

Researcher: David Holden

Research organization: Holden Research and Consulting, Camarillo, California

Field location: near Somis, California

Variety: Red Cyclone

Planting date: May 7, 2025

Soil analysis: pH (paste) = 7.2, organic matter = 2.47 %, $\text{NO}_3\text{-N}$ = 41.2 ppm, PO_4P (Olsen) = 23.0 ppm, PO_4P (Bray) = 52.3 ppm, K = 433 ppm, Zn = 2.2 ppm, Mn = 10.7 ppm, Fe = 12.4 ppm, Cu = 2.5 ppm. Nutrient levels are extractable nutrients, and all are within the optimum range.

Experimental design: A small plot pepper trial in a randomized complete block design, using six replications, with plots being 5 x 15 feet, was established near Somis, California. Three treatments were applied, with all plots receiving the grower standard of fertilization, and one treatment received Vitazyme while another treatment received Vitazyme that had been fortified with a silicon additive. The purpose of the trial was to evaluate the effect of these two products on the yield, quality, and economic return of bell peppers versus the untreated control.

① Control ② Vitazyme ③ Vitazyme + Nano Yield

Fertilization: The grower standard application totaled 169-40-45 lb/acre of $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$, applied as follows: 10 gal/acre of 10-34-0% $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$, (11 lb/acre of N, and 40 lb/acre of P_2O_5) on May 1; UN 32 (12 lb/acre of N) on May 7; 4 gal/acre of 3-0-11 % $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$ (1.2 lb/acre of N and 4.5 lb/acre of K_2O) on May 12; 9.5 gal/acre of CAN (20 lb/acre of N) on May 19; 16.25 gal/acre of CAN 17 (17.4 lb/acre of N) on June 4; 23 gal/acre of CAN 17 (50 lb/acre of N) on June 25; 20 lb/acre of N as UN 32 and 20 lb/acre of N as KNO_3 on July 7; 20 lb/acre of N as UN 32 and 20 lb/acre of N as KNO_3 July 30.

Irrigation: The plants were watered on May 7 (24 hours), May 12 (24 hours), May 14 (2 hours), May 19 (6 hours, and June 4 (6 hours).

Vitazyme application: at planting to the soil in the root zone at 13 oz/acre (1 liter/ha) on May 7 and on the leaves and soil at 13 oz/acre (1 liter/ha) on June 10 and July 2, at early bloom and during fruit production, respectively

Nano Yield application: the same applications as Vitazyme, with 1 oz/acre (0.08 liter/ha) of Nano Yield added to Vitazyme. Nano Yield is a silicic acid aluminum sodium salt designed to improve the uptake of active agents.



A portion of the California pepper trial is shown here, showing the watering system using drip irrigation.



A portion of the California pepper trial is shown here, showing the watering system using drip irrigation.

Plant vigor results:

Treatment	Vigor Rating ¹			
	June 6	June 23	July 28	Average
1. Control	2.1 b	2.4 a	1.6 a	2.0
2. Vitazyme	2.7 a	2.3 a	1.8 a	2.3
3. Vita + Nano	1.9 b	2.6 a	2.2 a	2.2

¹ Vigor rating of from 0 (poorest) to 5 (best). Means followed by the same letter are not significantly different at P = 0.10 according to the Student-Newman-Keuls Test.

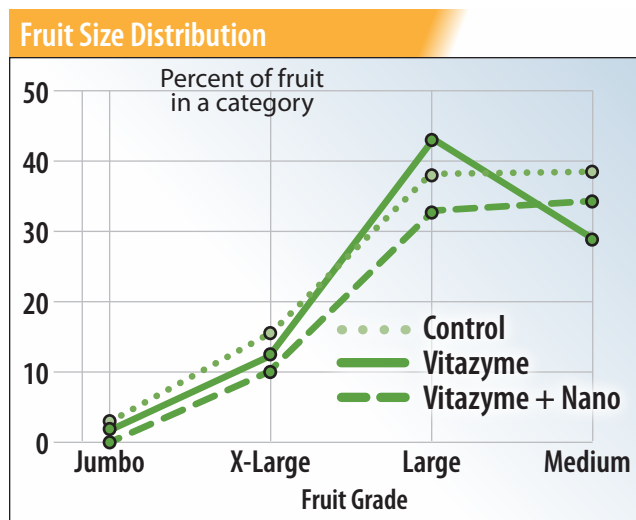
The Vitazyme and Vitazyme + Nano Yield treatments showed the best vigor on average throughout the trial period.

Fruit grade results: Fruit size was determined for two plants in each plot, and the percent of the fruit size for each grade was calculated at the end of the study, on August 20.

Treatment	Fruit in a size category ¹			
	Jumbo	X Large	Large	Medium
	%	%	%	%
1. Control	0 a	14 a	43 a	44 a
2. Vitazyme	1 a	19 a	39 a	41 a
3. Vita + Nano	1 a	15 a	46 a	38 a
LSD (P=0.1)	2.4	16.8	16.6	23.7
CV	318.0	100.7	37.4	65.4
Replicate probability (F)	0.611	0.506	0.416	0.926
Treatment probability (F)	0.632	0.847	0.725	0.904

¹Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Both Vitazyme and Vitazyme + Nano Yield produced more fruit of the large size, especially the Nano Yield variation. Due to the large plot variations these differences were not significant at P = 0.1.



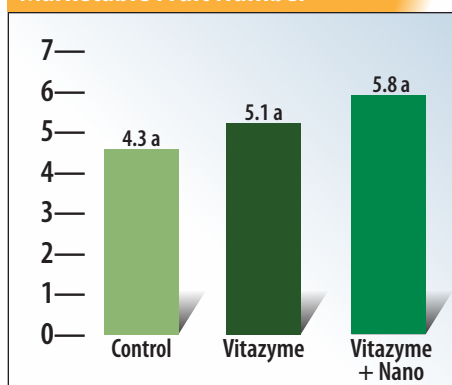
The bell peppers were sized according to industry standards, from Jumbo to medium sizes, with Vitazyme + NanoYield especially increasing the large size.

Marketable fruit number results: The total marketable fruit number was totaled and averaged for each plot.

Treatment	Marketable fruit number	Fruit change number
1. Control	4.3 a	—
2. Vitazyme	5.1 a	0.8 (+19%)
3. Vita + Nano	5.8 a	1.5 (+35%)
LSD (P=0.1))	2.0	
CV	39.05	
Replicate probability (F)	0.6728	
Treatment probability (F)	0.4450	

¹Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Marketable Fruit Number



The Vitazyme + Nano Yield treatment exceeded Vitazyme alone by 16%, and the control by 35%.

Increase in marketable fruit number with Vitazyme

Vitazyme only..... + 19%
Vitazyme + Nano Yield + 35%

Unmarketable fruit results: The average number of unmarketable fruit per plot was calculated.

Treatment	Unmarketable fruit number
1. Control	3.7 a
2. Vitazyme	3.5 a
3. Vita + Nano	4.2 a
LSD (0.1)	3.6
CV	92.9
Replicate probability (F)	0.543
Treatment probability (F)	0.943

¹Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

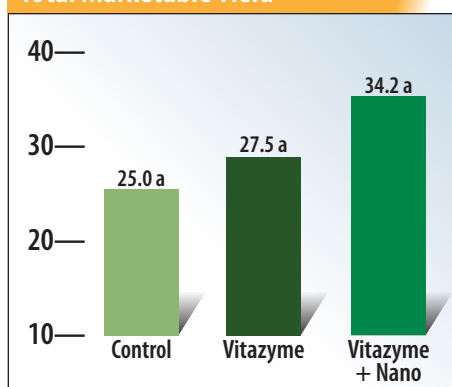
There were no significant differences in the number of unmarketable fruit for the three treatments.

