conditions for the trial were very good, with temperatures below normal and precipitation consistent throughout the crop cycle, except for a few days in June and August.
Irrigation: overhead center-pivot irrigation on June 12 and 13, and on August 11 to 14, and 18
Harvest date: October 21, 2014, using a Massey-Ferguson plot combine

Plant population results: Populations for the four treatments were very similar, without significant differences.

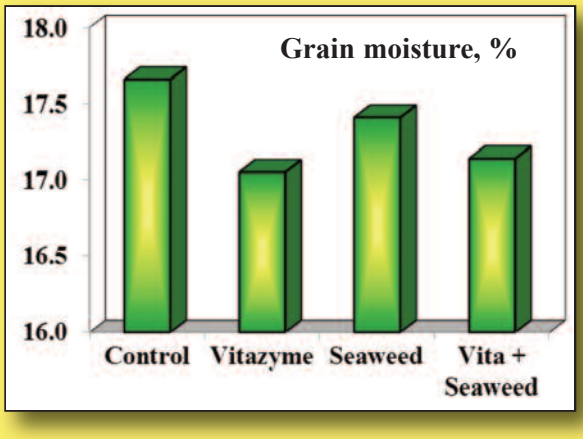
Treatment	Population*	Population change
	plants/acre	plants/acre
1. Control	34.065 a	—
2. Vitazyme	35,140 a	1,075 (+3%)
3. Seaweed	34,489 a	424 (+1%)
4. Vitazyme + Seaweed	34,111 a	46 (0%)
LSD (P = 0.05)	2,388	
CV	4.24%	
Treatment F	0.462	
Treatment probability	0.716	

*Means followed by the same letter are not significantly different at P = 0.05, according to the Student-Newman-Keuls Test.

Grain moisture results:

Treatment	Grain moisture*	Moisture change
	%	%
1. Control	17.66 a	—
2. Vitazyme	17.05 a	(-) 0.61
3. Seaweed	17.41 a	(-) 0.25
4. Vitazyme + Seaweed	17.14 a	(-) 0.52
LSD (P = 0.05)	0.78	
CV	2.82%	
Treatment F	1.276	
Treatment probability	0.340	

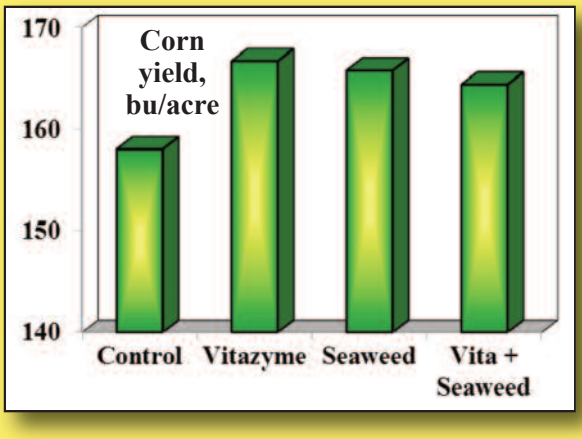
*Means followed by the same letter are not significantly different at P = 0.05, according to the Student-Newman-Keuls Test.



All three applications reduced grain moisture at harvest a small amount, with Vitazyme alone reducing moisture by 0.61 percentage-point.

Reduction in grain moisture with Vitazyme: 0.61 %-point

Grain yield results: The two center rows of each plot were harvested.



The three treatments all increased yield above the control, though not significantly, due to experimental error. Even so, Vitazyme increased yield by 5.5%.

Treatment	Corn yield*	Yield change
	bu/acre	bu/acre
1. Control	158.03 a	—
2. Vitazyme	166.70 a	8.67 (+5.5%)
3. Seaweed	165.78 a	7.75 (+4.9%)
4. Vitazyme + Seaweed	164.40 a	6.37 (+4.0%)
LSD (P = 0.05)	10.03	
CV	3.83%	
Treatment F	1.558	
Treatment probability	0.266	

*Means followed by the same letter are not significantly different at P = 0.05, according to the Student-Newman-Keuls Test.

Increase in corn yield with Vitazyme: 5.5%

Conclusions: A replicated corn study in east-central Iowa revealed that Vitazyme increased corn yield by 5.5%, followed closely by seaweed at 4.4%, and the combined products at 4.0%. Those increased were consistent, but no synergism was displayed between the two materials. Grain moisture was reduced by 0.61 percentage-point with Vitazyme, which gave the greatest reduction for the three treatments compared with the control. While these increases for the three treatments were not significant, they were consistently greater tha the control so can be assumed to be real.

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2014 Crop Results

Vitazyme on Corn

Researcher: unknown *Research organization*: Kernel Company, LLC, Ukraine
Location: Man'kivs'ky District, Cherkasy Region, Viktorivka Village, Ukraine *Variety*: DK 440
Planting rate: 75,000/ha *Planting date*: April 8, 2014 *Previous crop*: soybeans
Soil type: Chernozern, with 3.7% organic matter
Seedbed preparation: disk-plowing to 6-8 cm, plowing to 22-24 cm, harrowing, two cultivations to 5 - 6 cm.
Experimental design: A corn field was divided into a Vitazyme treated area and an adjoining control area, with the objective of evaluating the effect of this product on soybean yield. All other treatments — herbicides and fertilizers — were identical over the entire area.

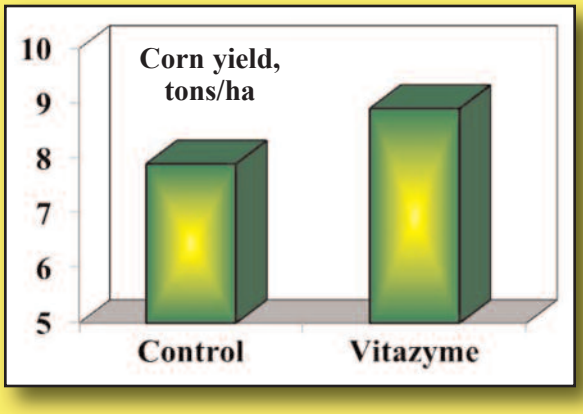
1. Control **2. Vitazyme**

Fertilization: 90 kg/ha of nitrogen broadcast and incorporated before planting, and 10-26-26 kg/ha of N-P_2O_5-K_2O applied in-furrow at planting.

Vitazyme application: 1 liter/ha sprayed on the leaves and soil at the 5 to 6 - trifoliate stage, on May 3
Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	7.91	—
Vitazyme	8.91	1.01 (+13%)

Increase in corn yield with Vitazyme: 13%



Income results: The gross income minus expenses for the two treatments revealed the Vitazyme improved net income by 2,090 UAH/ha ($132.72/ha at 1UAH = 0.0635 USD).

Increase in income with Vitazyme: 2,090 UAH/ha

Conclusions: This corn trial in Ukraine, using a single 1 liter/ha Vitazyme application at the 5 to 6-leaf stage, revealed a substantial 13% yield increase, which netted the farmer an extra 2, 090 UAH/ha ($32/72/ha). This result shows as have many other corn trials in Ukraine over the past years, the great efficacy of the Vitazyme program to boost yields and profits.

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2013 Crop Results

Vitazyme and Fish on Corn

Responses at Four Nitrogen Levels

Researcher: Sara Berg and Ron Gelderman, Ph.D.
Research institution: Department of Agronomy and Soils, South Dakota State University, Brookings, South Dakota
Location: South Dakota State University Research Farm, Aurora, South Dakota
Variety: Dekalb 45-51 *Soil type*: Brandt silty clay loam
Soil test results: tested April 30, 2013; organic matter = 4.4%, NO_3-N = 32 lb/acre (to 24 inches), P (Olsen) = 20 lb/acre, K = 292 lb/acre, Zn = 2.56 lb/acre, S = 50 lb/acre (to 24 inches), pH = 5.5, salts (1:1) = 0.2 mmhos/cm *Planting date*: May 15, 2013
Planting rate: 32,000 seeds/acre *Row spacing*: 30 inches
Experimental design: A small plot (10 x 45 feet, or 0.01033 acre) design with four replications was used to evaluate the effectiveness of Vitazyme and liquid fish in enhancing corn yield, plant population, and grain nutrient content as influenced by nitrogen rate. The fish was applied alone and with Vitazyme at the high nitrogen rate only. Statistics were calculated for Treatments 1 to 8, and also for Treatments 7 to 10.

Treatment	Nitrogen rate	Vitazyme	Fish
	% of optimal		
1. Control, 0% N	0	0	0
2. Vitazyme, 0% N	0	X	0
3. Control, 50% N	50	0	0
4. Vitazyme, 50% N	50	X	0
5. Control, 75% N	75	0	0
6. Vitazyme, 75% N	75	X	0
7. Control, 100% N	100	0	0
8. Vitazyme, 100% N	100	X	0
9. Fish, 100% N	100	0	X
10. Fish + Vitazyme, 100% N	100	X	X

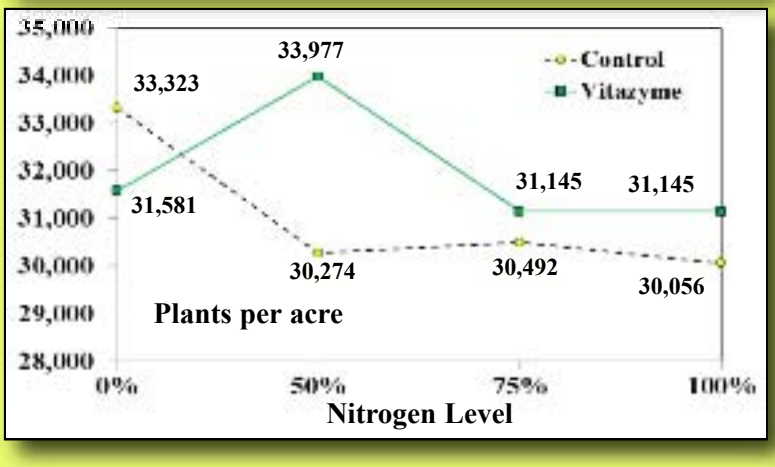
Fertilization: Nitrogen fertilizer (NH_4NO_3) was applied broadcast to the soil surface on May 15, just after planting. 100% N = 122 lb/acre of N; 75% N = 92 lb/acre of N; 50% N = 61 lb/acre of N.
Vitazyme application: (1) 13 oz/acre (1 liter/ha) in-furrow at planting, with 3 gallons of water per acre along with 10-34-0% N-P_2O_5-K_2O fertilizer; (2) 13 oz/acre (1 liter/h)a sprayed with a hooded plot sprayer on the leaves and soil at V8, on July 10, 2013
Fish application: (1) 2 gal/acre in a 5 gal/acre volume, with Vitazyme and 10-34-0% N-P_2O_5-K_2O, in-furrow at planting; (2) 2 gal/acre sprayed on the leaves and soil with a hooded plot sprayer at V8, on July 10, 2013; (3) 2 gal/acre on the leaves, hand-sprayed with a backpack sprayer at silking

Harvest date: October 25, 2013

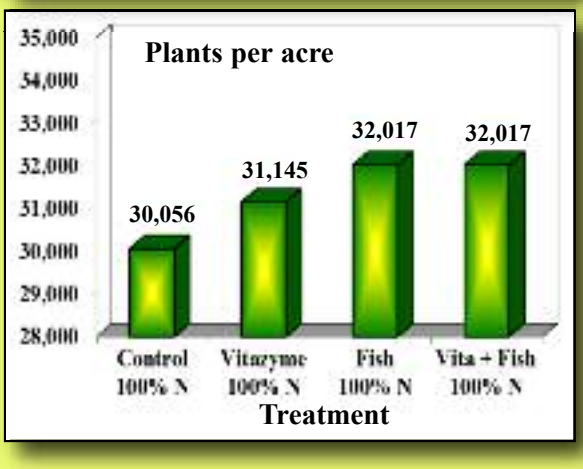
Chlorophyll results: Chlorophyll readings were made with a Minolta SPAD meter at V10 (July 17, 2013), and again at R1 (August 1, 2013). No consistent results were noted, although the highest overall value recorded was for 100% N + Vitazyme at R1 (54.6), which was 1.2 points higher than the respective control treatment.

Population results: There was some benefit to plant stand shown with Vitazyme at three out of the four nitrogen levels.

Plant Population and Nitrogen Rate



Plant Population With Vitazyme and Fish



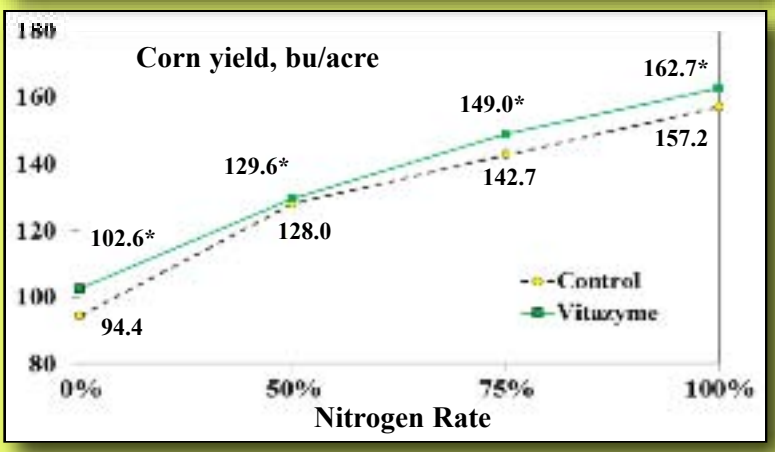
In every case except at 0% N, the Vitazyme and fish treatments exceeded the control treatments. Fish alone and Vitazyme + fish significantly exceeded the control in plants/acre.

Grain moisture results: There were no clear relationships between Vitazyme, fish, and nitrogen rates. At-harvest moisture was around 16.0 to 17.0%

Grain test weight results: Weight per bushel of grain varied little across all of the treatments, ranging from 53.4 to 55.9 lb/bu for the eight nitrogen rate treatments. The Vitazyme + Fish treatment, however produced the heaviest grain at 56.4 lb/bu.

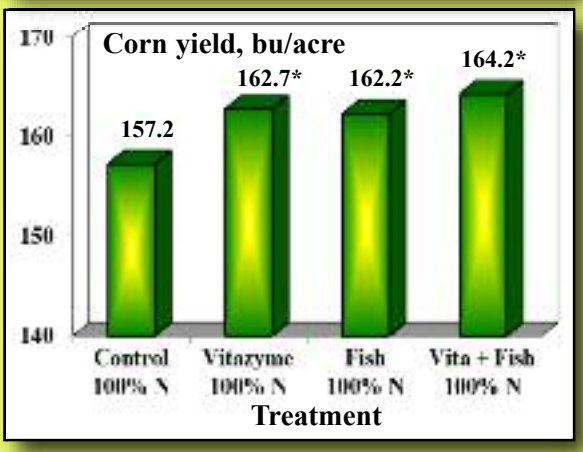
Grain yield results:

Grain Yield and Nitrogen Rate



*Significantly greater than the control treatment at the same nitrogen level at P = 0.05, according to the Statistical Analysis System, GLM.

Grain Yield With Vitazyme and Fish



*Significantly greater than the control treatment at the same nitrogen level at P = 0.05, according to the Statistical Analysis System, GLM.

Increase in Grain Yield With Vitazyme

0% N	8.7%
50% N	1.3%
75% N	4.4%
100% N	3.5%

Grain yield increases were consistent across all nitrogen levels, but the largest percentage increase (8.7%) was with no fertilizer nitrogen added.

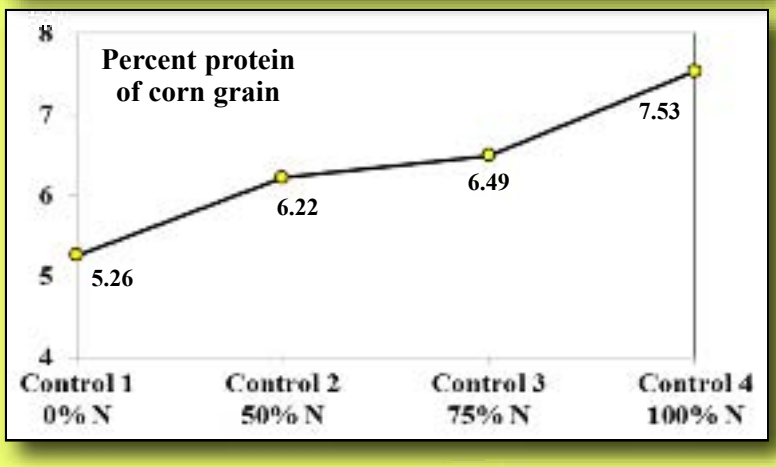
Increase in Grain Yield With Vitazyme and Fish - 100% N

Vitazyme only	3.5%
Fish only	3.2%
Vitazyme + Fish	4.5%

Both Vitazyme and fish alone significantly improved grain yield, but the combined Vitazyme and fish produced the highest yield — 4.5% higher than the 100% control — which was the highest yield of all ten treatments (164.2 bu/acre).

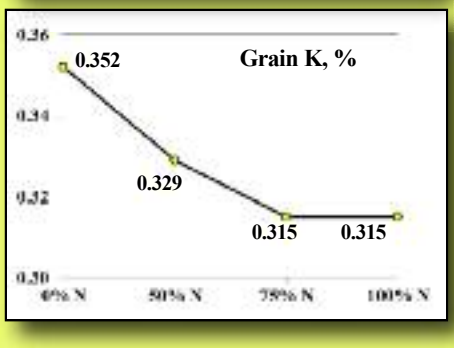
Grain quality results: Analyses of oil, protein, and starch were performed at the South Dakota State University diagnostic laboratory. Oil varied from 2.94 to 3.29%, protein from 5.26 to 7.53%, and starch from 57.74 to 58.87%. There was no effect of Vitazyme and fish on these contents although nitrogen levels increased the protein for the control and Vitazyme treatments. See the following graph.

Protein of Grain and Nitrogen Level

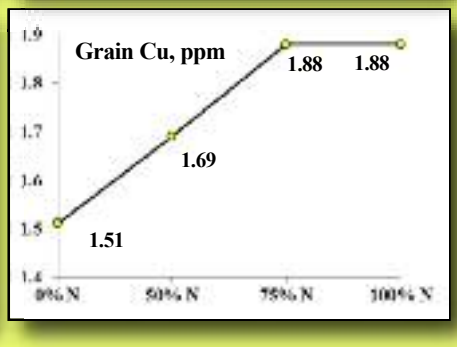


Analyses of grain potassium, copper, iron, zinc, manganese, phosphorus, sulfur, magnesium, and calcium revealed no clear patterns of effects for Vitazyme and fish on these nutrients, although fish tended to increase potassium and phosphorus. Nitrogen increased some nutrient levels and reduced others. Values of both the control and Vitazyme treatments are averaged for each N level.

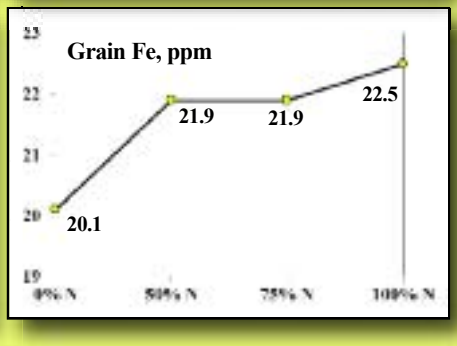
Grain K and N Level



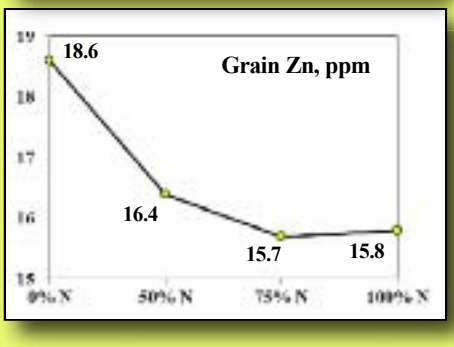
Grain Cu and N Level



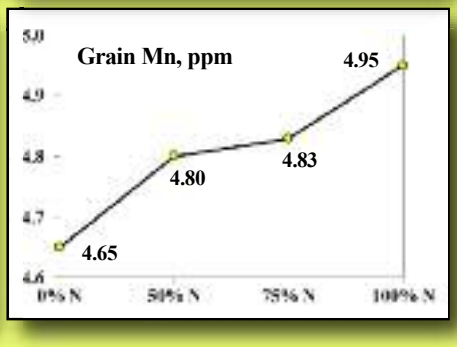
Grain Fe and N Level



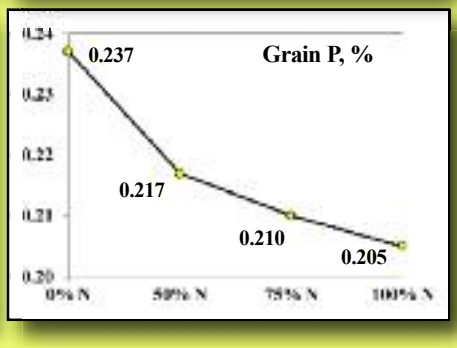
Grain Zn and N Level



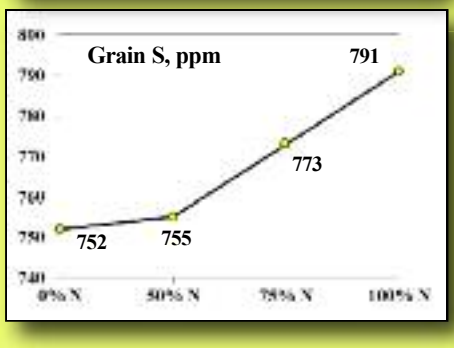
Grain Mn and N Level



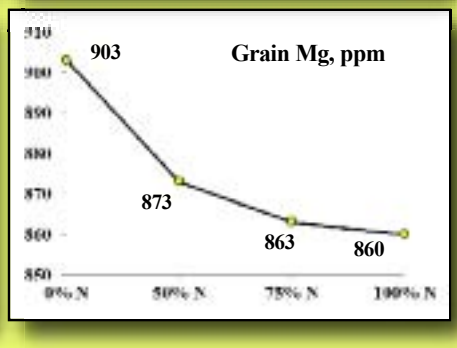
Grain P and N Level



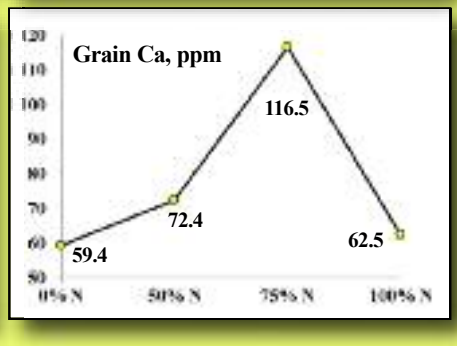
Grain S and N Level



Grain Mg and N Level



Grain Ca and N Level



<u>*Conclusions*</u>: A small plot corn study in east central South Dakota revealed that Vitazyme and fish — Vitazyme applied at planting and at V8, and fish applied at planting, V8, and silking — significantly increased corn yield at all nitrogen fertilizer levels, by up to 8.7% at the 0% N level. The Vitazyme plus fish treatment at 100% N gave the highest yield of all ten treatments (164.2 bu/acre). Vitazyme increased plant population at the three highest nitrogen levels, and fish and fish plus Vitazyme also increased population at 100% N. Grain quality parameters were affected by nitrogen levels to some degree, the contents of protein, copper, iron, manganese, and sulfur increasing and the contents of potassium, zinc, phosphorus, and magnesium decreasing with increasing nitrogen fertilizer. This study reveals the usefulness of Vitazyme and fish, and especially the two combined, to increase corn yields under rainfed conditions in eastern South Dakota.

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2013 Crop Results

Vitazyme on Corn

Researcher: Juan Carlos Diaz, Ph.D. *Farmer*: Ramiro Carlos Fonseen
Location: El Ahuaje de Abajo Farm, San Nicolas, Cocula, Jalisco, Mexico
Variety: N 432 HJ (Eagle) *Planting date*: May 8, 2012
Experimental design: Corn to be used for leaves to wrap tamales was treated with Vitazyme on the seeds, and later on the leaves and soil, to one portion of a field, and compared with an untrteated control to evaluate leaf production. The treated area was 1 ha.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: (1) Seed treatment of 50 ml in 450 ml of water, to treat 55,000 seeds (a 20 kg bag planted 1 ha); (2) soil and foliar treatment of 1 liter/ha (13 oz/acre) at an unknown date.
Leaf yield result: Actual yield numbers for the two plots were not available, but the data reported an 8% increase in leaves with Vitazyme versus the control.

Increase in yield with Vitazyme: 8%

Conclusion: This Mexican corn study, utilizing two Vitazyme applications — a seed and a soil/foliar treatment — showed that this product significantly enhanced leaf production of the corn plants.

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2013 Crop Results

Vitazyme on Corn

Researcher: Juan Carlos Diaz, Ph.D.
Location: Camino a la Coronilla Farm, Ameca, Jalisco
Planting date: May 8, 2012
Farmer: Eng. Jose Guadalupe Orozco Flores
Variety: Pioneer 3055
Planting rate: 80,000 seeds/ha

Experimental design: A 1 ha plot was selected from a corn field to treat with Vitazyme, on both the seeds and leaves, to determine the effectiveness of the product to increase yield.

1. Control **2. Vitazyme**

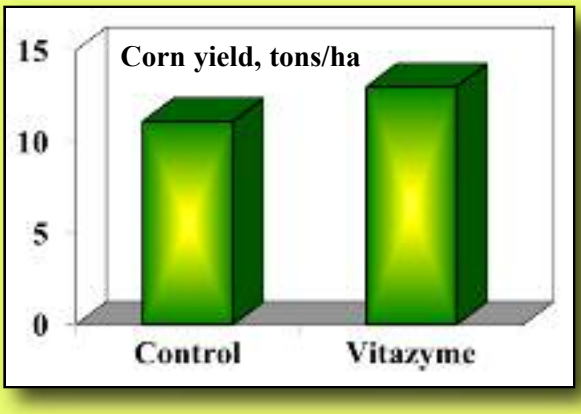
Fertilization: unknown

Vitazyme application: (1) A seed treatment of 50 ml in 450 ml of water, applied with Regent; (2) a soil and foliar spray treatment of 1.0 liter/ha at an unknown date

Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	11.1	—
Vitazyme	13.0	1.9 (+17%)

Increase in grain yield with Vitazyme: 17%



Conclusions: A corn study with Vitazyme in Mexico proved that the product increased grain yield substantially, by 17%, over the untreated control, showing the great effectiveness of this material to stimulate corn yield.

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2013 Crop Results

Vitazyme on Corn

Researcher: Tim Heikens and Leonard Jansen
Location: Lake Park, Iowa
Row spacing: 30 inches
Planting date: May 11, 2013
Farmer: Leonard Jansen
Variety: Golden Harvest H7891
Plant population: 33,000 seeds/acre
Soil type: silty clay loam (Mollisol)

Experimental design: A 30-acre uniform corn field was sprayed with Vitazyme in alternating 90-foot sprayer strips through the field after the corn was growing. The purpose of the study was to determine if a single application could improve grain yield.

1. Control **2. Vitazyme**

Fertilization: Total nutrients applied were 140-100-120 lb/acre of N-P_2O_5-K_2O.

Vitazyme application: 20 oz/acre (1.5 liters/ha) sprayed on the leaves and soil on July 6 at the 10 to 11 leaf stage

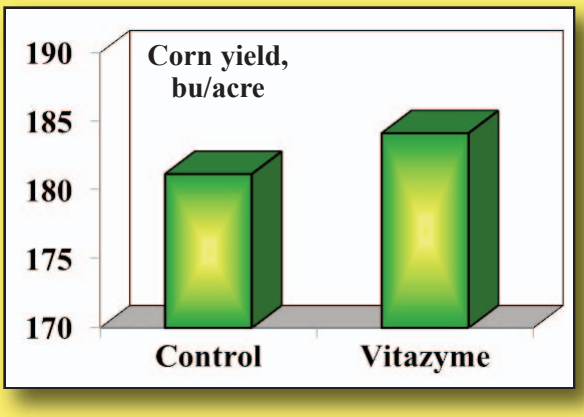
Weed control: 1.5 pints/acre Steadfast on May 9; 1 quart/acre Roundup on June 17

Weather during the season: a wet spring and a dry summer and fall

Harvest date: October 24, 2013

Yield results: A weigh wagon was used to quantify yields.

Treatment	Yield	Yield change
	bu/acre	bu/acre
Control	181.19	—
Vitazyme	184.16	2.97 (+2%)



Grain moisture results: the Vitazyme treated corn had 17% moisture and the control corn had 18% moisture.

Reduction in grain moisture with Vitazyme: 1.0%

Conclusions: This corn trial in northwestern Iowa revealed that Vitazyme, applied at the 10 to 11-leaf stage at 20 oz/acre, produced about a 3 bu/acre yield increase. Grain moisture was 1.0% less. Had the product been applied at planting as well the yield improvement would likely have been much greater.

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2013 Crop Results

Vitazyme on Corn

Researcher: unknown *Farmer*: Linh Thi Ngan *Location*: Dak Will, Cu Jut District, Dak Nong, Viet Nam *Variety*: P4199 *Planting date*: August 10, 2013
Planting rate: 50,000 plants/ha
Experimental design: A corn field was divided into a Vitazyme treated and control area to determine the effects of this product on corn growth and yield.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: (1) seed treatment with a 5% solution before planting; (2) 2 liters/ha spray on the leaves and soil 15 days after planting; (3) 2 liters/ha spray on the leaves and soil 30 days after planting.
Germination results: Both treatments had over 95% germination.
Harvest date: December 12, 2013, 120 days after planting
Harvest and Yield results:

Treatment	Plant height	Ear height	Drought resistance	Weight of 1,000 seeds	Seed color	Yield
	cm	cm		grams		tonnes/ha
Control	185	100	Fair	310	Light yellow	8.0
Vitazyme	192 (+4%)	110 (+10%)	Good	315 (+2%)	Dark yellow	9.0 (+13%)

Increase in plant height: 4%

Increase in ear height: 10%

Increase in 1,000 seed weight: 2%

Increase in yield: 13%

Income results: The Vitazyme treated corn sold for 4,000 VND/kg, versus 3,800 VND/kg for the control corn.

Costs with Vitazyme: 1,420,000 VND/ha
Increased income with Vitazyme: 4,180,000 VND/ha
Return On Investment with Vitazyme: 2,94 : 1

Conclusions: A corn study in Viet Nam proved that a Vitazyme seed treatment, plus two soil and foliar applications, produced an excellent 13% yield increase. Drought tolerance was improved, as was seed weight (2%), and plant height (4%). Income was substantially increased, giving a Return On Investment of 2.94 : 1. This program is an excellent one for corn production in Viet Nam.

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2013 Crop Results

Vitazyme on Corn

Researcher: Juan Carlos Diaz, Ph.D.
Location: La Mesita Farm, Cocula, Jalisco, Mexico
Planting date: 90,000 seeds/ha
Farmer: Eng. Juan Carlos Flores Orozco
Variety: Pioneer 3055
Irrigation: sprinkler

Experimental design: A 1.0 ha area of an irrigated corn field was treated with Vitazyme on the seeds, and later on the leaves and soil, in order to evaluate the product's ability to increase grain yield.

1. Control **2. Vitazyme**

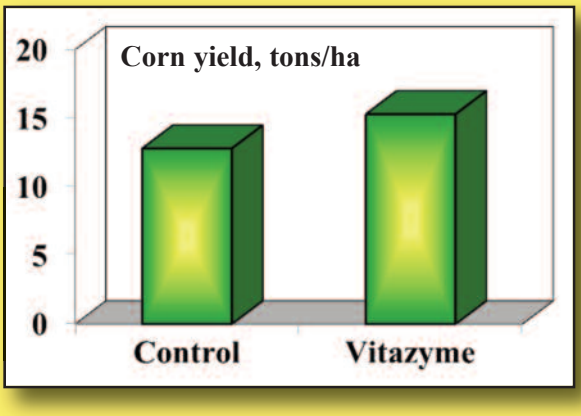
Fertilization: unknown

Vitazyme application: (1) Seeds were treated with a 10% solution; (2) leaves and soil were sprayed with 1 liter/ha (13 oz/acre) during growth at an unspecified time.

Yield results:

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	12.8	—
Vitazyme	15.3	2.5 (+20%)

Increase in grain yield with Vitazyme: 20%



Conclusions: A corn study under irrigation, using a seed treatment and an additional foliar and soil spray, revealed that Vitazyme improved grain yield by 20% above the untreated control.

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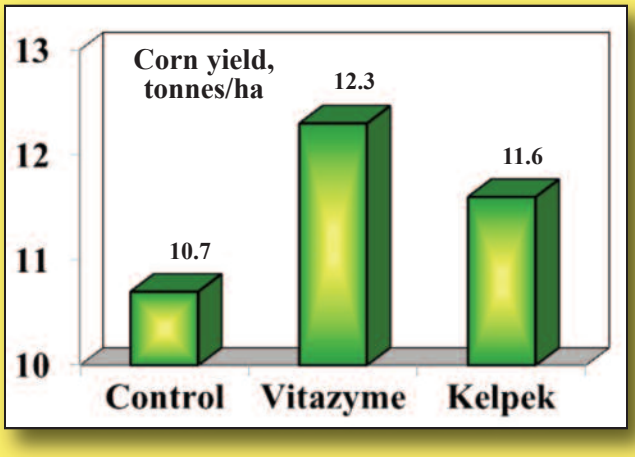
2013 Crop Results

Vitazyme and Kelpek on Corn

Researcher: V.V. Plotnikov *Research organization*: Scientific, Innovation, and Technology Center of the Institute of Forages and Agriculture of Podillya NAAS *Location*: National Academy of Agricultural Sciences, Ukraine *Variety*: DKS 2960, FAO 250 *Soil type*: ash gray soil (humus = 2.2%, hydrolyzed-N = 8.4 mg/100 g of soil, P = 15.8 mg/100 kg of soil, exchangeable K = 12.4 mg/100 g of soil, pH = 5.5) *Previous crop*: winter wheat *Planting date*: May 10, 2013
Soil preparation: disking, plowing, harrowing, cultivating *Seeding rate*: 80,000 seeds/ha
Experimental design: A small plot experiment with four replications was prepared to evaluate the effects of Vitazyme and Kelpek on the yield and growth of corn.

1. Control **2. Vitazyme** **3. Kelpek**

Fertilization: Before planting, 100-60-60 kg/ha of N-P_2O_5-K_2O were applied to the active test area.
Vitazyme application: 1 liter/ha sprayed on the leaves and soil at the 7 to 8-leaf stage (June 11, 2013)
Kelpek application: 2 liters/ha sprayed on the leaves and soil at the 7 to 8-leaf stage (June 11, 2013)
Yield results:



Increase in yield	
Vitazyme	15%
Kelpek	8%

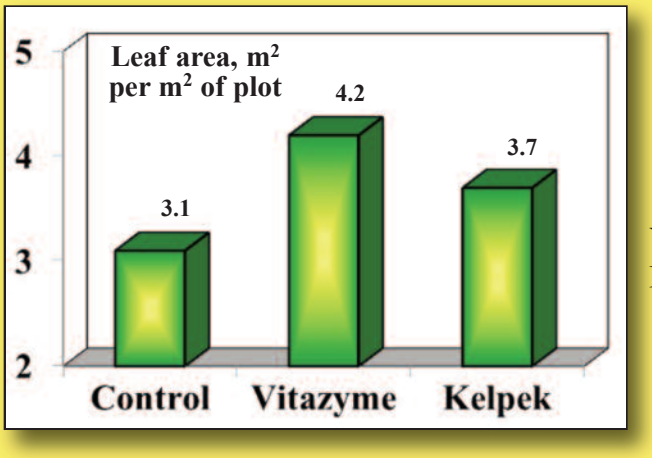
Both Vitazyme and Kelpek substantially increased corn yield, but Vitazyme produced nearly double the increase of Kelpek (15%)

Income results:

Increase in net income	
Vitazyme	1,690 UAH/ha
Kelpek	780 UAH/ha

Vitazyme clearly produced the greater income of the two products, more than doubling that achieved by Kelpek.

Leaf area results:



Increase in leaf area	
Vitazyme	35%
Kelpek	19%

Vitazyme nearly doubled the leaf area of corn versus Kelpek.

Conclusions: The authors of the report stated,

1. The treatment of corn hybrid DKS 2960 at the 7-8 leaf stage with Vitazyme, at 1 L/ha, gave a corn grain yield increase of 106 tonnes/ha, or 15%. When applying the competitive chemical Kelpek at a rate of 1 L/ha at the 7-8 leaf stage, the increase of corn grain yield was 0.9 tonne/ha, or 8%, and was 0.7 tonne/ha less than with Vitazyme.

2. With Vitazyme at 1 L/ha, the profit was 1,690 UAH/ha, which is 910 UAH/ha more than when applying Kelpek at 2 L/ha.

3. Vitazyme application at 1 L/ha gave an increase in corn leaf area of 1.1 m^2/m^2 of the plot. Applying Kelpek at 2 L/ha gave a corn leaf area increase of 0.6 m^2/m^2 of the plot, which is 0.5 m^2/m^2 less than when applying Vitazyme.

