

Vital Earth Resources

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

2014 Crop Results

Vitazyme on Cabbage

Researcher: Thierry Pelette

Research organization: Acra Industries, Haiti

Location: Belladere, Haiti

Variety: Tropicana

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 plants.

1. Control

2. Vitazyme

Fertilization: unknown

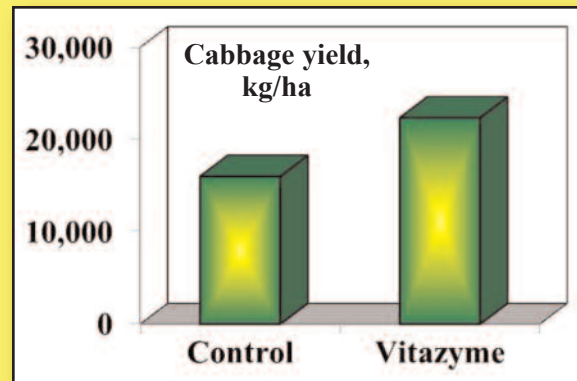
Vitazyme application: 1 liter/ha (13 oz/acre)

Harvest date: unknown

Yield results:

Treatment	Yield kg/ha	Yield change kg/ha
Control	15,999	—
Vitazyme	22,353	6,354 (+40%)

**Increase in cabbage yield
with Vitazyme: 40%**



Conclusions: A cabbage study in Haiti revealed a great increase in yield with Vitazyme application, the treated plants producing 40% more than the untreated control cabbage. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

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2009 Crop Results

Vitazyme on Cabbage

Researchers: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xino Wenzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute

Location: Xinzhou, Jinshi, Hunan, China

Variety: Jingfeng 1

Planting date: July 25, 2009

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

1. Control

2. Vitazyme

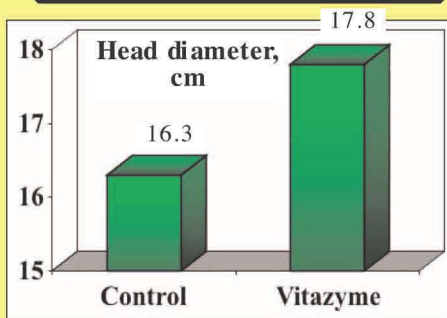
Fertilization: unknown

Vitazyme application: (1) seeds soaked in a 5% Vitazyme solution for 5 minutes (July 25); (2) transplant roots dipped in a 1% solution for 5 minutes (August 30); (3) 1.0 liter/ha sprayed on the leaves and soil 30 days after transplanting (September 30); (4) 1.0 liter/ha sprayed 60 days after transplanting (November 2)

Harvest date: unknown

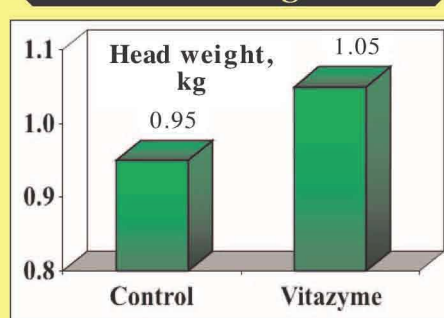
Yield results:

Head Diameter



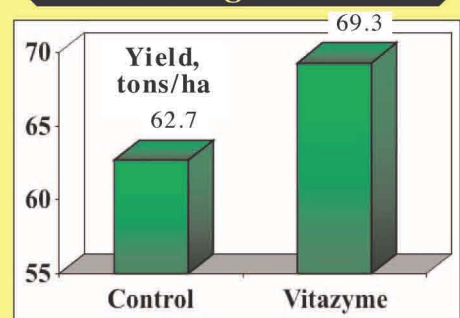
Increase in head diameter with Vitazyme: 9%

Head Weight



Increase in head weight with Vitazyme: 11%

Cabbage Yield



Increase in cabbage yield with Vitazyme: 11%

Income results:

Treatment	Income	Change
	----- RMB/ha -----	
Control	50,160	—
Vitazyme	55,440	5,280 (+11%)

Increase in income with Vitazyme: 11%

Conclusions: This cabbage study in China, where Vitazyme was applied on the seeds, transplants, and twice on the leaves and soil, revealed increases in head diameter (9%) and head weight (11%), plus an 11% increase in yield. Moreover, the income was increased by 11% with Vitazyme compared to the untreated control. These results show that this product can excellently improve cabbage yield and income in China.

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2008 Crop Results

Vitazyme on Cabbage

Researcher: unknown

Variety: KK cross

Planting date: spring, 2008

Experimental design: A field of cabbage was divided into Vitazyme treated and untreated areas for the purpose of evaluating the effect of the product on cabbage yield.