Total marketable yield results: Plot values were extrapolated to a per acre basis.

Treatment	Fruit yield ¹ tons/acre	Yield change tons/acre
1. Control	25.0 a	—
2. Vitazyme	27.5 a	2.5 (+10%)
3. Vita + Nano	34.2 a	9.2 (+37%)
LSD (P=0.1)	15.1	
CV	49.96	
Replicate probability (F)	0.5414	
Treatment probability (F)	0.5395	

¹Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.

Total Marketable Yield



While Vitazyme alone increased pepper yield, the Nano Yield greatly boosted the yield above Vitazyme alone, although the increases are not significant at P = 0.1.

Increase in marketable pepper yield with Vitazyme

Vitazyme only..... + 10%
Vitazyme + Nano Yield + 37%

Economic return results: The estimated value of the peppers for processing contracts is \$450/ton. The values shown here use this market value.

<i>Return on investment</i>	
<i>Cost of Vitazyme and Nano Yield (estimated):</i>	
<i>\$7.00/acre per 13 oz application¹</i>	
<i>Three applications = \$21.00/acre.</i>	
<i>Return on investment:</i>	
<i>Vitazyme</i>	<i>54.5:1</i>
<i>Vitazyme + Nano yield</i>	<i>198.2:1</i>
<small>¹This cost will vary depending upon dealer pricing.</small>	

Treatment	Fruit yield ¹	Yield change
	\$/acre	\$/acre
1. Control	11,244 a	—
2. Vitazyme	12,388 a	1,144 (+10%)
3. Vita + Nano	15,407 a	4,163 (+37%)
LSD (P=0.1)	6.801	
CV	49.96	
Replicate probability (F)	0.5414	
Treatment probability (F)	0.5395	
<small>¹Means followed by the same letter are not significantly different at P = 0.1 according to the Student-Newman-Keuls Test.</small>		

Conclusions: A small-plot bell pepper study in California revealed that Vitazyme alone, or incorporated with Nano Yield adjuvant, enhanced the yield and income of the peppers, although due to high plot variability the increases were not significant. More large peppers were harvested with the two products, and pepper number was also increased, with the final yield being increased by 2.5 tons/acre with Vitazyme alone, and 9.2 tons/acre with Nano Yield incorporated with it. These increases resulted in income increases of \$1,144/acre and \$4,163/acre, respectively. Return on investment ranged from 54.5:1 for Vitazyme, to 198:1 for Vitazyme + Nano Yield. These results show an excellent prospect for utilizing this silicon adjuvant to improve the activity of Vitazyme for vegetable crops.

<i>Increase in farm income</i>	
<i>Vitazyme</i>	<i>\$1,144/acre</i>
<i>Vitazyme + Nano Yield</i>	<i>\$4,163/acre</i>

Peppers with Vitazyme application—A Fertilizer Efficiency Study

Researcher: Bruce Kirksey, Ph.D.

Research organization: Agricenter International, Memphis, Tennessee

Location: Memphis, Tennessee **Variety:** LaSalle **Planting date:** August 14, 2024

Planting rate: 5 plants/plot **Row spacing:** 38 inches **Soil type:** Fayette silt loam **Tillage:** conventional

Soil character: pH = 6.5, organic matter = 1.8%, cation exchange capacity = 7.8 meq/100g, excellent fertility, good drainage

Experimental design: A small-plot randomized complete block design with four replications, was established, using pepper transplants that were placed in the holes of a plastic mulch. Treatments of Vitazyme were made to three fertilizer levels to determine the effectiveness of this biostimulant to influence fertilizer efficiency of use, as determined by pepper height and weight.

Treatment	Fertilizer	Vitazyme	
		First 13 oz/acre	Second 13 oz/acre
1. 100% fertilizer	100%	o	o
2. Vitazyme + 100% fertilizer	100%	x	x
3. 75% fertilizer	75%	o	o
4. Vitazyme + 75% fertilizer	75%	x	x
5. 50% fertilizer	50%	o	o
6. Vitazyme + 50% fertilizer	50%	x	x

Fertilization: Pre-planting: 100% = 500 lb/acre of 12-24-24% N-P₂O₅-K₂O; 75% = 375 lb/acre of 12-24-24% N-P₂O₅-K₂O; 50% = 250 lb/acre of 12-24-24% N-P₂O₅-K₂O. In season through drip irrigation: 100% = 50 lb/acre of CaNO₄ and KNO₄ in a weekly rotation; 75% = 37 lb/acre of CaNO₄ and KNO₄ in a weekly rotation; 50% = 25 lb/acre of CaNO₄ and KNO₄ in a weekly rotation.

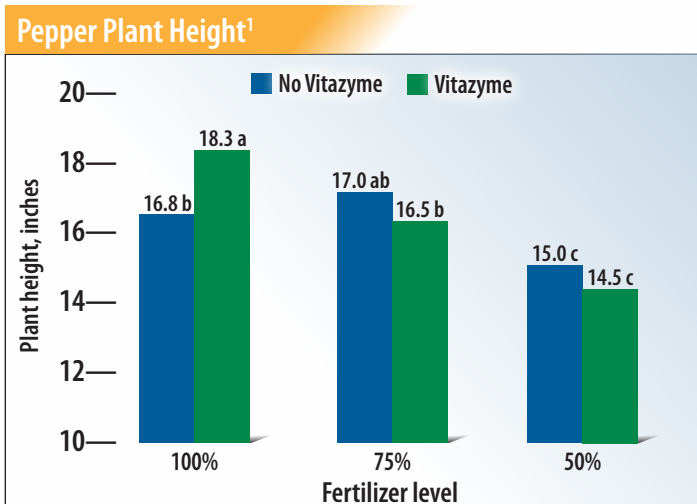
Vitazyme applications: 13 oz/acre (1 liter/ha)

sprayed on the leaves at the 3-5 leaf stage; 13 oz/acre (1 liter/ha) sprayed on the leaves at first flower

Plant height results: The height of each plant was measured on November 6, 2024.



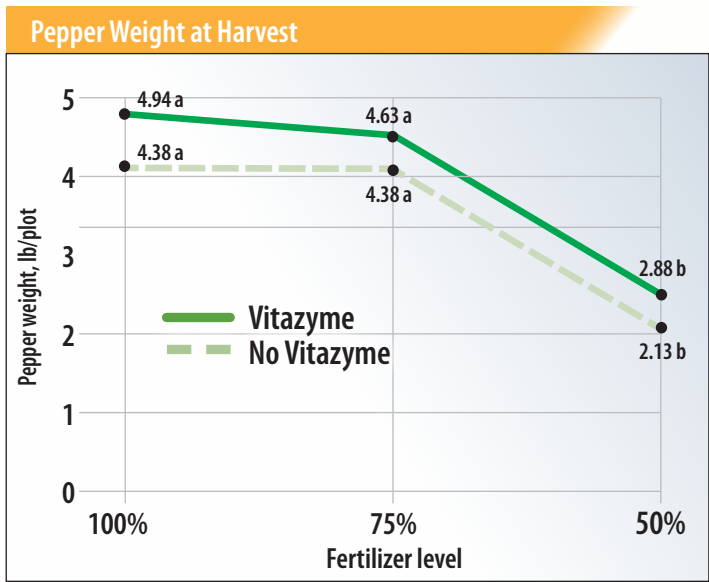
The peppers in the Tennessee trial were laid out as shown, with plastic mulch to suppress weeds and conserve moisture. Pepper yield was improved with Vitazyme at all three fertilizer levels.



¹Means followed by the same letter are not significantly different at P = 0.05 according to ANOVA. LSD (0.05) = 1.5 inches; CV + 6.09; replicate F = 0.4647; treatment prob (F) = 0.0009.