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2013 Crop Results

Vitazyme on Corn

Researcher: Juan Carlos Diaz, Ph.D.
Farmer: Odilon Ramos
Location: San Juan Acozac, Puebla, Mexico
Variety: unknown

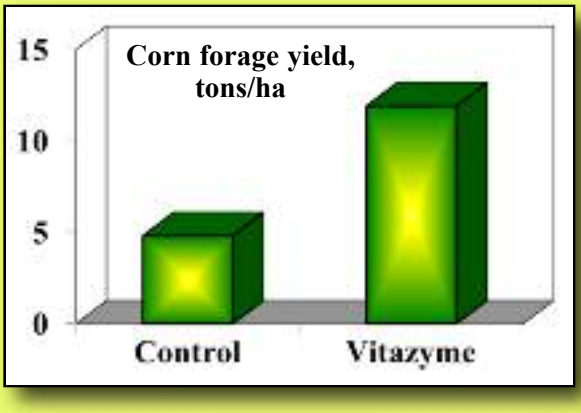
Experimental design: A corn field for fodder was divided into Vitazyme and control areas of 4,000 m^2 (0.4 ha) each, to evaluate the effect of the product on corn yield.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: 1 liter/ha (13 oz/acre) two times (timing unknown)
Yield results: Two cuttings were weighed for each treatment.

Treatment	Forage yield		Yield change
	tons	tons/ha	tons/ha
Control	1.9	4.8	—
Vitazyme	4.0	11.9	7.1 (+148%)

Increase in forage yield with Vitazyme: 148%



Conclusions: A forage corn study in Mexico revealed that Vitazyme applied twice during the growing season produced a remarkable 111% increase in yield. This program is highly effective for corn growers in Mexico.

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2013 Crop Results

Vitazyme on Corn

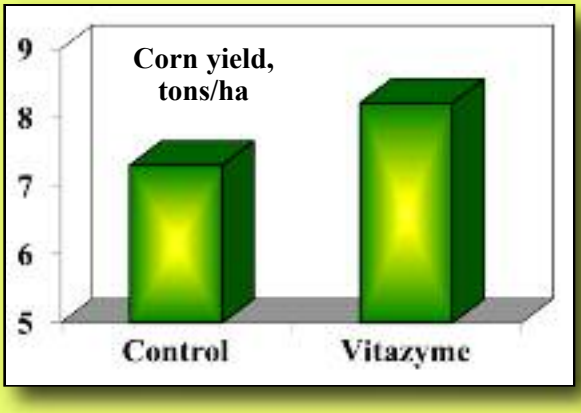
Researcher: Juan Carlos Diaz, Ph.D. *Farmer*: Eng. Salvador Sanchez Rica
Location: El Chivero Field, El Llano Farm, San Martin Hidalgo, Jalisco, Mexico
Variety: Cimarron
Experimental design: A corn field had 1 ha. selected to be treated with Vitazyme, applied to the seeds and later as a foliar spray, to evaluate effects on yield compared to an adjacent untreated area.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: (1) Seeds were treated with 100 ml/20 kg of seed; (2) a spray of 1 liter/ha (13 oz/acre) was made to the leaves and soil sometime during growth.
Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	7.30	—
Vitazyme	8.21	0.91 (+12%)

Increase in yield with Vitazyme: 12%



Conclusions: This Mexican corn study revealed that a Vitazyme seed treatment and single foliar treatment increased grain yield by 12%, showing the program to be highly valuable for corn production in Mexico.

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2013 Crop Results

Vitazyme and Fish on Corn

Researcher: Bertel Schou, Ph.D. *Research organization*: ACRES (Agricultural Research and Educational Services), Cedar Falls, Iowa
Location: Cedar Falls, Iowa *BBCH scale*: BCOR
Variety: Pioneer P0453HR (Roundup Ready) *Maturity*: 104 days *Planting Depth*: 1.5 inches
Planting rate: 38,000 seeds/acre *Row spacing*: 30 inches *Slope of plot*: 5%
Planting date: May 17, 2013 *Previous crop*: soybeans *Soil type*: Kenyon loam
Tillage: conventional (field cultivating and harrowing)
Soil test values: pH = 6.9 , organic matter = 2.7%, cation exchange capacity = 20.0 meq/100 g, N = 74 lb/acre, SO_4-S = 16 lb/acre, P_2O_5 = 246 lb/acre, Ca = 5,743 lb/acre, Mg = 807 lb/acre, K2O = 302 lb/acre, Na = 94 lb/acre, B = 1.45 lb/acre, Fe = 539 lb/acre, Mn = 143.7 lb/acre, Cu = 2.3 lb/acre. Zn = 11.8 lb/acre; percent base saturations: Ca = 71.6%, Mg = 16.8%, K = 1.9%, Na = 1.0%, other bases = 4.6%, H = 4.0%.
Experimental design: A corn study having individual plots 15 x 30 feet (450 ft^2, or 0.0103 acre) was set up in a randomized complete block design, with six replicates. The purpose of the study was to determine the effects of Vitazyme and fish applied separately, and the two applied together in-furrow and foliar, on crop yield, moisture, and plant population.

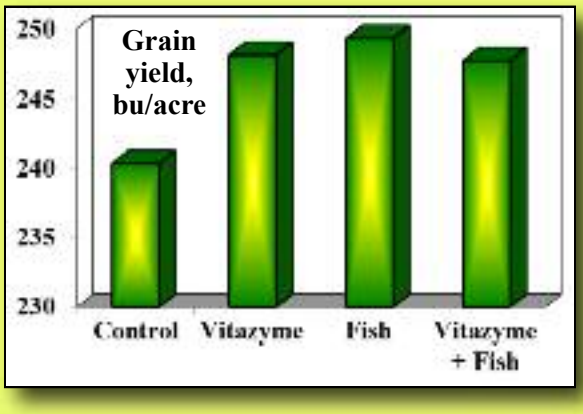
Treatment	At planting	At V6R1	At R4
1. Control	0	0	0
2. Vitazyme	13 oz/acre	13 oz/acre	0
3. Fish	2 gal/acre	2 gal/acre	2 gal/acre
4. Vitazyme + Fish	13 oz + 2 gal (Trt. 2 + 3)	13 oz + 2 gal (Trt. 2 + 3)	2 gal/acre (Fish only)

Fertilization: In the fall of 2012, 100 lb/acre of 18-46-0 (% N-P_2O_5-K_2O) and 100 lb/acre of 0-0-60. At 14 inches corn height, 100 lb/acre of N was applied as UAN (urea ammonium nitrate).
Vitazyme application: At planting (for Treatments 2 and 4), 13 oz/acre (1 liter/ha) in-row in a 10 gallon/acre solution; at V6 (Treatments 2 and 4), 13 oz/acre (1 liter/ha) sprayed on June 20 at 15 gallons/acre.
Fish application: Emulsified fish was applied at 2 gallons/acre in-row at planting (Treatments 3 and 4), and at 2 gallons/acre by foliar spray at V6 (Treatments 3 and 4) on June 20, as well as at V10 (Treatments 3 and 4) on August 26. The fish was mixed with water to give a 20 gal/acre output.
Weed control: Harness Xtra preplant (1.2 quarts/acre); Roundup postemergence at the recommended rate
Harvest date: October 25, 2013

Yield results: Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Kuels Test.

Treatment	Yield[1]	Yield change
	bu/acre	bu/acre
1. Control	240.3 b	—
2. Vitazyme	248.1 ab	7.8 (+3.2%)
3. Fish	249.3 a	9.0 (+3.7%)
4. Vitazyme + Fish	247.9 ab	7.6 (+3.2%)
LSD (P = 0.05)	8.0	
Standard deviation	6.5	
CV	2.6%	
Replicate F	1.73	
Treatment F	2.40	

[1]Adjusted to 15.5% moisture.



Increase in corn yield with Vitazyme: 3.2%

Increase in corn yield with Fish: 3.7%

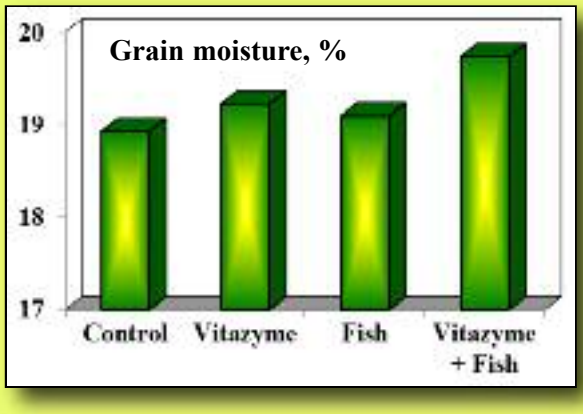
Increase in corn yield with Vitazyme + Fish: 3.2%

Although only the fish treatment statistically exceeded the control, the three Vitazyme and fish treatments were equal, differing by 0.5% from each other. Vitazyme increased yield at the 6% confidence level, but the combined Vitazyme and fish did not enhance the yield above either product alone.

Plant population results: All final population values were nearly equal (36,459 to 36,776 plants/acre).

Grain moisture results:

Treatment	Grain moisture	Moisture change
	%	%
1. Control	18.92 b	—
2. Vitazyme	19.22 ab	+0.30
3. Fish	19.09 ab	+0.17
4. Vitazyme + Fish	19.73 a	+0.81
LSD (P = 0.05)	0.62	
Standard deviation	0.50	
CV	2.6%	
Replicate F	1.73	
Treatment F	2.92	



Only the combined Vitazyme + Fish treatment exceeded the control in grain moisture at P = 0.05. The other treatments were very close to each other.

Conclusions: A replicated corn trial in east-central Iowa revealed that both Vitazyme and liquid fish, and the products combined, increased the yield of corn grain significantly — Vitazyme alone and the two products together at P = 0.06, and fish alone at P = 0.05 — with the combined products not showing a synegistic effect. These yield increases were 7.8, 9.0, and 7.6 bu/acre for the Vitazyme, fish, and combined treatments, respectively. Plant population was not affected by either material, but grain moisture was greater than the control for the combined products by 0.81 percentage point at P =0.05.

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2013 Crop Results

Vitazyme on Corn

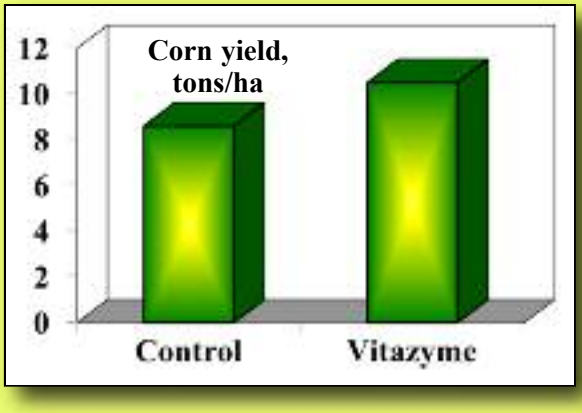
Researcher: Juan Carlos Diaz, Ph.D.
Farmer: Eng. Jose Isabel Hernandez Soto
Location: El Monte Farm, Villa Corona, Jalisco, Mexico
Variety: Cayman
Planting date: May 8, 2012
Experimental design: A corn field was divided into Vitazyme treated and control areas to determine the effect of a seed and foliar treatment on corn yield. The treated area was 1 ha.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: (1) Seed treatment, at 100 ml/20 kg of seed; (2) soil and foliar spray at 1 liter/ha (13 oz/acre) at an undetermined time
Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	8.6	—
Vitazyme	10.5	1.9 (+22%)

Increase in yield with Vitazyme: 22%



Conclusions: Applying a seed treatment and foliar spray to this corn study resulted in an excellent 22% yield increase.

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2013 Crop Results

Vitazyme on Corn

A Nitrogen Rate Study

Researcher: Timothy Veldkamp *Research Organization*: SGS Ag Research
Location: Aurora, South Dakota *Variety*: 4055 Roundup Ready *BCCH Scale*: BCOR
Planting Date: June 14, 2013 *Planting rate*: 32,000 seeds/acre *Planting depth*: 1.5 inches
Row spacing: 30 inches *Tillage*: conventional *Previous crop*: soybeans
Soil type: Strayhoss Loam (pH = 6.5, organic matter = 4.5%, cation exchange capacity = 25 meq/100 g of soil, P = 14 lb/acre, K = 174 lb/acre, Zn = 1.22 lb/acre)
Experimental design: A small plot soybean study was designed to evaluate the effect of Vitazyme, at two nitrogen levels, on the yield of corn. The plots were 10 x 40 feet (0.009183 acre), and arranged in a randomized complete block design, with four replicates.

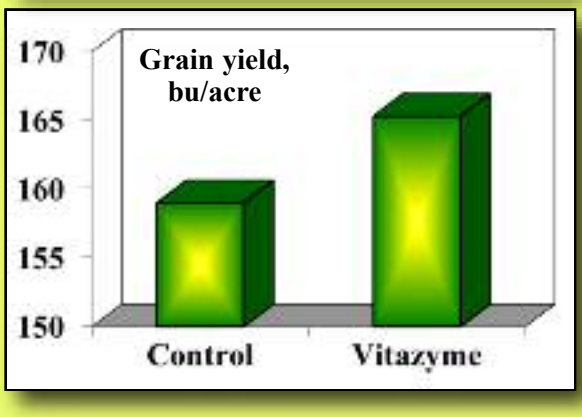
1. Control, 50% N 2. Vitazyme, 50% N 3. Control, 100% N 4. Vitazyme, 100% N

Fertilization: 50% N plots received 65 lb/acre of N; 100% N plots received 130 lb/acre of N
Vitazyme application: (1) 13 oz/acre (1 liter/ha) in the seed row at planting; (2) 13 oz/acre (1 liter/ha) on the leaves and soil at V8.
Weed control: 1.8 quarts/acre of Harness Xtra + 24 oz/acre of Roundup PowerMax on July 3; 24 oz/acre of Roundup PowerMax on August 8
Vigor results: Plant vigor was evaluated at the V2 stage on July 8, 2013. Values ranged from 5.8 to 6.3, and were not significantly different.
Harvest date: November 8, 2013
Yield results: The middle two rows of each plot were combined and weighed, and the moisture content was determined using an Almaco Grain Gauge.

Treatment	Grain yield[1]	Yield change[2]
	bu/acre	bu/acre
Control, 50% N	159.0 b	—
Vitazyme, 50% N	165.3 a	6.3 (+4%)
Control, 100% N	167.4 a	—
Vitazyme, 100% N	170.3 a	2.9 (+2%)
LSD (P = 0.10)	5.0	
CV	2.35%	
Replicate F	13.880	
Treatment F	6.138	

[1]Means followed by the same letter are not significantly different at P=0.10, according to the Student-Newman-Kuels Test.
[2]The Vitazyme means are compared with the control means at the same N level.

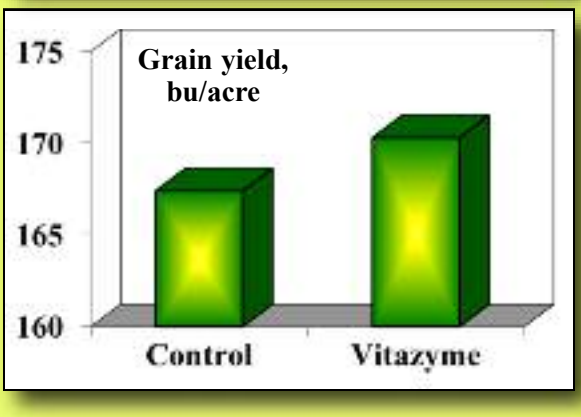
Grain Yield, 50% N



Increase in yield at 50% N: 4%

Increase in yield at 100% N: 2%

Grain Yield, 100% N



Vitazyme significantly increased grain yield at 50% N, boosting it by 6.3 bu/acre, while the 100% N application revealed that Vitazyme increased the yield by 2.9 bu/acre over the control, but not significantly. Vitazyme grain yield at 50% N was statistically the same as was the untreated grain yield at 100% N.

Test weight results: All values varied within a narrow range — 51.15 to 51.93 lb/bu — and none of the differences were significant. However, Vitazyme at both N levels slightly raised bushel weight.

Increase in test weight with Vitazyme
At 50% N ..... 0.78 lb/bu
At 100% N ..... 0.25 lb/bu

Grain moisture results: There were no significant differences in grain moisture among the four treatments.
Conclusions: This corn trial with Vitazyme at two nitrogen levels, near Brookings, South Dakota, revealed that Vitazyme significantly improved corn yield at the 50% N level. This yield was only 2.1 bu/acre less than the 100% N treatment without Vitazyme, and not significantly different from it. This reveals the improved nitrogen efficiency often noted with the use of this product. The 100% N level gave a 2% (2.9 bu/acre) yield increase for Vitazyme; the two were statistically the same. Grain moisture was not affected by the treatments, but there appeared to be a slight improvement in grain bushel weight with Vitazyme. These results show the excellent value of this program for corn growers in the northern Corn Belt.

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2013 Crop Results

Vitazyme on Corn

With Quantum Products at Two Nitrogen Rates

Researcher: Bertel Schou, Ph.D. *Research organization*: ACRES (Agricultural Research and Educational Services), Cedar Falls, Iowa
Location: Cedar Falls, Iowa *BBCH scale*: BCOR
Variety: Pioneer P9675 (Roundup Ready) *Planting Depth*: 1.5 inches *Maturity*: 96 days
Planting rate: 38,000 seeds/acre *Row spacing*: 30 inches *Slope of plot*: 4%
Tillage: field cultivated and harrowed *Planting date*: June 20, 2013 *Previous crop*: corn
Soil type: Maxfield silty clay loam (organic matter = 4.4%, pH = 6.3, cation exchange capacity = 17 meq/100 g of soil, drainage = excellent, fertility = excellent)
Experimental design: A small plot corn experiment was established in east-central Iowa to evaluate the effect of Vitazyme and two Quantum products on the yield of corn, at two nitrogen levels. Six replications were used, with a randomized complete block design. Individual plots were 15 x 30 feet, or 450 ft^2 per plot (0.01033 acre). This experiment had been put in earlier but was mistakenly fertilized incorrectly, so was redone and planted later with a short-season variety, so yielded less than the original study would have.

Treatment	Nitrogen	Vitazyme	Quantum Light	Quantum VSC
1. Control	50%	0	0	0
2. Vitazyme	50%	In-furrow,Foliar	0	0
3. Quantum	50%	0	In-furrow, Foliar	In-furrow, Foliar
4. Vitazyme + Quantum	50%	In-furrow, Foliar	In-furrow, Foliar	In-furrow, Foliar
5. Control	100%	0	0	0
6. Vitazyme	100%	In-furrow, Foliar	0	0
7. Quantum	100%	0	In-furrow, Foliar	In-furrow, Foliar
8. Vitazyme + Quantum	100%	In-furrow, Foliar	In-furrow, Foliar	In-furrow, Foliar

Fertilization: 18-46-0% N-P_2O_5-K_2O applied per acre the fall of 2012; 50% N, 80 lb/acre urea-NH_4NO_3; 100% N, 160 lb/acre urea NH_4NO_3, all sidedressed

Vitazyme application: 13 oz/acre (1 liter/ha) in-row at planting; 13 oz/acre (1 liter/ha) on the leaves and soil at V8, August 9, 2013

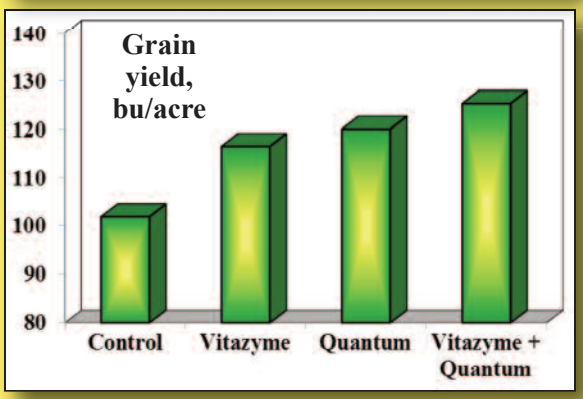
Quantum application: Both Quantum products are produced by Applied and Experimental Biology, Jacksonville, Florida. Quantum Light is a proprietary blend of beneficial cultures and photosynthetic microbes that increase plant photosynthesis and growth. Quantum VSC contains photosynthetic microbes, hypercellulose, symbiotic microbes, and humic substances. These were applied at 1 gallon/acre each for both in-furrow and foliar applications, at the same times as Vitazyme. The two were applied together.

Weed control: post-emergence herbicides
Weather during the growing season: Temperatures were about average after a cool early season; spring was wet, but July and August were dry.
Harvest date: October 28, 2013
Yield results: The two center rows of each plot were harvested for yield results. Weights are corrected to 15.5% moisture.

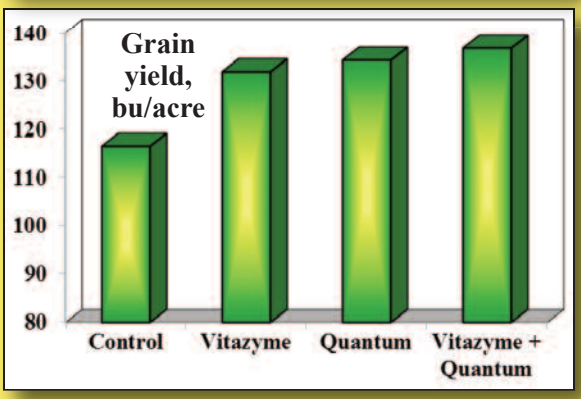
Treatment	Grain yield[1]	Yield change[2]
	bu/acre	bu/acre
---------- 50% Nitrogen ----------		
1. Control	101.9 d	—
2. Vitazyme	116.4 c	14.5 (+14%)
3. Quantum	120.0 c	18.1 (+18%)
4. Vitazyme + Quantum	125.3 bc	23.4 (+23%)
---------- 100% Nitrogen ----------		
1. Control	116.4 c	—
2. Vitazyme	131.8 ab	15.4 (+13%)
3. Quantum	134.2 ab	17.8 (+15%)
4. Vitazyme + Quantum	136.7 a	20.3 (+17%)
LSD (P = 0.05)	10.4	
CV (P = 0.05)	7.21%	
Replicate F	4.051	
Treatment F	10.244	

[1]Means followed by the same letter are not significantly different at P = 0.05 according to the Student-Newman-Kuels Test.
[2]Comparisons are made within the same fertility level.

Yield at 50% Nitrogen



Yield at 100% Nitrogen



Vitazyme consistently boosted yield by 13 to 14% above the control at both nitrogen levels, while the Quantum products improved the yield by 15 to 18%. The two products together further boosted corn yield, to 17 to 23% above the control. In every cases the greatest increases were at the 50% notrogen level. There appears to be a synergism between Vitazyme and Quantum materials, with additional boosts in yield of 2% at the 100% N level, and 5% at the 50% N level.

Increase in Yield With Vitazyme

	50% N	100% N
Vitazyme	14%	13%
Quantum Only	18%	15%
Vitazyme + Quantum	23%	17%

Grain moisture results: Grain moisture was determined by a device on the plot combine.

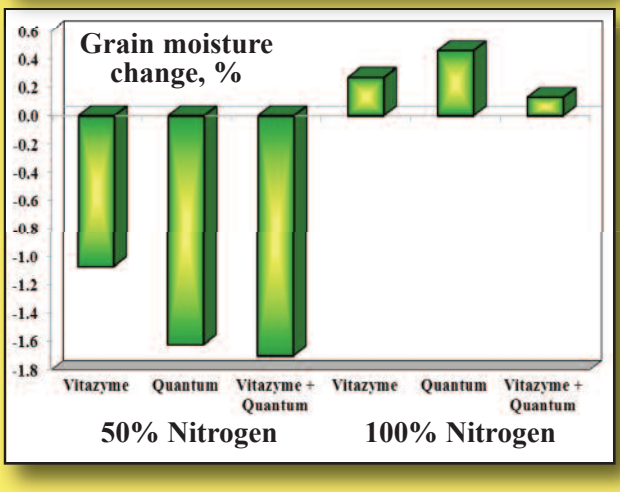
Treatment	Grain moisture[1]	Change[2]
	%	%e
---------- 50% Nitrogen ----------		
1. Control	25.00 a	—
2. Vitazyme	23.93 ab	-1.07
3. Quantum	23.38 ab	-1.62
4. Vitazyme + Quantum	23.30 b	-1.70
---------- 100% Nitrogen ----------		
1. Control	23.89 ab	—
2. Vitazyme	24.16 ab	+0.27
3. Quantum	24.35 ab	+0.46
4. Vitazyme + Quantum	24.02 ab	+0.13
LSD (P = 0.05)	1.67	
CV	5.90%	
Replicate F	0.940	
Treatment F	0.869	

[1]Means followed by the same letter are not significantly different at P = 0.05 according to the Student-Newman-Kuels Test.
[2]Comparisons are made within the same fertility level.

There was only one significant grain moisture change: a reduction of 1.70 percentage points with Vitazyme + Quantum at 50% N. Both Vitazyme and Quantum and Quantum alone also reduced grain moisture, but not significantly at 50% N. On the other hand, all treatments at 100% N slightly increased grain moisture.

Reduction in grain moisture with Vitazyme + Quantum at 50% N: 1.70%-point

Change in Grain Moisture



Plant population results: All treatments had statistically the same population (23,980 to 22,092 plants/acre) except the control at 50% N, and Quantum products at 50% N, and Quantum products at 50% N, which had significantly lower populations. The good yield response of the Quantum treatment showed that these slightly reduced populations had little effect on the resultant yield.

Conclusions: A small plot corn study in east-central Iowa revealed that a late-planted Roundup Ready variety responded well to both two nitrogen levels, and also Vitazyme and Quantum products, alone or in combination. Vitazyme boosted the grain yield by 14% at 50% N, and by 13% at 100% N; Quantum Light + Quantum VSC increased the yields by 18% and 15% at 50 and 100% N, respectively. The products applied together in-row and foliar brought a synergistic improvement in yield above either product alone, the increases being 23% at 50% N and 17% at 100% N. Grain moisture was significantly reduced by the combined products at the 50% N level, but this reduction was not achieved at the 100% N level. Both products, and especially the products applied together, showed fine grain yield responses in this trial, and should be evaluated further as to their potential as excellent synergists for farmers in the Corn Belt.

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2012 Crop Results

Vitazyme on Corn

Researcher: James Anderson
Farmer: David Bergeson
Location: Dawson, Minnesota
Varieties: Pioneer 38A56, Garst 88B37
Planting date: April 25, 2012
Row width: 30 inches
Planting rate: 32,000 seeds/acre
Previous crop: soybeans
Tillage: conservation

Experimental design: A field was divided into plots of field length to determine the effects of Vitazyme on corn yield and test weight for various varieties.

1. Control **2. Vitazyme**

Fertilization: (1) starter in-furrow at 8 gal/acre (a 20-14-12% N-P_2O_5-K_2O formulation with sulfur and zinc, dry mixed at 1.5 lb/gal of water); (2) 120 lb/acre of anhydrous NH_3 (82% N)

Vitazyme application: 13 oz/acre in the starter, on the seed row at planting

Weather: very dry all season

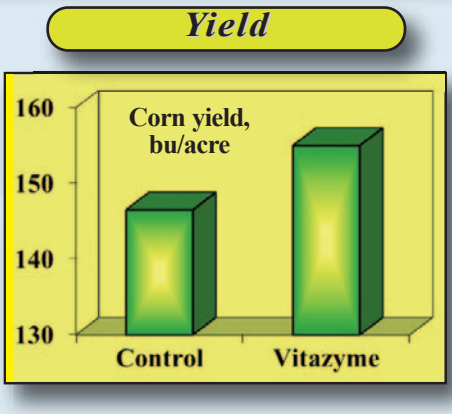
Yield and test weight results: A weigh wagon was used to weigh the corn for a measured area, from which yield calculations were made. Harvest date was September 29, 2012.

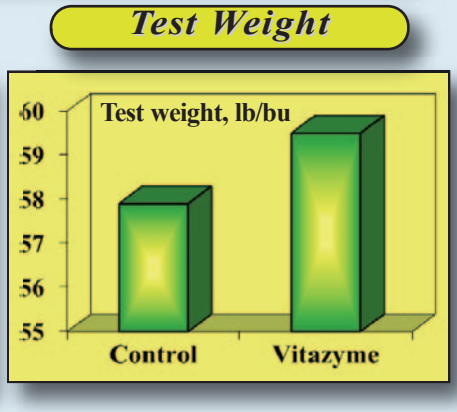
Variety: Pioneer 38A56

Treatment	Yield	Yield change	Test weight	Test weight change
	bu/acre	bu/acre	lb/bu	lb/bu
Control	146.5	—	57.9	—
Vitazyme	155.0	8.5 (+6%)	59.5	+1.6

Increase in yield with Vitazyme: 6%

Increase in test weight with Vitazyme: 1.6 lb/bu





Pioneer 38A56 responded with a yield increase of 6% (8.5 bu/acre), and with heavier grain that weighed 1.6 bu/acre more with Vitazyme.

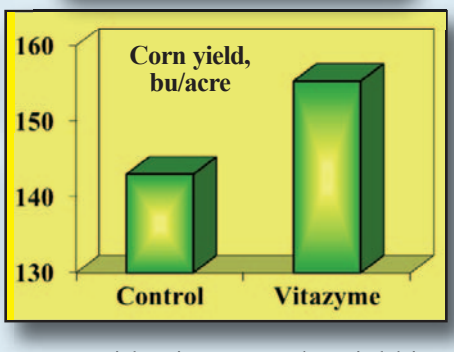
Variety: Garst 88B37

Treatment	Yield	Yield change	Test weight	Test weight change
	bu/acre	bu/acre	lb/bu	lb/bu
Control	143.0	—	51.9	—
Vitazyme	155.3	12.3 (+9%)	53.8	+1.9

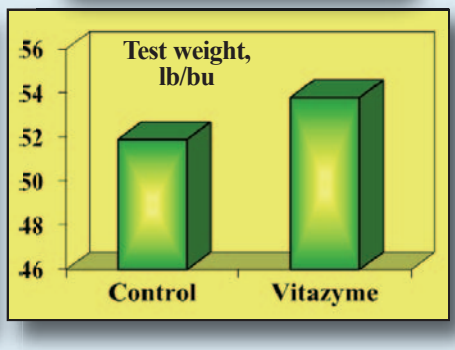
Increase in yield with Vitazyme: 9%

Increase in test weight with Vitazyme: 1.9 lb/bu

Yield



Test Weight

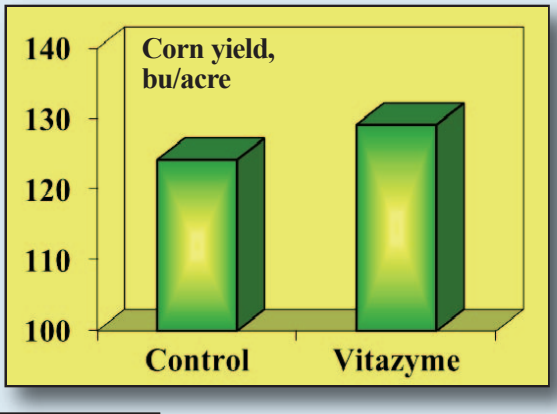


Garst 88B37 produced excellent responses with Vitazyme, the yield increasing by 9% (12.3 bu/acre), and the test weight by 1.9 lb/bu.

Variety: Pioneer 36152

Treatment	Yield	Yield change
	bu/acre	bu/acre
Control	124.2	—
Vitazyme	129.2	5.0 (+4%)

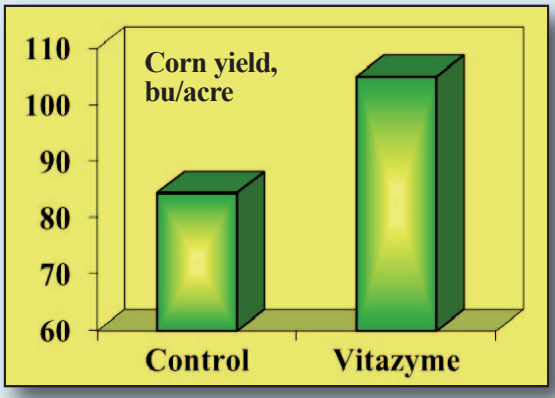
Increase in yield with Vitazyme: 4%



Variety: Federal 5100

Treatment	Yield	Yield change
	bu/acre	bu/acre
Control	84.4	—
Vitazyme	105.0	20.6 (+24%)

Increase in yield with Vitazyme: 24%



The great increase in yield with Vitazyme was due in part to the fact that the harvest was postponed because of equipment problems. As a result, high winds blew down some of the corn, preferentially downing the untreated control corn because the stalks and ear shanks were weaker

Conclusions: Four comparisons of Vitazyme treated and untreated corn varieties in this west central Minnesota study produced excellent yield increases for Vitazyme: 6% for Pioneer 38A56, 9% for Garst 88B37, 4% for Pioneer 36152. and 24% for Federal 5100. The 24% increase for the Federal variety was due in part to better standibility and stronger stalks and shanks of the great value in using Vitazyme to increase corn yields, grain weight, and profits in western Minnesota. Since only 13 oz/acre was used at planting, at a cost of about $5.00/acre, then the smallest increase (5.0 bu/acre) netted an added $32.50/acre — using $7.50/bu of corn — while the highest increase (20.6 bu/acre) netted $149.50/acre more with a single Vitazyme application. The recommended two applications would likely have given addition returns on investment.

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2012 Crop Results

Vitazyme on Corn

Free Amino Acid Levels - University of Missouri

Researcher: Manjula Nathan, Ph. D. *Location*: University of Missouri, Columbia, Missouri
Variety: unknown *Planting date*: May 3, 2011 *Row spacing*: 30 inches
Seeding rate: 32,000 seeds/acre *Soil type*: unknown
Experimental design: A plot area of 12 rows — six rows for the control and six rows for the Vitazyme treatment (0.33 acre per treatment) — was selected; each row was 200 feet long. Corn was grown to determine yield responses (reported elsewhere), and also to evaluate the free amino acid levels in plant tissues.

1. Control **2. Vitazyme**

Fertilization: station standard for corn
Vitazyme application: The seeds for Treatment 2 were treated with 100% Vitazyme to give a coating of 13 oz on 32,000 seeds, or an equivalent of 13 oz/acre. The control received only water on the seeds. On June 28 (V10 stage), an additional 13 oz/acre was applied to the leaves and soil of Treatment 2.
Free amino acid analysis: Samples of leaves below and opposite the ear were collected on July 14, during silking. These leaves were quite ragged due to the hail damage of a severe storm that struck on July 3, 11 days before. These composite samples from each treatment were frozen and later analyzed at a university laboratory to determine levels of free amino acids.

Amino acid*	Control	Vitazyme	Change
	µg/100 mg	µg/100 mg	µg/100 mg
Aspartic acid	23.32	20.04	-3.28
Threonine	21.72	20.33	-1.39
Serine	16.13	15.52	-0.61
Glutamic acid	29.55	28.15	-1.40
α-amino adipic acid	0.78	1.45	+0.67
Proline	9.49	9.73	+0.24
Gycine	6.88	5.84	-1.04
Alanine	35.26	32.81	-2.45
Valnine	14.06	13.40	-0.66
Methionine	0.61	0.46	-0,15
Cystine	11.07	11.43	+0.36
Isoleucine	10.21	15.39	+5.18
Leucine	15.28	16.64	+1.36
Tyrosine	11.14	11.83	-0.69
Phenylalanine	12.37	10.11	-2.26
β-amino isobutyric acid	5.80	4.66	-1.14
alpha-amino butyric acid	6.63	6.12	-0.51
Ornithine	3.29	7.93	+4.64
Lysine	14.89	13.80	-1.09
Histidine	3.26	3.10	-0.16
Arginine	0.72	3.20	+2.48
Net change			-1.90

*Only those free amino acids that were discovered in the analysis are listed here.

Note that the net effect of Vitazyme is to decrease the free amino acid level of the leaf tissue slightly (1.90 µg/100mg) This occurred in spite of the fact that large increases occurred for isoleucine, ornithine, and arginine. Most amino acids decreased with Vitazyme treatment, which should help explain the observation that treated plants resist fungal, bacterial, nematode, and other infections.

Conclusions: This University of Missouri corn trial revealed that Vitazyme reduced the level of most free amino acids in leaf tissue when sampled at silking, but fairly large increases in isoleucine, ornithine, and arginine offset much of the reduction. Even so, the theory of trophobiosis -- where high levels of free amino acids in tissues encourage the growth of pathogenic fungi, bacteria, nematodes, and other pests -- is somewhat substantiated by these results. Vitazyme stimulates the metabolic activity of various cycles in leaves, so proteosynthesis is encouraged to reduce the free amino acid backlog in tissues, thus reducing pest feeding potential.

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2012 Crop Results

Vitazyme on Corn

Yield, Quality, and Hail Damage - University of Missouri

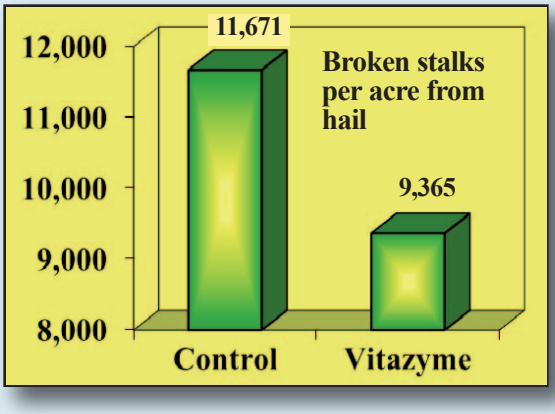
Researcher: Manjula Nathan, Ph. D., and Timothy Reinbott, research station supervisor
Location: University of Missouri Division of Plant Sciences, Columbia, Missouri, research farm
Variety: unknown hybrid *Planting date*: May 3, 2011 *Row spacing*: 30 inches
Seeding rate: 32,000 seeds/acre *Soil type*: unknown
Experimental design: A plot area of 12 rows – six rows for a control and six rows for the Vitazyme treatment, or 0.33 acre for each area – was selected; each row was 200 feet long. Corn was grown to determine the effects of Vitazyme on the yield and growth characteristics of corn.