Location: Hoai Duc, Ha Tay, Viet Nam

Soil Type: alluvial soils of the Red River

Planting density: unknown

1. Control

2. Vitazyme

Fertilization: unknown

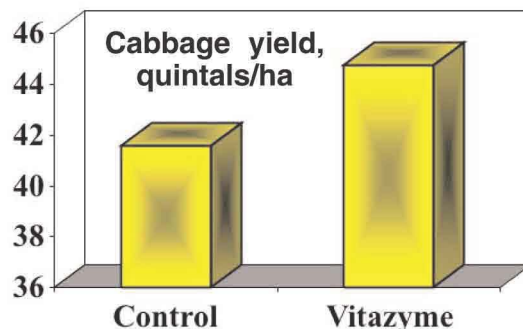
Vitazyme application: two applications of 1 liter/ha each time (times unknown)

Harvest date: unknown, in 2008

Yield results:

Treatment	Yield quintals/ha	Change quintals/ha
Control	41.58	—
Vitazyme	44.75	3.17 (+8%)

Increase in cabbage yield: 8%



Income results: an income increase of 4,140,000 Vnd/ha

Conclusions: Vitazyme in this Viet Nam trial increased cabbage yield by 8%, a very profitable increase on this alluvial river bottom soil. Note also the good increase in income from just two Vitazyme applications.

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2008 Crop Results

Vitazyme on Cabbage

Researcher: unknown

Variety: Dong Du

Planting date: spring, 2008

Experimental design: A field of cabbage was divided into Vitazyme treated and untreated areas for the purpose of evaluating the effect of the product on cabbage yield.

Location: Minh Khai and Tu Liem, Viet Nam

Soil Type: alluvial soils of the Red River

Planting density: unknown

1. Control

2. Vitazyme

Fertilization: unknown

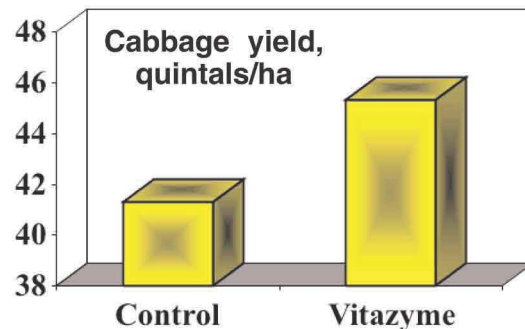
Vitazyme application: two applications of 1 liter/ha each time (times unknown)

Harvest date: unknown, in 2008

Yield results:

Treatment	Yield quintals/ha	Change quintals/ha
Control	41.30	—
Vitazyme	45.34	4.04 (+10%)

increase in cabbage yield: 10%



Income results: an income increase of 5,445,000 Vnd/ha

Conclusions: Vitazyme in this Viet Nam trial increased cabbage yield by 10%, a very profitable increase on this alluvial river bottom soil.

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2008 Crop Results

Vitazyme on Cabbage

Researcher: unknown

Variety: KK cross

Planting date: spring, 2008

Experimental design: A field of cabbage was divided into Vitazyme treated and untreated areas for the purpose of evaluating the effect of the product on cabbage yield.

Location: Thanh Xuan, Soc, Viet Nam

Soil Type: gray, "exhausted" soil

Planting density: unknown

1. Control

2. Vitazyme

Fertilization: unknown

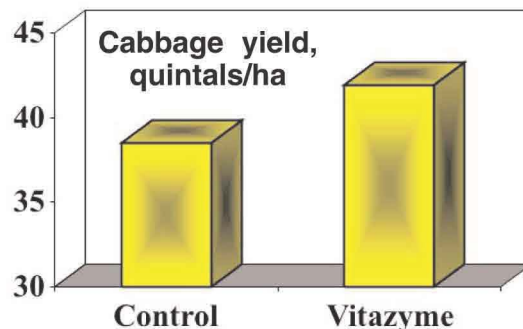
Vitazyme application: two applications of 1 liter/ha each time (times unknown)

Harvest date: unknown, in 2008

Yield results:

Treatment	Yield quintals/ha	Change quintals/ha
Control	38.50	—
Vitazyme	41.93	3.43 (+9%)

Increase in cabbage yield: 9%



Income results: an income increase of 4,530,000 Vnd/ha

Conclusions: Vitazyme in this Viet Nam trial increased cabbage yield by 9%, a very good increase on this highly farmed, exhausted soil. Besides, income was increased substantially.

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2007 Crop Results

Vitazyme on Cabbage, Organic

Researchers: Jorge Gonzalez Acosta and Wilberto Gonzalez Marrero

Organization: Ministry of Sugar, Camilo Cienfuegos Agricultural Enterprise

Location: Villena Farm, Havana Province, Cuba

Variety: Hercules

Soil type: red ferralitic, organic beds

Watering: rainfed

Planting date: September 1, 2006

Experimental design: A 0.02 ha area was selected to evaluate the effectiveness of Vitazyme in promoting cabbage yields. The crop was treated twice, and observed carefully throughout the growing cycle.