Vitazyme significantly increased plant height at the 100% fertilizer level, but the other fertilizer levels showed statistically equal heights for the treated and untreated treatments.

Pepper yield: Pepper fruit weights were measured at harvest on November 27, 2024. Comparisons are made at the same fertilizer level in the following discussions.



At every fertilizer level Vitazyme increased the pepper yield, from 6 to 35%. The greatest increase (35%) was at the 50% level, and the least at the 75% level (6%). All weights at the 75% and 100% fertilizer levels were statistically the same, but Vitazyme weights were higher in both cases.

Conclusions: A small-plot, replicated pepper trial in Tennessee, using three fertilizer levels — 50, 75, and 100% of optimum — and two Vitazyme applications, each at 13 oz/acre (1 liter/ha), revealed that at all fertilizer levels Vitazyme increased the pepper fruit yield. The highest increase at the same fertilizer level was at 50% fertilizer, where Vitazyme gave a 35% yield increase. All of the yield values were the same at the 75 and 100% fertilizer levels, but when Vitazyme was applied the yields were higher than the corresponding control. The fertilizer response of pepper yield over the three levels was quite impressive, being 80% and 86% for the 75% and 100% fertilizer averages versus the 50% fertilizer level. If plot variability had not been so great there would likely have been significant differences detected. Plant height was significantly greater with Vitazyme at 100% fertilizer; the 50% and 75% fertilizer levels showed no significant differences in plant height for the two treatments. These results reveal a definite trend in the response to Vitazyme for peppers, making this a highly viable management option for growers.

Statistical values	
LSD (0.05)	1.07 lb/plot
CV	0.7109
Replicate F	0.9963
Treatment F	0.0002

Pepper weight increases with Vitazyme at each fertilizer level	
100% fertilizer ...	0.56 lb/plot (+ 13%)
75% fertilizer	0.25 lb/plot (+ 6%)
50% fertilizer	0.75 lb/plot (+ 35%)

Fertilizer response, average of the two yield values at each fertilizer level	
100%....	4.66 lb/plot (+ 86% vs. the 50% level)
75% ...	4.51 lb/plot (+ 80% vs. the 50% level)
50% ...	2.51 lb/plot —

Peppers with Organic Vitazyme application

Researcher: Bence Kiraly, Natalia Simon, and Jeno Simon

Research organization: Biotek Agriculture Hungary Kft., 6636 Martely, hrsz. : 013818, Hungary; Vital Earth Resources, Inc. Gladewater, Texas, USA

Location: Forraskut, Csongrad-Csanad State, Hungary

Farm cooperator: Imre Illes, Forraskut, Hungary

Variety: Magus F1 (*Capsicum annuum*)

Planting date: June 12, 2021

Planting depth: 8 cm

Row spacing: 30 cm

In-row spacing: 30 cm

Soil traits: sand, 0.5% organic matter, 7.62 pH, fair fertility

Tillage: conventional

Experimental design: A small-plot pepper trial was arrayed in a randomized complete block design, using six replications.

Plots were 3 x 4.5 meters (13.5m²). The purpose of the trial was to evaluate the effect of two biostimulants on the growth, yield, and quality of peppers.

Treatment	Product applications			September 9
	June 16	July 7	July 28	
1. Control	0	0	0	
2. Amalgerol	4 liters/ha	4 liters/ha	4 liters/ha	4 liters/ha
3. Organic Vitazyme	0.5 liter/ha	0.5 liter/ha	0.5 liter/ha	0.5 liter/ha
4. Organic Vitazyme	1 liter/ha	1 liter/ha	1 liter/ha	1 liter/ha
5. Organic Vitazyme	2 liters/ha	2 liters/ha	2 liters/ha	2 liters/ha
Crop stage, BBCH scale	18:80	51:60	65:50	89:60
Interval from previous appl.	0	21 days	21 days	43 days
Method of treatment	soil drench	foliar spray	foliar spray	foliar spray
Application amounts	10,000 liters/ha	300 liters/ha	300 liters/ha	300 liters/ha

Fertilization: unknown

Organic Vitazyme application: See the rates and timing in the table.

Amalgerol application: See the rates and timing in the table. Amalgerol is a mixture of seaweed extracts, mineral oil, essential oils, and herbal extracts, and is "Qualified Organic" according to EC regulation number 834/2007, for organic use. It is produced by Hechenbichler, Innsbruck Austria.

Pest control: July 22—Thiovit Jet fungicide at 5 kg/ha, Cuproxat FW fungicide at 4 liter/ha, and Karate Zeon 5 CS insecticide at 0.3 liter/ha; August 16—Thiovit Jet fungicide at 5 kg/ha, Cuproxat FW fungicide at 4 liters/ha, and Karate Zeon 5 CS insecticide at 0.3 liter/ha; August 28—Cuproxat FW fungicide at 4 liters/ha

Phytotoxicity results: No phytotoxicity was noted for any treatment.

Crop vigor results: No significant differences were detected among the five treatments for the first three times of analysis, but the fourth date (September 23) did reveal significantly greater vigor for Vitazyme at 2 liters than the control. Averages for all four dates are given here.

Average Crop Vigor Versus the Control, %-points

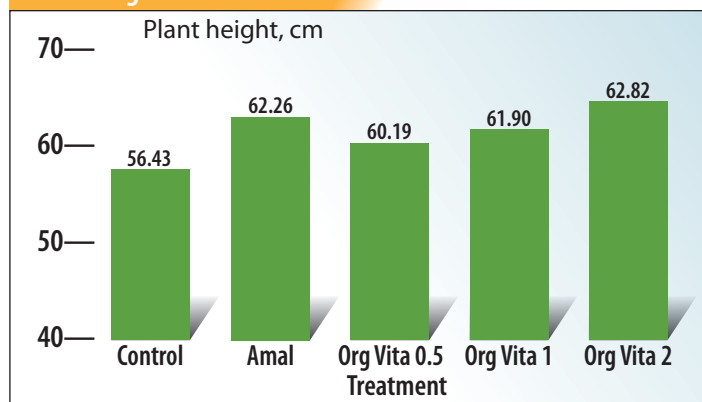
Amalgerol, 4 liters/ha	+2.6
Organic Vitazyme, 0.5 liter/ha	+1.7
Organic Vitazyme, 1 liter/ha	+2.9
Organic Vitazyme, 2 liters/ha	+3.9

Crop height results: Twenty-five plants were measured on August 11 for each plot and averaged.

Treatment	Rate	Height*	
	L/ha	cm	
1. Control	0	56.43 c	—
2. Amalgerol	4	62.26 ab	(+10%)
3. Organic Vita	0.5	60.19 b	(7%)
4. Organic Vita	1	61.90 ab	(+10%)
5. Organic Vita	2	62.82 a	(+11%)
LSD (P=0.10)		1.95	
CV		3.22	
Treatment F		0.0001	

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

Plant Height



Organic Vitazyme at 1 and 2 liters/ha significantly increased pepper height above the control (+10% and +11%), as did the Amalgerol treatment (+10%).