1. Control **2. Vitazyme**

Fertilization: station standard for corn
Vitazyme application: The corn seeds of Treatment 2 were seed treated with straight Vitazyme to give a coating of 13 oz on 32,000 seeds, or an equivalent of 13 oz/acre. The control received water only on the seeds. On June 28 (V10 stage), a soil/foliar application of 13 oz/acre was made to Treatment 2.
Hail damage event: On July 2, a severe hail storm (stones of golf ball size) struck the plot area, resulting in considerable damage to the crop, with many partially or completely broken stalks. Since there appeared to be a difference in stalk damage between the two treatments, a count was made of broken stalks.

Treatment	Broken stalks	Difference
	stalks/acre	stalks/acre
Control	11,671	—
Vitazyme	9,365	(-) 2,306 (-20%)

Decrease in broken stalks with Vitazyme: -20%



It is clear that the Vitazyme treated corn had substantially stronger stalks due to greater deposition of lignin, cellulose, and hemicellulose in the stalk structures.
Plant analysis results: On July 14, at silking, some of the hail-damaged ear-leaf tissue was collected and analyzed at the University of Missouri Soil and Crop Testing Laboratory. Results are shown below. d.m. = dry matter.

Treatment	Nitrogen	N change	Phosphorus	P change	Potassium	K change	Crude protein	Protein change
	% d.m.	% d.m.	% d.m.	% d.m.	% d.m.	% d.m.	%	%
Control	2.126	—	0.290	—	1.323	—	13.3	—
Vitazyme	2.188	0.062 (+3%)	0.338	0.048 (+17%)	1.550	0.227 (+17%)	13.7	0.4 (+3%)

Increase in leaf N with Vitazyme: 3%
Increase in leaf P with Vitazyme: 17%
Increase in leaf K with Vitazyme: 17%
Increase in leaf crude protein with Vitazyme: 3% (0.4%-point)

All nutrients and protein were increased in leaf tissue harvested at silking.

Grain analysis results: At harvest, grain samples of the two treatments were analyzed at the University of Missouri Soil and Crop Testing Laboratory, with the following results.

Treatment	N	P	K	Ca	Mg	Zn	Fe	Mn	Cu	B	Mo	S	N:S
	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	%	
Control	1.20	0.35	0.36	0.01	0.06	16.8	13.2	3.9	2.6	28.2	1.0	0.007	171
Vitazyme	1.20	0.55	0.40	0.01	0.09	20.4	14.6	5.1	2.9	27.5	0.3	0.005	240

Increases with Vitazyme

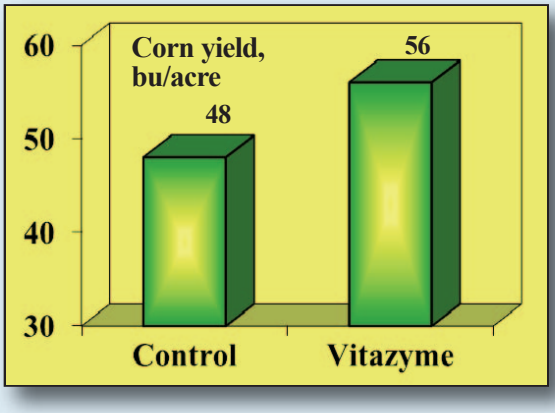
P ..... 0.20 %-point
K ..... 0.04 %-point
Mg ..... 0.03 %-point
Zn ..... 3.6 ppm
Fe ..... 1.4 ppm
Mn ..... 1.2 ppm
Cu ..... 0.3 ppm
N:S ..... 171 to 240

In most cases, nutrient uptake into the grain was increased with Vitazyme application.

Yield results: Due to the July 3 hail storm, yields were greatly reduced, and are given below.

Treatment	Grain yield	Yield change
	bu/acre	bu/acre
Control	48	—
Vitazyme	56	8 (+17%)

Yield increase with Vitazyme: 17%



Conclusions: In this side-by-side experimental farm demonstration at Columbia, Missouri, a seed plus foliar treatment of Vitazyme resulted in a substantial 8 bu/acre (17%) yield increase despite a severe hailstorm on July 3. Of considerable interest is the fact that the hail storm broke off 20% fewer stalks that had been treated with this product due to stronger connective tissues – cellulose, hemicellulose, and lignin – in the treated plants. Tissue levels of N, P, K, and protein were all increased, especially P, and K, and grain elemental levels at harvest was in most cases increased, especially for P. These results reveal the ability of Vitazyme's active agents to activate rhizosphere activity and the availability of nutrients, especially P, presumably because of a more active mycorrhizae population. An analysis of free amino acids in the plant tissues is discussed in a separate report.

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2012 Crop Results

Vitazyme on Corn

Researcher: Eddie Pearson
Location: Hooser Farm, Frost, Texas
Variety: Pioneer 2058
Planting date: February 27, 2012
Seeding rate: 26,500 seeds/acre
Row spacing: 30 inches
Experimental design: Two adjacent corn fields, both treated equally and of the same soil type, were selected to compare a single Vitazyme treatment with an untreated area. A 65-acre field served as the untreated control, and an adjacent 10-acre area was treated with Vitazyme.

1. Control **2. Vitazyme**

Fertilization: before planting, 150 lb/acre anhydrous ammonia (82-0-0 %N-$P_2O_5K_2O$), 150 lb/acre 18-46-0, and 150 lb/acre 32-0-0; during growth, 110 lb/acre 34-0-0 sidedressed
Vitazyme application: 13 oz/acre sprayed over the leaves and soil sometime between February 27 and May 10, 2012
Harvest date: July 19, 2012
Yield results: At harvest, three 30-foot typical sections of row for both treatments were picked and bagged, to make a composite 90-foot (225 ft.^{2}) row sample for each.

Treatment	Ear number	Ear weight	Estimated grain[1]	Yield[2]	Yield change
		lb	lb	bu/acre	bu/acre
Control	110	58.8	47.0	162.5	—
Vitazyme	123 (+12%)	65.8 (+12%)	52.6	181.8	19.3 (+12%)

[1]A shelling percentage of 80% grain on the ear is estimated. Moisture content is estimated at 14%.
[2]Area harvested for each treatment = 0.0051653 acre. 1 bushel = 56 lb.

Ear number increase with Vitazyme....12%

Ear weight increase with Vitazyme....12%

Yield increase with Vitazyme....12%

Income results: Based on corn valued at $8.30/bu, 13 oz/acre of Vitazyme increased the value of corn produced by $160.19/acre.
Aflatoxin levels: Samples of corn grain from each treatment were sent to A and L Laboratories in Lubbock, Texas. Both samples tested negative (<2 ppb) for aflatoxins.
Conclusions: By applying 13 oz/acre one time to this corn field in southern Texas, the yield was increased by 19.3 bu/acre, giving an increased income of about $160/acre. This shows the efficacy of even a single application of Vitazyme for corn, although the total program recommended a 13 oz/acre application on the seeds at planting, which likely would have increased the yield even more.

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2012 Crop Results

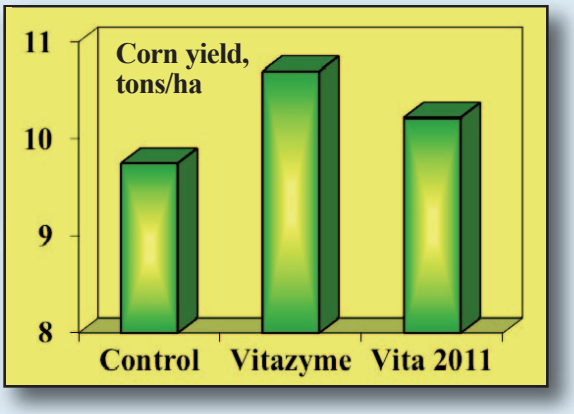
Vitazyme on Corn

Researcher: V. Plotnikov *Research organization*: National Academy of Agricultural Sciences
Location: Vinnytsia, Ukraine *Variety*: DKS 2960 (FAO 250) *Previous crop*: corn
Seedbed preparation: plowing, harrowing, and cultivation
Soil type: gray podzolic (2.2% organic matter, 8.4 mg/100 g of soil hydrolyzed N, 15.8 mg/100 g of soil P, 12.4 mg/100 g of soil exchangeable K, pH = 5.5)
Planting date: May 14, 2012 *Seeding rate*: 80,000 seeds/ha
Experimental design: A small plot corn study was laid out on land previously grown to corn, using 1.1 ha plots and four replications. The purpose of the study was to determine the effect of Vitazyme biostimulant on corn growth and yield, with one treatment using soil on which a Vitazyme treated corn crop had been grown in 2011.

1. Control **2. Vitazyme** **3. Vitazyme in 2011**

Fertilization: 100 kg/ha N, 60 kg/ha P_2O_5, and 60 kg/ha K_2O applied before cultivation
Vitazyme application: 1 liter/ha sprayed on the leaves and soil at five to six mature leaves
Yield and income results:

Treatment	Grain yield	Yield change	Income increase
	tons/ha	tons/ha	hrn/ha
Control	9.75	—	—
Vitazyme	10.70	0.95 (+10%)	1,700
Vita in 2011	10.22	0.47 (+5%)	880



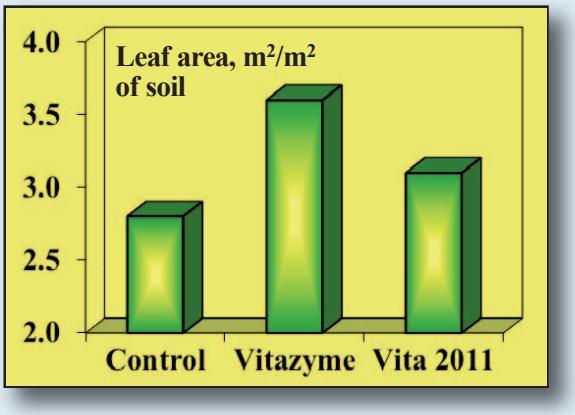
Yield increase with Vitazyme, 1 liter/ha: 10%

Yield increase with Vitazyme, applied in 2011: 5%

Vitazyme produced an excellent 10% yield increase with 1 liter/ha applied, and there was a significant 5% increase from residual effects from 2011 applications

Leaf area results:

Treatment	Leaf area	Leaf area change
	m^2/m^2 of soil	m^2/m^2 of soil
Control	2.8	—
Vitazyme	3.6	0.8 (+29%)
Vita in 2011	3.1	0.3 (+11%)



Increase in leaf area with Vitazyme, 1 liter/ha: 29%

Increase in leaf area with Vitazyme, applied in 2011: 11%

A great response in leaf area was noted with Vitazyme application, 29% more leaf area with the 1 liter/ha application, and 11% more with the 2011 treatment. The carryover effect was very apparent.

Conclusions: A replicated Ukrainian corn study, using Vitazyme at the 5 to 6 leaf stage, provided a yield increase of 10%, and a consequential income increase of 1,700 hrn/ha. Corn treated on the same plots in 2011 caused a respectable 5% yield increase. Corn leaf area was also increased by Vitazyme (by 29%) for the 1 liter/ha application, and by 11% with the 2011 treatments. These results show the strong carryover effect of the product, and the highly positive and profitable yield results, making it an excellent choice for farmers in Ukraine.

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2012 Crop Results

Vitazyme on Corn

Researcher: Bert Schou, Ph.D.
Research organization: Agricultural Custom Research and Education Services (ACRES)
Location: Cedar Falls, Iowa *Variety*: Pioneer PO 448 (non-GMO) *Previous crop*: soybeans
Soil type: Aredale Loam (36% sand, 42% silt, 22% clay), 3.6% organic matter, pH = 6.1, C.E.C. = 15.2 meq/100 g, fertility level = excellent, soil drainage = excellent *Planting depth*: 1.5 inches
Row spacing: 30 inches *Planting rate*: 38,000 seeds/acre *Seedbed at planting*: fine
Planting date: May 9, 2012 *Plot size*: 15 x 40 feet (600 ft^2) *Tillage*: conventional
Irrigation: 2 inches total in late July and early August
Experimental design: A small plot, replicated corn trial (four replicates) was established in eastern Iowa to evaluate the ability of two Vitazyme variations, plus an amino acid formulation, alone or in combination, to influence corn yield and quality.

Treatment	Vitazyme 1*	Vitazyme 2*	Amino acids*
1	0	0	0
2	13 oz/acre (2x)	0	0
3	0	13 oz/acre (2x)	0
4	0	0	2 oz/acre (2x)
5	13 oz/acre (2x)	0	2 oz/acre (2x)

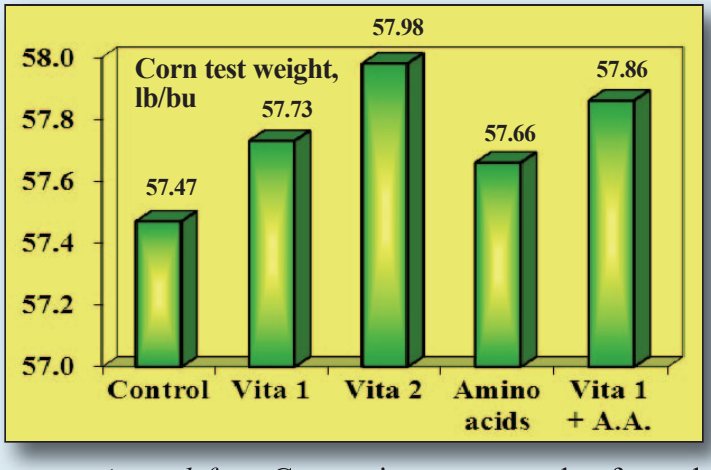
*All applications were on the seeds at planting, and on the leaves and soil later.

Fertilization: Fall of 2011, 60 lb/acre of 18-46-0% N-P_2O_5-K_2O; June 5, 2012, 110 lb/acre of N as urea ammonium nitrate, with a sprayer and drop nozzles
Vitazyme application: For Treatments 2, 3, and 5, 13 oz/acre on the seeds at planting (May 9), and again at 13 oz/acre on the leaves and soil at the V6 stage (June 16). Treatments 2 and 5 received Vitazyme 1, and Treatment 3 received a slight modification called Vitazyme 2.
Amino acid application: A proprietary amino acid blend was applied to Treatments 4 and 5, to the seeds at 2 oz/acre on May 9, and to the leaves and soil at the V6 stage at 2 oz/acre on June 16. For Treatment 5, the amino acids were mixed with the Vitazyme before application.
Sprayer settings: seed treatment, 10 gallons/acre of 115 ml of Vitazyme in 3 gallons of water, or 18 ml of amino acids in 3 gallons of water; foliar and soil treatment, 15 gallons/acre of 77 ml of Vitazyme in 3 gallons of water, or 12 ml of amino acids in 3 gallons of water
Weed control: preplant: Harness Xtra at 1.2 quarts/acre; additional post-emergence applications
Weather during the growing season: The season was hot and dry, with the July average high temperature being 92.3° F, and the August average high being 85.5° F. Rainfall for April through October 12 was 12 inches, whereas the normal is 26 inches.

Harvest date: October 20, 2012. A Massey-Ferguson 9 plot combine harvested the middle two rows of each plot, and the corn was weighed on an electronic scale.

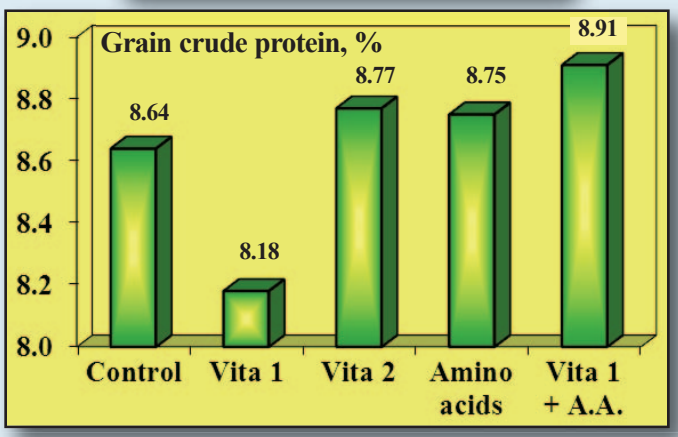
Plant population results: No significant differences were detected.

Corn test weight: Although differences among treatments were not significant, all four Vitazyme and amino acid treatments exceeded the control.



Corn protein and fat: Composite corn samples from the four replicates of each treatment were sent to Midwest Laboratories, Inc., Omaha, Nebraska, to evaluate the levels of protein and fat in the samples. Fat of the treated corn always exceeded the untreated control, and in all but one case the protein was also evaluated by the treatments.

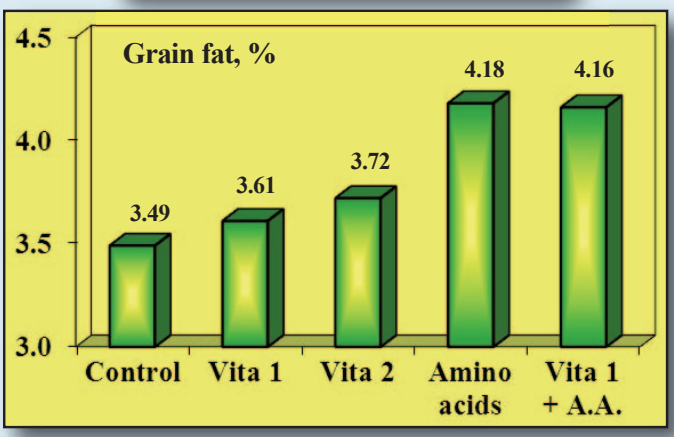
Protein (dry basis)



Increase grain protein with Vitazyme and amino acids

Vitazyme 2	+2%
Amino acids	+1%
Vitazyme 1 + Amino acids	+3%

Fat (dry basis)



Increase grain fat with Vitazyme and amino acids

Vitazyme 1	+3%
Vitazyme 2	+7%
Amino acids	+20%
Vitazyme 1 + Amino acids	+3%

Changes in grain composition are usually quit resistant to treatment, but there were small increases in grain protein with Vitazyme and amino acids. Fat composition was improved by all four treatments, and dramatically by the amino acid and Vitazyme 1 plus amino acid treatments (19 to 20%).

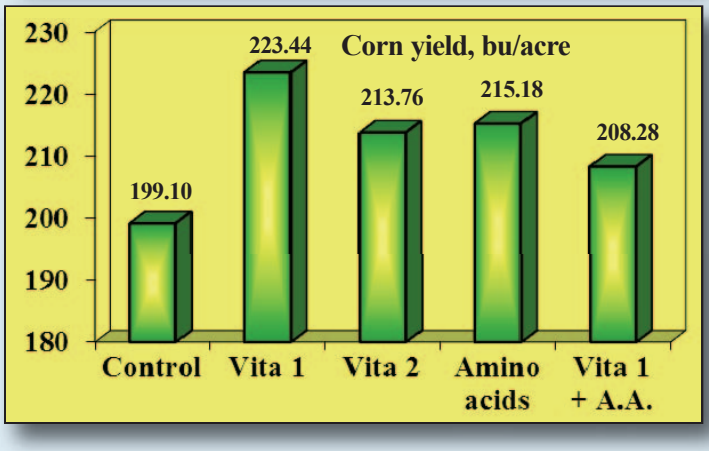
Yield results: The two inner rows of each plot were harvested.

Treatment	Yield[1]	Yield change
	bu/acre	bu/acre
1. Control	199.10 b	—
2. Vitazyme 1	223.44 a	24.34 (+12%)
3. Vitazyme 2	213.76 ab	14.66 (+7%)
4. Amino acids	215.18 ab	16.08 (+8%)
5. Vita 1 + A.A.	208.28 ab	9.18 (+5%)
$LSD_{0.05}$	15.21 bu/acre	
Standard deviation	11.35 bu/acre	
Replicate F	10.947	
Treatment F	3.150	
C.V.	5.35%	

[1]Means followed by the same letter are not significantly different at P = 0.05, according to the Student-Newman-Keuls Test.

Yield increase with Vitazyme and amino acids

Vitazyme 1 ..... +12%
Vitazyme 2 ..... +7%
Amino acids ..... +8%
Vitazyme + Amino acids ..... +5%



Notice that Vitazyme 1 increased the corn yield by 12% (24.34 bu/acre), while the other treatments boosted the yield by from 5 to 8% above the control. While these lower increases were not significant at P = 0.05, yet the 7 and 8% increases were very close to being significant.

Conclusions: A replicated corn study in east-central Iowa, during a very hot and dry year, revealed that two variations of Vitazyme both increased corn yield, one by 12% (24.34 bu/acre), and another by 7% (14.66 bu/acre). An amino acid product increased yield by 8% (16.08 bu/acre). With a corn price of $7.50/bu during the fall of 2012, these yield increases translate to $182.55, $109.95, and $120.60/acre. The combined Vitazyme plus amino acid treatment increased yield a very respectable 5% (9.18 bu/acre), but did not display a synergism. Grain quality was also improved by both Vitazyme and amino acids. Per bushel weight was increased by up to 0.51 lb/bu (Vitazyme 2), and grain protein was improved by 1 to 3%. Grain fat was especially enhanced by both products, increasing by 3 to 7% with Vitazyme alone, and by 20% with amino acids alone, and by 19% with the two products combined. These results show the great value of utilizing Vitazyme, and to a lesser extent the amino acids, to improve corn grain yield and quality in the central Corn Belt. There appears to be no synergism between Vitazyme and the amino acid formulation used in this study.

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2012 Crop Results

Vitazyme on Corn

A Greenhouse Study

Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Planting date*: January 19, 2012 *Pot size*: 1 gallon
Planting rate: 8 seeds/pot, thinned to 3 plants/pot *Soil type*: silt loam
Experimental design: A greenhouse pot trial using 12 replicates was set up to evaluate the effect of Vitazyme, applied once at a standard field rate, on corn growth.

1. Control **2. Vitazyme**

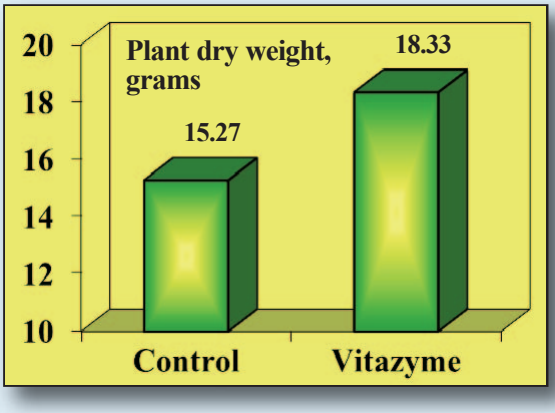
Fertilization: none
Vitazyme application: 100 ml of a 0.1% solution for each pot, immediately after planting
Harvest date: March 5, 2012, 46 days after planting
Plant height results: All plants were measured to the nearest cm, and the three plants for each pot were averaged.

Treatment	Plant height	Height change
	cm	cm
Control	95.7 a	—
Vitazyme	99.3 a	3.6 (+4%)
Block P	0.382	
Treatment P	0.153	
Model P	0.336	
$CV_{0.10}$	5.85%	
$LSD_{0.10}$	4.2 cm	

Vitazyme increased corn height by 4% at 46 days after planting, but this increase was not significant at P = 0.10.

Dry weight results: The plants were placed in a drying oven for 24 hours at 115°F, and then weighed to the nearest 0.01 gram.

Treatment	Dry Weight	Weight change
	grams	grams
Control	15.27	—
Vitazyme seed trt.	18.33	3.06 (+20%)
Block P	0.7148	
Treatment P	0.0029**	
Model P	0.1589	
$CV_{0.10}$	11.74%	
$LSD_{0.10}$	1.45 grams	



Increase in dry weight with Vitzyme: 20%

Vitazyme dramatically and significantly increased the dry matter accumulation of the corn with only one application, by 20%.

Conclusions: In this greenhouse trial, Vitazyme greatly increased the fixation of dry matter in the plants with 100 ml/pot of a 0.1% solution applied at planting. The increase was highly significant, and 20% greater than the control. Plant height was increased by 4% with Vitazyme, but this increase was not significant. These results verify the utility of this product, with its natural vitamins and growth regulators, to improve plant growth and yield.

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2012 Crop Results

Vitazyme on Corn

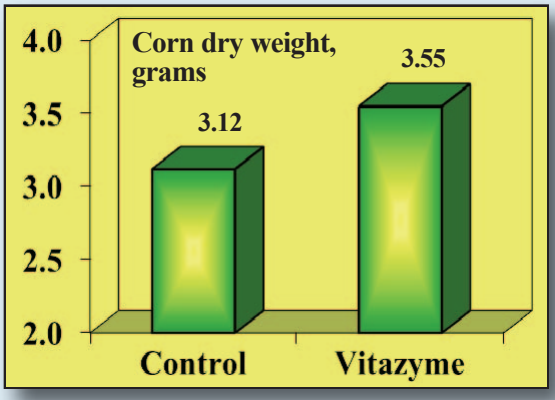
Seed Treatment Results in the Greenhouse

Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Planting date*: March 14, 2012 *Pot size*: 1 gallon
Soil type: silt loam *Seeding rate*: 8 seeds/pot, thinned to 3 plants/pot
Experimental design: A four replicated greenhouse trial, using corn seeds pre-treated with Vitazyme on January 17, 2012, was planted on March 14, 2012, 57 days after treatment, to determine residual effects of the seed treatment on plant growth. A randomized complete block design was used.

1. Control **2. Vitazyme seed treatment**

Fertilization: none
Vitazyme treatment: On January 17, corn seeds were soaked in a 10% Vitazyme solution for 6 minutes, then dried on paper towels with a fan blowing accross them for rapid drying. The seeds were stored in closed jars at room temperature along with untreated seeds, which served as the control.
Harvest date: April 5, 2012, 21 days after planting
Dry weight results: Roots of the corn plants were washed free of soil, and the plants were placed in a drying oven at 115 °F for 24 hours. Weights of the dried plants for each pot were recorded to the nearest 0.01 gram.

Treatment	Dry Weight	Weight change
	g	g
Control	3.12	—
Vitazyme seed trt.	3.55	0.43 (+14%)
Block P	0.339*	
Treatment P	0.0978*	
Model P	0.0403*	
$CV_{0.10}$	7.581%	
$LSD_{0.10}$	0.42 gram	



Increase in dry weight with Vitzyme: 14%

A seed treatment on these corn seeds 57 days before planting caused a significance 14% increase in dry weight at harvest.

Conclusions: A greenhouse pot study, using corn seeds treated with a 10% Vitazyme solution and dried 57 days earlier, produced a 14% increase in dry weight after 21 days of growth. This significant increase at P = 0.10 shows the effectiveness of a seed treatment to improve corn growth, and the long-term efficacy of the practice.

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2012 Crop Results

Vitazyme on Corn

A Greenhouse Trial -- Synergism With Amino Acids

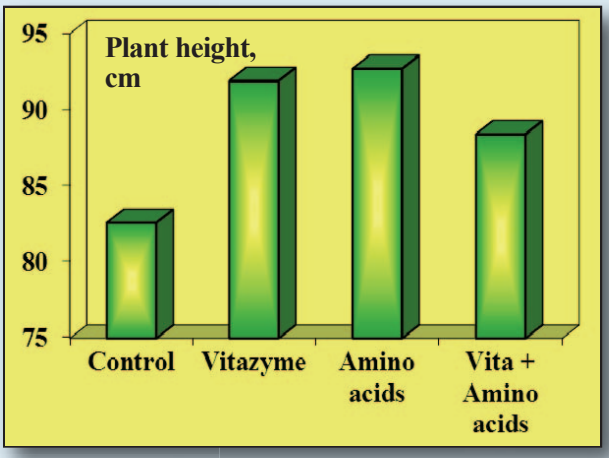
Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Planting date*: January 19, 2012 *Pot size*: 1 gallon
Planting rate: 8 seeds/pot, thinned to 3 plants/pot *Soil type*: silt loam
Experimental design: A replicated greenhouse pot study (four reps) use set up to evaluate the effects of Vitazyme and certain amino acids — alone and together — on corn growth.

1. Control **2. Vitazyme** **3. Amino acids** **4. Vitazyme + Amino acids**

Fertilization: none
Vitazyme application: Pots of Treatments 2 and 4 received 100 ml/pot of a 0.1% Vitazyme solution just after seeding.
Amino acid application: A special liquid proprietary amino acid blend was applied at 100 ml of a 0.04% solution to Treatments 3 and 4. For Treatment 4, the product was mixed with Vitazyme in 100 ml of water.
Harvest date: March 1, 2012, 41 days after planting
Height results: The three plants from each pot were measured to the nearest cm, and averaged. A statistical analysis was then performed on these averages.

Plant Height

Treatment	Plant height	Height change
	cm	cm
Control	82.6 b	—
Vitazyme	91.9 a	9.3 (+11%)
Amino acids	92.7 a	10.1 (+12%)
Vita + A.A.	88.4 a	5.8 (+7%)
Block F	0.0096*	
Main effects F	0.0262*	
Model F	0.0088*	
$LSD_{0.10}$	5.3 cm	
$CV_{0.10}$	4.63%	

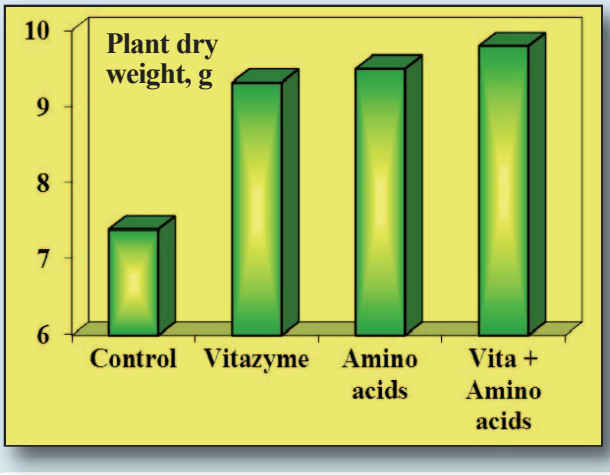


Increase in height with Vitazyme: 11%
Increase in height with Amino Acids: 12%

All three treatments significantly increased plant height at P = 0.10.

Dry weight results: The harvested plants were dried in a drying oven for 24 hours at 115°F, before weighing to the nearest 0.01 gram.

Plant Dry Weight



Treatment	Dry weight	Weight change
	g	g
Control	7.39 b	—
Vitazyme	9.32 a	1.93 (+26%)
Amino acids	9.50 a	2.11 (+29%)
Vita + A.A.	9.80 a	2.41 (+33%)
Block F	0.184	
Main effects F	0.068*	
Model F	0.088*	
$LSD_{0.10}$	1.54 gram	
$CV_{0.10}$	13.2%	

Increase in dry weight

Vitazyme 26%
Amino acids 29%
Vitazyme + Amino Acids 33%

All three treatments increased plant dry weight at P = 0.10, especially the combined Vitazyme + Amino Acid treatment.

Conclusions: In this greenhouse study with corn, Vitazyme, Amino Acids, and the combined products all significantly increased both plant height and dry weight. Dry weight was especially

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2012 Crop Results

Vitazyme on Baby Corn

Researcher: Richard Stonewigg
Research organization: Lachlan Kenya Limited.
Location: Mboga Tuu, Isinya, Kenya
Soil type: unknown
Variety: "Baby" corn
Planting date: November, 2011
Irrigation: drip

Experimental design: A field of baby corn was divided into five treatments of 1,800 m^2 each to evaluate the effect of Vitazyme (two formulations) and Rizobacter, alone and in combination, on the health, growth parameters, and the yield of the crop.

1. Control **2. Vitazyme, regular** **3. Rizobacter**
4. Vitazyme, regular + Rizobacter **5. Vitazyme, from concentrate + Rizobacter**

Fertilization: unknown

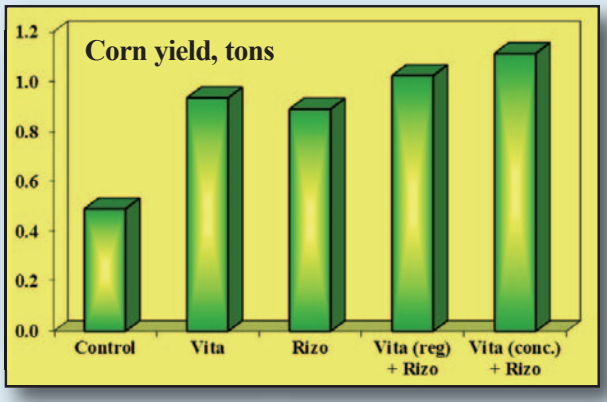
Vitazyme treatment: The Vitazyme from concentrate was diluted with water (1 part concentrate to 9 parts water). Treatments for either product alone, or combined with Rizobacter, were as follows:

Time	Rate
Seeding	5 ml/kg of seed
Drench, pre-plant	200 ml/20 liters of water
Two weeks post-plant	foliar 50 ml/20 liters of water
Before tasseling	foliar 50 ml/20 liters of water
At tasseling	foliar 50 ml/20 liters of water
At ear filling	foliar 50 ml/20 liters of water

Rizobacter application: The Rizobacter products are bacterial preparations from Argentina.

Yield results: The crop was harvested in January of 2012.

Treatment	Yield	Yield increase
	tons	tons
1. Control	0.490	—
2. Vitazyme, regular	0.935	0.445 (+91%)
3. Rizobacter	0.890	0.400 (+82%)
4. Vita (regular) + Rizobacter	1.024	0.534 (+109%)
5. Vita (from conc.) + Rizobacter	1.113	0.623 (+127%)



Yield increase with Vitazyme

Vitazyme regular ..... +91%
Vitazyme regular + Rizobacter ..... +109%
Vitazyme concentrate + Rizobacter ..... +127%

Conclusions: This baby corn study in Kenya proved that both Vitazyme and Rizobacter inoculant gave excellent yield increases, especially when the two products were combined. Regular Vitazyme gave a 91% yield increase, while Rizobacter alone provided an 82% increase. When regular Vitazyme was combined with Rizobacter, a 109% yield increase resulted, showing the synergism between the bacterial product and Vitazyme. Both the regular and the diluted concentrate (10:1) provided excellent yield increases (109% and

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2011 Crop Results

Vitazyme on Corn

Researcher: Unknown
Research coordinator: I.V. Braginets
Research organization: Alfa-Agro, Ukraine
Variety: unknown
Experimental design: A field was divided into a Vitazyme treated and an untreated portion to evaluate the effect of this product on crop yield.

1. Control **2. Vitazyme**

Fertilization: farm practice
Vitazyme application: 1 liter/ha sprayed on the leaves and soil at the 10 to 12-leaf stage
Yield results: No yield results are available, but the increase in yield is given.

Increase in corn yield with Vitazyme:
1.72 tons/ha (27.4 bu/acre)

Conclusion: This yield increase was an excellent result of Vitazyme application in this Ukraine study.

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2011 Crop Results

Vitazyme on Corn

Researcher/Farmer: Nong Van Duc
Nong Province, Viet Nam
Location: Village 7, Eapo Hamlet, Cu Jut District, Dak
Variety: NK 7328
Planting season: Summer – Fall, 2011
Experimental design: A corn field was divided into a Vitazyme treated area of 1.0 ha, and an untreated control area of 0.5 ha, to determine the effect of this product on the yield and profitability of the crop.

1. Control **2. Vitazyme**

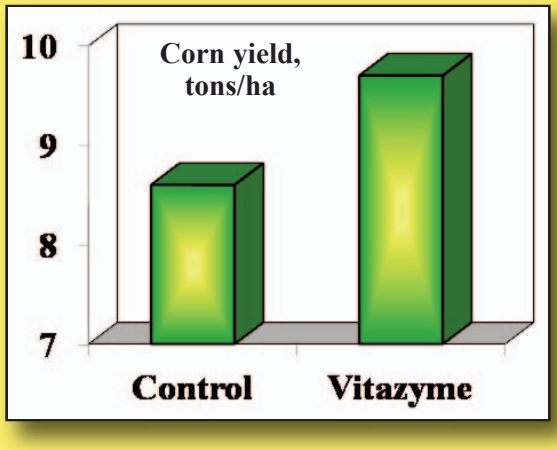
Vitazyme application: (1) a 5% Vitazyme seed spray on the seeds before planting; (2) 1 liter/ha sprayed on the leaves and soil 35 days after planting
Growth results: With Vitazyme the following effects were noted:

- Taller plants
- Stronger root systems
- Darker green leaves
- Excellent disease resistance from steaked leaf and stem rot
- During a drought period, plants showed no leaf rolling
- Seed color was brighter

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	8.6	—
Vitazyme	9.7	1.1 (+13%)

Increase in corn yield with Vitazyme: 13%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income[2]	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	11,250,000	38,700,000	26,700,000	—
Vitazyme	500,000	11,500,000	43,650,000	31,150,000	4,450,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.
[2]Corn price = 4,500 VND/kg.

Increase in income with Vitazyme:
4,450,000 VND, or $222.50/ha

Conclusion: This Vietnamese corn trial revealed that Vitazyme, applied on the seeds as well as 35 days after planting, increased yield by 13%, while boosting profit by $222.50/ha. These results prove the great utility of the Vitazyme program to grow corn in Viet Nam.