1. Control

2. Vitazyme

Fertilization: according to recommendations

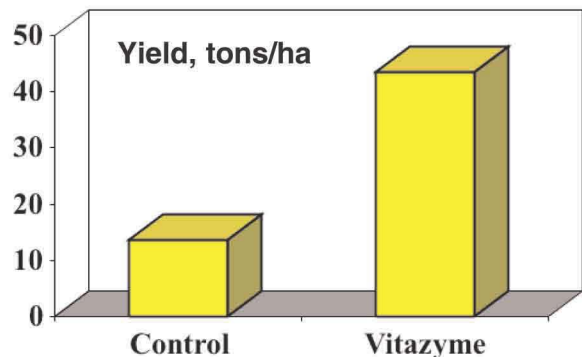
Vitazyme application: 1 liter/ha sprayed on September 20, 2006, 19 days after transplanting, and again on October 23, 33 days later

Harvest date: December 30, 2006

Treatment	Yield	Change
	tons/ha	tons/ha
Control	13.6	—
Vitazyme	43.5	29.9 (+220%)
Historic yield	6.5	—

Increase in cabbage yield: 220%

Cabbage Yield



Conclusions: This Cuban cabbage trial revealed how effective Vitazyme can be in enhancing cabbage yield under organic growing conditions. This dramatic response has been rather typical with various vegetable crops receiving Vitazyme across Cuba.

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2007 Crop Results

Vitazyme on Cabbage

Researcher/Farmer: Kludt Brothers, Inc.

Location: Kendall, New York

Variety: Morton (a kraut variety)

Soil type: sandy loam

Planting rate: 11,600 plants/acre

Row spacing: 30 inches

In-row spacing: 18 inches

Irrigation: none

Planting date: May 7, 2007

Experimental design: A cabbage field was divided into a portion treated with Vitazyme at planting, and an area alongside treated with Black Label (a United Agri-Products material) to compare final yield.

1. Black Label

2. Vitazyme

Fertilization: 350 lb/acre of 0-0-60% N-P₂O₅-K₂O applied pre-plant; 13 gal/acre 7-21-7% N-P₂O₅-K₂O starter at planting; 34 gal/acre of 30% N sidedressed

Vitazyme application: 13 oz/acre in the starter fertilizer at planting

Black Label application: the correct amount according to label directions

Chlorophyll levels: On August 15, a Minolta SPAD meter was used to evaluate the leaf chlorophyll level. Results are given below.

Treatment	SPAD values*	Change
	----- SPAD units-----	
Control	69.6	—
Vitazyme	72.2	+2.6

*Average of 30 leaves per treatment.

**Increase in leaf chlorophyll
with Vitazyme: 2.6 SPAD units**

Harvest date: September 5

Yield results: One complete row of each treatment was harvested, which were side-by-side at the treatment border. The per-acre difference in yield was calculated at that time, but the per acre values were not saved; only the increase was recorded. Yields below are based on the field average for 2007.

Treatment	Yield		Yield change
	lb/acre	tons/acre	tons/acre
Control	80,600	40.30	—
Vitazyme	82,150	41.08	0.78 (+2%)

**Yield increase with Vitazyme:
2%**

Income results: Based on a kraut cabbage value of \$65.00/ton, the extra 0.78 ton/acre yield increase brought **an additional \$50.70/acre** to the grower.

Conclusions: In this New York cabbage trial, Vitazyme, a natural growth regulator biostimulant, increased the yield by 2% above a starter fertilizer + humate product called Black Label. Ordinarily Vitazyme would be applied along with such a material to improve its efficacy, since it works by improving nutrient availability. This 2% yield enhancement resulted in a \$50.70/acre increase in income.

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2006 Crop Results

Vitazyme on Cabbage

Research location: Ontario County, New York

Planting date: May 5 (transplants)

In-row spacing: 20 inches

Population: 10,454 plants/acre

Experimental design: A cabbage field was divided into untreated and Vitazyme treated areas to determine effects of the product on cabbage yield.

Variety: Fresco (a kraut or fresh type)

Soil type: gravelly loam

Row spacing: 30 inches

Harvest date: August 8

1. Control

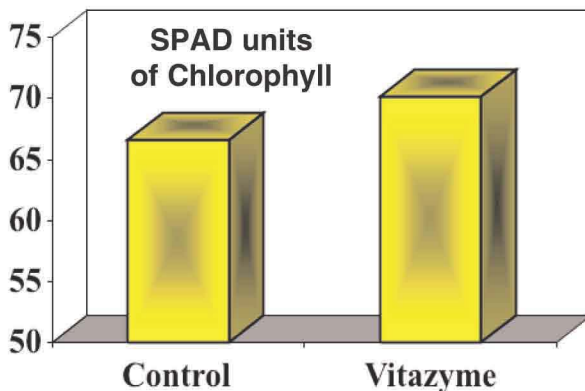
Fertilization: a standard N-P-K program

Vitazyme application: 13 oz/acre in the transplant water

Weather for the season: adequate moisture until August, then excessive

Chlorophyll results: On August 8, chlorophyll readings were made using a Minolta SPAD meter (30 leaf samples per average).

2. Vitazyme

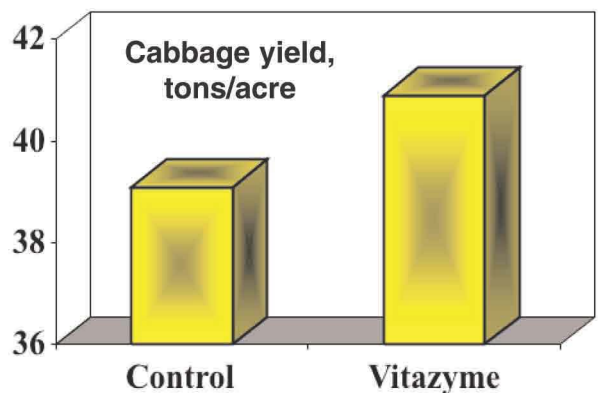


**Increase in chlorophyll with
Vitazyme: 3.5 SPAD units**

Yield results: Sections of equal length were measured and flagged in both treatments. The cabbage harvested from the two areas were 4,440 lb for the control and 4,620 lb for the treated row. This yield was superimposed on an average yield of 40.0 tons/acre to calculate treatment yield.