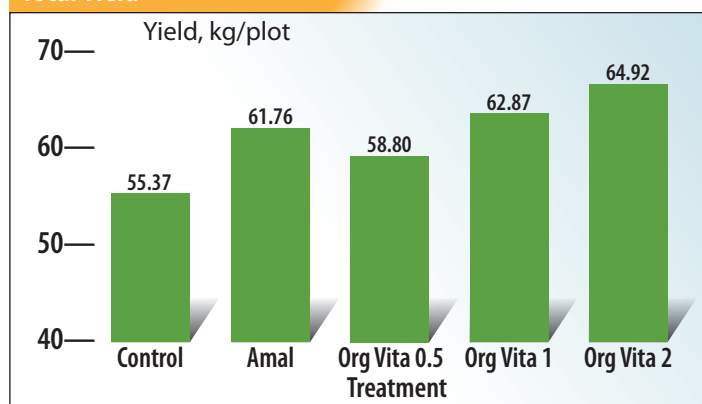
Crop yield results:

Treatment	Rate	Harvest Date*			
		September 9	September 16	September 23	Total
	L/ha	kg/plot	kg/plot	kg/plot	kg/plot
1. Control	0	41.14 c	51.47 c	55.37 c	
2. Amalgerol	4	43.85 ab	56.05 ab	61.76 ab	(+12%)
3. Organic Vita	0.5	42.24 bc	53.59 bc	58.80 bc	(+6%)
4. Organic Vita	1	44.05 ab	55.97 ab	62.87 ab	(+14%)
5. Organic Vita	2	44.71 a	56.55 a	64.92 a	(+17%)
LSD (P=0.10)		1.96	2.70	4.33	
CV		4.57	4.95	7.16	
Treatment F		0.0311	0.0190	0.0101	

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

Organic Vitazyme at 2 liters/ha produced the greatest yield increase (+17%), followed by Organic Vitazyme at 1 liter/ha (+14%) and Amalgerol (+12%). All treatments significantly exceeded the control.

Total Yield



Increase in yield above the control

Organic Vitazyme, 2 liters/ha+17%
 Organic Vitazyme, 1 liter/ha+14%
 Organic Vitazyme, 0.5 liter/ha+6%
 Amalgerol, 4 liters/ha+12%

Unmarketable fruit results: An analysis of unusable fruit was made on September 9, 16, and 23. No differences were significant, but Vitazyme at 1 and 2 liters/ha produced the least unmarketable fruit. These average percentages for all three dates are shown here.

Unmarketable fruit

<i>Organic Vitazyme, 1 liter/ha</i>	<i>5.33%</i>
<i>Organic Vitazyme, 2 liters/ha</i>	<i>5.55%</i>
<i>Organic Vitazyme, 0.5 liter/ha</i>	<i>6.54%</i>
<i>Amalgerol, 4 liters/ha</i>	<i>6.18%</i>
<i>Control</i>	<i>7.48%</i>

Fruit sugar content: There were no significant differences in fruit sugar content. All values were from 3.9 to 4.2% sugar.

Leaf chlorophyll results: All treatments were about equal, and significantly exceeded the control by about 1.0 SPAD unit, at $P=0.10$. Twenty leaves from each plot were measured for chlorophyll with a Minolta SPAD meter, and averaged.

Root mass results: No treatment was significantly different at $P=0.10$, from 20 plant roots weighed from each plot, and averaged. Treated roots varied from about 155 to 160 g/plot, which was nonsignificantly greater than the 149.3 g weight of the control.

Conclusions: A small plot replicated pepper trial in Hungary, which evaluated the effectiveness of Organic Vitazyme at 0.5, 1, and 2 liters/ha and Amalgerol at 4 liters/ha, revealed that Organic Vitazyme at 2 liters/ha was the superior treatment in terms of plant vigor, plant height, and yield. Organic Vitazyme at 2 liters/ha increased crop vigor by 3.9 percentage points above the control, and the yield of peppers was 17% greater than the control for this treatment. The 1 liter/ha Organic Vitazyme treatment produced 14% more yield, while Amalgerol increased the yield by 12%. The height of the plants was significantly greater than the control by 10 to 11% for Organic Vitazyme at both 1 and 2%, and for Amalgerol. No significant effects were noted for phytotoxicity, fruit sugar, leaf chlorophyll, root mass, and unmarketable fruit, although both 1 and 2 liters/ha of Organic Vitazyme reduced unsalable fruit to the lowest levels, from 5.33 to 5.55% of the total yield.

Peppers with Vitazyme application

Researchers: V. V. Plotnikov and
V. V. Rohach

Research Organization: Vinnytsia
State Pedagogical University, Ministry
of Education and Science of Ukraine,
Vinnytsia, Ukraine

Location: "Berzhan P, G", Horbanovka
Village, Vinnytsia District, Ukraine

Variety: Antei

Planting rate: 66,000/ha

Seed Planting date: March 9, 2015, in
hot frames

Seedling planting date: May 15, 2015

Soil type: gray podzolic; humus = 2.2%,
hydrolyzed N = 8.4 mg/100 g of soil,
P = 15.8 mg/100 g of soil, exchangeable
K = 12.4 mg/100 g of soil, pH = 5.5

Replications: 5

Experimental design: An area of 33
m² per plot was selected from a uniform
soil area to treat with Vitazyme one time,
in order to evaluate the effect of this
product on growth parameters and yield.

1 Control 2 Vitazyme

Fertilization: a mineral fertilizer giving
50, 40, and 30 kg/ha of N-P₂O₅-K₂O

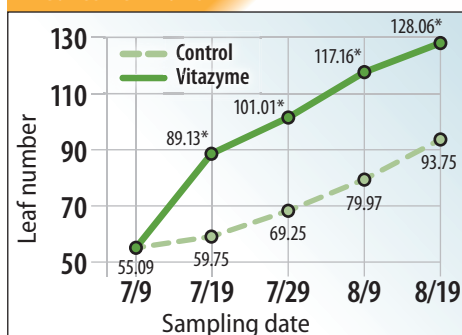
Vitazyme application: 1 liter/ha with a
backpack sprayer the morning of July 9,
2015; control plants were sprinkled with
water only at the same time

Growth results:



Pepper fruit treated with Vitazyme tends to be larger and of higher quality than their untreated counterparts.

Leaves Per Plant

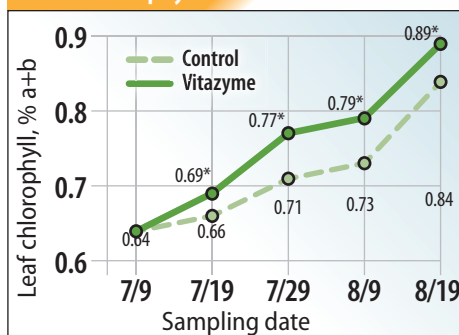


*Significantly greater than the control at P=0.05.

Increase in leaf area with Vitazyme

7/19/15.....	+14%
7/29/15	+24%
8/9/15	+38%
8/19/15	+52%

Leaf chlorophyll



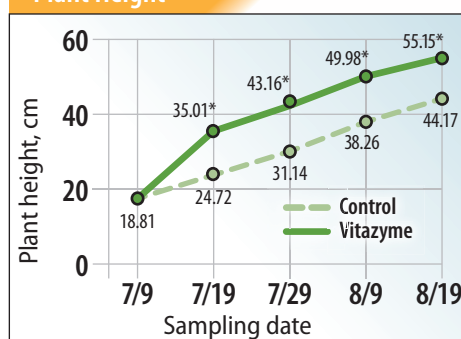
*Significantly greater than the control at P=0.05.

¹ Calculated as follows: $X = \frac{(C)(V)(100)}{(P)(1000)}$, where X=pigment content (% per leaf, net weight), C=pigment concentration (mg/liter), V=extract volume (ml), and P=weight of plant material (mg).

Increase in leaf chlorophyll with Vitazyme

7/19/15.....	+5%
7/29/15	+8%
8/9/15	+8%
8/19/15	+6%

Plant Height



*Significantly greater than the control at P=0.05.