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2011 Crop Results

Vitazyme on Corn

Researcher/Farmer: Dinh Thi Ngan
Location: Village 2, Dak Will, Cu Jut District, Dak Nong Province, Viet Nam
Variety: NK 72
Planting season: Summer – Fall, 2011
Experimental design: A corn field was divided into a Vitazyme treated area of 0.9 ha, and an untreated control area of 0.5 ha, to determine the effect of this product on the yield and profitability of the crop.

1. Control **2. Vitazyme**

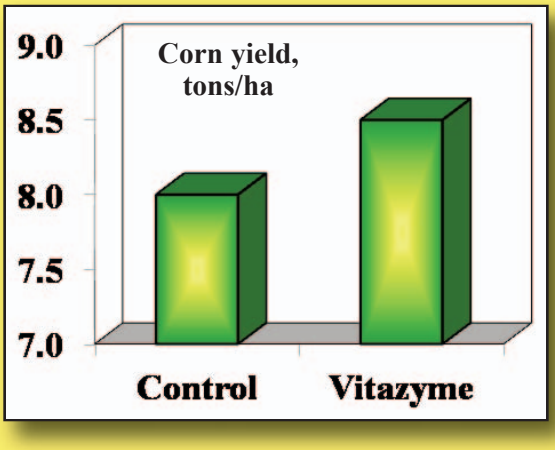
Vitazyme application: a 5% Vitazyme seed spray on the seeds before planting
Growth results: With Vitazyme the following effects were noted:

- Taller plants
- Stronger root systems
- Darker green leaves
- Excellent disease resistance from steaked leaf and stem rot
- During a drought period, plants showed no leaf rolling
- Seed color was brighter

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	8.0	—
Vitazyme	9.0	1.0 (+13%)

Increase in corn yield with Vitazyme: 6%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income[2]	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	12,000,000	36,000,000	24,750,000	—
Vitazyme	250,000	12,250,000	38,250,000	27,000,000	2,250,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.
[2]Corn price = 4,500 VND/kg.

Increase in income with Vitazyme:
2,250,000 VND, or $112.75/ha

Conclusion: This Vietnamese corn trial revealed that Vitazyme, applied as a 5% seed treatment at planting, increased yield by 6%, while boosting profit by $112.75/ha. Had an additional foliar treatment been applied, yields and profits would likely have improved even more.

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2011 Crop Results

Vitazyme on Corn

Researcher/Farmer: Tran Van Nhuong *Location*: Village Tan Thanh, Eapo, Cu Jut District, Dak Nong Province, Viet Nam
Variety: SSC 557
Planting season: Summer – Fall, 2011
Experimental design: A corn field was divided into a Vitazyme treated area of 0.5 ha, and an untreated control area of 0.2 ha, to determine the effect of this product on the yield and profitability of the crop.

1. Control **2. Vitazyme**

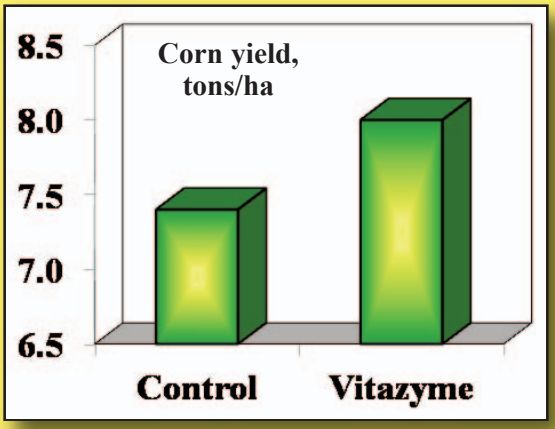
Vitazyme application: 1.5 liters/ha sprayed on the leaves and soil 30 days after planting
Growth results: With Vitazyme the following effects were noted:

- Taller plants
- Stronger root systems
- Darker green leaves
- Excellent disease resistance from steaked leaf and stem rot
- During a drought period, plants showed no leaf rolling
- Seed color was brighter

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	7.4	—
Vitazyme	8.0	0.6 (+8%)

Increase in corn yield with Vitazyme: 8%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income[2]	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	11,125,000	31,080,000	19,955,000	—
Vitazyme	575,000	11,700,000	33,600,000	21,900,000	1,945,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.
[2]Corn price = 4,200 VND/kg.

Increase in income with Vitazyme:
1,945,000 VND, or $97.25/ha

Conclusion: This Vietnamese corn trial revealed that Vitazyme, applied once at 1.5 liters/ha at 30 days after planting, increased yield by 8%, while boosting profit by $97.25/ha. Had a seed treatment been applied, yields and profits would likely have improved even more.

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Average Values for 2009 to 2011 in Ukraine

Vitazyme on Corn

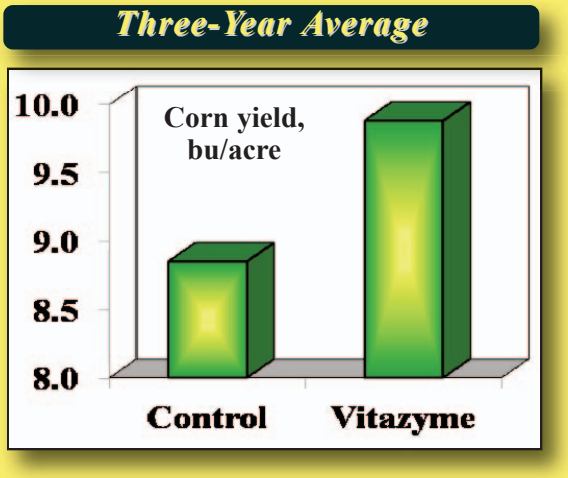
Researcher: V.V. Plotnikov *Location*: National Academy of Agrarian Sciences, Vinnytsia State Agricultural Research Station, Vitnnytsia, Ukraine (Central Forest and Steppe Region)

Demonstration plot values averaged over three years, 2009 to 2011:

Treatment	Yield	Yield change
	tons/ha	tons/ha
1. Control	8.85	—
2. Vitazyme on leaves[1]	9.88	1.03 (+12%)

[1]1 liter/ton on the leaves + soil at the 7 to 8-leaf stage.

Three-Year Average Increase With Vitazyme: +12%



Conclusion: Over three years of demonstrations, Vitazyme is shown to be an excellent adjunct to corn production in Ukraine.

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2011 Crop Results

Vitazyme on Corn

Researcher: Michael Rethwisch
Extension, David City, Nebraska
Variety: Kruger K-4510
Research organization: University of Nebraska-Lincoln
Location: Aurora, Nebraska
Soil type: unknown

Experimental design: A corn field was divided into replicated strips with four different products, with Vitazyme applied to the side of the seeds, to evaluate the yield and test weight responses. All treatments received starter fertilizer under conventional tillage.

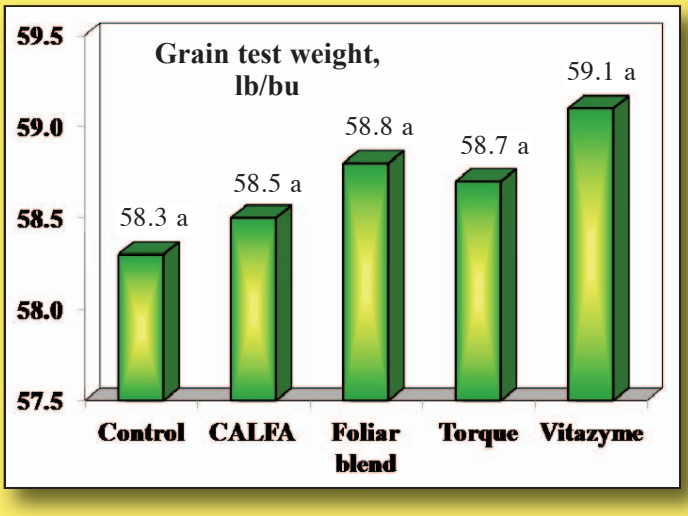
Treatment	Starter fertilizer	Product rate
		amount/acre
1. Control	X	—
2. CALFA	X	10 oz
3. Foliar Blend	X	16 oz
4. Torque	X	8 oz
5. Vitazyme	X	13 oz

Fertilization: Besides typical N-P_2O_5-K_2O fertilizer, all products and the control received 5 gallons/acre of NaChurs 6-24-6 Starter fertilizer applied to the side of the seeds with a "splitter."

Vitazyme and other product applications: At planting, all four products were applied at the rates shown in the above table, using the "splitter."

Weather for the growing season: Rains were ample to excessive, and temperatures were somewhat below normal.

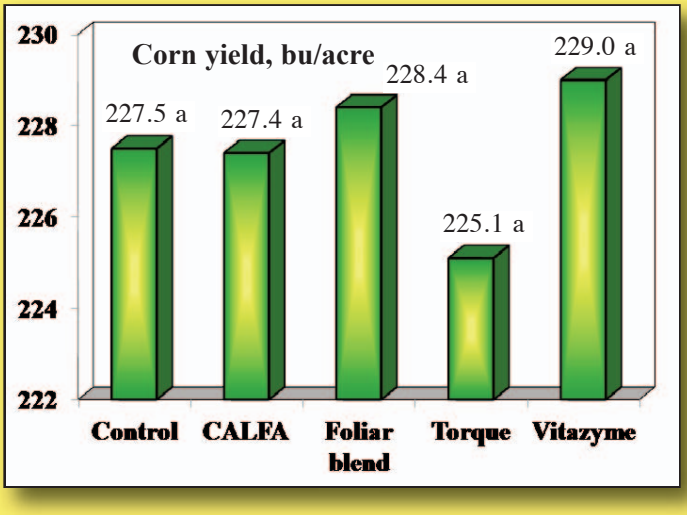
Test weight results: Grain volume weights were determined corrected to 15.5% moisture.



While none of the test weight values were significantly different, Vitazyme had the highest test weight, which was 0.3 lb/bu greater than the closest other product value.

Increase in test weight with Vitazyme: 0.8 lb/bu

Yield results:



Yield values were not significantly different among the five treatments, but Vitazyme produced the greatest yield, of 1.5 bu/acre above the control.

Increase in yield with Vitazyme: 1.5 bu/acre

Conclusion: In this eastern Nebraska corn study using four products applied at planting, using a "splitter", Vitazyme produced the highest yield and the heaviest test weight, although the values did not differ significantly. The reason for a less than significant response with Vitazyme may have been because the product was applied to the side of the seeds, not directly on them.

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2011 Crop Results

Vitazyme on Corn

A Nematode Evaluation

Researcher: Michael Rethwisch *Research organization*: University of Nebraska - Lincoln Extension, David City, Nebraska *Location*: Silver Creek, Nebraska
Variety: Mycogen 2T832 *Soil type*: Darr sandy loam
Experimental design: A replicated corn trial having Vitazyme applied twice, plus the normal farming program, was evaluated for nematodes and statistically analyzed.

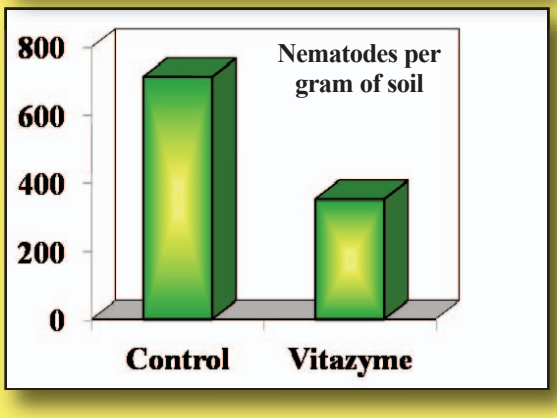
1. Control **2. Vitazyme**

Fertilization: normal farming program
Vitazyme application: 13 oz/acre (1 liter/ha) in the seed row with starter fertilizer at planting
Growing season weather: excessive rain and normal temperatures
Nematode results: After harvest in the fall of 2010, soil samples were taken in the vicinity of the roots of each plot and analyzed at the nematode testing facilities of the University of Nebraska at Lincoln.

	Nematode species[1]		
Treatment	Stunt[2]	Lesion[3]	Dagger[4]
Control	119.5	119	711.8
Vitazyme	133.0	93	352.3 (-149%)
p-value (0.05)	0.61	0.36	0.0016**

[1]All data from each plot was subjected to statistical analyses to arrive at probabilities, as shown here.
[2]*Tylenchorhynchus* spp. They can possibly cause stunting of corn, and feed externally on the roots.
[3]*Pratylenchus* spp. These can be important root pathogens causing stunting of corn plants. They feed inside roots.
[4]*Xiphinema* spp. This nematode feeds externally on roots, and can survive sandy soils but is sensitive to tillage.

Dagger Nematodes



Reduction in dagger nematodes with Vitazyme: 149%

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2011 Crop Results

Vitazyme on Corn

An Evaluation of Soil Phosphorus Levels and Two Formulations

Researcher: Bert Schou, Ph.D. *Research organization*: Agricultural Custom Research and Education Services (ACRES) *Location*: Cedar Falls, Iowa *Variety*: Pioneer P0528 (non-GMO)
Soil type: Kenyon loam (34% sand, 46% silt, 20% clay, 3.6% organic matter, pH = 7.2, C.E.C. = 15 meq/100 g, fertility level = excellent, drainage = excellent) *Planting depth*: 2 inches
Row spacing: 30 inches *Planting rate*: 35,000 seeds/acre *Seedbed at planting*: fine
Planting date: May 16, 2011 *Tillage*: conventional *Plot size*: 15 x 40 feet (600 ft.^{2})
Experimental design: A small plot, six replicate study with corn, using three phosphorus levels in a phosphorus-deficient soil, received nine treatments, with two Vitazyme formulations. The trial was conducted to determine effects on corn yield and grain quality.

Treatment	Phosphorous	Vitazyme A[1]	Vitazyme B[1]
	lb/acre	oz/acre	oz/acre
1	0	0	0
2	0	13 (2X)	0
3	0	0	13 (2X)
4	65	0	0
5	65	13 (2X)	0
6	65	0	13 (2X)
7	130	0	0
8	130	13 (2X)	0
9	130	0	13 (2X)

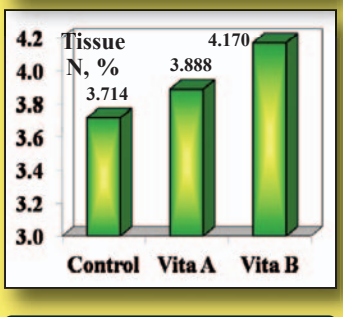
[1]2X = two applications.

Fertilization: All plots received 100 lb/acre of nitrogen and 75 lb/acre of K_2O preplant, plus the P_2O_5 applications of 0, 65, or 130 lb/acre as shown in the table above
Weed control: Harness at 1.2 qt/acre preemergence, giving excellent weed control
Vitazyme application: (1) 13 oz/acre (1 liter/ha) in the seed row at planting on May 16, 2011; (2) 13 oz/acre (1 liter/ha) on the leaves and soil at V7 on June 30, 2011. Vitazyme A ad B are different formulations of Vitazyme.
Weather during the growing season: The season was favorable to the corn growth in terms of temperature and rainfall, although early July was quite dry.
Harvest date: October 15, 2011. A Massey-Ferguson 9 plot combine harvested the middle two rows of each plot, and the corn was weighed using an electronic scale.
Plant Population: There were no significant differences among the nine treatments, so these data are not

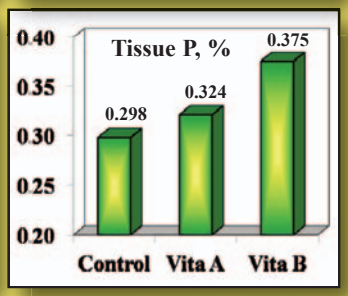
included here.

Tissue test results: On July 12, 2011, tissue analyses were conducted on composite samples for each treatment at Perry Agricultural Laboratory, Bowling Green, Missouri. The results for the first three treatments (no added phosphorus) are presented here, to reveal effects of Vitazyme A and Vitazyme B on tissue element levels.

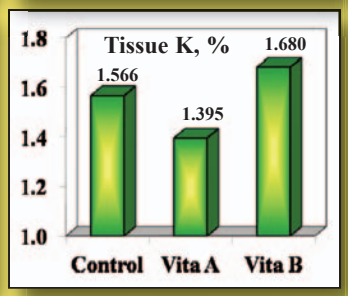
Nitrogen



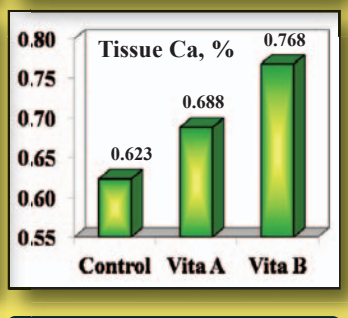
Phosphorus



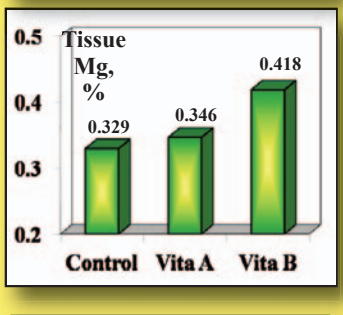
Potassium



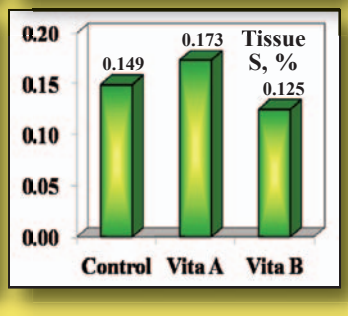
Calcium



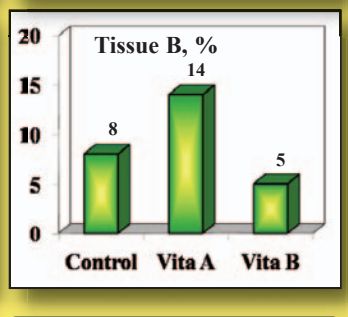
Magnesium



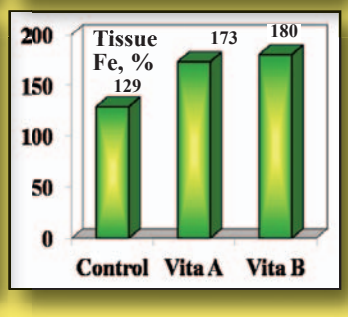
Sulfur



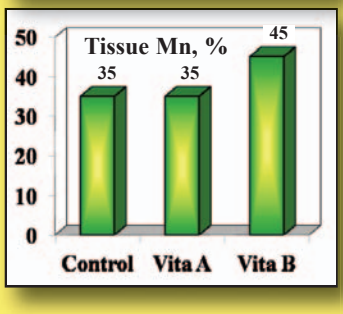
Boron



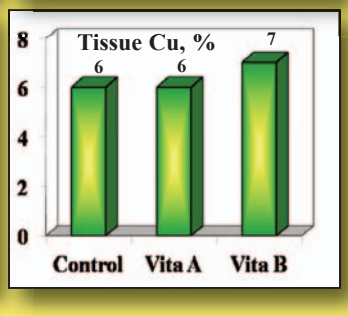
Iron



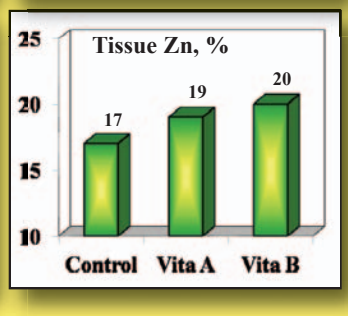
Manganese



Copper



Zinc



Notice that in most cases Vitazyme A and Vitazyme B increased the elemental composition of the corn tissue. For potassium, sulfur, boron, manganese, and copper there were either equal contents or a lower content of the element for one product or the other.

Test weight results: There were some differences in grain test weight.

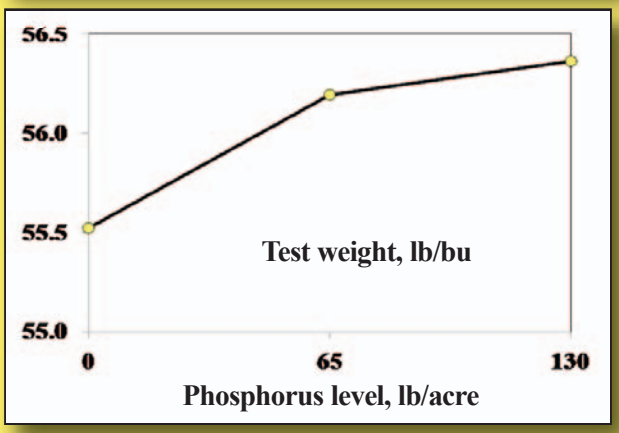
Treatment	Test weight[1]	Test weight change[2]
	lb/bu	lb/bu
1 (O P)	55.17 b	—
2 (O P, Vita A)	55.82 ab	0.65 (+1%)
3 (O P, Vita B)	55.57 ab	0.40 (+1%)
4 (Low P)	56.39 a	—
5 (Low P, Vita A)	55.94 ab	(-) 0.45 (-1%)
6 (Low P, Vita B)	56.25 ab	(-) 0.14 (0%)
7 (High P)	56.04 ab	—
8 (High P, Vita A)	56.48 a	0.44 (+1%)
9 (High P, Vita B)	56.55 a	0.51 (+1%)
$LSD_{0.05}$	0.77 lb/bu	
Standard deviation	0.66 lb/bu	
Replicate F	4.21	
Treatment F	2.86	
CV	1.18%	

[1]Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Keuls Test.

[2]Comparisons are made with the control at the same phosphorus level.

Combined Phosphorus Test Weight for All Treatments

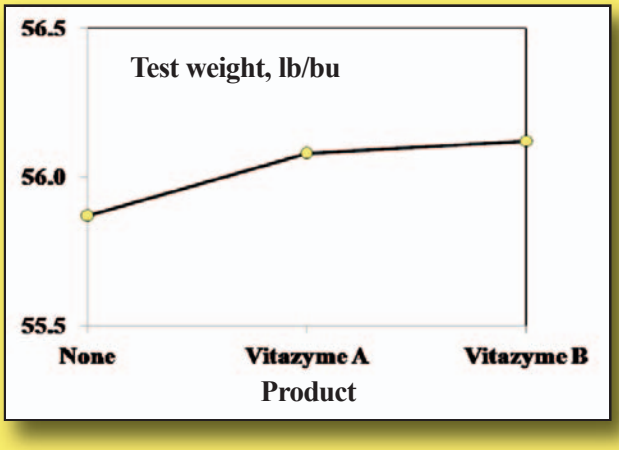
P level	Test weight	Test weight change
lb/acre	lb/bu	lb/bu
0	55.52	—
65	56.19	+0.67
130	56.36	+0.84



Note the trend towards higher test weight with higher P levels.

Combined Product Test Weight for All Treatments

Product	Test weight	Test weight change
	lb/bu	lb/bu
None	55.52	—
Vitazyme A	56.08	+0.21
Vitazyme B	56.12	+0.25



Both Vitazyme A and Vitazyme B show increased test weights versus the untreated controls. This result is likely due to the products' enhanced rhizosphere activation so more nutrients were available for uptake.

Yield results:

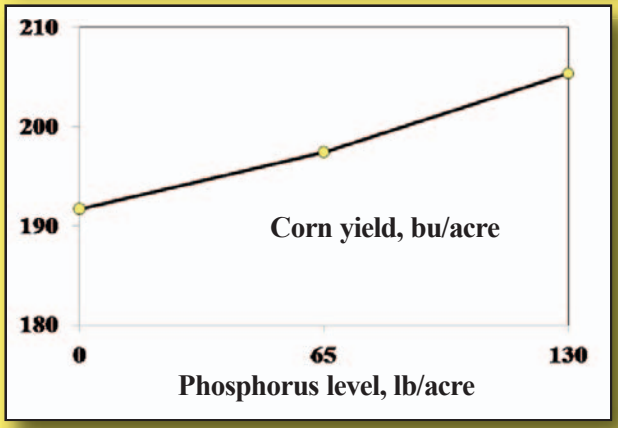
Treatment	Yield[1]	Yield change[2]
	bu/acre	bu/acre
1 (O P)	187.1 c	—
2 (O P, Vita A)	190.3 bc	3.2 (+2%)
3 (O P, Vita B)	197.7 abc	10.6 (+6%)
4 (Low P)	196.7 abc	—
5 (Low P, Vita A)	195.8 abc	(-) 0.9 (0%)
6 (Low P, Vita B)	199.8 abc	3.1 (+2%)
7 (High P)	202.6 ab	—
8 (High P, Vita A)	203.3 ab	0.7 (0%)
9 (High P, Vita B)	209.9 a	6.6 (+3%)
$LSD_{0.05}$	9.7 bu/acre	
Standard deviation	8.3 bu/acre	
Replicate F	3.27	
Treatment F	4.13	
CV	4.19	

[1]Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Keuls Test.

[2]Comparisons are made with the control at the same phosphorus level.

Combined Phosphorus Yield for All Treatments

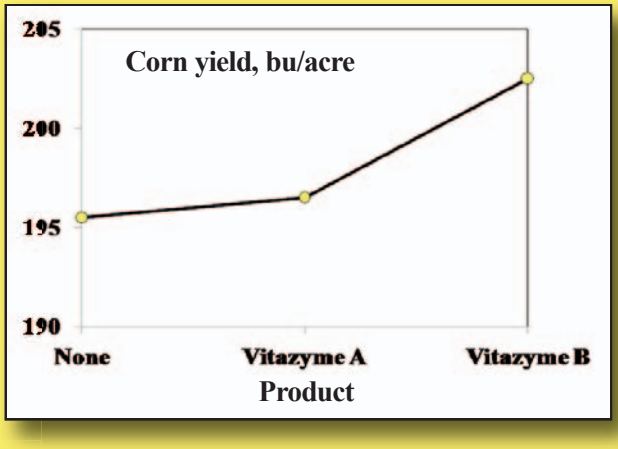
P level	Yield	Yield change
lb/acre	lb/bu	lb/bu
0	191.7	—
65	197.4	+5.7 (+3%)
130	205.3	+13.6 (+7%)



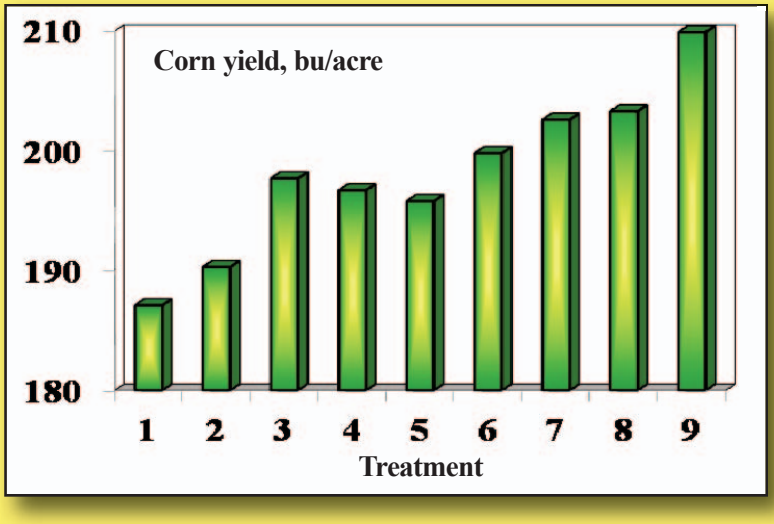
With increasing phosphorus levels the yield of corn grain increased almost in a linear fashion, to 3 and 7% above the control at 65 and 130 lb/acre of phosphorus, respectively.

Combined Product Test Weight for All Treatments

Product	Yield	Yield change
	lb/bu	lb/bu
None	195.5	—
Vitazyme A	196.5	+1.0 (+1%)
Vitazyme B	202.5	+7.0 (+4%)



Vitazyme A, accross all phosphorus levels, slightly increased corn yields, but Vitazyme B increased yields by 4%, or 7.0 bu/acre.



There was a trend accross the treatments for higher yields due to higher fertilizer phosphorus applications and Vitazyme B. The highest overall treatment was combined high phosphorus plus Vitazyme B (Treatment 9), which increased yield by 22.8 bu/acre (+12%) above the untreated, low phosphorus control (Treatment 1).

Grain protein: A composite grain sample from each of the six replicates for the nine treatments was sent to Midwest Laboratories in Omaha, Nebraska, for the analysis of protein and elements. The various elements showed no trends among the treatments, but protein displayed interesting results.

Treatment	Crude protein[1]
	%
1 (O P)	6.42
2 (O P, Vita A)	6.80
3 (O P, Vita B)	6.66
4 (Low P)	6.80
5 (Low P, Vita A)	6.90
6 (Low P, Vita B)	6.60
7 (High P)	6.22
8 (High P, Vita A)	7.21
9 (High P, Vita B)	6.28

[1]Dry weight basis

Combined Phosphorus Protein for All Treatments

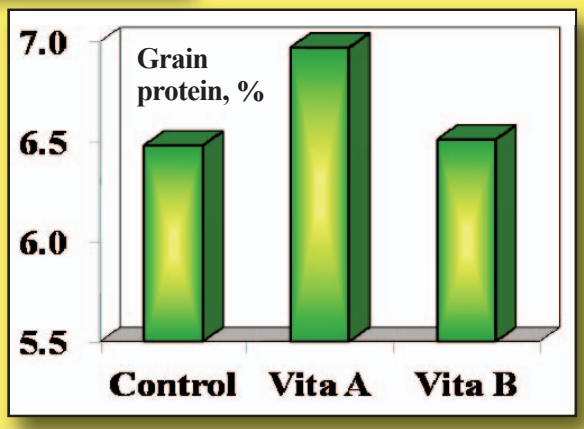
P level	Protein	Protein change
lb/acre	%	%
0	6.63	—
65	6.77	+0.14
130	6.57	-0.06

There was no clear relationship between fertilizer and soil phosphorus and grain protein.

Combined Product Protein for All Treatments

Product	Protein	Protein change
	%	%
None	6.48	—
Vitazyme A	6.97	+0.49
Vitazyme B	6.51	+0.02

Note that Vitazyme A improved grain protein by near 0.5%, although Vitazyme B had little effect.



Conclusion: A replicated small-plot study in east-central Iowa, using two Vitazyme versions with treatments at planting and V-7, and three phosphorous fertilizer levels, revealed several significant effects of phosphorous and Vitazyme on test weight, yield, and grain protein. The year was favorable for high yields, so yields varied from 187.1 to 209.9 bu/acre. The tissue element levels for the first three treatments, analyzed mid-season, revealed that both Vitazyme A and Vitazyme B increased element levels, with few exceptions.

Test weight showed a positive impact from fertilizer phosphorous, increasing by 0.67 lb/bu for 65 lb/acre of P_2O_5, and by 0.84 lb/bu for 130 lb/acre of P_2O_5. Both Vitazyme A and Vitrazyme B gave increases in the test weight, of 0.21 and 0.25 lb/bu, respectively. It is interesting that the highest test weights were for Treatments 8 and 9 (high P_2O_5, Vitazyme A and Vitazyme B, respectively), which produced significantly heavier grain than the low-P_2O_5, no-Vitazyme control (Treatment 1). This result reveals that higher phosphorous levels plus Vitazyme increase mineral uptake the most due to rhizosphere activation – especially phosphorous-extracting mycorrhizae – and increased availability of soil nutrients.

Yield results showed significant increases in corn grain with the high P_2O_5 + Vitazyme B treatment, which exceeded the no P_2O_5 and no P_2O_5 + Vitazyme A treatments. Of particular interest is the trend for increasing grain yield with both increasing phosphorous fertility and Vitazyme A and B, especially with Vitazyme B, which boosted corn yield by 7.0 bu/acre (4%) above the combined average of the no-Vitazyme phosphorous treatments at all P_2O_5 levels. The highest yield was for Treatment 9 – high P_2O_5 + Vitazyme – which boosted grain yield by 22.8 bu/acre over the no P_2O_5 + no Vitazyme control.

Grain protein responded with no pattern to added P_2O_5 fertilizer, but Vitazyme A increased protein by 0.49%-point across all three P_2O_5 fertilizer levels. This study reveals that, of the two Vitazyme formulations, Vitazyme B is the best in terms of test weight and yield enhancement, but Vitazyme A increased grain protein the most. Both products, however, improved yield, protein, and test weight of corn.

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2011 Crop Results

Vitazyme on Corn

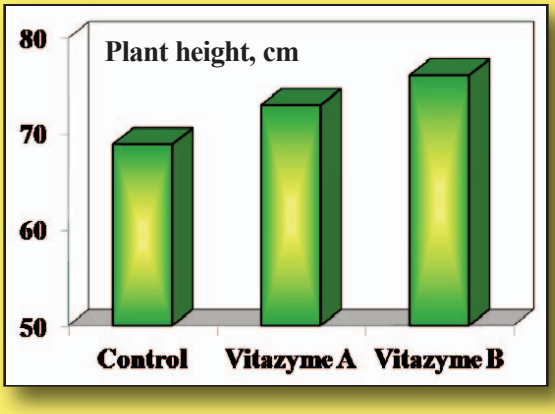
Researcher: Paul W. Syltie, Ph.D. *Location*: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Pot size*: 1 gallon *Soil type*: silt loam
Planting rate: 10 seeds/pot, thinned to 3 plants/pot *Planting date*: November 12, 2010
Experimental design: A replicated greenhouse pot study was conducted to evaluate the effect of two Vitazyme formulations to increase plant growth. Seven replicates were used.

1. Control **2. Vitazyme A** **3. Vitazyme B**

Fertilization: none
Vitazyme application: Vitazyme A: 100 ml/pot at planting of a 0.1% solution, for regular product; Vitazyme B: 100 ml/pot at planting of a 0.1% solution, diluted directly from concentrate
Plant height results: The plants were measured on December 15, 2010, and averaged for each pot.

Treatment	Plant height[1]	Height change
	cm	cm
Control	68.9 b	—
Vitazyme A	73.0 a	4.1 (+6%)
Vitazyme B	76.1 a	7.2 (+10%)
Treatment P	0.0023**	
Model P	0.0023***	
CV	4.45%	
$LSD_{0.05}$	3.6 cm	

[1]Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Keuls-Test.



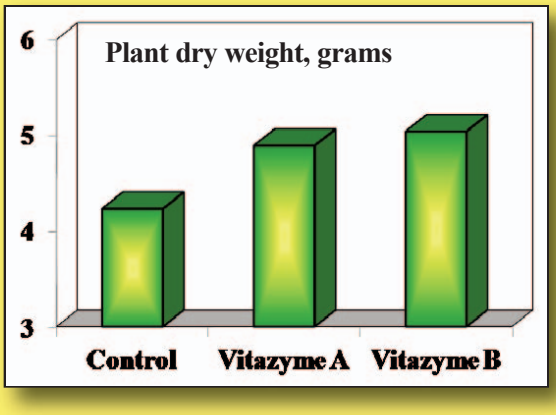
Increase in height with Vitazyme A: 6%

Increase in height with Vitazyme B: 10%

Dry weight results: On December 15, 2010, the roots were washed free of soil, and dried in a drying oven at 120º F for 24 hours.

Treatment	Dry Weight[1]	Weight change
	grams	grams
Control	4.23 b	—
Vitazyme A	4.89 a	0.66 (+16%)
Vitazyme B	5.04 a	0.81 (+19%)
Treatment P	0.0006***	
Model P	0.0006***	
CV	7.06%	
$LSD_{0.10}$	0.37 gram	

[1]Means followed by the same letter are not significantly different at P=0.10 according to the Student-Newman-Keuls-Test.



Increase in dry weight with Vitazyme A: 16%

Increase in dry weight with Vitazyme B: 19%

Conclusion: A replicated pot trial in the greenhouse, using two variations of Vitazyme, proved that both corn height and dry weight responded significantly to both products. Height increased by 6% and 10%, respectively, for Vitazyme A and Vitazyme B, while dry weight increased by 16% and 19% for the two products. These results prove that both products are very effective for improving corn growth, especially Vitazyme B, the product made directly from concentrate.

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2011 Crop Results

Vitazyme on Corn

A Greenhouse Study

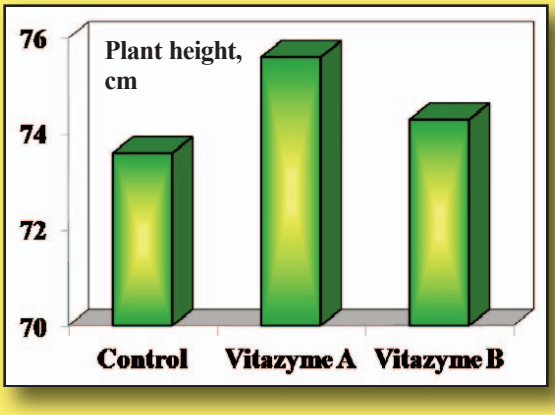
Researcher: Paul W. Syltie, Ph.D. *Location*: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Pot size*: 1 gallon *Soil type*: silt loam
Planting rate: 10 seeds/pot, thinned to 3 plants/pot *Planting date*: February 14, 2011
Experimental design: A replicated greenhouse pot study was conducted to evaluate the relative effectiveness of two Vitazyme formulations to increase plant growth. Eight replications were used.

1. Control **2. Vitazyme A** **3. Vitazyme B**

Fertilization: none
Vitazyme application: Vitazyme A: 100 ml/pot at planting of a 0.1% solution, from regular product; Vitazyme B: 100 ml/pot at planting of a 0.1% solution, diluted directly from concentrate
Plant height results: On March 22 at harvest, 36 days after planting, the plants were measured for height, and averaged for the three plants in each pot.