Treatment	Cabbage yield tons/ha	Yield increase tons/ha
Control	39.1	—
Vitazyme	40.9	1.8 (+5%)

Cabbage yield increase: 5%



Income results: Cabbage sells for about \$50/ton, so the gross income for the treatments would be \$1,955/acre for the control and \$2,045/acre for the Vitazyme treatment.

Increase in income with Vitazyme: \$90/acre

Conclusions: This New York study, which evaluated the effects of Vitazyme on cabbage yield, showed that a single 13 oz/acre rate in the transplant water increased the yield by a very profitable 5%. This increase translated into an additional \$90/acre, or an increase of about \$22.50/acre for every dollar invested.

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2006 Crop Results

Vitazyme on Cabbage

Location: Monroe County, New York

Planting date: April 25, 2006 (transplants)

Previous crop: soybeans

Experimental design: This study is a comparison of early cabbage yield with previous crops on the same farm, using identical farming practices for the various years except Vitazyme was applied to the field in 2006. The field was treated entirely with Vitazyme.

Variety: Artist

Soil type: sandy loam

1. Control (previous crops)

2. Vitazyme

Fertilization: 1,000 lb/acre of 10-20-20% N-P₂O₅-K₂O; 10 gal./acre 32% liquid N sidedressed

Vitazyme application: 13 oz/acre at transplanting in the transplant water; 13 oz/acre twice more at 30-day intervals

Weather: Rainfall was ample to excessive throughout the cropping cycle.

Harvest date: July 11 to 18, 2006

Yield results:

For 2006 (with Vitazyme)

Area harvested: 8.5 acres

Average yield: 25.51 tons/acre

Average box weight: 1,915 lb

For previous years (no Vitazyme)

Average early cabbage yield is 20 to 22 tons/acre (about 21 tons/acre).

The average box weight is about 1,750 lb.

Harvest date	Gross box weight	Net weight
	lb	lb
July 11	1,875	62,147
July 14	1,904	119,803
July 15	1,885	59,229
July 17	1,944	88,594
July 18	<u>1,944</u>	<u>103,952</u>
Total	9,552	433,725 (216.86 tons)
Average	1,915	[25.51 tons/acre]

Increase in cabbage yield: 4.51 tons/acre (+21%)

Increase in box weight: 165 lb/box (+9%)

Income results: Early cabbage averages about \$100/ton. With 4.51 tons/acre above the average yield, the added return would be \$451/acre.

Income increase: \$451/acre

Conclusions: This early cabbage evaluation in New York revealed that, compared to previous years, Vitazyme substantially improved the yield (21%) and specific gravity (9%) of the crop. These improvements amounted to a \$451/acre estimated increased return on the crop. The results are estimates only, but give a reasonable evaluation of the efficacy of Vitazyme for cabbage production on this farm.

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2006 Crop Results

Vitazyme on Cabbage

Researchers: Christy Hoepting and Jeremiah Smith
Program and the New York Crop Research Facility

Variety: Amtrack (a storage cabbage)

Soil type: clayey

CEC, 9.6 meq/100 g; K, 236 ppm; P (Mehlich), 123 ppm; P (Morgan), 40 ppm; Ca, 1,590 ppm; Mg, 121 ppm; Zn, 2.4 ppm; B, 0.9 ppm; Cu, 2.6 ppm; Al, 758 ppm; base saturation percentages, Ca = 83.1, Mg = 10.5, K = 6.3.

Row spacing: 30 inches

Experimental design: Seven products produced by different companies were applied to cabbages at transplanting to evaluate the effects on yield and growth parameters. Plots contained 20 heads in a single row, with "guard rows" between treatments. Each treatment was replicated four times. Only one product application was made, at planting.

Research Organization: CCE-Lake Plains Vegetable

Location: Batavia, New York

Planting date: June 28, 2004

Soil test results: organic matter, 3.9%; pH, 7.0;

Previous crop: turf (several years)

In-row spacing: 14.5 inches

Treatment	Rate	Active ingredients
1. Control	0	—
2. RiseR	2.5 gal/acre	7-17-3 + Cu, Mn. and Fe + ZnNH ₄ -acetate
3. Super Bio Ag Blend	1.5 gal/acre	3-0-0 + 1% humate + microbes
4. Alpine EXP + 6-24-6	1 qt/acre + 5 gal/acre	Humic coal product + 6-24-6
5. Vitazyme + Alpine EXP + 6-24-6	13 oz/acre + 1qt/acre + 5 gal/acre	Biostimulant + above products (see 3)
6. Fertiactyl GZ	4 pt/acre	13-0-5 + microbes, humates, and fulvic acid
7. Fertiactyl Starter	7 pt/acre	10-5-10 + humates, fulvic acid, zeaton, and glycin betaine
8. Hydra-Hume	2 gal/acre	0-0-2 + 12% humate + 4% fulvic acid

Fertilization: 600 lb/acre Cabbage Blend M (14.7-13.1-2.9-0.7% N-P₂O₅-K₂O-S-Zn) broadcast in the spring; two applications of 32% N Nitro (70 lb/acre N) sidedressed during the growing season

Product application: On June 28 at transplanting, furrows in the field were dug with a hoe and the transplants were placed in them. The products were poured evenly in 350 gal/acre equivalent of water over the transplants to simulate mechanical planter placement.