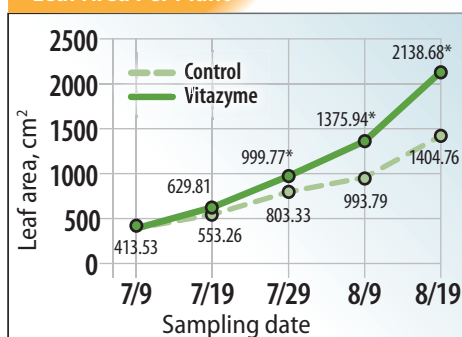
Increase in plant height with Vitazyme

7/19/15.....	+42%
7/29/15	+39%
8/9/15	+31%
8/19/15	+25%

Increase in leaves/plant with Vitazyme

7/19/15.....	+49%
7/29/15	+46%
8/9/15	+47%
8/19/15	+37%

Leaf Area Per Plant¹

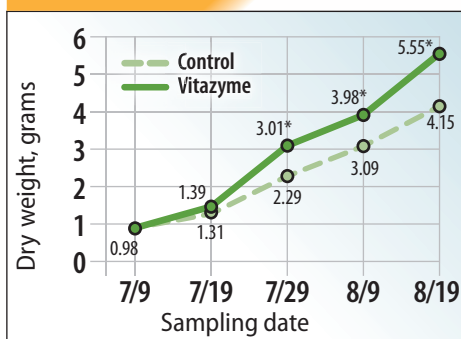


*Significantly greater than the control at P=0.05.

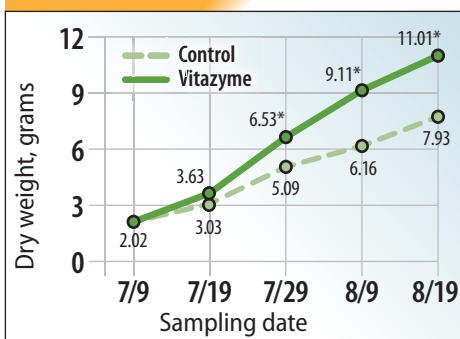
¹ Calculated as follows: $S = \frac{n(m_1)(S_2)}{m_2}$, and $S_2 = \pi r^2$, where S= leaf area (cm²), n= leaf number, m₁= leaf weight (g), m₂= cutting weight (g), S₂= cutting area (cm²), $\pi=3.14$, and r= cutting radius (cm).

Plant Organ Dry Weights

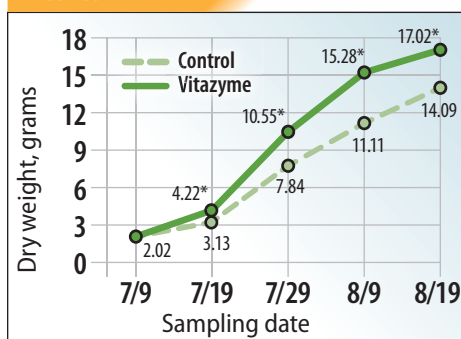
Roots



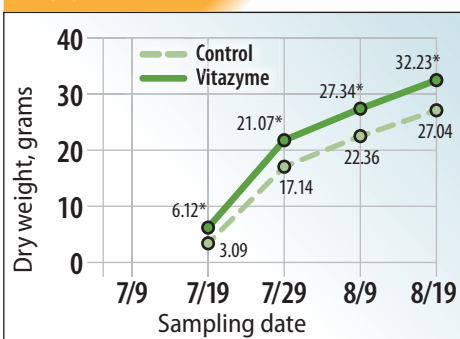
Stems



Leaves



Fruit



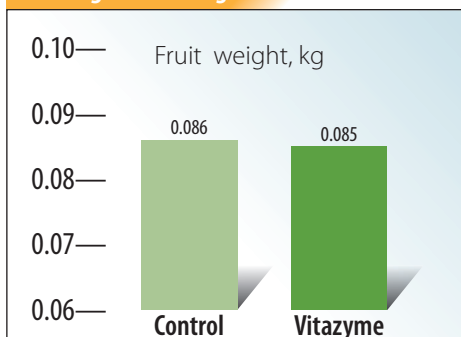
*Significantly greater than the control at P=0.05.

Economic results: An analysis of many factors was made to determine the profitability of the Vitazyme application. Costs included tillage, oil and fuel, harrowing, cultivation, fertilizers, planting, seedling, rent, watering, product applications, trucking, and harvesting.

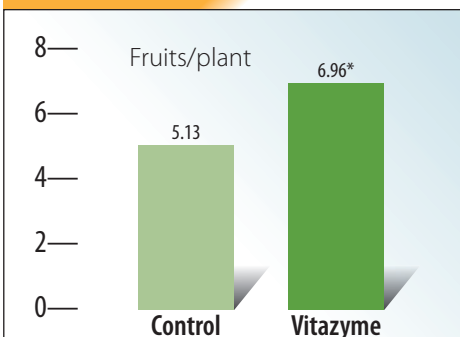
Conclusions: A bell pepper study in Ukraine, using one 1 liter/ha foliar application, revealed that the yield increased by 34%, with a net profit increase of 42%. This yield and profit improvement resulted from significant increases in plant height (up to 42%), leaves/plant (37 to 49%), leaf area/plant (14 to 52%), and leaf chlorophyll (5 to 8%). Improvements in root, stem, leaf, and fruit yields were significant in most cases for the four dates measurements were made. These results reveal the great effectiveness of Vitazyme for pepper production in Ukraine.

Yield results:

Average Fruit Weight

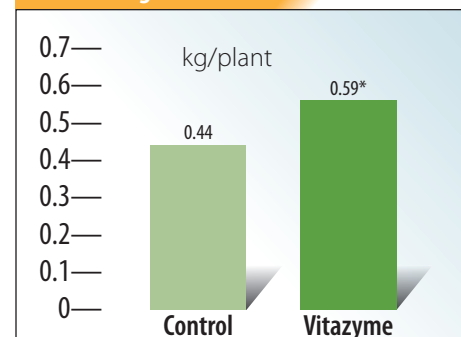


Fruits Per Plant



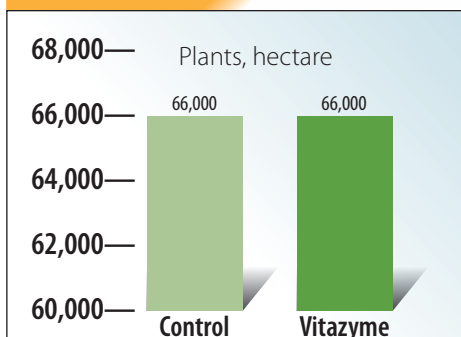
*Significantly greater than the control at P=0.05.

Fruit Weight Per Plant

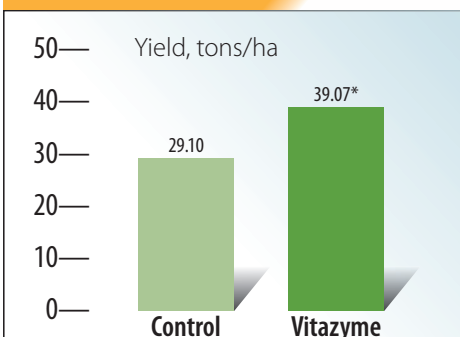


*Significantly greater than the control at P=0.05.

Plants Per Hectare



Fruit Yield



*Significantly greater than the control at P=0.05.

Treatment	Net profit	Profit increase
	UAH/ha	UAH/ha
Control	162,411.51	—
Vitazyme	230,375.23	67,963.72 (+42%)

Increase in net profit with Vitazyme: 42%

Increase with Vitazyme

Fruits/plant +36%
Fruit weight/plant..... +34%
Fruit yield +34%

Peppers with Vitazyme application

Researchers: Jonathan Pedroza, Lucero Fernandez, Agustin Peralta, and Ernesto Infante

Research organizations: Quimica Lucava, Mexico

Farmer Cooperator: Maurilio Lozano

Location: El Tabano Farm, San Francisco del Rincon, Guanajuato, Mexico

Variety: Jalapeño

Transplanting date: March 19, 2015

Experimental design: A half hectare of a pepper field was selected to apply three Vitazyme applications to jalapeño peppers, with the objective of evaluating the product's effects on plant growth, yield, and profitability.