Treatment	Plant height[1]	Height change
	cm	cm
Control	73.6 a	—
Vitazyme A	75.6 a	2.0 (+3%)
Vitazyme B	74.3 a	0.7 (+1%)
Block P	0.605	
Treatment P	0.463	
Model P	0.624	
$CV_{0.10}$	4.07%	
$LSD_{0.10}$	2.9 cm	

[1]Means followed by the same letter are not significantly different at P=0.10 according to the Student-Newman-Keuls-Test.



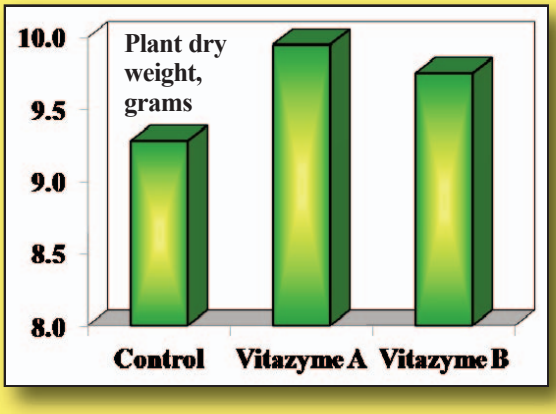
Increase in plant height with Vitazyme

Vitazyme A 3%
Vitazyme B 1%

Dry weight results: On March 22 the roots were washed of all soil, and then dried in a drying oven at 120º F for 24 hours. Weights were recorded to the nearest 0.01 gram for the combined three plants of each pot.

Treatment	Dry weight[1]	Weight change
	grams	grams
Control	9.28 b	—
Vitazyme A	9.95 a	0.67 (+7%)
Vitazyme B	9.75 a	0.47 (+5%)
Block P	0.018*	
Treatment P	0.011*	
Model P	0.008**	
$CV_{0.10}$	3.64%	
$LSD_{0.10}$	0.34 gram	

[1]Means followed by the same letter are not significantly different at P=0.10 according to the Student-Newman-Keuls-Test.



Increase in dry weight with Vitazyme

Vitazyme A 7%
Vitazyme B 5%

Conclusion: This replicated greenhouse study with corn proved that both Vitazyme A (regular product) and Vitazyme B (direct dilution from concentrate) increased dry matter production significantly above the untreated control.

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2011 Crop Results

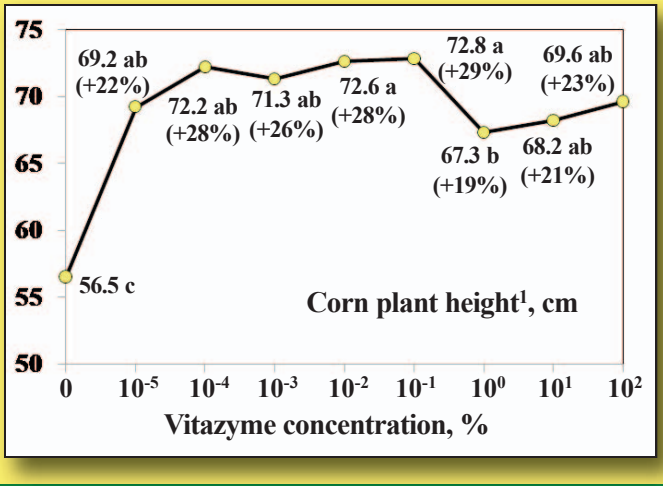
Vitazyme on Corn

A Concentration Series Study

Researcher: Paul W. Syltie, Ph.D. *Location*: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Pot size*: 1 gallon *Soil type*: silt loam
Planting rate: 10 seeds/pot, thinned to 3 plants/pot *Planting date*: November 15, 2010
Experimental design: A dilution series of Vitazyme was prepared and applied to pots in a replicated greenhouse setting, the purpose of which was to determine relative degrees of response to the active agents at varying conentrations. A completely randomized design was used, with eight replications.

Treatment	Vitazyme concentration
	%
1	0
2	0.00001 (10^{-5})
3	0.0001 (10^{-4})
4	0.001 (10^{-3})
5	0.01 (10^{-2})
6	0.1 (10^{-1})
7	1 (10^{0})
8	10 (10^{1})
9	100 (10^{2})

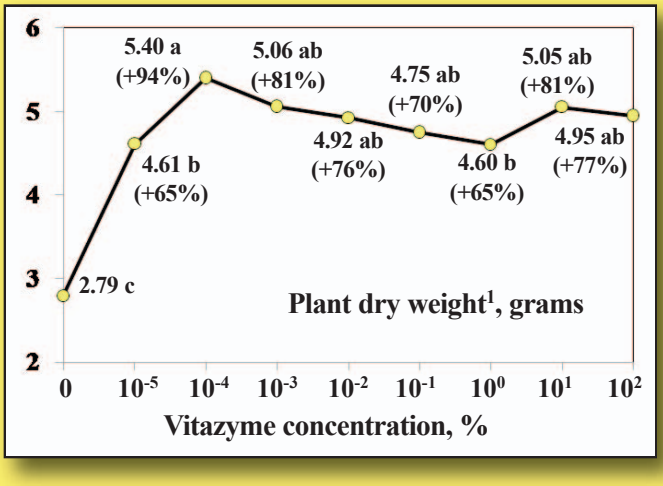
Fertilization: none
Vitazyme application: At planting, 100 ml of the eight dilutions were added to the soil surface of the appropriate pots, directly after seeding.
Plant height results: Plant heights were measured for the three plants of each pot at harvest, on December 15, 2010, and averaged.



Treatment P	**0.0000*** **
Model P	**0.0000*** **
CV	**7.55%**
$LSD_{0.05}$	**5.2 cm**

[1]Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Keuls Test.

Dry weight results:



Treatment P	**0.0000*** **
Model P	**0.0000*** **
CV	**7.55%**
$LSD_{0.05}$	**5.2 cm**

[1]Means followed by the same letter are not significantly different at P=0.05 according to the Student-Newman-Keuls Test.

Conclusions: Vitazyme at all concentrations improved the growth of corn above the control in terms of plant height and dry weight. All concentrations, from 10^{-5} to 10^{2}, gave significant responses for plant height, with the 10^{-2} and 10^{-1} dilutions giving the strongest responses (28% and 29%, respectively). Plant weight increases were statistically equal across the entire range of concentrations except for 10^{-5} and 10^{0} %, the highest values appearing at 10^{-4}, 10^{-3}, and 10^{1} %; the reason for this bimodal response is not known, The field application rates are typically represented by 10^{-2} to 10^{-3} % Vitazyme.

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2011 Crop Results

Vitazyme on Corn

Researcher/Farmer: Nguyen Ngoc Tuan *Location*: Easling Town, Cu Jut District, Dak Nong Province, Viet Nam *Variety*: 30 D55

Planting season: Summer – Fall, 2011

Experimental design: A corn field was divided into a Vitazyme treated area of 0.5 ha, and an untreated control area of 0.3 ha, to determine the effect of this product on the yield and profitability of the crop.

1. Control **2. Vitazyme**

Vitazyme application: (1) 5% Vitazyme seed spray just before planting; (2) 1 liter/ha sprayed on the leaves and soil 35 days after planting

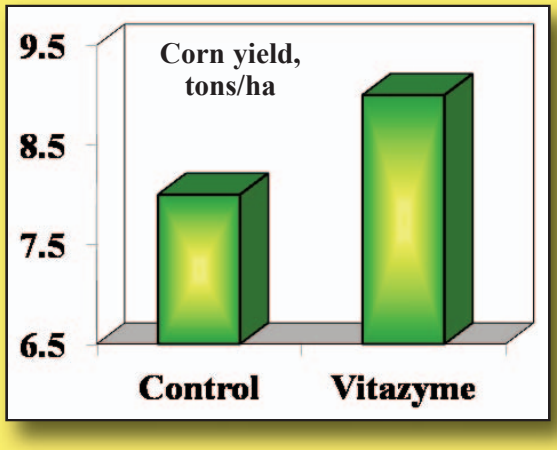
Growth results: With Vitazyme the following effects were noted:

- Taller plants
- Stronger root systems
- Darker green leaves
- Excellent disease resistance from steaked leaf and stem rot
- During a drought period, plants showed no leaf rolling
- Seed color was brighter

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	8.0	—
Vitazyme	9.0	1.0 (+13%)

Increase in corn yield with Vitazyme: 13%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income[2]	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	13,500,000	36,000,000	22,500,000	—
Vitazyme	500,000	14,000,000	38,250,000	26,500,000	4,000,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.
[2]Corn price = 4,500 VND/kg.

Increase in income with Vitazyme:
4,000,000 VND, or $200.00/ha

Conclusion: This Vietnamese corn trial revealed that Vitazyme, applied on the seeds and also 30 days after planting, increased yield by 13%, while boosting profit by $200.00/ha. This program is highly effective for corn production in Viet Nam.

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2011 Crop Results

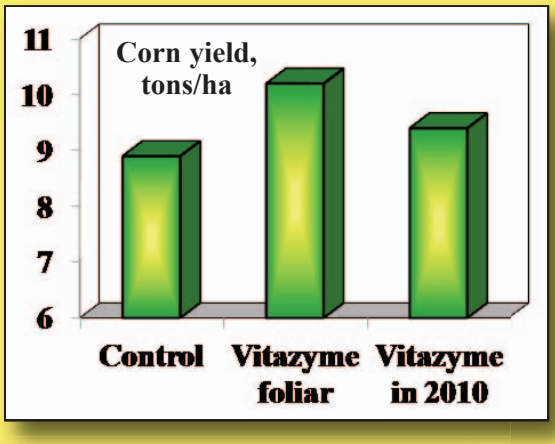
Vitazyme on Corn

Researcher: Unknown *Research organization*: National Academy of Agrarian Sciences, Vinnytsia State Agricultural Research Station *Location*: Vinnytsia, Ukraine (Central Forest and Steppe Region)
Variety: Sangriya *Planting date*: unknown
Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)
Experimental design: Replicated corn plots were prepared and treated with a Vitazyme treatment, and plots treated with Vitazyme were also used to evaluate a carryover effect, to evaluate the effect of the product on corn yield and profitability.

1. Control **2. Vitazyme on leaves and soil** **3. Vitazyme on leaves and soil in 2010**

Vitazyme applications: 1 liter/ha at the 7 to 8-leaf stage (June 16, 2011) for Treatment 2
Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	8.9	—
Vitazyme foliar	10.2	1.3 (+15%)
Vitazyme in 2010	9.4	0.5 (+6%)



Yield increase with a Vitazyme foliar treatment: 15%
Yield increase with a Vitazyme in 2010: 6%

Income results:

- Income increase with a Vitazyme treatment: 2,050 hrn/ha
- Income increase with Vitazyme in 2010: 850 hrn/ha

Conclusion: This replicated corn trial in Vinnytsia, Ukraine, reveals what previous years' trials have shown ... that Vitazyme increases yield (+15% in 2011) and profitability (+2,050 hrn/ha in 2011) consistently. It is a product that powerfully improves agricultural productivity in Ukraine.

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2009 Crop Results

Vitazyme on Corn

Researcher: Nathan Temples *Farm cooperator*: Parker Brothers *Location*: Sikeston, Missouri
Variety: Pioneer 33N58 *Soil type*: sandy loam *Planting rate*: 31,500 seeds /acre
Row-spacing: 38 inches *Irrigation*: unknown *Planting date*: April 23, 2009

Experimental design: A corn field received Vitazyme on the seeds of 24 rows within the field, to determine the effects of this product on corn yield.

1. Control **2. Vitazyme**

Fertilization: 200-60-90 lb/acre N-P_2O_5-K_2O

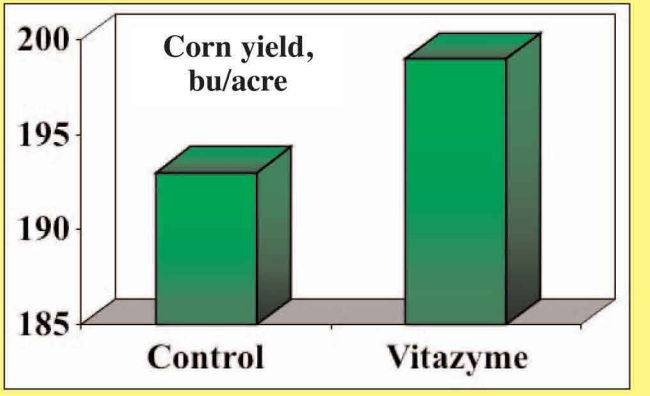
Vitazyme application: 8 oz/acre on the seeds at planting

Harvest date: September 23, 2009

Yield results:

Treatment	Yield	Yield change
	bu/acre	
Control	193	—
Vitazyme	199	6 (3%)

Increase in corn yield with Vitazyme: 3%



Conclusions: This high yielding corn study in Missouri revealed that Vitazyme, applied at 8 oz/acre to the seeds at planting, increased yield by 6 bu/acre (+3%). This is a highly profitable additional yield, to reveal the potential of Vitazyme to improve corn yields in the Corn Belt of Missouri.

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2009 Crop Results

Vitazyme on Corn

Researcher: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists
Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine *Location*: Ukraine central forest-steppe area near Vinnytsia
Planting date: May 22, 2009 *Variety*: Ronaldinio *Seeding rate*: 22 kg/ha
Tillage: plowing, harrowing, and cultivation *Previous crop*: winter wheat
Soil type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil "hydrolyzed nitrogen", 15.8 mg/100g of soil phosphorous, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.
Experimental design: A uniform field was divided into plots of 1.0 ha each with two treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either a seed application, or a seed plus foliar application, on the yield of corn grain.

1. Control **2. Vitazyme, once foliar**

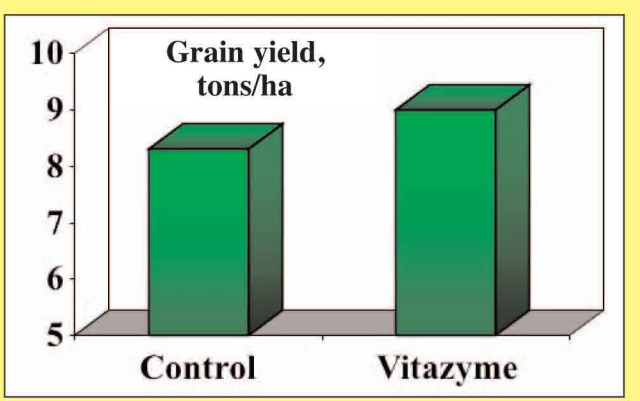
Fertilization: 60 kg/ha, 30 kg/ha P_2O_5, and 60 kg/ha K_2O

Vitazyme application: Treatment 2 received 1.0 liter applied to the leaves and soil on June 25, 2009, at the 7 to 8 leaf stage

Yield results:

Treatment	Grain yield	Change
	tons/ha	tons/ha
Control	8.3	—
Vitazyme	9.0	0.7 (+8%)

Increase in corn yield with Vitazyme: 8%



Income results:

Income increase with Vitazyme foliar: 479 hrn/ha

Conclusions: Corn grain with and without Vitazyme (1 liter/ha, foliar) in this Ukraine study showed an 8% yield increase. Moreover, the return to the farmer was improved substantially.

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2009 Crop Results

Vitazyme on Corn

Researcher: Nathan Temples
Farm cooperator: Schlosser Farms
Location: Perkins, Missouri
Variety: Pioneer 33 N 58
Soil type: silt loam
Planting date: April 20, 2009
Planting rate: 25,000 seeds /acre
Irrigation: none

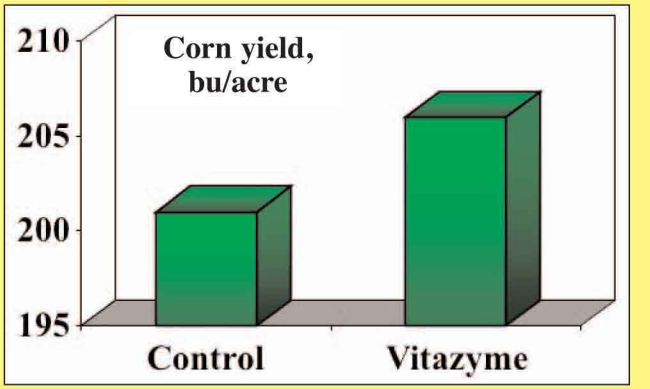
Experimental design: Five acres of a 90-acre corn field were treated with Vitazyme, applied with the herbicide, to determine the product's ability to improve crop yields.

1. Control **2. Vitazyme**

Fertilization: 160-50-90 lb/acre N-P_2O_5-K_2O preplant
Vitazyme application: 13 oz/acre with the herbicide, 42 days after planting
Harvest date: October 3, 2009
Yield results:

Treatment	Yield	Yield change
	---------bu/acre	----------
Control	201	—
Vitazyme	206	5 (2.5%)

Increase in yield with Vitazyme: 2.5%



Conclusions: A Misourri corn study showed that Vitazyme, applied along with a herbicide at 13 oz/acre, increased yield by 5 bu/acre (+2.5%)

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2009 Crop Results

Vitazyme on Corn

Researcher: Nathan Temples
Farm cooperator: Seyer Farms
Location: Oran, Missourri
Variety: Dekalb
Soil type: sandy
Planting rate: 29,000 seeds /acre
Row-spacing: 30 inches
Irrigation: furrow, six times
Planting date: April 22, 2009

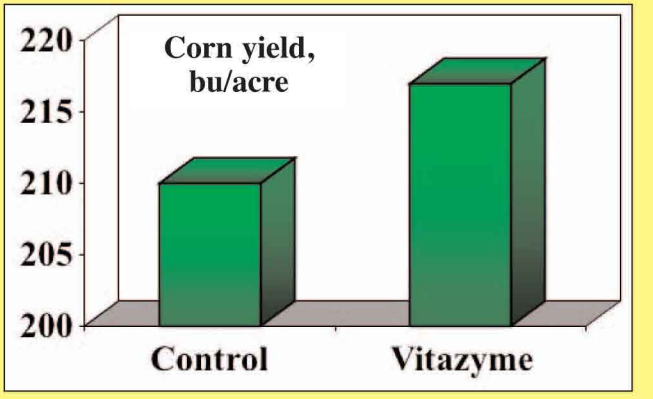
Experimental design: An 80-acre irrigated corn field was divided into 60 acres treated with Vitazyme, and 20 acres left untreated, to determine the product's effect on crop yield.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: 13 oz/acre along with a herbicide
Harvest date: September 14, 2009
Yield results:

Treatment	Yield	Yield change
	---------- bu/acre ----------	
Control	210	—
Vitazyme	217	7 (3.3%)

Increase in corn yield with Vitazyme: 3.3%



Conclusions: In this high yielding Missouri irrigated corn trial, Vitazyme increased corn yield by 7 bu/acre (3.3%), showing the utility of this product to improve production even at high yield levels.

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2009 Crop Results

Vitazyme on Corn

Researcher: Nathan Temples
Farm cooperator: Donnie and Chris Wondel, D and C Farms
Location: Arbor, Missouri
Variety: 32 D 78
Soil type: silt loam
Planting rate: 29,000 seeds /acre
Row-spacing: 30 inches
Irrigation: furrow, six times
Planting date: May 7, 2009

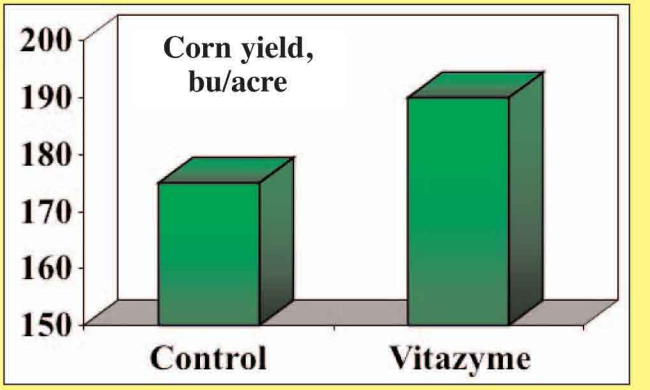
Experimental design: A 55-acre field was treated with Vitazyme on 40 acres, using seed and foliar treatments, to determine if this product would increase the yield of grain.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: (1) 8 oz/acre on the seeds at planting; (2) 13 oz/acre on the leaves and soil at 7 inches height, with a herbicide
Harvest date: October 6, 2009
Yield results:

Treatment	Yield	Yield change
	bu/acre	
Control	175	—
Vitazyme	190	15 (9%)

Increase in yield with Vitazyme: 9%



Conclusions: In this Missouri corn trial, using seed and foliar/soil applications, the Vitazyme treatments increased grain yield by 9% (15 bu/acre) in this high-yielding field, showing the program's great effectiveness in corn programs, even when yields are high.

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2008 Crop Results

Vitazyme on Corn

A Long-Term study: Year 1

Researcher: Bertel Schou, Ph.D. *Research organization*: ACRES (Agricultural Custom Research and Environmental Services), Cedar Falls, Iowa
Planting rate: 29,900 seeds/acre
Variety: Pioneer 34R67 (BBCH Scale:BCOR)
Planting date: May 21, 2008
Tillage: conventional (cultivated and harrowed on May 21)
Row spacing: 30 inches
Planting depth: 2 inches *Previous crop*: corn
Soil type: Kenyon loam (34% sand, 46% silt, 20% clay, 3.6% organic matter, 15.0 meq/100 grams cation exchange capacity, pH 7.2, good fertility)
Soil test results, initial for all plots (analyzed May 15, 2008): pH, 7.2; organic matter, 3.90%; N, 89 lb/acre; SO_4-S, 6 lb/acre; P_2O_5, 1,076 lb/acre; Ca, 5,407 lb/acre; Mg, 916 lb/acre; K, 298 lb/acre; Na, 52 lb/acre; B, 1.76 lb/acre; Fe, 460 lb/acre; Mn, 176 lb/acre; Cu, 3.4 lb/acre; Zn, 12.6 lb/acre; base saturations: Ca, 72.6%, Mg, 20.5%, K, 2.1%, Na, 0.6%, others, 4.2%
Experimental design: A field was selected to place plots (15 x 40 feet) in a randomized complete block design (five replicates), using two treatments for a long-term field study. These plots are designed to assess the long-term effects of Vitazyme on the yield and growth of corn and soybeans in rotation, but moreover the effects on the physical, chemical, and microbial characteristics of the soil.

1. Control **2. Vitazyme**

Fertilization: 120 lb/acre of N as 28% N applied postemergence in 20-inch spaced bands, using drop nozzles from a shielded sprayer
Vitazyme application: 13 oz/acre (1 liter/ha) in the seed furrow at planting (May 21), and 13 oz/acre sprayed over the leaves and soil on July 6, 2008, at the V6 stage
Weed control: Harness Extra preemergent, and Accent postemergent
Microorganism analyses: Soil biological activity was evaluated in the spring and fall to determine product effects on a number of parameters. Soil samples were collected from the root zones of plants from each of the five replicates, and then combined for each treatment and sent to the Soilfoodweb Laboratory in Corvallis, Oregon, for analysis.

May 29 analysis (baseline values for future comparisons)

Treatment	Organism biomass	Active bacteria	Total bacteria	Active fungi	Total fungi	Protozoa			Total nematodes
						Flagellates	Amoebae	Ciliates	
		ug/g	ug/g	ug/g	ug/g	no./g	no./g	no./g	no./g
Control	0.81	28.4	1,853	20.4	244	5,718	17,211	34	2.33
Vitazyme	0.80	24.7	2,324	13.3	282	3,454	5,738	72	1.84

Treatment	Total fungi to bacteria	Active fungi to total fungi	Active bacteria to total bacteria	Active fungi to active bacteria	Plant-available nitrogen
					lb/acre
Control	0.13	0.08	0.02	0.72	75 to 100
Vitazyme	0.12	0.05	0.01	0.54	50 to 75

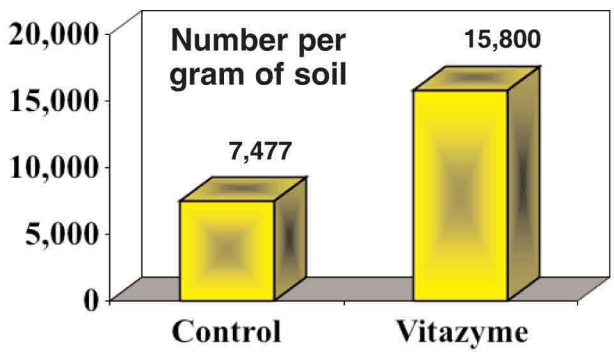
September 10 analysis

Treatment	Organism biomass	Active bacteria	Total bacteria	Active fungi	Total fungi	Protozoa			Total nematodes
						Flagellates	Amoebae	Ciliates	
		ug/g	ug/g	ug/g	ug/g	no./g	no./g	no./g	no./g
Control	0.82	41.6	929	18.7	352	1,690	5,618	169	2.73
Vitazyme	0.81	3.4	1,033	13.4	240	8,594	7,103	103	0.57

Treatment	VA mycorrhizae	Total fungi to bacteria	Active fungi to total fungi	Active bacteria to total bacteria	Active fungi to active bacteria	Plant-available nitrogen
	% infection				lb/acre	
Control	0	0.38	0.05	0.04	0.45	50 to 75
Vitazyme	0	0.23	0.06	0.03	0.41	75 to 100

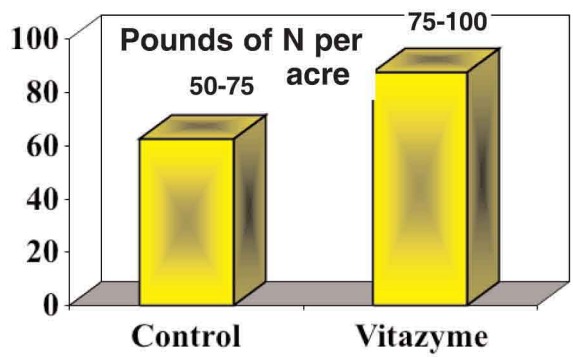
Differences in microbes between the two treatments are not pronounced, although there was a distinctly greater number of protozoa with the Vitazyme treatment, especially flagellates. There was no VAM mycorrhizal root infection for either treatment. Fungal and bacterial ratios were not very different, but plant-available nitrogen was decideably greater with the Vitazyme treatment.

Total Protozoa



Increase in protozoa with Vitazyme: 111%

Plant-Available Nitrogen



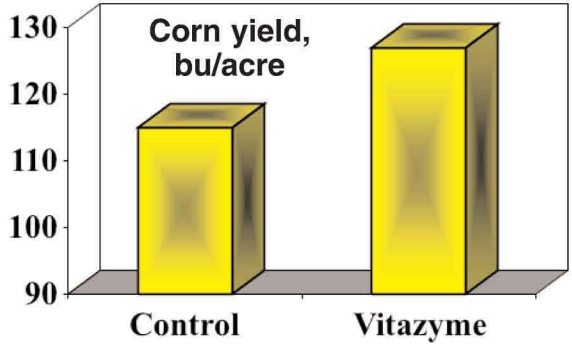
Increase in N availability with Vitazyme: 25 lb/acre

Harvest date: The crop was harvested on November 1, 2008, using a Massy-Ferguson 8 plot combine. Two rows 40 feet long were harvested from each plot.

Plant populations: The populations of the two treatments were very similar: 21,414 plants/acre for the control, and 21,235 plants/acre for the Vitazyme treatment. This difference was not significant (P=0.871).

Yield results:

Treatment	Grain yield	Yield increase
	bu/acre	bu/acre
Control	114.96 b	——
Vitazyme	127.02 a	12.06 (+10%)
LSD (0.05)	8.53	
Standard deviation	4.86	
Coeff. of variation	4.02	
Replicate F	4.4	
Replicate probability	0.090	
Treatment F	15.4	
Treatment probability	0.017	



Vitazyme significantly increased the yield of corn, by 12.06 bu/acre, a full 10% above the control yield.

Conclusions: In this first year of a long-term trial to evaluate the effects of Vitazyme on the physical, chemical, and microbiological effects of the soil, and on crop response, Vitazyme greatly boosted grain yield (12.06 bu/acre, or 10%) above the control. Baseline soil chemical analyses were completed, as were baseline microbiological analyses. A September 10 microbial analysis revealed that, while both treatments showed minimal differences in most parameters measured, there was a marked 111% increase in total protozoa with Vitazyme. In addition, the supply of plant-available nitrogen was improved by about 25 lb/acre with Vitazyme, a significant factor in the current climate of high and volatile fertilizer prices. Work will continue during the coming years on monitoring the changes brought about by Vitazyme on an array of soil and plant characteristics.

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2008 Crop Results

Vitazyme on Corn

Researcher/Farmer: Rick Nichols
Variety: Pioneer 34Y88 (non-GMO)
Row spacing: 30 inches
Planting date: May 4, 2008
Location: Hebron, Indiana
Soil type: silty clay "gumbo"
Population: 34,000 seeds/acre
Previous crop: soybeans

Experimental design: A field was divided into a control area receiving no sidedressed nitrogen or Vitazyme, and a treated area receiving both. The objective of the test was to evaluate the effect of combined sidedressed nitrogen plus Vitazyme on crop yield.

1. Control **2. Vitazyme + sidedressed nitrogen**

Fertilization: Before planting: 140 lb/acre nitrogen, as urea. At planting: 300 lb/acre 18-46-60% N-P_2O_5-K_2O placed 4 inches to the side of the seeds. At sidedressing, in June (corn about 2 feet tall): 40 lb/acre nitrogen as a 28% solution

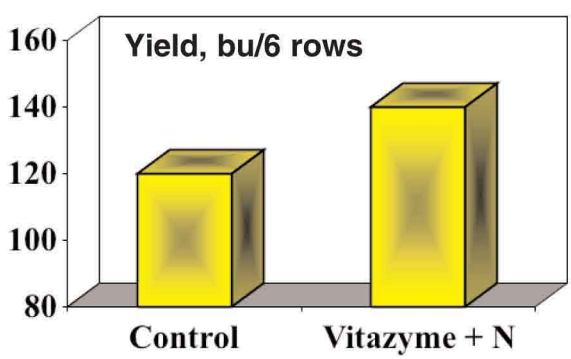
Vitazyme application: 13 oz/acre with sidedressed nitrogen on the treated area, applied in June at the 2-foot height

Harvest date: October 7, 2008

Yield results: Six rows of field length were harvested and weighed from each treatment in passes near one another. However, no row length was measured, so per acre yields were not obtained.

Treatment	Yield	Increase
	bu/6 rows	bu/6 rows
1. Control	120	—
2. Vitazyme + Sidedressed N	140	20 (+17%)

Increase in corn yield: 17%



Conclusions: In this northern Indiana corn trial, Vitazyme side-dressed with 40 lb/acre of nitrogen as a 28% solution increased the yield by 17% above the control. It was not possible to separate the effects of the nitrogen and the Vitazyme, but it is well documented that Vitazyme enhances the utilization of soil and fertilizer applied nutrients, especially nitrogen.

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2008 Crop Results

Vitazyme on Corn

Researcher/Farmer: Gary Burkey
Variety: Flexseed 4918 non-GMO
Row spacing: 30 inches
Planting date: May 6, 2008
Location: Couts, Indiana
Soil type: silty clay loam "gumbo"
Population: 29,500 seeds/acre

Soil test: pH, 6.6; cation exchange capacity, 24.6 meq/100g; organic matter, 3.6%; base saturations, Ca = 65.6%, Mg = 21.8%, K = 1.4%, Na = 0.3%, other bases = 4.8%, H = 6.0%; estimated N release, 86 lb/acre; S, 9 ppm; P_2O_5, 175 lb/acre; Ca, 6,468 lb/acre; Mg, 1,290 lb/acre; K. 274 lb/acre; Na, 38 lb/acre; B, 0.9 ppm; Fe, 1,842 ppm; Mn, 77 ppm; Cu, 1.1 ppm; Zn, 26.7 ppm

Experimental design: A corn field was treated entirely on the seeds with Vitazyme, and part of the field received a foliar Vitazyme treatment as well, along with two other products in the sprayer tank. The objective of the study was to evaluate the effect of an additional Vitazyme application and these other foliar products on corn yield.

1. Vitazyme on the seeds
2. Vitazyme on the seeds, plus Vitazyme and two other products on the leaves

Fertilization: *Before planting*: 150 lb/acre potassium chloride (0-0-60% N-P_2O_5-K_2O); 100 lb/acre diammonium phosphate (18-46-0% N-P_2O_5-K_2O); 70 lb/acre N from dry urea. *At planting*: 4 gallons/acre 3-18-18% N-P_2O_5-K_2O on the seeds. *At knee-height*: 70 lb/acre N (28% N) side-dressed with a row-crop cultivator. *Foliar spray on July 6*: Tricert K (1 quart/acre of a 50-0-20 N-P_2O_5-K_2O material), manganese (1.5 lb/acre). with Vitazyme.

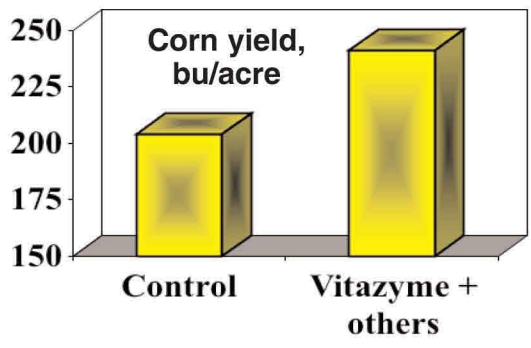
Vitazyme application: (1) 13 oz/acre on the seeds at planting, along with 3-18-18 fertilizer; (2) 13 oz/acre sprayed foliar with Tricert K and manganese on July 6

Weather results: a wet spring and late planting, few rains in July, and a very dry late July and August, followed by a 12-inch flooding rain in mid-October

Harvest date: November 10, 2008

Yield results: Eight -row swatchs were combined and weighed for both treatments. Due to an extreme rain event in mid-October, water rose so high in the field that the ears were covered for two to three days. In spite of that problem the corn grade was not affected, although untreated corn from neighbors' fields suffered water damage to their grain.

Treatment	Yield	Change
	bu/acre	bu/acre
1. Vitazyme on seeds	204	—
2. Vitazyme on seeds + foliar with Tricert K + Mn	241	37 (+18%)



Increase in corn yield: 18%

Conclusions: In this Indiana in-field corn trial, Vitazyme plus Tricert K and manganese boosted the yield by 18% (37 bu/acre), though it was not possible to separate the individual effects of these products. Vitazyme works in synergism with native soil and applied nutrients to boost utilization, so this great yield increase is not uncommon. **Of great interest is the fact that submersion of the ears before harvest for up to three days did not reduce the grain quality, indicating that cell wall integrity and anti-pathogen properties of the grain were likely enhanced by Vitazyme throughout the field.**

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2008 Crop Results

Vitazyme on Corn

Researcher/Farmer: Gary Burkey
Variety: Flexseed 303 Triple-Stack
Row spacing: 30 inches
Planting date: May 18, 2008
Location: Couts, Indiana
Soil type: mucky sand
Population: 31,000 seeds/acre
Soil test: pH, 7.2; cation exchange capacity, 22.53 meq/100g; organic matter, 6.0%; base saturations, Ca = 70.8%, Mg = 20.5%, K = 4.2%, Na = 0.3%, others = 4.2%, H = 0%; estimated N release, 105 lb/acre; S, 10 ppm; P_2O_5, 468 lb/acre; Ca, 6,376 lb/acre; Mg, 1,110 lb/acre; K. 739 lb/acre; Na, 31 lb/acre; B, 0.9 ppm; Fe, 277 ppm; Mn, 29 ppm;Cu, 0.4 ppm; Zn, 6.6 ppm

Experimental design: A field was treated entirely with Vitazyme on the seeds at planting, and a portion of the field was foliar treated to determine the effect of this later application on crop yield.

1. Vitazyme on the seeds **2. Vitazyme on the seeds + leaves**

Fertilization: Before planting: 150 lb/acre potassium chloride (0-0-60% N-P_2O_5-K_2O); 100 lb/acre diammonium phosphate (18-46-0% N-P_2O_5-K_2O). At planting: 4 gallons/acre 3-18-18% N-P_2O5-K_2O on the seeds at planting. Sidedressed on June 18, at 5-feet plant height: 40 gallons/acre 28% N.

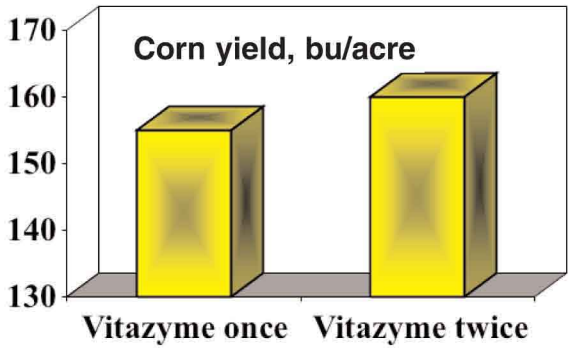
Vitazyme application: (1) 13 oz/acre on the seeds at planting, with 3-18-18% N-P_2O_5-K_2O over all areas; (2) 13 oz/acre foliar over one portion of the field, on June 18

Weather results: a wet spring and late planting, few rains in July, and very dry in late July and August, with a flooding rain (12 inches) in mid-October

Harvest date: December 12, 2008

Yield results: Eight-row swaths were combined and weighed for both treatments.