Growing season: unusually wet and cool all summer, giving high disease pressure (especially black rot), but low insect pressure

Growth results: Field evaluations were made about 2 and 6 weeks (June 16 and August 7, respectively) after planting on 10 randomly selected plants per row. Measurements were made on height, width, leaf number, and overall health. Final yield harvest was made on October 20, at which time overall plant health, head weight, head size and density, and head quality were evaluated.

Plant Size¹

Treatment	Bareroot ²		Plugs ²	
	Two weeks	Six weeks	Two weeks	Six weeks
	cm ²	cm ²	cm ²	cm ²
1. Control	944 a	2450 a	453 b	2172 a
2. RiseR	597 cd	2383 a	290 c	2084 a
3. Super Bio	439 d	1152 c	251 c	1256 c
4. Alpine	602 c	1772 b	408 b	1741 b
5. Vitazyme	752 b	1548 b	460 ab	2132 a
6. Fertiactyl GZ	827 ab	2515 a	474 b	2034 a
7. Fertiactyl St.	937 a	2215 a	527 a	1916 ab
8. Hydra-Hume	742 bc	2370 a	444 b	2034 ab

¹Plant size = (Plant width)(Plant height), in cm.

²Means followed by the same letter are not significantly different at P=0.05 according to Fisher's Protected LSD Test.

Health Rating¹, Pre-Harvest

Treatment	Bareroot ²		Plugs ²	
	Two weeks	Six weeks	Two weeks	Six weeks
1. Control	4.4	4.6	4.3	4.8
2. RiseR	4.3	4.1	2.9	4.0
3. Super Bio	2.1	2.4	2.7	2.8
4. Alpine	3.2	3.7	3.7	3.6
5. Vitazyme	3.6	3.0	4.4	4.2
6. Fertiactyl GZ	4.4	4.3	4.5	4.2
7. Fertiactyl St.	4.5	4.1	4.7	4.4
8. Hydra-Hume	4.2	4.6	4.3	4.6

¹Health rating: 1 = all dead, 5 = plants look very healthy.

²No means differed significantly according to Fisher's Protected LSD Test (P=0.05).

There were no significant differences between the eight treatments, in large part due to some very poorly performing plots. The reason for these failures was not known.

Number of Leaves

Treatment	Leaf number at two weeks ¹	
	Bareroot	Plugs
1. Control	10.6 ab	8.8 b
2. RiseR	9.4 bc	7.8 c
3. Super Bio	6.5 e	7.1 c
4. Alpine	7.9 de	7.2 c
5. Vitazyme	9.1 cd	9.1 ab
6. Fertiactyl GZ	10.1 abc	8.9 ab
7. Fertiactyl St.	11.3 a	9.8 a
8. Hydra-Hume	10.1 abc	9.0 ab

¹Means followed by the same letter are not significantly different at P=0.05 according to Fisher's Protected LSD Test.

For plugs, Fertiactyl Starter had the biggest plant size, but this size was statistically equal to Vitazyme. At 6 weeks after transplanting all but the Super Bio and Alpine treatments were statistically equal in plant size, the control having the largest plants.

Harvest and yield results: On October 20, 2004, a final overall plant health rating was made. Then every other head, for a total of 10 heads per replicate, was harvested and weighed. Of these 10 heads, five were selected at

The control had the highest leaf number of all treatments for bareroot transplants, and the Fertiactyl Starter did best for the plugs. Vitazyme was only slightly behind behind the control in leaf number for bareroot transplants, and statistically equal to the highest value for plugs.

The control performed the best for total plant size of bareroot transplants at 2 weeks after transplanting, but at 6 weeks the Fertiactyl GZ had surpassed the control slightly, though not significantly.