1 Control 2 Vitazyme

Vitazyme application: (1) transplant trays dipped in a 0.5% solution (1 liter/200liters of water) on March 16, three days before transplanting; (2) 1.0 liter/ha sprayed on the leaves and soil on April 26; (3) 1.0 liter/ha sprayed on the leaves and soil on May 15

Harvest date: June 24, 2015

Growth results:

April 23 observations (35 days after transplanting)

- Greater total root growth and health compared to the control plants
- More fine roots and root hairs

May 15 observations (57 days after transplanting)

- Greater overall plant growth and appearance than the control plants
- More leaves, flowers, and fruit
- Greater primary, secondary, and fine roots

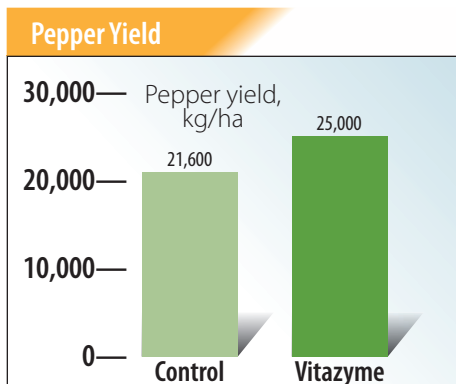
Yield results:

Treatment	Yield	Yield change
	kg/ha	kg/ha
Control	21,600	—
Vitazyme	25,000	3,400 (+16%)
Increase in pepper yield with Vitazyme: 16%		

Income results: The price of Jalapeño peppers was 0.4733 USD/kg, and the cost of three Vitazyme applications, including labor, was 113.33 USD/ha.



Peppers grown with Vitazyme (left) in Mexico display a greater number of fruit, and better uniformity.



Conclusions: A field Jalapeño pepper study in Mexico, using a root dip before transplanting followed by two foliar applications at 35 and 57 days after transplanting, revealed that pepper yield increased by 16%, as evidenced by larger, leafier, and healthier plants having more extensive and fibrous root systems compared to the untreated control. Besides, income improved by nearly 1,500 USD/ha, with a cost : benefit of 13.2. These results show that pepper production in Mexico can greatly benefit from Vitazyme use.

Increased gross added income from 3,400 kg/ha = 1,609.22 USD/ha

Net added income after three applications = 1,495.89 USD/ha

Cost : Benefit with Vitazyme: 13.2

Vital Earth Resources

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

2014 Crop Results

Vitazyme on Peppers (Chili)

Researcher: Thierry Pelette

Research organization: Acra Industries, Haiti

Location: Belladere, Haiti

Variety: West Indies

Planting date: unknown

Experimental design: This experiment was part of a multi-crop testing program that was established in December of 2011, to evaluate the efficacy of Vitazyme for increasing crop yields in Haiti. The test area was 1 hectare (10,000 m²) for the treated and control plots.

1. Control

2. Vitazyme

Fertilization: unknown

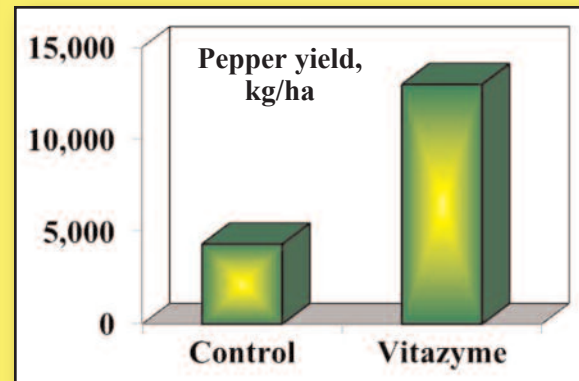
Vitazyme application: 1 liter/ha (13 oz/acre)

Harvest date: unknown

Yield results:

Treatment	Yield kg/ha	Yield change kg/ha
Control	4,329	—
Vitazyme	17,316	12,987 (+300%)

**Increase in chili pepper
yield with Vitazyme: 300%**



Conclusions: A chili pepper study in Haiti revealed a great increase in yield with Vitazyme application, fully 300% greater than the control. It is not known why the control treatment yielded so poorly, possibly due to plant disease which Vitazyme suppresses. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Vital Earth Resources

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

2013 Crop Results

Vitazyme on Pepper (Black)

Four Farm Trials — Cu Jut District

Trial 1

Researcher: unknown
District, Viet Nam

Farmer: Dam Van Huan
Variety: *Piper nigrum*

Location: Dak Rong Hamlet, Cu Jut
Plant population: 1,600 pillars/ha

Experimental design: Pepper plants were treated with Vitazyme multiple times to evaluate its effect on pepper production, as compared to an untreated control.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) applied to 150 pepper pillars four times per year

Treatment	Ear length	Flowering	Fruits/Ear	Ear falling	Yield/Pillar	Total yield
	cm		number		kg	kg/ha
Control	10	Long periods	22.5	Much	4.1	6,560
Vitazyme	11	Same time	27.0	None	5.8	9,200

Trial 2

Researcher: unknown
Cu Jut District, Viet Nam

Farmer: Lang Van Chanh
Variety: unknown

Location: Bon U2-Dak Rong Hamlet,
Plant population: 1,700 pillars/ha

Experimental design: Pepper plants were treated with Vitazyme multiple times to evaluate its effect on pepper production, as compared to an untreated control.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) applied to 250 pepper pillars five times per year

Treatment	Ear length	Flowering	Ear falling	Yield/Pillar	Total yield
	cm			kg	kg/ha
Control	10.5	Long periods	Much	4.1	7,480
Vitazyme	11.0	Same time	None	6.0	10,200

Trial 3

Researcher: unknown
District, Viet Nam

Farmer: Trien Van Muu
Variety: unknown

Location: Cu Knia Hamlet, Cu Jut
Plant population: 1,300 pillars/ha

Experimental design: Pepper plants were treated with Vitazyme multiple times to evaluate its effect on pepper production, as compared to an untreated control.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) applied to 200 pepper pillars three times a year

Treatment	Ear falling	Yield/Pillar	Total yield
		kg	kg/ha
Control	Falling 30-60 days before harvest	5.0	6,500
Vitazyme	None	5.3	6,890

Trial 4

Researcher: unknown
District, Viet Nam

Farmer: Nguyen Van Yan
Variety: unknown

Location: Cu Knia Hamlet, Cu Jut
Plant population: 1,800 pillars/ha

Experimental design: Pepper plants were treated with Vitazyme multiple times to evaluate its effect on pepper production, as compared to an untreated control.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) applied to 100 pepper pillars five times a year

Treatment	Ear length	Flowering	Fruits/Ear	Ear falling	Yield/Pillar	Total yield
	cm		number		kg	kg/ha
Control	11.0	Long periods	26.5	A few	6.3	11,340
Vitazyme	10.5	Same time	29.0	None	6.8	12,240

Trial Summary

Increases in Parameter Values With Vitazyme

Trial	Ear length	Flowering ¹	Fruits/Ear	Ear falling ²	Yield
Trial 1	+20%	Improved	+20%	Improved	+41%
Trial 2	+5%	Improved	—	Improved	+36%
Trial 3	—	—	—	Improved	+6%
Trial 4	-5%	Improved	+9%	Improved	+8%

¹In all cases Vitazyme caused uniform flowering at the same time, while the control displayed flowering a number of times over a long period.

²Immature pepper ears fell 1 to 2 months before harvest to a lesser or greater degree for all trials, but few fell with Vitazyme.