Treatment	Yield	Change
	bu/acre	bu/acre
1. Vitazyme on seeds	155	—
2. Vitazyme on seeds + leaves	160	5 (+3%)



Conclusions: Vitazyme applied foliar in this northern Indiana corn trial resulted in a substantial 5 bu/acre increase in yield above the treatment receiving only a seed treatment.

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2008 Crop Results

Vitazyme on Corn

A Greenhouse Study

Researcher: Paul W. Syltie, Ph.D. *Location*: Vital Earth Resources Research Greenhouse, Gladewater, Texas *Variety*: yellow dent *Planting date*: January 31, 2008
Soil type: silt loam *Pot size*: 1 gallon
Planting rate: 10 seeds/pot, thinned to three plants *Watering*: on-demand
Temperature: 55 to 85°F *Planting depth*: 0.5 inch

Experimental design: A replicated greenhouse pot study was designed to evaluate the effect of various rates of Vitazyme on the growth of corn. six replicates were included with six treatments, and the data were analyzed using Analysis of Variance with CoHort software.

1. **Control**
2. **Vitazyme at 7.5 oz/acre**
3. **Vitazyme at 13 .0 oz/acre**
4. **Vitazyme at 26.0 oz/acre**
5. **Vitazyme at 39.0 oz/acre**
6. **Vitazyme at 52.0 oz/acre**

Vitazyme applications: The 13.0 oz/acre application was made immediately after planting to the soil surface of the pot, using 100 ml of a 0.0016% solution. Other treatments were multiples of this rate.

Harvest date: On March 5, 35 days after planting, the soil was washed from the roots of the plants, and measurements were made of the height of each plant. The plants were then placed in a drying oven at about 50°C for 48 hours.

Plant height results:

Treatment	Plant height	Height change*
	cm	cm
5 (Vitazyme, 3x)	85.3 a	5.5 (+7%)
3 Vitazyme, 1x)	84.6 a	4.8 (+6%)
4 (Vitazyme, 2x)	83.8 a	4.0 (+5%)
2 (Vitazyme, 0.5x)	83.4 a	3.6 (+5%)
6 (Vitazyme, 4x)	80.0 b	0.2 (+0%)
1 (Control)	79.8 b	—
	Statistical analysis	
Replicate P	0.0245	
Treatment P	0.0040	
Model P	0.0029	
Coefficient of variation	3.24%	
$LSD_{0.10}$	2.6 cm	

*Compared to the untreated control, Treatment 1.

The highest (4 times normal) rate, as well as the untreated control, gave significantly shorter plants than all of the other Vitazyme treatments. There was no statistical difference among the 0.5 to 3 times normal treatments, but the greatest heights were for the 3 times normal and normal treatments.

Increase in plant height	
3x Vitazyme	**7%**
1x Vitazyme	**6%**
2x Vitazyme	**5%**
0.5x Vitazyme	**5%**

Dry weight results:

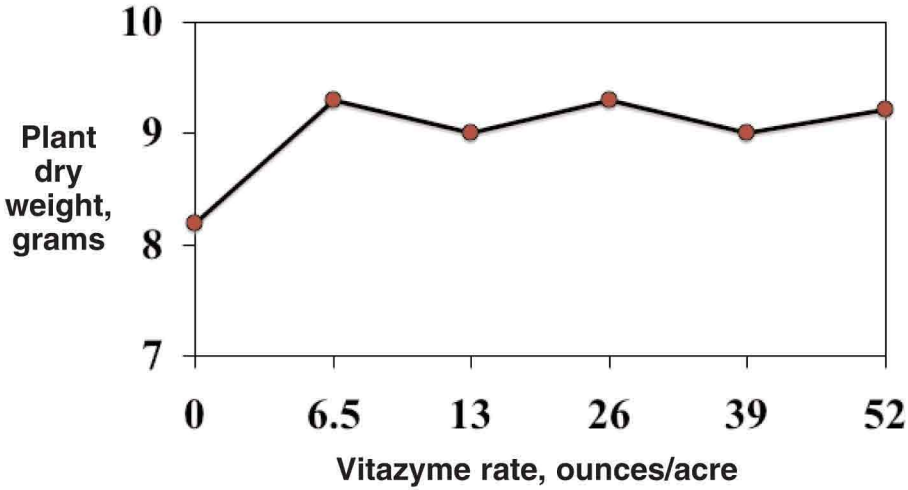
Treatment	Dry weight	Dry weight change*
	cm	cm
2 (Vitazyme, 0.5x)	9.30 a	1.11 (+14%)
4 Vitazyme, 2x)	9.30 a	1.11 (+14%)
6 (Vitazyme, 4x)	9.22 a	1.03 (+13%)
5 (Vitazyme, 3x)	9.01 a	0.82 (+10%)
3 (Vitazyme, 1x)	9.00 a	0.81 (+10%)
1 (Control)	8.19 b	—
	Statistical analysis	
Replicate P	0.0092	
Treatment P	0.0192	
Model P	0.0043	
Coefficient of variation	6.23%	
$LSD_{0.10}$	0.55 gram	

*Compared to the untreated control, Treatment 1.

All of the Vitazyme applications gave increases in dry plant weight of from 10 to 14%, the highest increases being with the 0.5x, 2x, and 4x rates. None of these differences were statistically significant, and all exceeded the control.

Increase in plant dry weight

0.5x Vitazyme 14%
2x Vitazyme 14%
4x Vitazyme 13%
3x Vitazyme 10%
1x Vitazyme 10%



Conclusions: In this greenhouse study to evaluate the effects of progressively higher rates of Vitazyme to stimulate corn height and dry weight accumulation, the product proved to significantly increase plant height by 5 to 7% at all but the 4x (52 oz/acre) rate, whereas dry weight significantly increased from 10 to 14% for all of the Vitazyme rates. These data prove that more than just the standard 13 oz/acre rate can be effective in stimulating crop growth, but higher rates do not produce a linear yield or growth increase.

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2007 Crop Results

Vitazyme on Corn

Researchers: Fred Vaughn and Greg Wilson *Organization*: Vaughn Agricultural Research Services
Location: Branchton, Ontario, Canada *BBCH Scale*: BCOR *Variety*: Pioneer 38P03
Planting rate: 76,000 seeds/ha *Planting depth*: 5cm
Row spacing: 76 cm *Planting Date*: May 14, 2007 *Seedbed conditions*: dry, fine
Soil temperature at planting: 13.3C *Soil*: silt loam (31.9% sand, 53.7% silt, 14.4% clay), 6.2 pH, 14.2 meq/100 g CEC, good fertility *Field preparation*: cultivation twice
Previous crop: 2004, winter wheat (with Cobutox); 2005, potatoes (with Dual + Sencor); 2006, corn (Dual + Marksman)
Experimental design: A uniform site was divided into plots that were 3x6 meters (six rows), using four treatments with six replications in a randomized complete block design. The objective of the study was to determine Vitazyme's ability to improve soybean yield with two applications. The treatments were as follows:

Treatment	At planting	At 8 leaves	Nitrogen
	liters/ha		Kg/ha
1. No Vitazyme	0	0	60
2. No Vitazyme	0	0	60
3. Vitazyme	1	1	120
4. Vitazyme	1	1	120

Fertilization: All areas received 200 kg/ha of dry 6-24-24% N-P_2O_5-K_2O before planting. 100 liters/ha of liquid 6-24-6% N-P_2O_5-K_2O was applied in the seed furrow at planting (May 14). A 28% nitrogen solution was applied to the plots on June 8 so that the appropriate plots would receive either 60 or 120 kg/ha of nitrogen.
Vitazyme application: To Treatments 3 and 4, 1 liter/ha was applied to the seeds at planting (May 14), as a spray on the seeds just behind the disc openers, and 1 liter/ha was applied to the leaves and soil at the eight-leaf stage (June 20).
Crop emergence date: May 18, four days after planting
Weed control: unknown
Harvest date: October 12, 2007. An area of 1.52 x 6.00 meters (the two center rows) was harvested for each plot.
Yield results: There were no significant differences in grain moisture content and test weight, nor were any differences discovered in stalk lodging. Thus, those data are not included below.

Grain Yield

Treatment	Grain yield	Change*
	bu/acre	bu/acre
1. No Vitazyme, 60 N	118.6 c	—
2. No Vitazyme, 120 N	144.3 b	25.7 (+22%)
3. Vitazyme, 60 N	137.7 b	19.1 (+16%)
4. Vitazyme, 120 N	166.8 a	48.2 (+41%)
LSD	16.3	
CV	11.37	
Bartlett's X2	3	
P (Bartlett's X2)	0.392	
Replicate F	4.315	
Replicate Prob (F)	0.0124	
Treatment F	9.158	
Treatment Prob (F)	0.0011	

.Vitazyme Effect at 60 kg/ha N

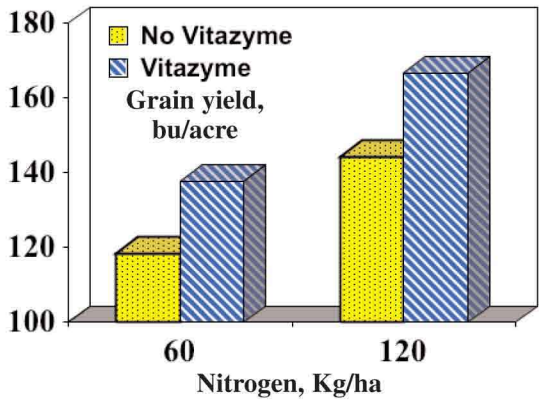
Treatment	Yield	Change
	bu/acre	bu/acre
No Vitazyme	118.6 b	—
Vitazyme	137.7 a	19.1 (+16%)

Yield increase with Vitazyme at 60 kg/ha N: 16%

Vitazyme Effect at 120 kg/ha N

Treatment	Yield	Change
	bu/acre	bu/acre
No Vitazyme	144.3 b	—
Vitazyme	166.8 a	22.5 (+16%)

Yield increase with Vitazyme at 120 kg/ha N: 16%



At both nitrogen levels, Vitazyme significantly increased grain yield at P=0.10. This increase was 16% above the control at both nitrogen levels. What is especially interesting to note is that the 60 kg/ha N yield (137.7 bu/acre) with Vitazyme was statistically equal to the 120 kg/ha N yield (144.3 bu/acre) without Vitazyme. This reveals a benefit of Vitazyme to improve the utilization of fertilizer nitrogen.

Income results: At $4.00/bu, the increased incomes for the grain produced in this study are as follows:

At 60 kg/ha N. No Vitazyme: 118.6 bu/acre x $4.00/bu = $474.40
Vitazyme: 137.7 bu/acre x $4.00/bu = $550.80
Increase with Vitazyme: $74.40/acre

At 120 kg/ha N. No Vitazyme: 144.3 bu/acre x $4.00/bu = $577.20
Vitazyme: 166.8 bu/acre x $4.00/bu = 667.20
Increase with Vitazyme: $90.00/acre

Conclusions: In this southern Ontario, Canada, study of Vitazyme on corn at two nitrogen levels, Vitazyme was shown to significantly increase grain yield, by 16% above the respective control (no Vitazyme) levels. Moreover, the yield of the Vitazyme + 60 kg/ha N rate was statistically equal to the 120 kg/ha N rate without Vitazyme, demonstrating the ability of the product to improve the utilization of nitrogen. Two applications of 1 l/ha, at planting and again at the eight-leaf stage, brought about this yield improvement. The yield increases gave significant income increases: $74.40/acre at 60 kg/ha nitrogen, and $90.00/acre at 120 kg/ha nitrogen.

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2006 Crop Results

Vitazyme on Corn

Ministry of Sugar, Cuban Ministry of Agriculture

Researchers: Wilberto G. Marrero and Jorge G. Acosta
Location: Juan Abrahantes Farm, Madruga, Havana Province, Cuba
Variety: unknown
Soil type: red ferralitic of low fertility
Planting rate: unknown
Row spacing: unknown
Planting date: July 23, 2006
Watering: rain-fed
Experimental design: An area of 1.5 acres in a production corn field was treated with Vitazyme twice, each time at 1 liter/ha, to determine the effect of the product on corn yield.

1. Control **2. Vitazyme**

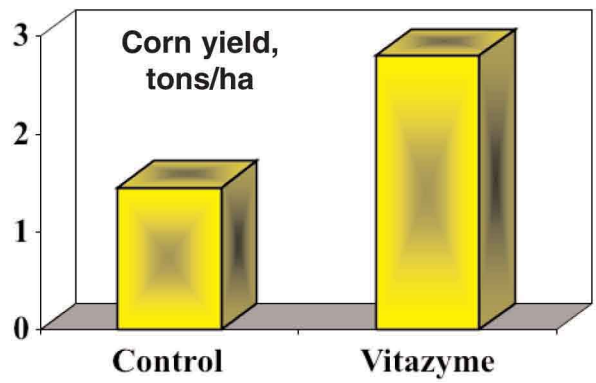
Fertilization: unknown
Vitazyme application: 1 liter/ha on the leaves and soil on August 7, 15 days after planting, and again 39 days later on September 15
Harvest date: October 14, 2006, 83 days after planting
Growth results:

Parameter	Control	Vitazyme
Rows of kernels	Averaging <12 rows/ear	Averaging>12 rows/each
Ear size	Average size	Larger than average
Stalk diameter	Average diameter	Greater than average diameter
Plant vigor	Average vigor	More vigorous
Plant height	2.00 meters average	1.55 meters average
Root development	Moderate	Extensive

Yield results:

Treatment	Yield	Increase
	tons/ha	tons/ha
Control	1.45	—
Vitazyme	2.80	1.35 (+93%)
Historical yield	0.70	

Increase in corn yield: 93%



Conclusions: This Cuban corn study showed that Vitazyme greatly increased corn yield (by 93%) with two applications at 1 liter/ha each time, separated by 39 days. **This yield was four times the normal historical yield experienced in that area under the management system used.** The treated corn plants expressed superior vigor and growth throughout the growth cycle.

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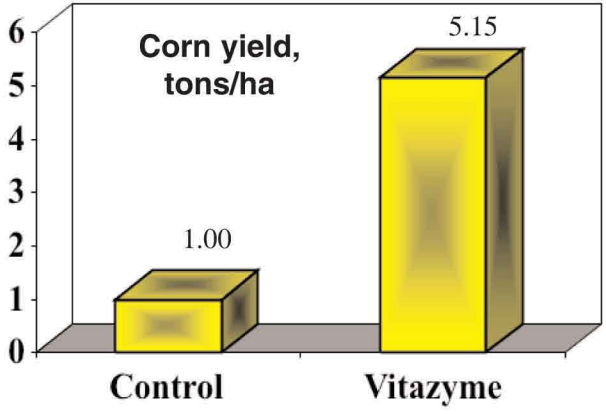
2006 Crop Results

Vitazyme on Corn

Researchers: Eng. Wilberto Gonzalez, and Eng. Jorge Gonzalez, Camilo Cienfuegos, Agricultural Enterprise
Location: Armistad Farm of Camilo Cienfuegos Agricultural Enterprise, Havana Province, Cuba
Variety: unknown
Soil type: red ferralitic
Planting date: late 2005 to early 2006
Experimental design: A commercial production trial involved a split field area of 1.0 ha treated and 1.0 ha untreated with Vitazyme at Armistad Farm.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme applications: 1.0 liter/ha on the leaves twice, separated by 30 days



Increase in corn yield: 415%

Conclusions: This commercial corn trial in Cuba revealed the remarkable ability of Vitazyme to increase corn production, with a very large 415% yield increase.

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2006 Crop Results

Vitazyme on Corn

USDA/National Soil Tilth Laboratory

Researcher: Jerry Hatfield, Ph.D.
Location: Ames, Iowa
Variety: Pioneer 35P17
Planting rate: 36,000 seeds/acre in double rows
Planting date: April 18, 2006
Tillage: chisel plowing on November 26, 2005, and field cultivation on April 4 and April 18, 2006
Experimental design: A field area was treated with Vitazyme to determine if corn planted in a double-row fashion would respond to the product under conventional tillage. The trial was non-replicated.

1. Control **2. Vitazyme**

Fertilization: 50 lb/acre of N as 32% UAN on October 18, 2005; 30-80-120 lb/acre of N-P_2O_5-K_2O dry spread on November 23, 2005; 300 lb/acre of SuperCal 98 pelleted lime on February 8, 2006; 300 lb/acre of SuperCal SO_4 pelleted gypsum on February 9, 2006; sidedressed 180 lb/acre of N as 32% UAN on May 29, 2006

Vitazyme application: 13 oz/acre foliar, hand applied, on June 5, 2006; 13 oz/acre foliar, hand applied, on June 27, 2006

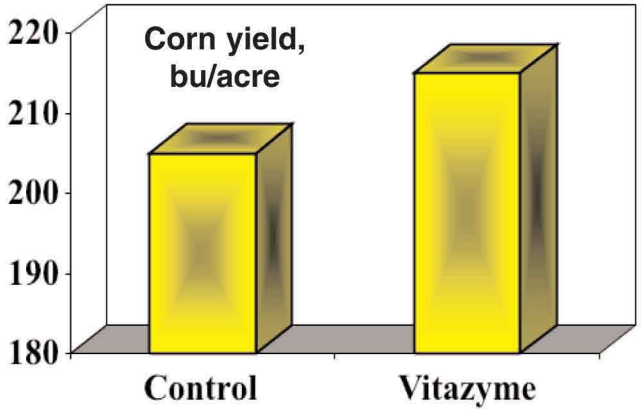
Herbicide application: 3 qt/acre of Lumax, pre-emergent, on April 24, 2006

Harvest date: October 19, 2006

Yield results:

Treatment	Yield	Increase
	tons/ha	tons/ha
Control	205	—
Vitazyme	215	10 (+5%)

Yield increase with Vitazyme: 5%



Conclusions: On this non-replicated corn-yield study in central Iowa, using a double row system, two foliar Vitazyme applications utilizing 13 oz/acre each time increased the grain yield by 10 bu/acre (5%). Had a seed application been made it is likely that the response would have been greater.

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2006 Crop Results

Vitazyme on Corn (Organic)

Research location: Ontario County, New York
Planting date: May 24
Row spacing: 30 inches
Variety: Blue River 42A32 (96-day)
Soil type: silty clay loam
Seeding rate: 28,400/acre

Experimental design: A field of organically grown corn was divided into Vitazyme treated and untreated areas in an effort to determine the product's effects on the yield of high-moisture corn. This corn was placed in an air-tight silo to be ground and used for cattle feed later.

1. Control **2. Vitazyme**

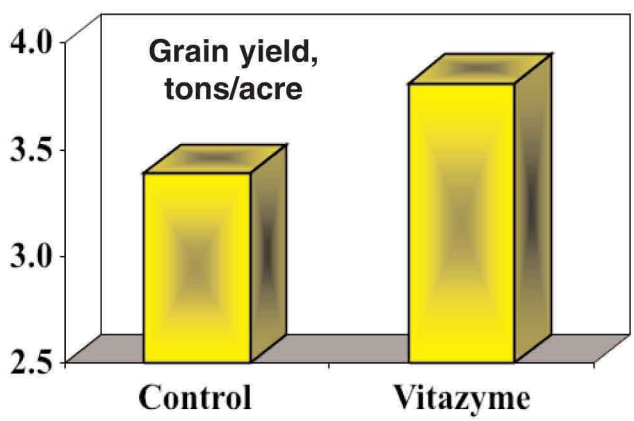
Fertilization: Liquid cow manure, 8,500 gal/acre in November of 2005, and 7,300 gal/acre on May 8, 2006; 300 lb/acre of a 5-5-5% N-P_2O_5-K_2O dry Fertrell organic mix, in a 2 x 2-inch placement

Vitazyme treatment: 13 oz/acre on the seed in-furrow at planting
Weather for 2006: adequate moisture until August, then excessive afterwords
Harvest date: October 13

Yield results: Each parcel was harvested for a certain area, and the grain was dumped into a bin where a measurement of volume was taken. From the difference of these values the value of each treatment was calculated based upon the average field yield.

Treatment	Grain yield	Yield increase
	tons/acre	tons/acre
Control	3.39	—
Vitazyme	3.81	0.42 (+12%)

Grain increase with Vitazyme: 12%



Income results: The value of high moisture corn (25%) is about $175/ton.

Value of control corn $593.25/acre
Value of Vitazyme corn $666.75/acre
Income increase with Vitazyme $73.50/acre

Conclusions: In this New York split-field study on organically grown corn, only one 13 oz/acre treatment of Vitazyme, on the seeds, produced a marked 12% increase in the yield of high moisture corn. This yield increase translated into an additional $73.50/acre income, or about an $18 return for each dollar invested in Vitazyme.

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2005 Crop Results

Vitazyme on Corn

North Carolina State University

Researcher: Ron Heiniger, Ph.D.
Variety: De Kalb Dk 69-71 RR/YG
Soil type: Roanoke silt loam
Row width: 30 inches
Location: Hertford, North Carolina
Planting date: April 21, 2005
Previous crop: soybeans
Population: 27,000 and 38,000 seeds/acre

Experimental design: A split-plot randomized complete block design (four replicates) was placed on a uniform soil area with the main plots containing the two seeding rates. Plots were 10 x 40 feet. Subplots contained starter fertilizer, starter fertilizer + Vitazyme, Vitazyme only, and a control. Evaluations were made on stalk diameter, root parameters, and yield to discover the effects of all variables on these parameters.

Main Plots
1. 27,000 seeds/acre
2. 38,000 seeds/acre

Subplots
1. Control
2. Vitazyme
3. Starter
4. Vitazyme + Starter

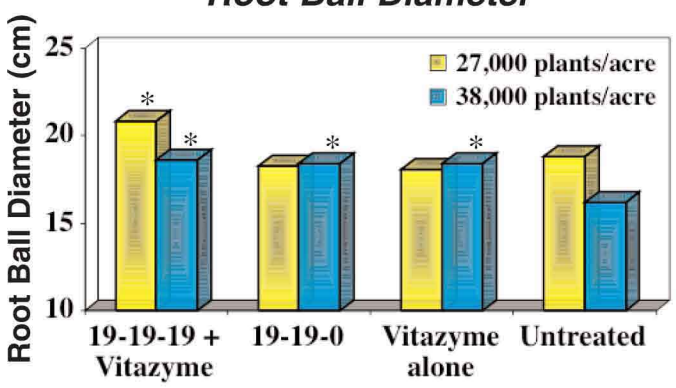
Fertilization: A 19-19-0% N-P_2O_5-K_2O fertilizer was applied to the subplots 3 and 4 at a 10 gal/acre rate in a 2 x 2 inch band below and beside the seeds at planting. On June 7, 60 gal/acre of 30% UAN (urea ammonium nitrate) was applied.

Vitazyme application: 13 oz/acre on the seeds at planting for subplots 2 and 4

Weed control: excellent control with Bicep, Roundup, and atrazine herbicides

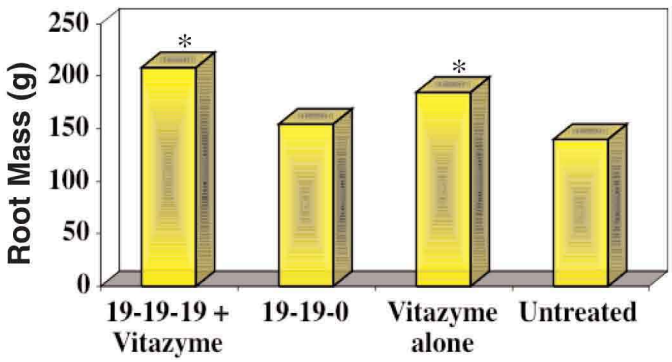
Root and stalk results: In early July five plants in consecutive order in rows of each treatment were dug, and the soil was washed from the root balls. Roots were pruned and dried, and the stalk diameter at the first internode below each ear was measured. Root ball depth and diameter were also measured.

Root Ball Diameter

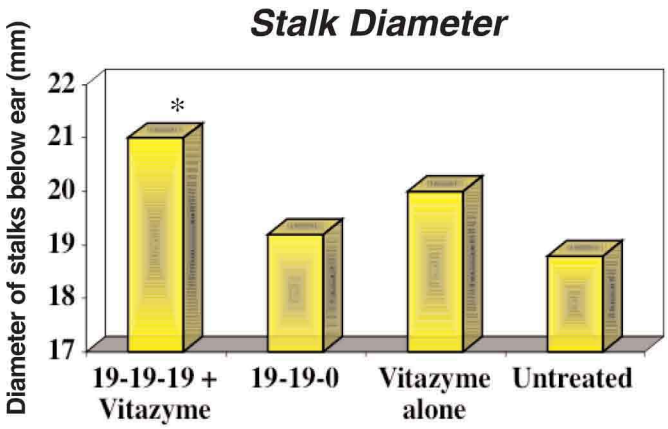


*Significantly greater than the control. $LSD_{0.05}$= 1.32 cm. (Comparisons are made within the same plant population.)

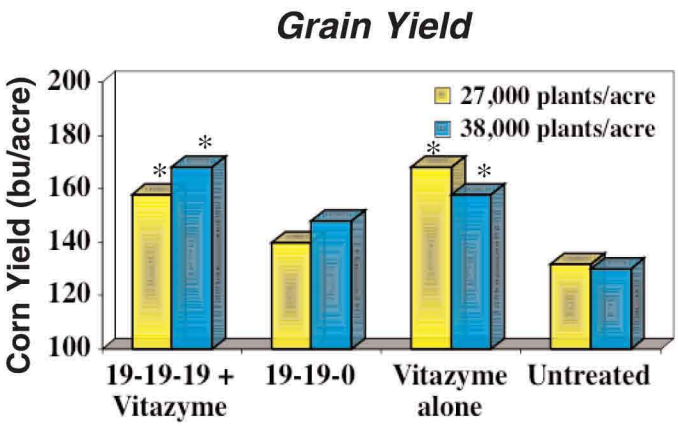
Root Mass



*Significantly greater than the control. $LSD_{0.05}$= 43.5 g



*Significantly greater than the control. $LSD_{0.05}$= 0.93 mm.



*Significantly greater than the control. $LSD_{0.05}$= 22.9 bu/acre (Comparisons are made within the same plant population.)

Conclusions (by the researcher): Significant treatment effects or interactions involving Vitazyme were found for the diameter of the root ball, root mass, stalk diameter and grain yield. In the case of the diameter of the root ball there was a significant plant population by treatment interaction. At the lower plant population of 28 000 plants/acre the combination of 19-19-0 and Vitazyme significantly increased the diameter of the root ball compared to either product used alone or when compared to the untreated check. Neither the 19-19-0 nor Vitazyme when used alone increased the diameter of the root ball compared to the untreated check. In contrast, at the higher plant population, Vitazyme, 19-19-0, or the combination of the two significantly increased the diameter of the root ball compared to the untreated check. Although none of these three treatments were significantly different from each other the combination of Vitazyme and 19-19-0 again tended to have the higher yield. There were no significant interactions for root mass. However, there was a significant treatment effect. Vitazyme when used alone or in combination with 19-19-0 resulted in greater root mass compared to the untreated check. Again, the combination of Vitazyme and 19-19-0 produced the greatest root mass when compared with either treatment used alone. There was also a treatment effect on stalk diameter. The combination of Vitazyme and 19-19-0 increased stalk diameter at the first internode below the ear when compared with the untreated check or with a treatment of only 19-19-0. There was not a significant difference in stalk diameter between a treatment with only Vitazyme and the combination of Vitazyme and 19-19-0. However, the combination did have the largest stalk diameter.

For grain yield there was a significant plant population and treatment interaction. At the lower plant population, Vitazyme alone significantly increased yield compared to either the starter fertilizer or the untreated check; while the combination of starter and Vitazyme resulted in a yield similar to that obtained by Vitazyme alone. In comparison, at the higher plant population, the starter treatment, Vitazyme, or the combination of the two resulted in statistically similar yields but only the Vitazyme or Vitazyme-starter combination had significantly higher yields than the untreated check.

In summary, Vitazyme or Vitazyme in combination with 19-19-0 increased root ball diameter, root mass, stalk diameter, and grain yield compared to an untreated check. While plant disease ratings were not taken in this study, it is unlikely that the Vitazyme effect was related to better disease resistance. It appears that Vitazyme applied to the seeds at planting improves early root development resulting in a larger root mass, greater stalk diameter, and increased yield.

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2004 Crop Results

Vitazyme on Corn
North Carolina State University

Researcher: Ron Heiniger, Ph.D *Location*: Clarkton, North Carolina
Variety: DKC69-71 RRH62 *Tillage*: conventional *Population*: 33,000 seeds/acre
Row width: 30 inches *Planting date*: April 24, 2004 *Previous crop*: soybeans

Experimental design: A plot area of 18,000 ft^2 (180 x 100 ft) was divided into individual plots of 400 ft^2 (40 x 10 ft), with four replicates. The objective of the study was to evaluate the potential of Vitazyme biostimulant to improve grain yield at five nitrogen rates.

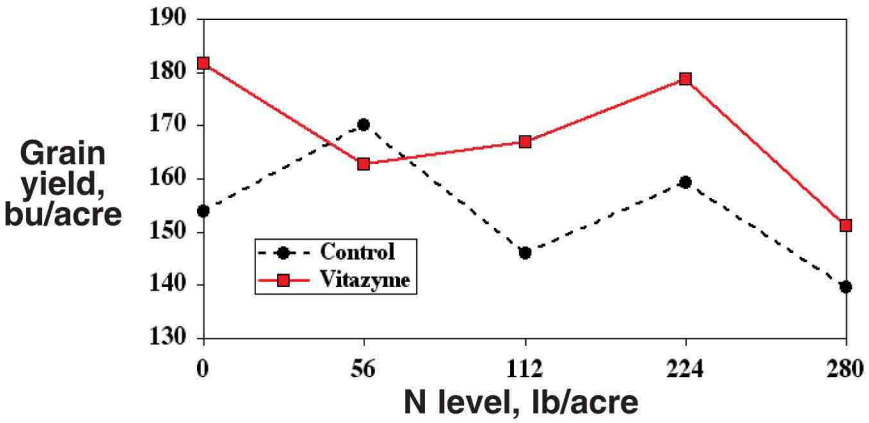
Control	Vitazyme
1. No N	6. No N
2. 56 lb/acre	7. 56 lb/acre
3. 112 lb/acre N	8. 112 lb/acre N
4. 224 lb/acre N	9. 224 lb/acre N
5. 280 lb/acre N	10. 280 lb/acre N

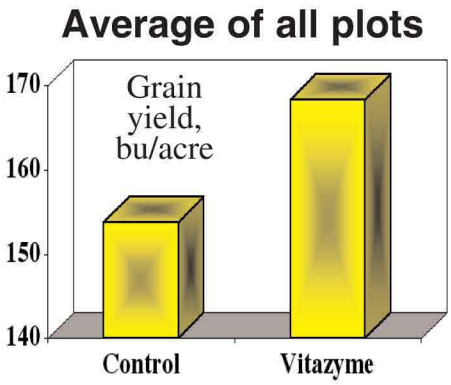
Fertilization: 10 gal/acre of 19-19-0 %N-P_2O_5-K_2O in a 2x2 band on April 24 after broadcasting 30% UAN and a 10-34-0 fertilizer on April 19
Herbicide application: Lariat (3 qt/acre) on April 19, broadcast pre-plant
Insecticide application: Counter 20CR (7 lb/acre) on April 21, T-banded on April 21
Vitazyme application: 13 oz/acre on the seeds at planting, and 13 oz/acre broadcast at knee height
Harvest date: September 23, 2004
Yield Results:

Treatment	N-level	Yield	Change[1]	NCLB rating[2]	Change[1]	GLS rating[3]	Change[1]
	lb/acre	bu/acre	bu/acre				
Control	0	153.9	—	9.25	—	8.88	—
	56	170.2	—	9.38	—	8.88	—
	112	145.9	—	9.63	—	9.00	—
	224	159.3	—	9.75	—	9.38	—
	280	139.7	—	10.00	—	9.50	—
	Average	153.8	—	9.60	—	9.13	—
Vitazyme	0	181.6	27.7* (+18%)	9.38	0.13 (+1%)	8.88	0 (0%)
	56	162.6	(-) 7.6 (-4%)	9.75	0.37* (+4%)	9.25	0.37* (+4%)
	112	166.8	20.9* (+14%)	9.88	0.25* (+3%)	9.50	0.50*(+6%)
	224	178.6	19.3* (+12%)	9.88	0.13 (+1%)	9.63	0.25* (+3%)
	280	151.2	11.5 (+8%)	10.00	0 (0%)	9.50	0 (0%)
	Average	168.2	14.4* (+9%)	9.78	0.18 (+2%)	9.35	0.22* (+2%)
	$LSD_{0.05}$	14.3		0.19		0.15	

[1] Differences are compared with the same N level for control and Vitazyme
[2]NCLB = Northern Corn Leaf Blight: 1 = leaves covered with lesions, 10 = no disease.
[3]GLS = Gray Leaf Spot: 1 = leaves covered with lesions, 10 = no disease.
*Significant difference vs. the control at P=0.05.

Corn Grain Yield

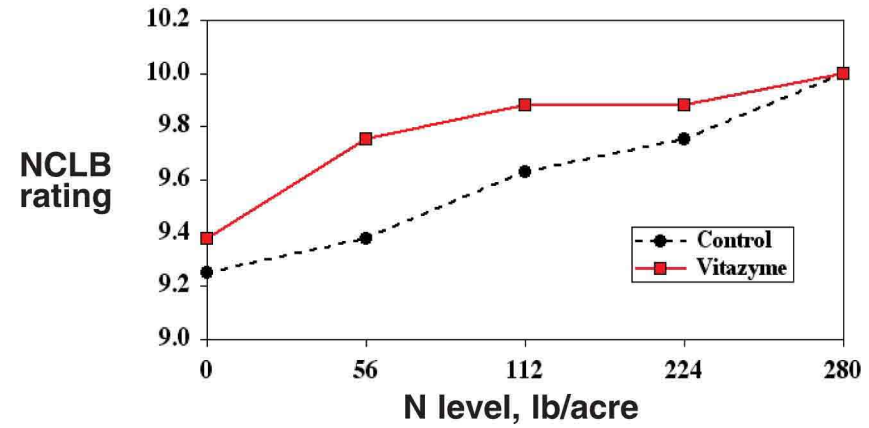


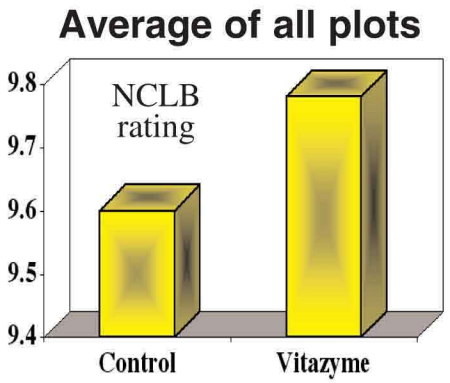


Vitazyme significantly boosted grain yield across all N levels, by 14.4 bu/acre (9%), and especially at the 0 N level (+18%), the 112 lb/acre N level (+14%), and the 224 lb/acre N level (+12%). Residual N levels and seasonal N release were apparently quite high, since the highest yield was with no added N plus Vitazyme (181.6 bu/acre), and yields in general tapered off as N levels increased, the lowest yields being at the 280 lb/acre N rate for both treatments. The yield response thus exhibited some N excess at the higher N rates.

Leaf pathogen results:

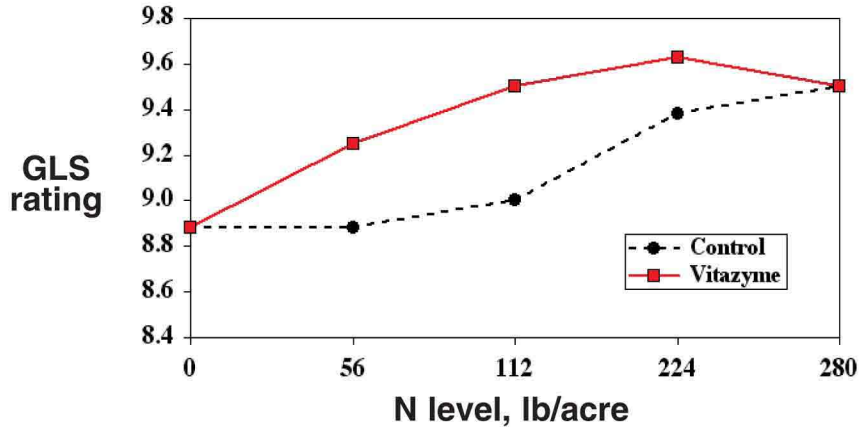
Northern Corn Leaf Blight Rating

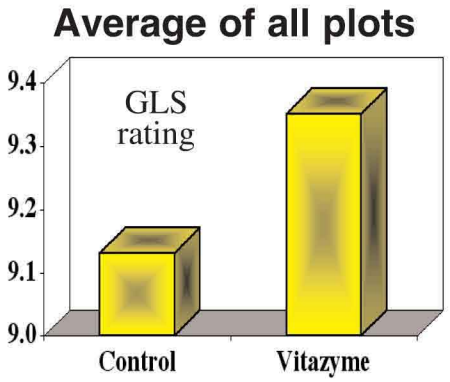




Vitazyme reduced the Northern Corn Leaf Blight rating significantly across nearly all plots, and did so at the 56 and 112 lb/acre N rates. At all N rates, Vitazyme treated corn reduced NCLB incidence compared to the control.