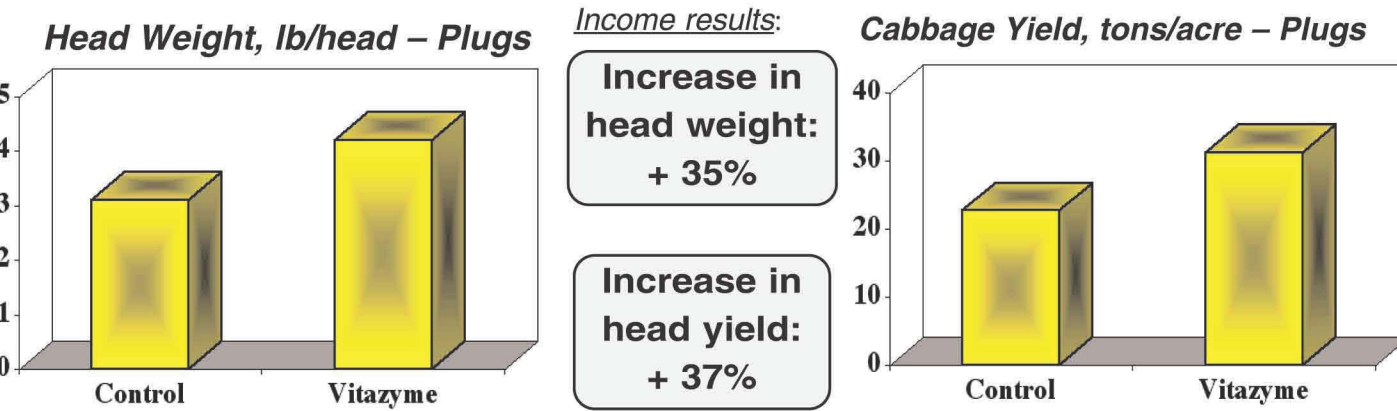
random to measure individual weight, length, and width. These data were used to estimate head density. Head quality was also judged at harvest.

No treatment means were significantly different, but there were some notable differences among the treatments. The Hydra-Hume had the highest field (health) rating for bareroot transplants at harvest, while Hydra-Hume,

Treatment Head density	Field rating ¹		Head weight		Yield ²			
	Bareroot	Plugs	Bareroot	Plugs	Bareroot	Plugs	Bareroot	Plugs
			lb		tons/acre		grams/in ²	
1. Control	4.3	4.2	4.0	3.1	28.8	22.7	0.53	0.48
2. RiseR	4.1	3.8	4.3	3.3	30.4	23.6	0.60	0.57
3. Super Bio	2.4	4.2	3.1	3.3	19.3	20.5	0.58	0.62
4. Alpine	3.7	3.1	3.6	3.4	25.7	19.1	0.57	0.56
5. Vitazyme	3.0	4.2	3.4	4.2	21.4	31.2	0.57	0.51
6. Fertiactyl GZ	3.9	3.4	3.4	3.0	25.0	21.1	0.62	0.51
7. Fertiactyl St.	3.9	4.3	3.2	3.2	23.3	21.1	0.49	0.61
8. Hydra-Hume	4.7	4.2	4.2	3.2	29.9	23.3	0.50	0.51

¹Field rating: 1 = all dead, 5 = plants look very healthy.
²Estimated yield adjusted for missing plants (i.e., dead), but including unmarketable heads; (average head weight)(14,400 plants/acre) + (2000 lb)(100% – % missing plants).

Fertiactyl Starter, Vitazyme, Super Bio, and the control had virtually identical high ratings for plug transplants. Individual head weight was highest for RiseR and Hydra-Hume for bareroot transplants, but **by far the highest head weight for plugs was with Vitazyme (+35%)**. Estimated yields varied considerably for bareroot plants, being highest for RiseR, Hydra-Hume, and the control, while **Vitazyme produced by far the highest yield for the plug transplants (+37%)**. Head density was highest for Fertiactyl GZ with bareroot plants, and for Super Bio and Fertiactyl Starter for plugs.



Cost Benefit Per Acre of Materials That Demonstrated Yield Enhancement Capabilities

Treatment	Transplants	Rate/Acre	Yield enhancement ¹				Cost of product			Cost bene-	
			Processing		Fresh market						
			tons/acre	\$/acre	tons/acre	\$/acre	\$/gal	\$/acre	Total, \$/acre	Processing	Fresh market
RiseR	bareroots	2.5 gal	1.6	77.92	1.6	403.20	8.25	20.63	20.63	57.29	382.57
	plugs	2.5 gal	0.9	43.83	0.9	226.80	8.25	20.63	20.63	23.20	206.17
Vitazyme	plugs	13 oz					45.00	4.57			
Alpine EXP		1 qt					10.00	2.50			
6-24-6		5 gal	8.5	413.95	8.5	2,142.00	2.70	13.50	20.57	393.38	2,121.43
Hydra-Hume	bareroots	2 gal	1.1	53.57	1.1	277.20	6.50	13.00	13.00	40.57	264.20
	plugs	2 gal	0.6	29.22	0.6	151.20	6.50	13.00	13.00	16.22	138.20

(From the table on the previous page) ¹USDA average commodity prices: processing = \$48.70/ton; fresh = \$252.00/ton.

Conclusions: According to the researchers, **“Although not significant, Vitazyme + Alpine EXP 6-24-6 (Treatment 5) on plug transplants had the greatest effect on yield. Compared to the untreated check, this treatment increased yield by 8.5 tons/acre (37.4%) and improved head quality.** RiseR and Hydra-Hume also increased yield by 5.6% and 3.8%, respectively, on bareroots, and by 4.0% and 2.6%, respectively, on plugs, although not significantly. Note, Hydra-Hume did have a higher percentage of poor quality heads at harvest compared to the untreated check.”