Income results:

Trial	Applications	Estimated added income with Vitazyme	Vitazyme cost ¹	Return On Investment
		Vnd/ha	Vnd/ha	VND spent : VND returned
Trial 1	4	136,000,000	8,000,000	17 : 1
Trial 2	5	127,500,000	6,375,000	20 : 1
Trial 3	3	71,500,000	3,900,000	18.3 : 1
Trial 4	5	162,000,000	8,100,000	20 : 1

¹Includes product plus labor to apply.

Conclusions: This Viet Nam pepper trial at four locations revealed that Vitazyme, applied as a 0.25% solution three to five times per year, improved ear length (except in one case) and fruits per ear, and greatly reduced premature ear dropping while causing flowering to occur at one time instead of over a one to two month period. Yield increased by 6 to 41%, and income by up to 162,000,000 VND/ha. **Return On Investment was boosted from 17 : 1 to 20 : 1, a very consistent response.** Based on these results, Vitazyme is highly recommended for pepper culture in Viet Nam.

Other observations: **Vitazyme treated plants had darker green leaves and more buds by only 5 to 7 days after spraying.**

Vital Earth Resources

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

2012 Crop Results

Vitazyme on Peppers

Researchers: Nelson Najarro and Cristhian Mazariegos, Foragro Development, Guatemala City, Guatemala.

Location: Jutiapa, Guatemala

Variety: Natali (sweet pepper) Transplanting date: July 25, 2011

Planting rate: row spacing = 1.25 m; in-row spacing = 2.5 cm

Growth environment: plastic tunnels

Experimental design: A pepper field was selected to evaluate the ability of Vitazyme to increase crop population. Two 120-meter rows containing 800 seedlings in a 300 m² area were treated with a single Vitazyme drench.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: Three days after transplanting, on July 28, 2011, a 1% Vitazyme solution was sprayed as a drench at the base of the transplants in the treated area. A total of 24 liters of solution was applied to the 800 seedlings, giving 30 ml/plant.

Growth results: At seven days after planting, the following results were noted with Vitazyme treatment as compared to the untreated control:

- **More intense green color**
- **Higher seedling survival rate**

Yield results:

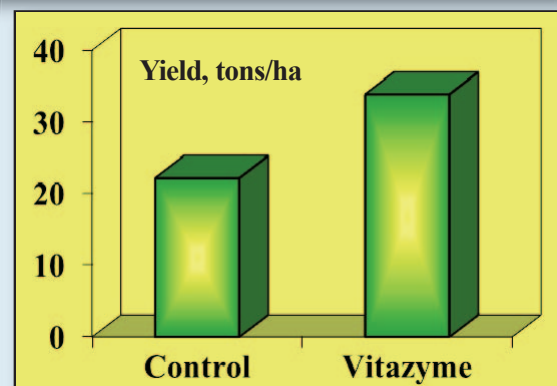
Treatment	Diameter	Length	Weight	Fruits/ha	Yield
	cm	cm	grams		tons/ha
Control	15.00	13.20	56.0	395,833	22.16
Vitazyme	23.34 (+56%)	21.32 (+62%)	65.0 (+16%)	520,833 (+32%)	33.85 (+53%)

Increase with Vitazyme

Fruit diameter	56%
Fruit length	62%
Fruit weight	16%
Fruit/ha	32%

Note that all parameters of growth, especially yield, were dramatically increased with Vitazyme application.

Conclusions: In this Guatemala pepper trial, where only a single application to the root zone was made, the fruit size was dramatically increased (56% wider and 62% longer), as were the number per hectare (32%). Weight was boosted by 16% on average. These results were gained due to greater chlorophyll development and subsequent growth, and increased transplant survival. Also, contributing to a greater final yield was a **greatly reduced infection from a viral disease** that severely infected the control area after a storm, early in the trial, tore off the plastic covers of the growth tunnels.



Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

2007 Crop Results

Vitazyme on Peppers

A Testimonial

Farmer: Michael Prochko

Location: Jefferson, Ohio

Varieties: sweet, hot, and other varieties

Soil type: silt loam, poorly drained, tilled at 20-foot centers

Spacing: double rows spaced 5 feet

In-row spacing: 15 inches

Mulching: plastic mulch over rows

Fertility level: good

Experimental design: The farmer applied a special fertility program plus Vitazyme over the entire 4.0-acre pepper area. He compared this program to previous years' results with the same cropping system.

Fertilization: added sulfur, high-calcium lime, boron, zinc, manganese, and copper

Vitazyme application: 13 oz/acre to the leaves and foliage at intervals

Weather: erratic, with a drought until late July, and then good moisture

Yield and quality results: All varieties yielded excellently, the Excursion variety producing many peppers of 1.25 lb! The hot and pablano peppers were exceptionally large and prolific, with a rapid turnover of the new fruit after picking. there were more peppers produced than he could market this year with the Vitazyme program.

Conclusions: Vitazyme in this pepper production system in Ohio produced large numbers of very sizable and tasty fruit. The product enabled the plants to make optimum use of the native and applied plant nutrients.

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

2006 Crop Results

Vitazyme on Peppers

A Testimonial

Researcher: Ing. Agapo Castro

Location: La Beatriz, Atuntaqui, Ecuador

Experimental design: No replicates were used in this study. The researcher observed the state of the crops as compared to untreated areas.

Comments by the researcher: “The plants reached a higher developmental stage and their strength was excellent, with an intense green color. We harvested bigger fruits and had a better yield. The entire crop had better sanitary [disease resistance] conditions and better drought resistance.”

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

2004 Crop Results

Vitazyme on Peppers

Researchers: Isel Creach Rodriguez, Ph.D.

Location: Santiago de Cuba Experiment Station, Dos Rios, Palma Soriana, Santiago de Cuba

Variety: Chay

Row spacing: 1 meter

Soil type: Leptic haplustert

Transplanting Date: December 5, 2003

Experimental design: An area of 73m² was used for each of the two treatments to determine the effects of the products on the growth and yield potential of the peppers. Each plot had an equal number of plants.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 1 liter/ha on January 20, 2004, and 1 liter/ha on February 11, 2004

Growth results: Plants were evaluated on January 21 and February 2, 2004, for height and leaf number using random sampling of plants and leaves. The experimental design of this study was not conducive to a detailed statistical analysis, so only basic statistics were calculated.

Plant Height

January 21, 2004

Sample	Control	Vitazyme
	cm	cm
1	23	24
2	24	23
3	24	22
4	22	25
5	23	24
6	24	23
7	25	23
8	22	24
9	23	25
10	24	22
Mean	23.4	23.5

February 9, 2004

Sample	Control	Vitazyme
	cm	cm
1	30	32
2	31	32
3	21	33
4	28	31
5	27	33
6	22	30
7	26	33
8	24	32
9	22	31
10	23	33
Mean	25.4	32.0 (+26%)

Increase in plant height: none

Increase in plant height: 26%

Leaves Per Plant (February 6)

Sample	Control	Vitazyme
	----- number of leaves -----	
1	86	112
2	87	103
3	98	100
4	95	98
5	93	102
6	82	86
7	84	108
8	95	101
9	92	106
10	99	102
Mean	91.1	101.8 (+12%)

Increase in leaves per plant: 12%

Yield results (estimated): A formula was used to calculate estimated fruit weight and final yield of the pepper crop (after two pickings), based upon previous field studies.

Parameter	Control	Vitazyme
Fruit weight	16 g	24 g
Fruit yield/plot	4.8 kg	7.2 kg

Conclusions: This study in Santiago de Cuba showed that two applications of Vitazyme substantially increased plant height by 59 days after transplanting (+26%), while leaves per plant increased by 12% with Vitazyme by 63 days after transplanting. Estimated pepper yield with Vitazyme increased by 50% over the control.