Grey Leaf Spot Rating





At all levels of N except at 0 and 280 lb/acre, Vitazyme reduced the incidence of grey leaf spot. This reduction was significant at 56, 112, and 224 lb/acre of N, and also for the overall average of all plots.

Conclusions: In this North Carolina State University replicated corn study, Vitazyme increased corn grain yields at all N levels except at 56 lb/acre N. the average overall yield was increased by Vitazyme by 9%, which was significant at P=0.05. Resistance to both Northern Corn Leaf Blight and Grey leaf Spot were also significantly (P=0.05) increased over several N levels, and was significantly greater for Vitazyme over all N levels for Grey Leaf Spot, and nearly so for NCLB. This product shows excellent promise in promoting higher yields with greater disease resistance under North Carolina conditions.

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2004 Crop Results

Vitazyme on Corn

Farmer: James Glass *Location*: Austin, Texas *Variety*: Golden Acre 2850RR
Soil type: silty clay loam *Row spacing*: 30 inches *Population*: 24,000 plants/acre
Planting date: March 28, 2204

Experimental design: A 110-acre field was divided into two parts, 30 acres treated with Vitazyme and the rest of the field left untreated. All other treatments were the same across the entire field.

1. Control **2. Vitazyme**

Fertilization: anhydrous ammonia and a mixed N-P-K fertilizer

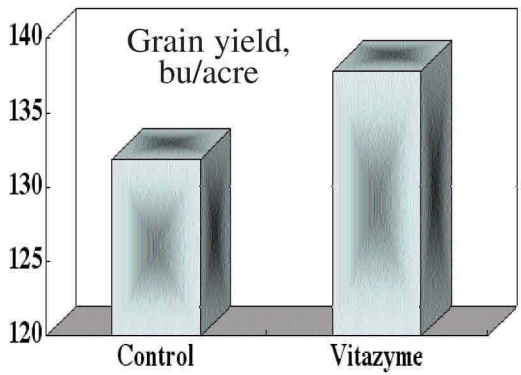
Vitazyme application: 13 oz/acre added to the seeds with a liquid starter fertilizer at planting

Growth observations: An examination of corn plants from each treatment at midseason revealed a noticeable size advantage for the treated plants.

Yield results: On August 27, 2004, one-acre areas of each treatment located close to each other were measured and blocked off. The one-acre areas were harvested and unloaded into a truck, and weighed individually.

Treatment	Grain weight		Change
	lb/acre	bu/acre	bu/acre
Control	7,385	131.9	—
Vitazyme	7,715	137.8	5.9 (+4.5%)

Increase in grain yield: 4.5%



Conclusions: This south Texas corn study revealed that Vitazyme applied in the seed row at planting increased the yield by 4.5% (5.9 bu/acre). There was little change in grain quality due to Vitazyme application. If a $3.00/bushel corn price is used, this yield increase is profitable $17.70/acre.

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2004 Crop Results

Vitazyme on Corn
North Carolina State University

Researcher: Ron Heiniger, Ph.D *Location*: Elizabeth City, North Carolina
Variety: DKC69-71 RRH62 *Tillage*: conventional *Population*: 33,000 seeds/acre
Row width: 30 inches *Planting date*: April 21, 2004 *Previous crop*: soybeans

Experimental design: A plot area of 15,400 ft^2 (220 x 70 ft) was divided into individual plots of 400 ft^2 (40 x 10 ft), with four replicates. The objective of the study was to evaluate the potential of Vitazyme biostimulant to improve grain yield and reduce disease incidence at five nitrogen rates.

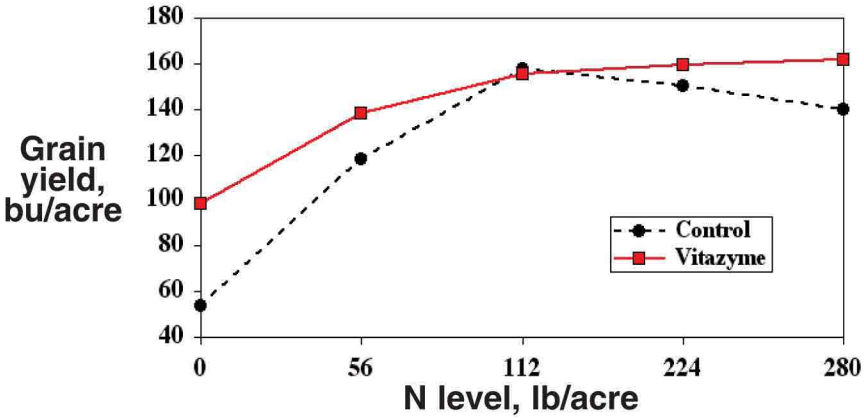
Control	Vitazyme
1. No N	6. No N
2. 56 lb/acre	7. 56 lb/acre
3. 112 lb/acre N	8. 112 lb/acre N
4. 224 lb/acre N	9. 224 lb/acre N
5. 280 lb/acre N	10. 280 lb/acre N

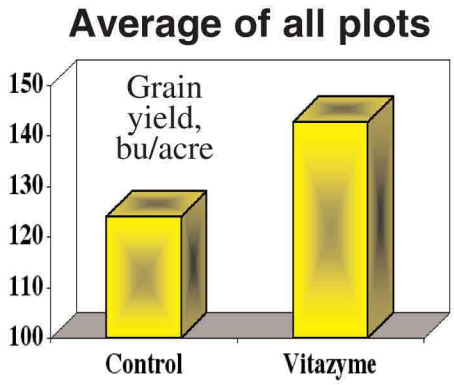
Fertilization: 10 gal/acre of 19-19-0 %N-P_2O_5-K_2O in a 2x2 band on April 21 after broadcasting 30% UAN and a 10-34-0 fertilizer before planting
Herbicide application: Atrazine (2 qt/acre) with Banvel (0.5 pt/acre) plus Accent on May 27
Insecticide application: Counter 20CR (15 lb/acre), T-banded on April 21
Vitazyme application: 13 oz/acre on the seeds at planting, and 13 oz/acre broadcast at knee height
Harvest date: unknown
Yield Results:

Treatment	N-level	Yield	Change[1]	NCLB rating[2]	Change[1]	GLS rating[3]	Change[1]
	lb/acre	bu/acre	bu/acre				
Control	0	54.0	—	3.25	—	6.13	—
	56	118.3	—	3.75	—	6.13	—
	112	157.8	—	3.88	—	6.38	—
	224	150.0	—	4.25	—	6.63	—
	280	139.9	—	4.13	—	6.75	—
	Average	124.0	—	3.85	—	6.40	—
Vitazyme	0	98.5	44.5* (+82%)	4.88	1.63* (+50%)	6.50	0.37 (+6%)
	56	138.4	20.4* (+17%)	5.13	1.38* (+37%)	6.88	0.75* (+12%)
	112	155.6	(-)2.2 (-1%)	5.13	1.25* (+32%)	7.25	0.87* (+14%)
	224	159.4	9.4 (+6%)	5.88	1.63* (+38%)	7.38	0.75*(+11%)
	280	161.5	21.6*(+15%)	5.75	1.62* (+39%)	7.88	1.13* (+17%)
	Average	142.7	18.7*(+15%)	5.35	1.50* (+39%)	7.18	0.78* (+12%)
	$LSD_{0.05}$	15.0		0.40		0.38	

[1] Differences are compared with the same N level for control and Vitazyme
[2]NCLB = Northern Corn Leaf Blight: 1 = leaves covered with lesions, 10 = no disease.
[3]GLS = Gray Leaf Spot: 1 = leaves covered with lesions, 10 = no disease.
*Significant difference vs. the control at P=0.05.

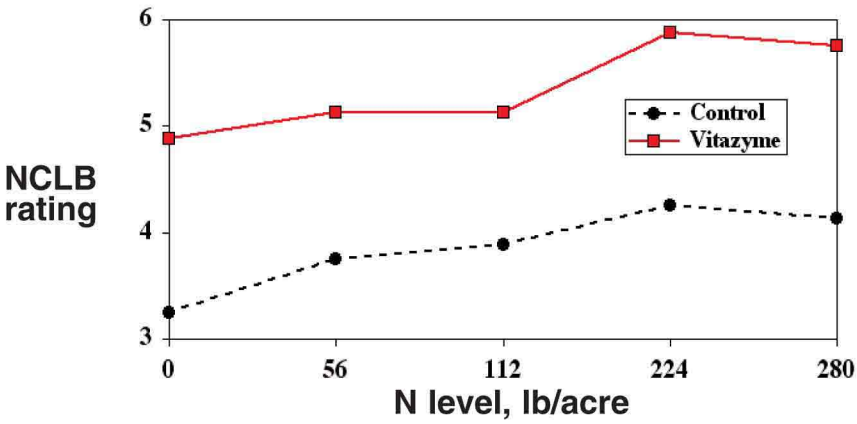
Corn Grain Yield

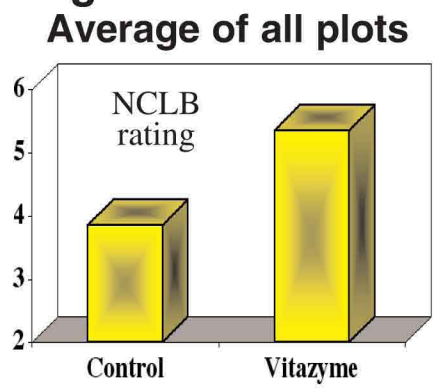




Vitazyme caused a substantial increase in yield over the untreated control at all N levels except at 112 lb/acre N; most of these yield differences were significant. The average yield difference was 18.7 bu/acre in favor of Vitazyme, a significant increase over the control of 15%.

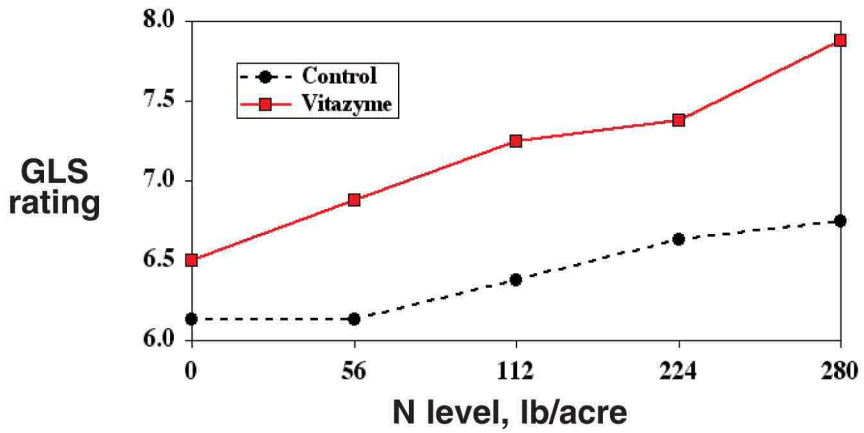
Northern Corn Leaf Blight Rating

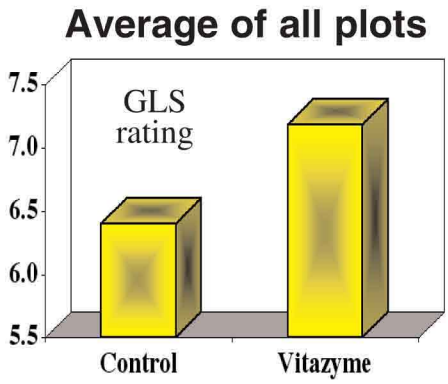




At all N levels the Vitazyme treatment produced significantly reduced NCLB infection than did the control. This led to an average 39% reduction in NCLB lesions over all treatments.

Grey Leaf Spot Rating





As for Northern Corn Leaf Blight ratings, Grey Leaf Spot ratings were significantly better for Vitazyme at all N levels than for the control. This differences led to a significant average difference of 12% over all plots for each treatment.

Conclusions: This corn study in North Carolina revealed that Vitazyme increased grain yield significantly, by an average of 18.7 bu/acre (+15%) over all plots ... and especially at the 0 N level, where yield was improved by 44.5 bu/acre (+82%) above the control. Both Northern Corn leaf Blight and Grey Leaf Spot were also significantly reduced by Vitazyme at all N levels, the average reduction being 39% for NCLB and 12% for GLS. These data show that Vitazyme apparently improves plant immunity to common corn pathogens, and concurrently boosts the yield potential of the crop, especially when N is limiting. The optimum N application in this study was 112 lb/acre; corn yields increased only slightly with Vitazyme with higher N rates, although without Vitazyme the yields fell somewhat.

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2003 Crop Results

Vitazyme on Corn *(Surfactant vs. None)*

Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Soil type*: Bowie very fine sandy loam
Pot size: 1 gallon *Planting date*: December 30, 2002
Experimental design: A greenhouse study was established to discover the relative effectiveness of a foliar application on corn using either diluted product in the leaf whorl or diluted product in the whorl and on leaf surfaces using a surfactant. Five replicates were used for each treatment in a complete block design. Temperatures were maintained at 55° to 80°F during the study, with no artificial light.

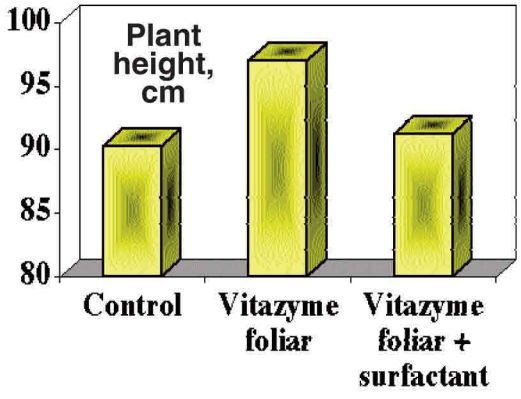
1. **Control**
2. **Vitazyme in the whorl, no surfactant**
3. **Vitazyme on the leaves, plus a surfactant**

Fertilization: All plants received 0.88 g/pot at planting of a 13-13-13% N-P_2O_5-K_2O pelleted fertilizer with 0.65% Mg, 6.0% S, 0.02% B, 0.0006% Co, 0.0006% Cu, 1.40% Fe, 0.06% Mn, 0.0006% Mo, and 0.06 % Zn. This fertilizer, giving 50 lb/acre of N, was applied to the soil surface.
Vitazyme application: On January 24, 2003, Vitazyme at 1% was sprayed from a small spray bottle into the leaf whorl of all plants in Treatment 2, being careful not to apply to the soil surface. Paper towels were used to prevent any spray from contacting the soil of the pots. Vitazyme was also sprayed the same day on the leaves and whorl of Treatment 3, with a 1% Vitazyme solution plus 5 tablespoons/gallon of Sunspray Ultra-Fine Oil, a fine agricultural oil containing 98.8% paraffinic oil.
Harvest date: February 14, 2003, 47 days after planting
Harvest results: The corn plants were washed free of soil, the leaves were measured, and then all plants were dried at about 115°F for two days. They were then weighed to the nearest 0.01 gram.

Plant Height

Treatment	Plant height*	Height change
	cm	cm
1. Control	90.3 b	—
2. Vitazyme on leaves, no surfactant	97.0 a	6.7 (+7%)
3. Vitazyme on leaves, with a surfactant	91.2 b	0.9 (+1%)

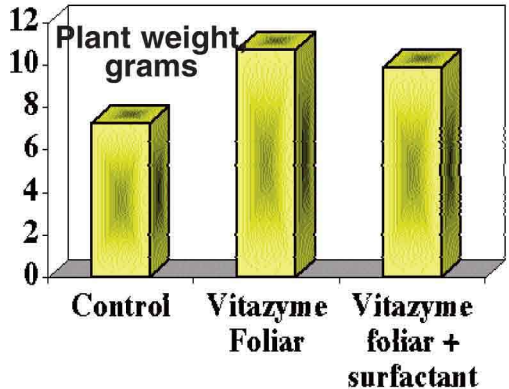
*Means followed by the same letter are not significantly different at P=0.10 according to the Tukey-Kramer Test. $LSD_{0.1}$=5.0 cm.



Plant Dry Weight

Treatment	Dry weight*	Weight change
	grams	grams
1. Control	7.25 b	—
2. Vitazyme on leaves, no surfactant	10.71 a	3.46 (+48%)
3. Vitazyme on leaves, with a surfactant	9.88 a	2.63 (+36%)

*Means followed by the same letter are not significantly different at P=0.10 according to the Tukey-Kramer Test. $LSD_{0.1}$=1.58 grams.



Conclusions: **This experiment showed that corn responded almost equally well with Vitazyme applied to the leaves only, with or without a surfactant, in terms of dry weight gain during the growth period.** Vitazyme in the leaf whorl only caused a highly significantly 48% weight gain versus the control, while the surfactant plus Vitazyme increased dry weight by 36%. Both treatments received the product in the leaf whorl, but Treatment 3 — with the surfactant — also had product clinging to other leaf surfaces. Both Treatments 2 and 3 had no Vitazyme applied to the soil surface.

Plant height was significantly increased by Vitazyme applied to the leaves without a surfactant, but the failure of Treatment 3 (with the surfactant) to increase significantly in height did not prevent the plants of Treatment 3 from increasing dry matter accumulation nearly as much as Treatment 2.

It is concluded from this study that, **as long as sufficient active agents are present on the plant — such as in the leaf whorl for corn — the plant will react properly to the biostimulants.** Additional amounts of product clinging to leaf surfaces as produced by a surfactant may be important in encouraging plant growth if enough droplets cling to leaf surfaces during application. However, droplets falling to the soil surface will normally contribute to product activity through root stimulation by active agents, so there may be only certain instances in which the use of a surfactant with Vitazyme may be advantageous.

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2003 Crop Results

Vitazyme on Corn *(Foliar vs. Soil Application)*

Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Planting rate*: 10 seeds/pot thinned to 3 plants/pot
Soil type: Bowie very fine sandy loam *Planting date*: December 30, 2002 *Pot size*: 1 gallon

Experimental design: A greenhouse study was established to discover the relative effect of soil versus foliar application of Vitazyme on corn growth. Seven replicates were set up for each treatment in a complete block design. Temperatures were maintained at 55° to 80°F during the study, with no artificial light.

1. Control **2. Vitazyme on the soil** **3. Vitazyme on the leaves**

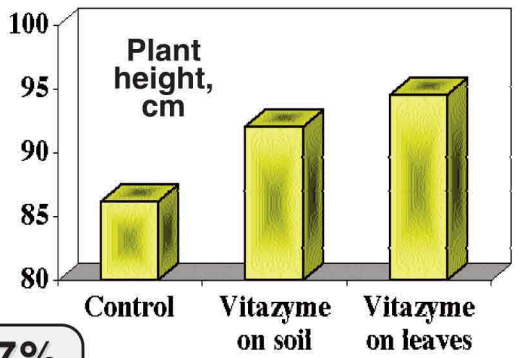
Fertilization: All plants were given 0.88 g/pot at planting of a 13-13-13% N-P_2O_5-K_2O pelleted, slow release fertilizer with 0.65% Mg, 6.0% S, 0.02% B, 0.0006% Co, 0.0006% Cu, 1.40% Fe, 0.06% Mn, 0.0006% Mo, and 0.06 % Zn. This fertilizer gave an effective rate of 50 lb/acre of N, applied to the soil surface.

Vitazyme application: Vitazyme was applied to the soil surface only of Treatment 2 on January 24 about at the six-leaf stage. It was also applied (a spray of a 1% solution) to the leaf whorl of the plants of Treatment 3 on January 24; care was taken to avoid applying any product to the soil surface.

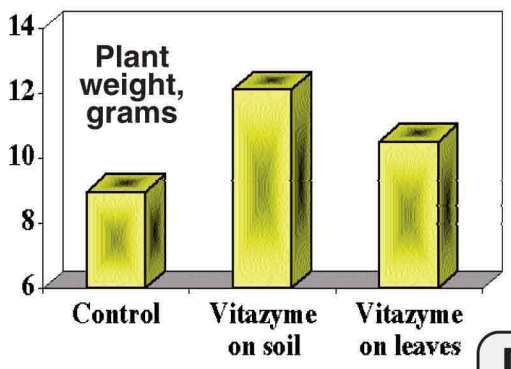
Plant Height

Treatment	Plant height*	Height change
	cm	cm
1. Control	86.2 a	——
2. Vitazyme on soil	92.0 a	5.8 (+7%)
3. Vitazyme on leaves	94.5 a	8.3 (+10%)

*Means followed by the same letter are not significantly different at P=0.10 according to the Tukey-Kramer Test. $LSD_{0.1}$=9.7 cm.



Plant height increase (soil applied): 7%



Plant Dry Weight

Treatment	Dry weight*	Weight change
	grams	grams
1. Control	8.96 b	——
2. Vitazyme on soil	12.11 a	3.15 (+ 35%)
3. Vitazyme on leaves	10.51 ab	1.55 (+17%)

*Means followed by the same letter are not significantly different at P=0.1 according to the Tukey-Kramer Test. $LSD_{0.1}$=1.89 grams.

Dry weight increase (soil applied): 35%

Harvest date: February 13, 2003, 46 days after planting

Harvest results: The corn plants were washed free of soil, the leaves were measured, and then all plants were dried at about 115°F for two days, and weighed to the nearest 0.01 gram.

Conclusions: Vitazyme applied to the soil of corn in this greenhouse study produced a nonsignificant increase in plant height of 7%. Applied to the leaves, the height was increased nonsignificantly by 10%. However, Vitazyme applied to either the soil or leaves increased dry weight accumulations of the corn plants. The soil application increased growth significantly (at P=0.10) by 35%, and almost significantly with a foliar application (17%). It is possible that too few active agents were applied by the foliar applications for a maximum growth response, since only enough product could be applied to fill the leaf whorl; the product would not stick to the slick corn leaves. **It is concluded that both soil and foliar applications of Vitazyme are highly effective in increasing the growth rate of corn.**

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2003 Crop Results

Vitazyme on Corn

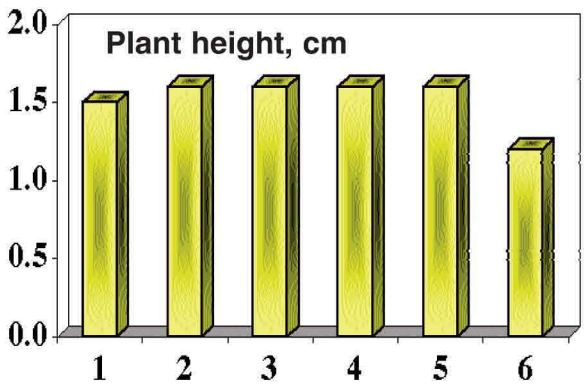
Researcher: unknown *Research organization*: Department of Agriculture, Ondo State, Nigeria
Location: Iju/itaogbolu, Akure North Local Government Area, Ondo State, Nigeria
Soil type: unknown *Planting date*: late season of 2000 *Variety*: unknown
Experimental design: A small plot replicated (3 reps), randomized complete block design was set up to evaluate the effects of Vitazyme on a number of growth parameters. Three levels of fertility were used and two applications of Vitazyme, with the following treatments:

Treatment	NPK Fertilizer	Vitazyme
1	0	yes
2	100 kg/ha	yes
3	200 kg/ha	yes
4	100 kg/ha	no
5	200 kg/ha	no
6	0	no

Fertility treatments: Treatments 2 and 4 received 100 kg/ha of an unknown fertilizer formulation two weeks after planting; Treatments 3 and 5 received 200 kg/ha of this same fertilizer also two weeks after planting.
Vitazyme treatments: Treatments 1, 2, and 3 received a 5% Vitazyme spray on the corn seeds before planting, and the newly emerged plants and soil received 1 liter/ha (13 oz/acre) two weeks after planting.
Harvest date: unknown
Growth and yield results: At harvest time several growth parameters were measured, and the data were statistically analyzed to determine significant differences at P=0.05.

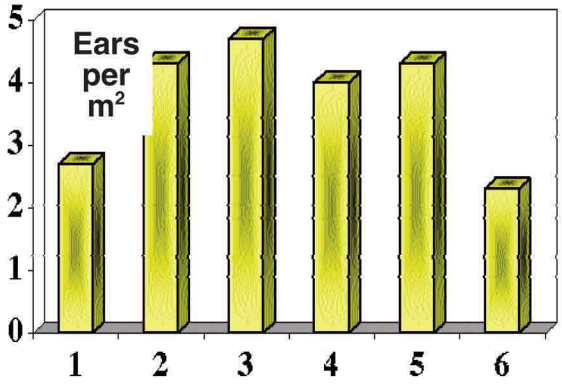
Plant Height

Treatment	Plant height	Change
	m	m
1. (Vitazyme only)	1.5	0.3 (+25%)
2. (100 NPK + Vit.)	1.6	0.4 (+33%)
3. (200 NPK + Vit.)	1.6	0.4 (+33%)
4. (100 NPK)	1.6	0.4 (+33%)
5. (200 NPK)	1.6	0.4 (+33%)
6. (Control)	1.2	—
$LSD_{0.05}$	0.1	



All of the fertilizer and Vitazyme treatments significantly (P=0.05) increased plant height, Vitazyme alone increasing height by 25% and all other treatments increasing it by 33%.

Ears per Square Meter

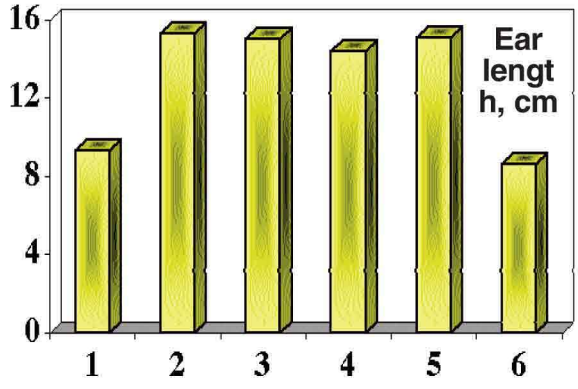


Treatment	Ears	Change
	number/m²	number/m²
1. (Vitazyme only)	2.7	0.4 (+17%)
2. (100 NPK + Vit.)	4.3	2.0 (+87%)
3. (200 NPK + Vit.)	4.7	2.4 (+104%)
4. (100 NPK)	4.0	1.7 (+74%)
5. (200 NPK)	4.3	2.0 (+87%)
6. (Control)	2.3	—
$LSD_{0.05}$	1.3	

Vitazyme alone increased ears/m² by 17%, but not significantly. However, all other Vitazyme + fertilizer treatments and all fertilizer treatments significantly increased ears/m². The Vitazyme + 200 kg/ha NPK increased ears the most, and the Vitazyme + 100 kg/ha NPK increased ears as much as did 200 kg/ha NPK, showing the ability of Vitazyme to increase the efficiency of fertilizer use.

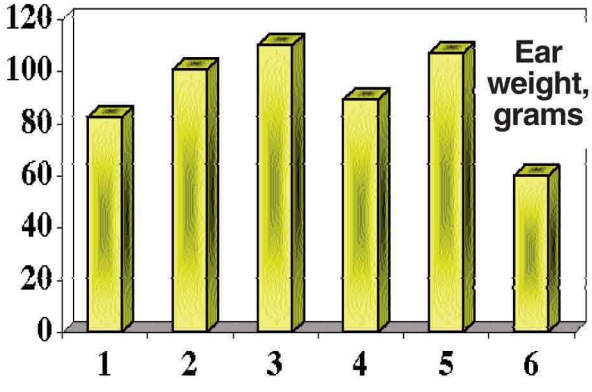
Ear Length

Treatment	Ear length	Change
	cm	cm
1. (Vitazyme only)	9.3	0.7 (+8%)
2. (100 NPK + Vit.)	15.3	6.7 (+78%)
3. (200 NPK + Vit.)	15.0	6.4 (+74%)
4. (100 NPK)	14.4	5.8 (+67%)
5. (200 NPK)	15.1	6.5 (+76%)
6. (Control)	8.6	—
$LSD_{0.05}$	1.0	



All but the Vitazyme only treatment significantly increased ear length. The Vitazyme and 100 kg/ha NPK increased ear length the most (78%), followed closely by the Vitazyme + 200 kg/ha NPK and 200 kg/ha NPK treatments.

Ear Weight



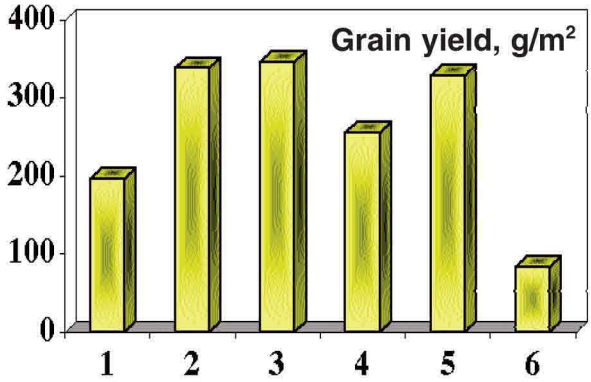
Treatment	Ear weight	Change
	g	g
1. (Vitazyme only)	82.3	22.3 (+37%)
2. (100 NPK + Vit.)	100.7	40.7 (+68%)
3. (200 NPK + Vit.)	110.0	50.0 (+83%)
4. (100 NPK)	89.3	29.3 (+49%)
5. (200 NPK)	107.0	47.0 (+78%)
6. (Control)	60.0	—
$LSD_{0.05}$	11.3	

Ear weight was greatly affected by both Vitazyme alone (+37%) and by fertilizer alone (up to 78% with 200 kg/ha NPK), but most by Vitazyme + fertilizer (+68% for Vitazyme + 100 kg/ha NPK, and + 83% for Vitazyme + 200 kg/ha NPK). As with ears/m² Vitazyme is shown to increase the efficiency of fertilizer use at both the 100 and 200 kg/ha NPK rates, but especially at the 100 kg/ha NPK fertilizer rate.

Grain Yield

Treatment	Grain yield	Change*
	g/m²	g/m²
1. (Vitazyme only)	196.2	113.2 (+136%)
2. (100 NPK + Vit.)	338.3	255.3 (+308%)
3. (200 NPK + Vit.)	345.3	262.3 (+316%)
4. (100 NPK)	255.0	172.0 (+207%)
5. (200 NPK)	328.3	245.3 (+296%)
6. (Control)	83.0	—
$LSD_{0.05}$	110.3	

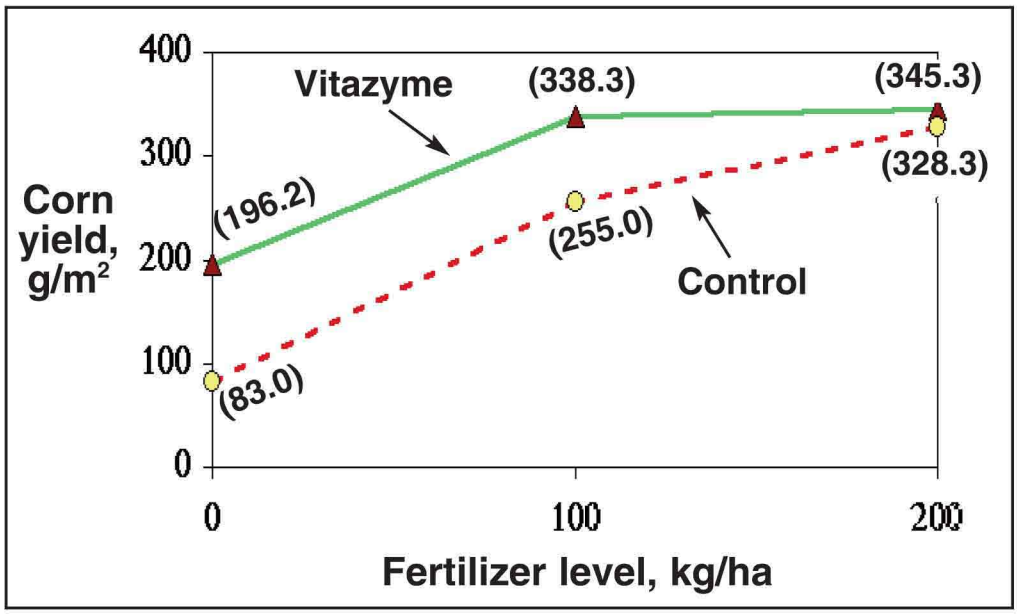
*All comparisons are made with the untreated control (6).



Increase in yield with Vitazyme only: 136%
Increase in yield with Vitazyme + 100 kg/ha NPK: 33%
Increase in yield with Vitazyme + 200 kg/ha NPK: 5%

All treatments significantly increased grain yield above the control. Vitazyme produced a 126% yield improvement, while the highest yield was generated by Vitazyme + 200 kg/ka NPK (+316%). This was 17.0 grams/m² higher than the 200 kg/ha NPK value. The difference was even greater for the 100 kg/ha NPK rate, where Vitazyme plus the fertilizer increased yield by 308%, but without Vitazyme the yield increased 207%. These data show a marked improvement of fertilizer efficiency with Vitazyme at the lower NPK rate, and also an improvement at the high NPK rate. These effects over the three rates are diagrammed below.

Note that the increase in grain yield above the untreated level is greatest at the lower fertilizer levels, with no fertilizer or with the 100 kg/ha NPK rate. The increase was not as dramatic at the highest NPK rate. These responses are similar to those noted in many other trials, and reflect the fact that microorganisms in the rhizosphere are stimulated to produce more available nutrients when soil nutrient levels are less than optimal. As fertility and environmental factors approach the optimum, the response from Vitazyme decreases somewhat.



Conclusions: In this replicated Nigerian corn study Vitazyme has been shown to increase plant growth and yield parameters (grain, ear number, ear length, and ear weight) significantly above the control. Vitazyme also increased yield parameters significantly, especially at the lower fertilizer levels (0 and 100 kg/ha NPK), where the Vitazyme +100 kg/ha NPK yield exceeded the 200 kg/ha NPK yield by 10.0 g/m². At 100 kg/ha NPK, Vitazyme significantly boosted yield by 83.3 g/m² above the same fertility level without Vitazyme.

In this highly weathered tropical soil of Ondo State of Nigeria, Vitazyme is seen as a powerful motivator of higher yield potential for corn.

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2003 Crop Results

Vitazyme on Corn – *testimonial*

Farmer/Researcher: David Schemm
Location: Arrow S Farms, Sharon Springs, Kansas
Variety: NC+ 5021RB *Planting rate*: 26,000 seeds/acre *Soil type*: Keith sandy clay loam
Previous crop: sunflowers *Planting date*: May 3, 2003 *Tillage system*: no-till
Experimental design: A center pivot covering 120 acres was treated with Vitazyme over the entire area.
Fertilization: 180 lb/acre N, 35 lb/acre P_2O_5
Vitazyme and herbicide applications: (1) 13 oz/acre on May 7, with 0.5 lb/acre Atrazine 90df, 1.5 qt/acre Harness Extra, and 24 oz/acre Roundup herbicides; (2) 13 oz/acre on June 4, with 24 oz/acre Roundup herbicide when the corn was 10 inches tall
Irrigation: 16 inches total during the growing season
Weather: 8.5 inches during the growing period, with an 8-inch moisture deficit in 2002 and another 4.5 inch deficit to October of 2003; record heat throughout the summer, including several weeks of 100°F+ temperatures and 25 mph+ winds
Harvest date: October 10, 2003
Yield results: Harvested grain at 16.7% H_2O: 27,500 bushels

Yield per acre for 120 acres: 229.2 bu/acre

Conclusions: The corn received significant hail damage on June 10 when the leaves were stripped. In spite of severe heat and wind as well, the corn did exceptionally well with Vitazyme, exceeding in yield any other fields in the area. Most yields were 140 to 200 bu/acre, with a few in the 220 to 225 bu/acre range.

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2002 Crop Results

Vitazyme and Awaken on Corn

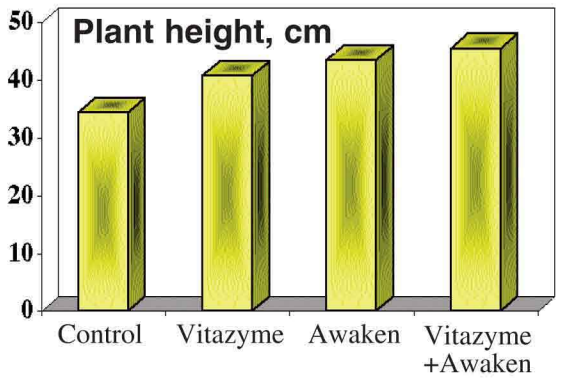
Researcher: Paul W. Syltie, Ph.D.
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas
Variety: yellow dent *Soil type*: Bowie very fine sandy loam
Planting date: November 21, 2001 *Pot type*: 1 gallon *Population*: 7 seeds/pot, thinned to 3/pot
Experimental design: A complete block design was set up using eight replicates for each of four treatments. The soil was carefully packed into each pot, watered evenly, and then treated with the materials. Plants were watered on demand, and grown in the greenhouse at about 70°F for a high and 55°F for a low temperature.