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2004 Crop Results

Vitazyme on Cabbage

Researcher: Isel Creach Rodriguez, Ph.D. and others

Farm: Alfride Vazquez

Variety: unknown

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

Soil type: Leptic haplustert

Transplanting date: unknown

Row spacing: unknown

Experimental design: Two treatments were set up in a cabbage field to evaluate the effects of Vitazyme on growth and yield. Several growth parameters were measured in addition to final yield.

1. Control

2. Vitazyme

Fertilization: unknown

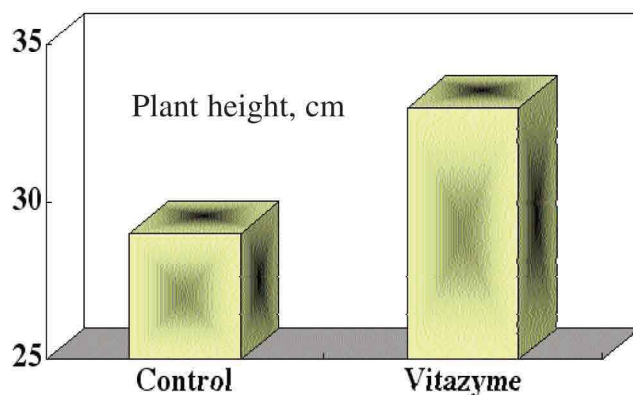
Vitazyme treatment: unknown

Growth and yield results: The parameters shown here were measured at harvest.

Plant Height

Treatment	Height	Change
	cm	cm
Control	29	—
Vitazyme	33	4 (+14%)

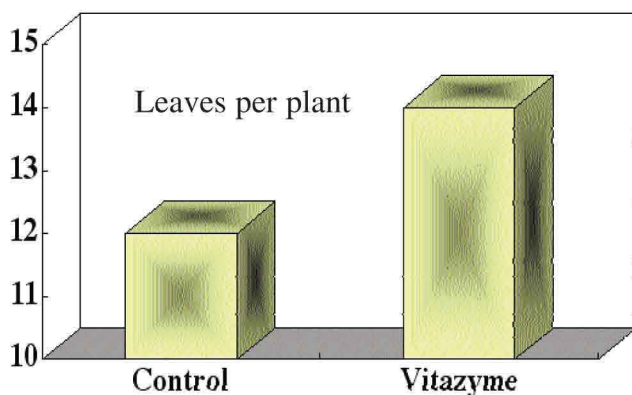
Increase in plant height: +14%



Leaf Width

There was no difference in leaf width for the two treatments. Each averaged 21 cm in width.

Leaves Per Plant



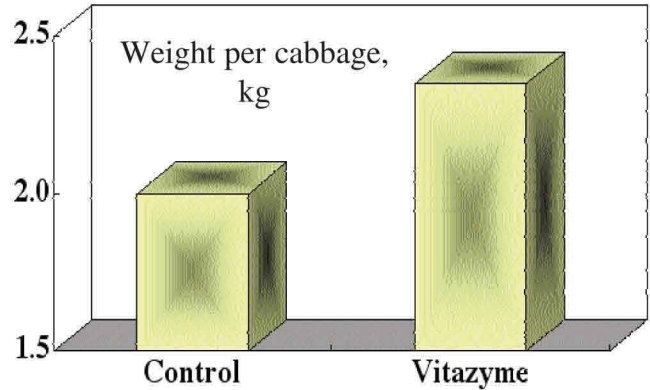
Treatment	Leaves/plant	Change
	number	number
Control	12	—
Vitazyme	14	2 (+17%)

**Increase in leaves per plant:
+17%**

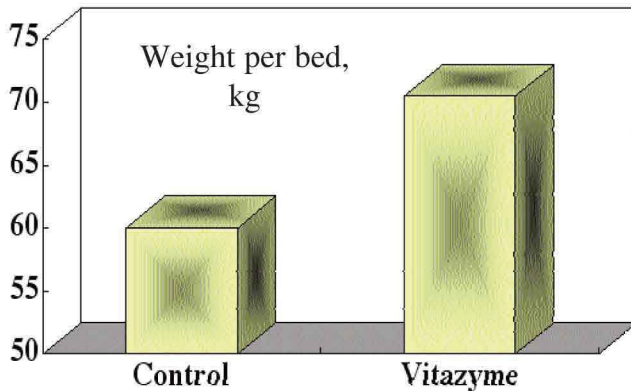
Weight Per Cabbage

Treatment	Weight/CabbageChange	
	kg	kg
Control	2.00	—
Vitazyme	2.35	0.35 (+18%)

**Increase in weight per
cabbage: +18%**



Cabbage Yield



Treatment	Yield per bed	Change
	kg	kg
Control	60.0	—
Vitazyme	70.5	10.5 (+18%)

**Increase in cabbage yield:
+18%**

Conclusions: Vitazyme applied to cabbages in this Cuban study caused excellent responses in growth parameters (height, +14%; leaves per plant, +17%), as well as yield values. The average cabbage size was increased by 18%, and yield increased by 18% as well. Vitazyme is shown to be a highly effective adjunct to cabbage cultivation in Cuba.