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

2000 Crop Results

Vitazyme on Peppers

Caribbean Chemical International

Agronomist: Fayaz Shah

Variety: King Henry Sweet Pepper

Harvest date: January 25, February 7, 12, 16, and 24, and March 8 and 20, 2000

Experimental design: A plot of a pepper field was treated with Vitazyme, and an adjoining portion of the field served as a control. The treated plot had 245 pepper plants in an area 10x70 feet.

Location: Aranguez, Trinidad, West Indies

Transplanting date: August 12, 1999

1. Control

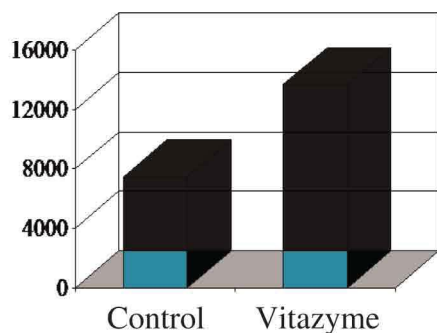
2. Vitazyme

Fertility treatments: unknown

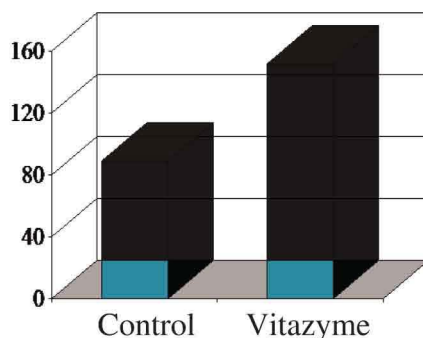
Vitazyme treatments: Vitazyme was applied three times at 30 ml/gallon (about 1%, or 3.29 liters/ha) each time on December 16 and December 29, 2000, and January 16, 2000.

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

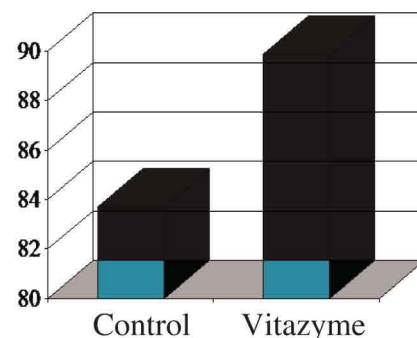
<u>Treatment</u>	<u>Yield</u>	<u>Increase</u>	<u>Fruit number</u>	<u>Increase</u>	<u>Weight per fruit</u>	<u>Increase</u>
	-----g-----				-----g/fruit-----	
Control	7,449	--	89	--	83.7	-
--						
Vitazyme	13,668	6,219 (+83%)	152	63 (+71%)	89.9	6.2 (+7%)



Total yield, grams



Fruit number



Weight per fruit, grams

Conclusion: Vitazyme proved to be a great stimulator of pepper yield in this study, increasing total production by 83% above the control and increasing pepper size by 7%.

Yield increase: 83%

Fruit number increase: 83%

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

1999 Crop Results

Vitazyme on Peppers Caribbean Chemical International

Researcher: Chris Teixeira, agronomist

Location: Trinidad, West Indies

Variety: King Henry

Transplanting date: September 19, 1999

Harvest date: unknown

Experimental design: An area of a pepper field was treated with Vitazyme, while an adjacent area was left untreated. The determinations below are the analysis of five replications:

1. Control (no Vitazyme)

2. Vitazyme

Fertility treatments: 1 oz/plant of 12-24-12% N-P₂O₅-K₂O at planting; 1oz/plant of 12-12-17-2(Mg) 2 weeks after planting, and every 3 weeks thereafter

Vitazyme treatment: a 1% solution sprayed on the leaves and foliage on September 19, October 5, and October 24, 1999

Yield and growth results: All values are from five replicates, collected on **November 10, 1999.**

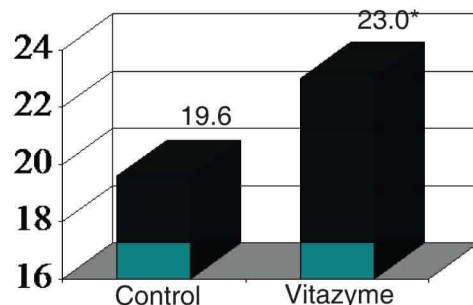
Plant Height

	Height, cm	Change, cm
Control	19.6	---
Vitazyme	23.0*	3.4 (+17%)

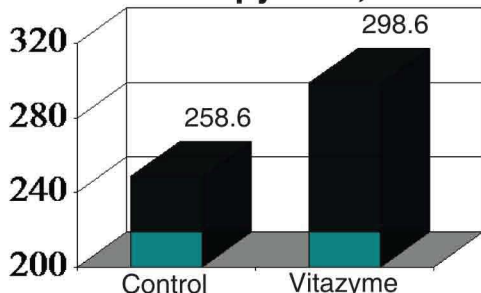
*Significantly greater than the control at P=0.12 (Duncan's Test)

Height increase: 17%

Plant height, cm



Canopy area, cm²



Leaf Canopy Area

	Canopy area, cm ²	Change, cm
Control	248.6	---
Vitazyme	298.6	50.0 (+20%)

***Significantly greater than the control at P=0.001 (Duncan's test)

Canopy increase: 20%

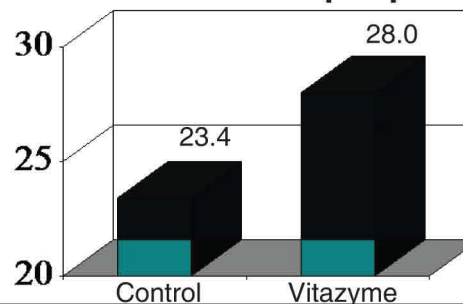
Fruit and Flower Number

	Fruit and flower number	Increase
Control	23.4	---
Vitazyme	28.0*	4.6 (+20%)

*Significantly greater than the control at P=0.21 (Duncan's Test)

Fruit and flower increase: 20%

Fruit and flowers per plant

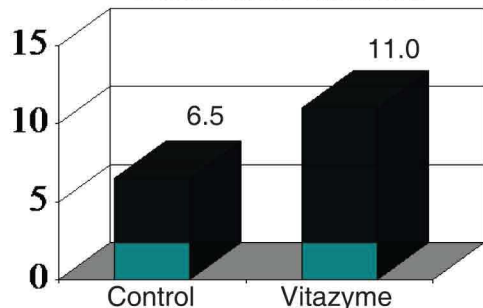


At this date the Vitazyme treatment was visibly superior to the control in the following respects:

- **A thicker, lusher leaf canopy**
- **Bigger and better developed roots**
- **A noticeably better fruit set, and larger and more numerous pepper fruit**

Yield and growth results: Observations were made on **December 1, 1999**, using 10 plants per treatment.

Buds and flowers



Buds and Flowers

	<u>Buds and flowers</u>	<u>Increase</u>
Control	6.5	---
Vitazyme	11.0	4.5 (+69%)

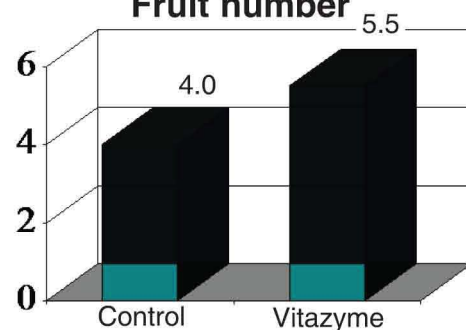
Bud and flower increase: 69%

Pepper Fruit

	<u>Fruit number</u>	<u>Increase</u>
Control	4.0	---
Vitazyme	5.5	1.5 (+38%)

Pepper fruit increase: 38%

Fruit number



The Vitazyme treated plants also had **thicker stems**, were **darker green** in color throughout, and were **larger** in size than the control plants.