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

Vitazyme application: After planting on November 21, 100 ml of a 0.01% Vitazyme solution was applied to the soil surface of each pot for Treatment 2. This rate is higher than recommended, but used so as to obtain a 50-50 mixture of the two products.
Awaken application: Awaken was applied to the soil surface of the pots of Treatment 3 as 100 ml of 0.01% solution; this is equivalent to 71 oz/acre, the recommended rate for this experiment. The Awaken for Treatment 4 was mixed at the same percentage with 0.01% Vitazyme, which was also applied at 100 ml/pot.
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.
Awaken: a macro/micronutrient solution for plant growth stimulation having 16% N, 2% K_2O, 0.02% B, 0.15% Cu (chelated), 0.15% Fe (chelated), 0.15% Mn (chelated), 0.0006% Mo, and 2.7% Zn of which 0.15% is chelated. Awaken also contains as a major component the material called ACA (Agricultural Crop Additive). ACA's active component is zinc ammonium phosphate, the mechanism of action of which has not been fully characterized. Producer: United AgriProducts (UAP).
Harvest date: January 8, 2002, 48 days after planting.
Height results: On January 8, all of the plant roots were washed clean of soil, and the plants were measured for height. The plants were then dried in a drying oven at 115°F for 48 hours.

Treatment	Plant height*	Change vs. the control
	---------- cm ----------	
4. Vitazyme + Awaken	45.4 a	+11.1 (+32%)
3. Awaken	43.4 ab	+9.1 (+27%)
2. Vitazyme	40.7 b	+6.4 (+19%)
1. Control	34.3 c	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Tukey-Kramer Test. $LSD_{0.10}$=2.0 cm.

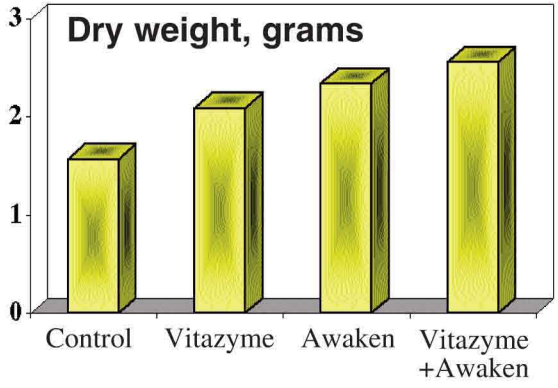


There were some differences in plant height among the four treatments. The control treatment was significantly shorter than the other three treatments, and the Vitazyme treatment was significantly shorter than the combined Vitazyme-Awaken treatment.

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

Treatment	Dry weight*	Change vs. the control
	---------- grams ----------	
4. Vitazyme + Awaken	2.56 a	+1.20 (+30%)
3. Awaken	2.34 ab	+0.93 (+23%)
2. Vitazyme	2.09 b	+0.46 (+11%)
1. Control	1.57 c	—

* Means followed by the same letter are not significantly different at P=0.10, according to the Tukey-Kramer Test. LSD_{010}=0.27 g.



The dry weight of corn plants treated with Vitazyme plus Awaken was significantly greater than Vitazyme alone or the control, and also exceeded the Awaken treatment by 7%. There appears to be a synergism between Vitazyme and Awaken in this greenhouse study.

Conclusions: It appears that Vitazyme enhances the activity of Awaken for corn in terms of both plant height and dry tissue weight. Awaken, with its nutrients, stimulated corn growth somewhat more than did Vitazyme in this study, though not significantly. **Vitazyme and Awaken together appear to work well together, displaying a noticeable synergism.**

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2001 Crop Results

Vitazyme on Corn and Soybeans

A Testimonial

Farmer: Tom Jones *Location*: Delavan, Minnesota

Soil type: Clarion-Nicollet-Webster series

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

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

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

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

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

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

* Twenty leaves per treatment were examined

Other crop responses noted on July 30, 2001:

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

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

Observations by Tom Jones:

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

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

Thanks,

Tom Jones
Faribault County
Southern Minnesota

Effects of Solution pH During Storage On Vitazyme Efficacy With Corn (*Zea Mays L.*)

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Introduction

Vitazyme is a naturally fermented biostimulant that contains a multiple array of active agents — vitamins, enzymes, growth regulators, and other substances — which trigger various growth responses in plants. Typical effects include enhanced root growth, greater leaf chlorophyll, increased carbon fixation, and concomitant increases in overall growth, life-cycle stimulation, root exudation, rhizosphere microbial growth, and crop yields.

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

Materials and Methods

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

Table 1. Dilutions of Vitazyme at various pH levels for a corn efficacy study.

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

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

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

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

Treatment	Vitazyme, 100%	Vitazyme, 1%
1. Control (no Vitazyme)	none	none
2. pH 7.0	x	x
3. pH 8.0	x	x
4. pH 9.0	x	x
5. pH 10.0	x	x

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

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

Results and Discussion

Solution pH changes over 34 days

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

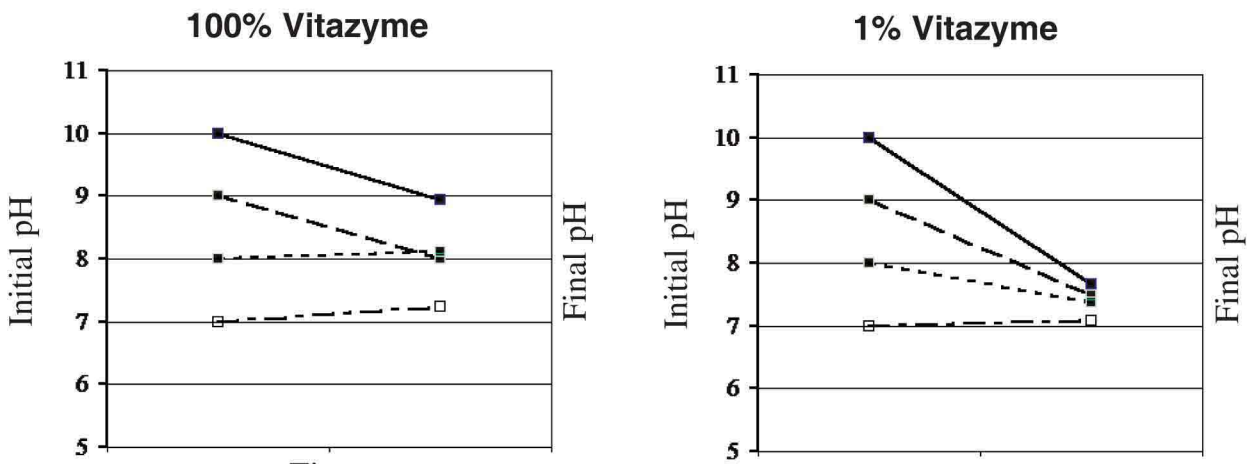


Figure 1. pH changes during 34 days of storage of Vitazyme solutions.

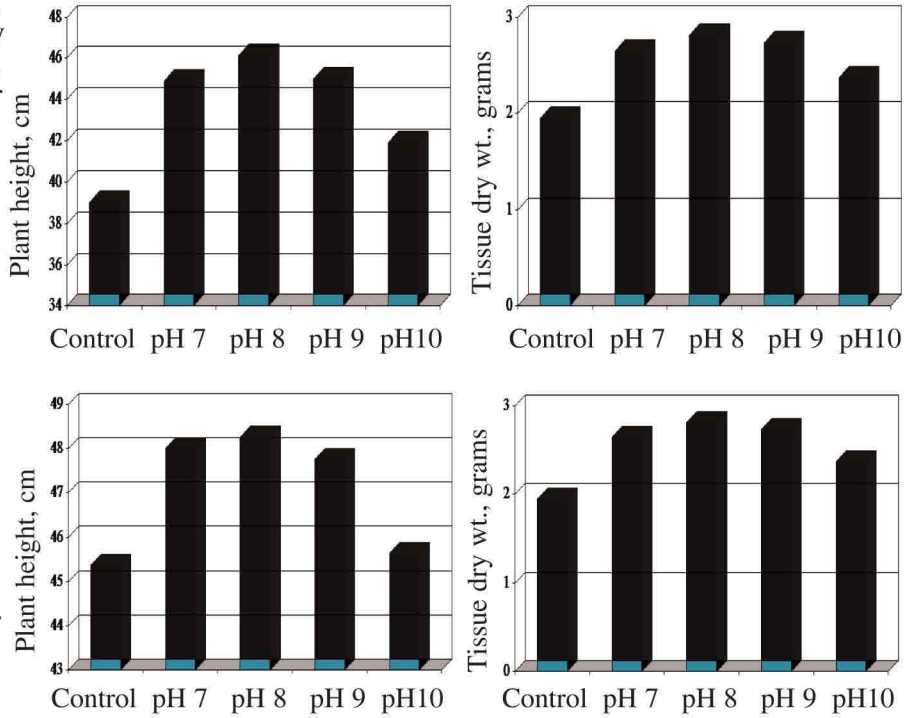
Vitazyme tended to move towards neutrality (pH 7.0) at both the 1% and 100% concentrations when stored at room temperature for 34 days. This was equally true for the dilute (1%) solution, where all four solution pH's ended up between pH 7.08 and 7.66 at the end of the storage period.

Corn Growth Effects

The average height and weight of the corn plants for the treatments are shown in Table 3.

Table 3. Corn heights and weights treated with different Vitazyme solutions stored at various pH's.

Treatment	Corn height (cm)	Tissue dry weight (g)
1% Vitazyme		
1. Control	39.00	1.95
2. pH 7.0	44.88	2.64
3. pH 8.0	46.13	2.81
4. pH 9.0	45.00	2.73
5. pH 10.0	41.88	2.37
100% Vitazyme		
1. Control	45.38	2.59
2. pH 7.0	48.00	2.79
3. pH 8.0	48.25	2.97
4. pH 9.0	47.75	2.71
5. pH 10.0	45.63	2.70



A statistical analysis of the data revealed the following, as shown in Table 4.

Table 4. A statistical analysis of a corn study, using Vitazyme stored at different pH's.

Treatment	Corn height (cm)	Tissue dry weight (g)
1% Vitazyme*		
3. pH 8.0	46.13 a (+18%)	2.81 a (+44%)
4. pH 9.0	45.00 a (+15%)	2.73 a (+40%)
2. pH 7.0	44.88 ab (+15%)	2.64 ab (+35%)
5. pH 10.0	41.88 bc (+7%)	2.37 b (+22%)
1. Control	39.00 c	1.95 c
CV	5.48%	10.70%
$LSD_{0.10}$	2.02	0.23
100% Vitazyme*		
3. pH 8.0	48.25 a (+6%)	2.97 a (+15%)
2. pH 7.0	48.00 a (+6%)	2.79 ab (+8%)
4. pH 9.0	47.75 a (+5%)	2.71 ab (+5%)
5. pH 10.0	45.63 a (+1%)	2.70 ab (+4%)
1. Control	45.38 a	2.59 b
CV	4.78%	9.51%
$LSD_{0.10}$	1.91	0.22

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

It is clear that Vitazyme in every case, at both the 1% and 100% concentrations, and at all pH's, provided height and dry weight increases in this corn study. Several of these increases were significant at P=0.01, especially when Vitazyme was stored at pH 8.0 for both the 1% and 100% concentrations. At 1%, the pH 8.0 solution provided a 44% dry weight increase for Vitazyme, and at 100% a 15% increase. Plant height increases were in all cases less than half of the dry weight increases, but followed the same order as with dry tissue weight.

Vitazyme stored at pH 7.0, 8.0, and 9.0 always provided good dry weight increases for corn, especially for the 1% solution. At pH 10.0, however, the increases were less — indicating some deactivation of active agents — though with the 1% solution the increase was still significant; for the 100% solution the increase was not significantly greater than with the untreated control.

Summary and Conclusions

Vitazyme at 1% dilution, when adjusted to pH 7.0, 8.0, or 9.0, and stored for 34 days at room temperature, always caused significant height and weight increases for corn in this study. Increases in dry weight were up to 44% above the control. At pH 10.0 the increases were smaller but, in the case of dry weight, still significantly greater than the control. At the 100% dilution the increase in dry weight with Vitazyme at pH 8.0 was significant, and all other pH's also produced increases.

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

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2001 Crop Results

Vitazyme on Corn

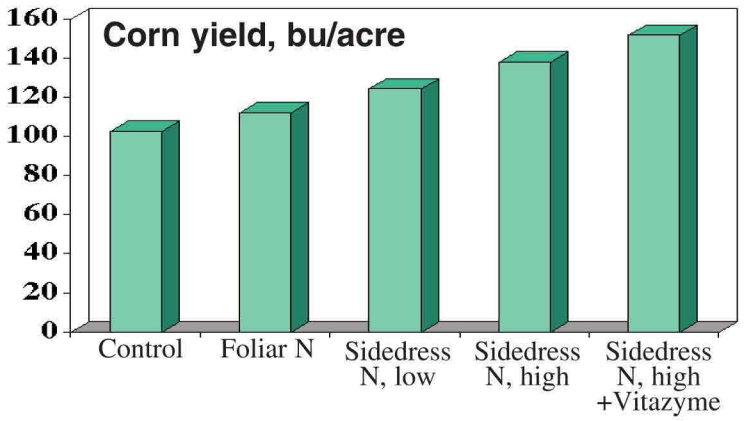
Researcher: Dennis Parrett, Cecilia Farm Service, Inc. *Location*: Cecelia, Kentucky
Farm cooperator: Richard Preston *Variety*: Novartis 6367 *Row spacing*: 30 in
Population: 26,600 seeds/acre *Planting date*: April 10, 2001 *Soil type*: unknown
Experimental design: A test field was divided into five portions, each with a treatment as shown below.

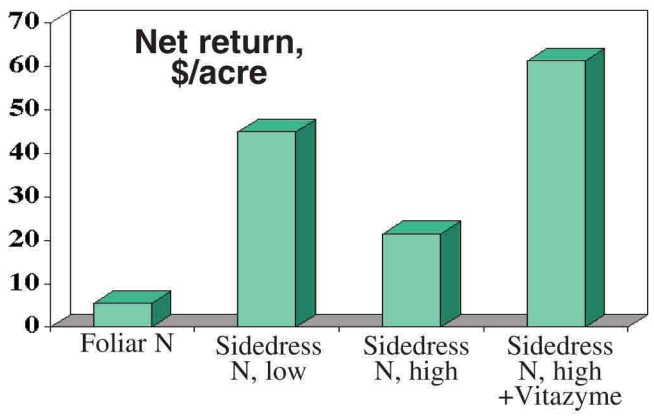
Treatment	Foliar N	Sidedress N	Vitazyme
1. Control	0	0	0
2. Foliar N	5 gal/acre of 28% N	0	0
3. Sidedress N, low	0	80 lb/acre of 28% N	0
4. Sidedress N, high	0	105 lb/acre of 28% N	0
5. Sidedress N, high + Vitazyme	0	105 lb/acre of 28% N	13 oz/acre

Fertilization : 50-60-60 lb/acre N-P_2O_5-K_2O preplant incorporated; sidedress fertilizer as shown above
Vitazyme treatments: 13 oz/acre along with the 28% nitrogen solution, applied June 9
Yield and income results: Harvest was on October 11, 2001.

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

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





True increase from Vitazyme

Yield: Treatment 5 vs. Treatment 4: 151.9 bu/acre – 138/bu/acre = **13.8 bu/acre**

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

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

Return per dollar invested in Vitazyme: $9.95

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2001 Crop Results

Vitazyme on Sweet Corn

New York Crop Research Facility, Cornell University

Researchers: Arlie McFaul, Alan Erb, Lee Stivers, and Christy Hoepting
Location: near Batavia, New York *Variety*: Bonus *Row spacing*: 30 inches
Spacing-in-row: 9 inches *Planting date*: June 4, 2001

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

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

Fertilization: All areas received 250 lb/acre of a 15-15-15% N-P_2O_5-K_2O dry formulation banded along the seed row at planting. On July 10, 100 lb/acre of N was applied.

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

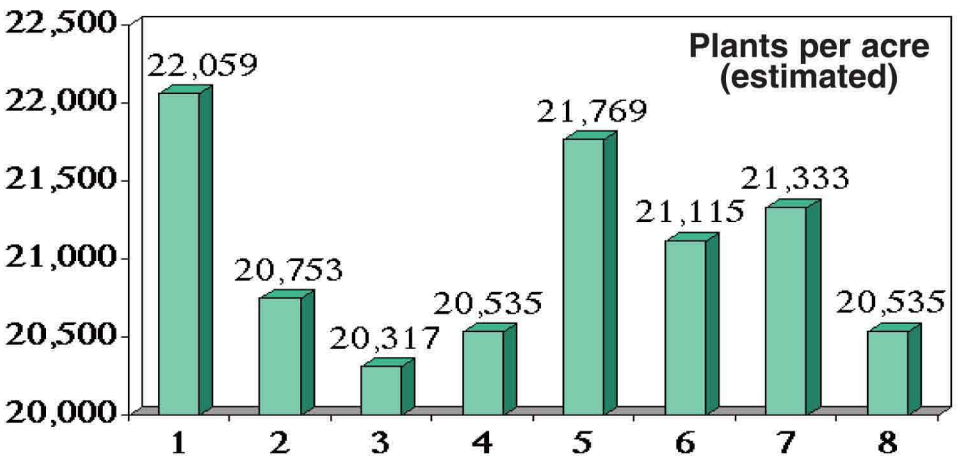
Herbicides: Atrazine (3 pints/acre) and Basagran (1.5 pints/acre) post-emergent on June 21

Harvest date: August 31, 2001

Weather: It was very hot and dry during the summer, with growth and yields curtailed due to the drought. Monthly totals: May, 3.84 in; June, 1.47 in; July, 1.02 in; August 2.21 in; September, 2.82 in.

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

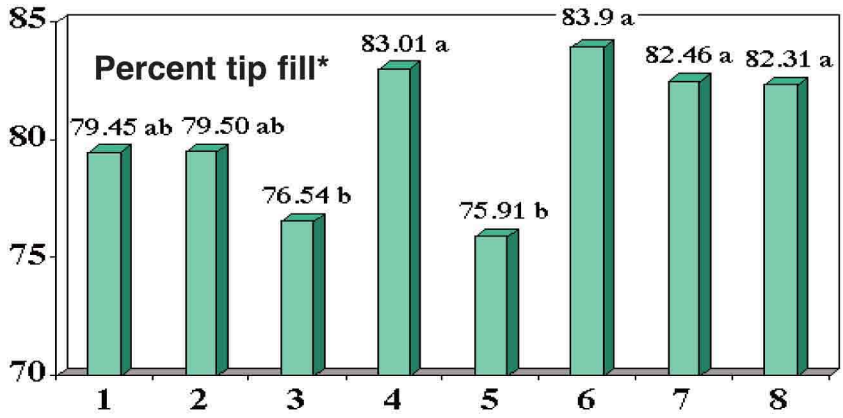
Plant population

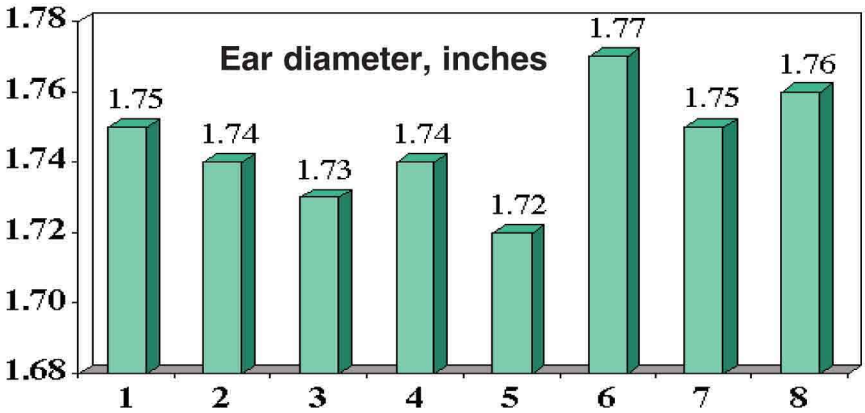


Percent Tip Fill

All values were not significantly different, but the population with Vitazyme was the highest, being 7% higher than the control.
Some significant differences in percent tip fill appeared, with Messenger and Asset RS being the lowest in value of all treatments. Vitazyme was statistically equal to the highest tip fill value.

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



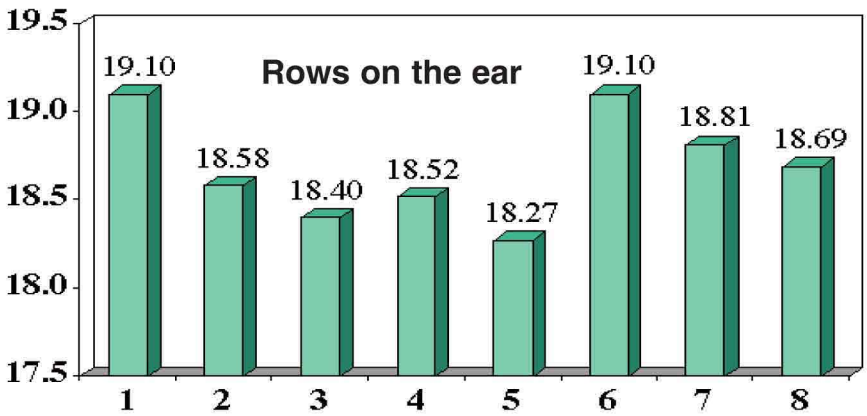


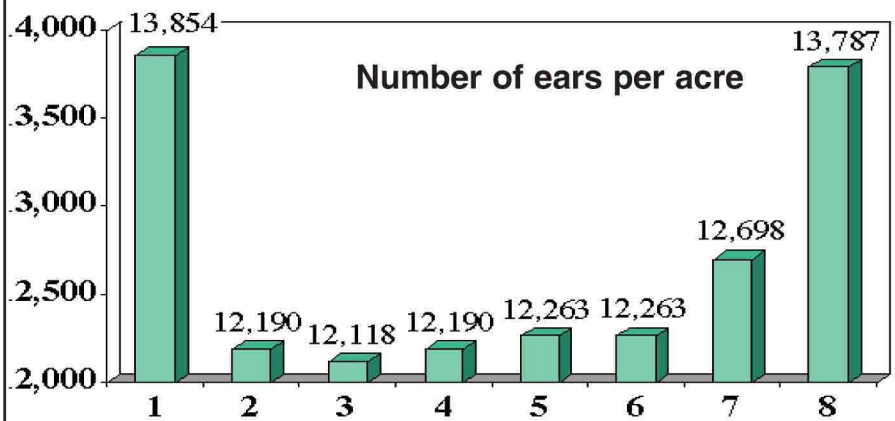
Ear Diameter

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

Number of Rows

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



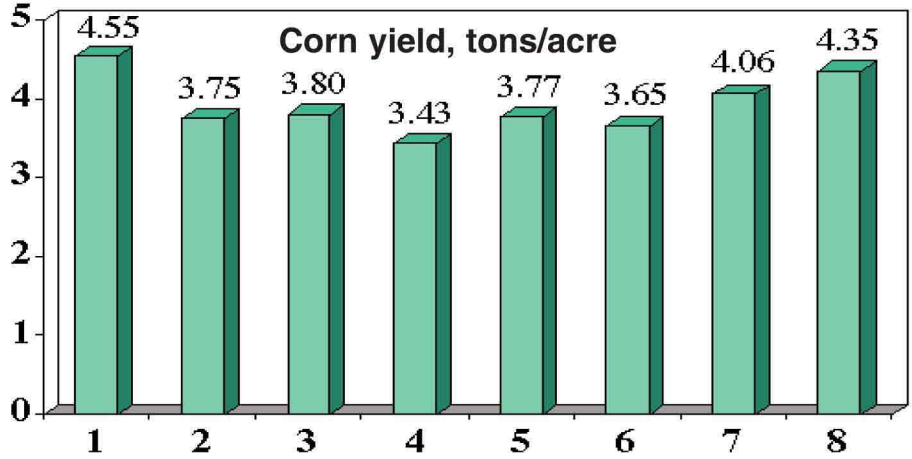


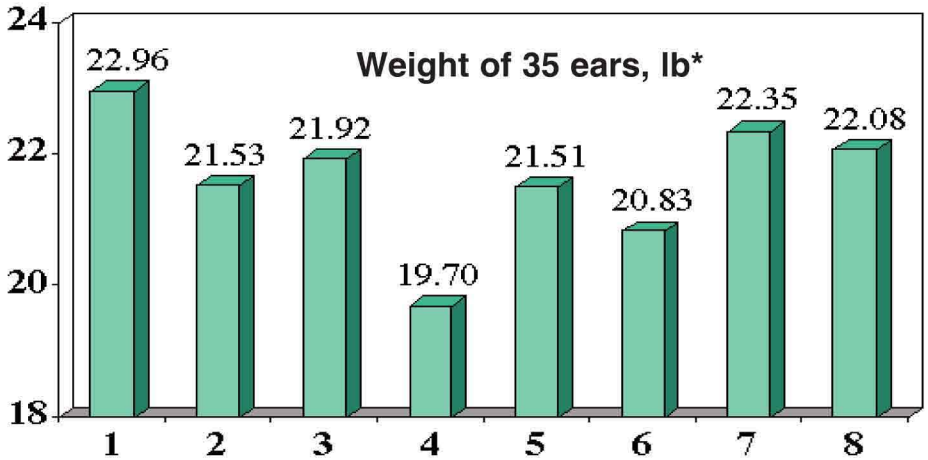
Ears per Acre

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

Corn Yield

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





Cob Weight, 35 Ears

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

Conclusions: Results with sweet corn in this study were greatly affected by a severe summer drought. In spite of this fact, **Vitazyme performed the best of all seven treatments used in this study, being highest in plant population, rows per ear, ears per acre, yields per acre, and total weight per 35 ears. Vitazyme treatment produced 33% more yield than the lowest yielding other treatment.** Though significance in the mean differences was lacking, the consistent trend of this study was for Vitazyme to provide excellent plant responses that would substantially benefit sweet corn growers.

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2000 Crop Results

Vitazyme on Corn

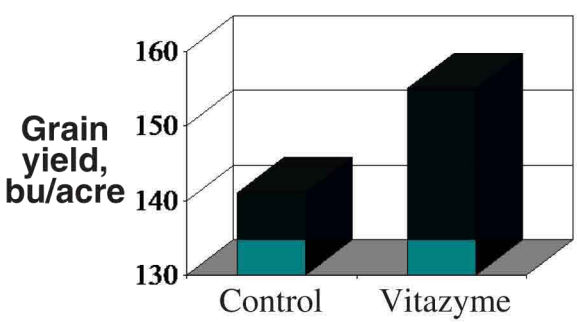
Grower: Jim Clise *Location*: Waterloo, New York *Variety*: Agway 501
Researcher: Jake Gephart, Agway, Inc. *Planting date*: May 31, 2000 *Seeding rate*: unknown
Row spacing: 30 inches
Experimental design: A 100-acre field was divided into halves (50 acres each), with half treated with Vitazyme and half left untreated.

1. Control **2. Vitazyme**

Fertilization: 380 lb/acre of a urea and potash mixture, broadcast before planting and incorporated; 250 lb/acre of 11-37-0% N-P_2O_5-K_2O as a starter
Weed control: Bicep and Prowl tank-mixed
Vitazyme application: 13 oz/acre with the herbicide, at 18-inches corn height
Harvest date: December 3, 2000
Yield results:

	Control	Vitazyme	Change
		bu/acre	
Corn yield	141	155	(+) 14 (+10%)

Yield increase: 10%



Income results:

	Control	Vitazyme	Change
		$/acre	
Income	246.75	271.25	(+) 24.50

Income increase: $24.50/acre

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

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1999 Crop Results

Vitazyme on Corn

Farmer: Craig Rice, Rice Farms
Location: Geneseo, New York
Supervisor: Don Jones, Agway Inc.
Variety: unknown
Planting date: unknown
Harvest date: November 10, 1999

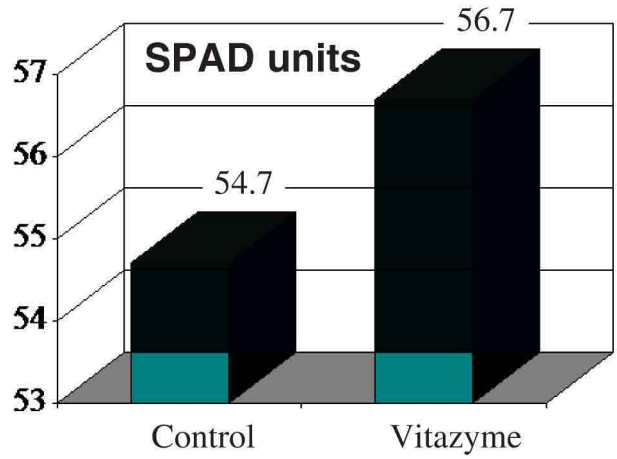
Experimental design: A large field was divided in two, with part treated with Vitazyme and part left untreated. Yields were determined by harvesting a 15- ft wide strip that was 254 to 768 feet long for each treatment.

1. Control **2. Vitazyme**

Fertility treatments: unknown
Vitazyme treatment: 13 oz/acre at planting
Chlorophyll determinations: On August 12 readings were taken of leaves from the corn treatments with a Minolta SPAD chlorophyll meter. Each value represents an average of 10 individual leaf determinations.

Treatment	SPAD units	Increase
Control	54.7	--
Vitazyme	56.7	2.0

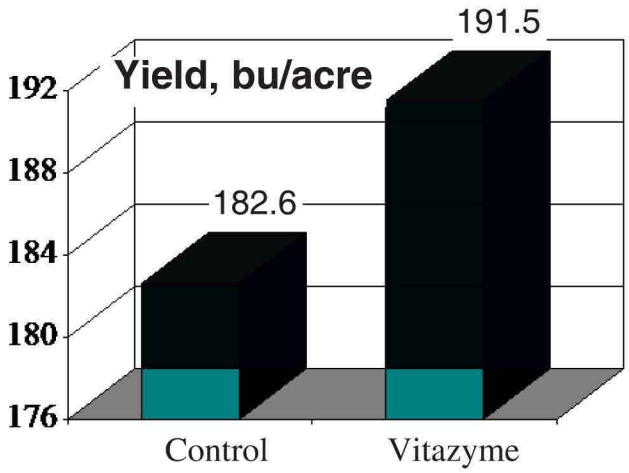
Chlorophyll increase: 2.0 SPAD units



Yield results:

Treatment	Yield	Plot area	Yield
	lb/plot	acre	bu/plot
Control2,700		0.264	182.6
Vitazyme, area 1	2,865	0.259	197.5
Vitazyme, area 2	2,690	0.259	185.4
Vitazyme, average	---	---	191.5

Yield increase: 5%



Income increase: Estimated corn price = $2.50/bu.
8.9 bu/acre increase x $2.50/bu = $22.25/acre

Income increase: $22.50/acre

Comments: In spite of a very dry and hot summer, the Vitazyme treatment boosted the corn yield significantly (8.9 bu/acre). Leaf chlorophyll increases during the growing season would explain most of this increase, since this would promote greater root growth and exudation to feed a more vigorous rhizosphere organism population.

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1999 Crop Results

Vitazyme on Corn

Farmer: Bill Goodell *Location*: Shortsville, New York *Variety*: Pioneer 3573
Planting date: May 4, 1999 *Population*: 30,000 seeds/acre planted, 28,000 plants/acre final
Experimental design: A 5-acre field was split in half, one half receiving Vitazyme with 50% of the usual starter fertilizer at planting, and the other half receiving the regular starter rate but no Vitazyme.

1. **Control**: 100% starter
2. **Vitazyme** + 50% starter

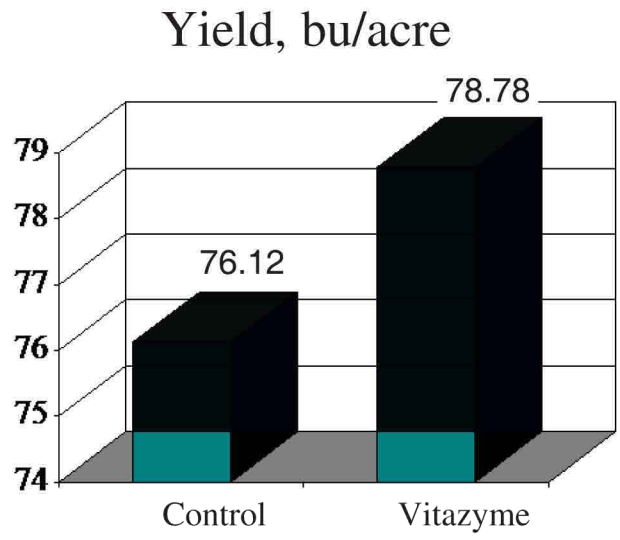
Fertility treatments: All areas of the field received a broadcast application of 100 lb/acre $(NH_4)_2SO_4$ (21%N) + Boron + Copper, 500 lb/acre EnviroSoil (composted sewage sludge mixed with high-calcium lime), 32 gal/acre 30% UAN, and 1 gal/acre liquid Ca-nitrate. At planting the control received 10 gal/acre of 3-18-18 ($3.25/gal = $32.50/acre), while the Vitazyme treated area received 5 gal/acre of 3-18-18 ($16.25/acre). Total N per acre for the broadcast fertilizer was 107 lb/acre, excluding the compost, for the control, and 106 lb/acre for the Vitazyme treatment.

Vitazyme treatment: 13 oz/acre mixed with the 3-18-18, on the seeds at planting

Weather conditions: very dry season-long

Yield results:

Treatment	Yield	Test weight
	bu/acre	lb/bu
Control	76.12	57.0
Vitazyme	78.78 (+3.5%)	57.5



Test weight increase: 0.5 lb/bu

Yield increase with 50% starter: 3.5 %

Income results: Corn is priced at $2.00/bu.

Treatment	Corn value	Fertilizer savings*	Total Increase
Control	$152.24/acre	---	---
Vitazyme	$157.56/acre	$12.35/acre	**$17.67/acre**

Comments: Yields were reduced by about 50%, due to very dry conditions throughout the summer. In spite of this, Vitazyme stimulated a yield increase with a reduced starter fertilizer input, illustrating its ability to activate rhizosphere nutrient uptake.

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1997 Crop Results

Vitazyme on Corn

Researcher: William (Bill) Goodell
Seeding date: May 14, 1997
Location: Shortsville, New York
Row width: 30 inches
Seeding rate: 30,000 seeds/acre
Variety: Pioneer 3752 (97 day)

Experimental design: A field of reasonable uniformity was divided into two parts: an untreated control part and a Vitazyme treated part.

1. **Control (no Vitazyme)**
2. **Vitazyme + 33% of fertilizer at planting**

Fertility treatments: The entire field received 10 tons/acre of manure, plus 26 gal/acre of 30% nitrogen and 4 gal/acre of ammonium thiosulfate. The control area received an additional 8 gal/acre of 9-18-9 plus 4 gal/acre of 0-0-30 at planting on the seed. The Vitazyme treatment received 2.7 gal/acre of 9-18-9 plus 1.3 gal/acre of 0-0-30 at planting, or 33% of the control treatment.

Vitazyme application: 12 oz/acre with the liquid fertilizer, on the seeds at planting

Soil: Ontario loam, 3 to 10% slope

Previous crop: wheat
Harvest date: November 26, 1997

Yield results: Both treatments yielded about 22.7% grain moisture.

	Control	Vitazyme	Increase with Vitazyme
Corn yield	129.6 bu/acre	142.2 bu/acre	12.6 bu/acre

Yield Increase: 10%

Income results: The grain price has been calculated at about $3.00/bu. Natures 9-18-9 + 0-0-30, mixed at a 2:1 ratio retails for about $3.20/gal.

	Control	Vitazyme	Income Increase
Corn income	$386.12/acre	$423.64/acre	$37.80/acre
Fertilizer savings, less Vitazyme	—	$25.60/acre	$25.60/acre
Net income increase			$63.40/acre

Income Increase: $63.40/acre

Test weight results:

	Control	Vitazyme
Test weight	53 lb/bu	55 lb/bu

Test weight increase: 2 lb/bu

Comments: The cropping year was quite good. Only July 13, leaf chlorophyll measured on 20 average leaves of each treatment gave 50.7 SPAD units for the Vitazyme treatment and 49.1 SPAD units for the control.

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2. **Vitazyme + 33% of fertilizer at planting**

Fertility treatments: The entire field received 10 tons/acre of manure, plus 26 gal/acre of 30% nitrogen and 4 gal/acre of ammonium thiosulfate. The control area received an additional 8 gal/acre of 9-18-9 plus 4 gal/acre of 0-0-30 at planting on the seed. The Vitazyme treatment received 2.7 gal/acre of 9-18-9 plus 1.3 gal/acre of 0-0-30 at planting, or 33% of the control treatment.
Vitazyme application: 12 oz/acre with the liquid fertilizer, on the seeds at planting
Soil: Ontario loam, 3 to 10% slope
Previous crop: wheat *Harvest date*: November 26, 1997
Yield results: Both treatments yielded about 22.7% grain moisture.

	Control	Vitazyme	Increase with Vitazyme
Corn yield	129.6 bu/acre	142.2 bu/acre	12.6 bu/acre

Yield Increase: 10%

Income results: The grain price has been calculated at about $3.00/bu. Natures 9-18-9 + 0-0-30, mixed at a 2:1 ratio retails for about $3.20/gal.

	Control	Vitazyme	Income Increase
Corn income	$386.12/acre	$423.64/acre	$37.80/acre
Fertilizer savings, less Vitazyme	—	$25.60/acre	$25.60/acre
Net income increase			$63.40/acre

Income Increase: $63.40/acre

Test weight results:

	Control	Vitazyme
Test weight	53 lb/bu	55 lb/bu

Test weight increase: 2 lb/bu

Comments: The cropping year was quite good. Only July 13, leaf chlorophyll measured on 20 average leaves of each treatment gave 50.7 SPAD units for the Vitazyme treatment and 49.1 SPAD units for the control.