Vital Earth Resources

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2001 Crop Results

Vitazyme on Cabbage University of Costa Rica

Researcher: Oscar Acuna N., M.S.

Location: Agronomic Research Center, San Jose, Costa Rica, in conjunction with Organic Planet International Corporation

Variety: a standard green heading type

Soil type: unknown

Transplanting date: unknown

Experimental design: A small plot study involving two treatments of cabbages was established. The two treatments are as follows:

1. Control

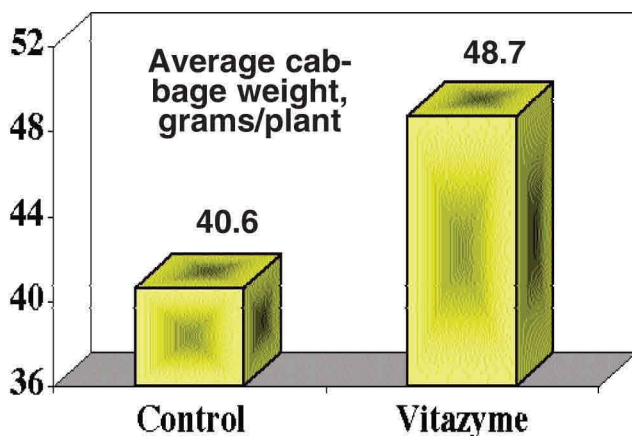
2. Vitazyme

Fertilization: unknown

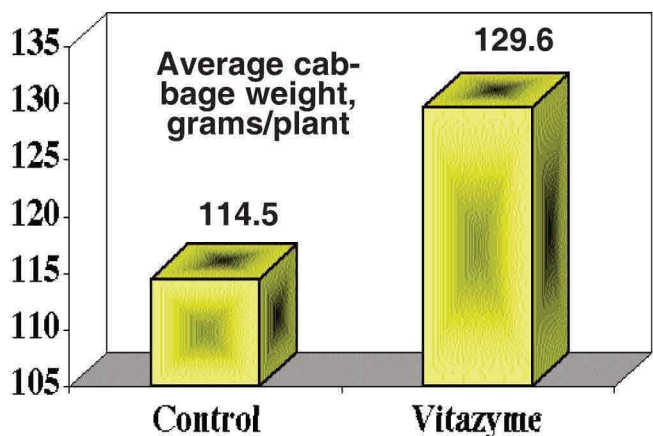
Vitazyme application: A dilute application of Vitazyme was applied to the cabbages of the treated plots 15 days after transplanting, and again 30 days after transplanting.

Growth and harvest results: At 30 days after transplanting (15 days after the first Vitazyme application) a sampling of the weights of plants was made. This sampling was repeated at 60 days after transplanting (30 days after the second application).

Plant weight at 30 days



Plant weight at 60 days



Conclusions: This cabbage study in Costa Rica has shown that Vitazyme can significantly increase the growth of cabbages, beginning at two weeks after the first application and up to at least 45 days later. The following conclusions are offered:

1. Vitazyme stimulates crop development from the early stages of growth.
2. Vitazyme emerges as a good alternative for improving production of vegetable crops.
3. The weight increase generated by Vitazyme is important for producing greater income.

Yield increase at 30 days: 20%
Yield increase at 60 days: 13%

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2000 Crop Results

Vitazyme on Cabbage (Transplants)

Researcher: Paul W. Syltie

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Soil medium: Vital Earth Ultra-Blend Potting Soil

Variety: Copenhagen Market

Planting date: January 19, 2001

Pot size: 3.25 in. x 3.25 in.

Experimental design: Forty pots were planted and placed on a greenhouse bench. Half of the pots were treated with Vitazyme and the other half was left untreated.

1. Control

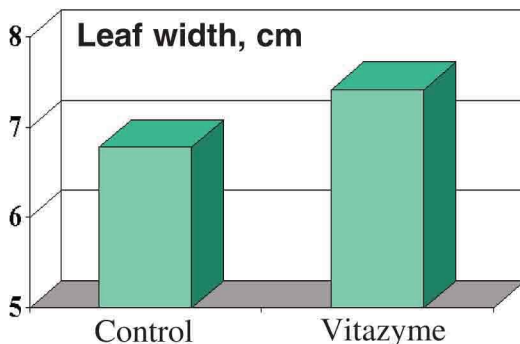
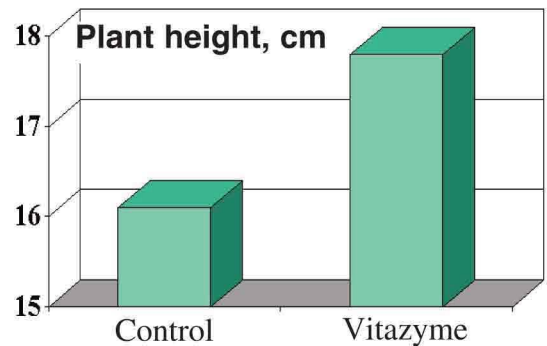
2. Vitazyme

Vitazyme treatment: 50 ml of a 0.1% Vitazyme solution applied to each pot immediately after planting

Growth results: On February 25, 2001, 37 days after planting, the forty plants were measured for height and leaf width, and the data were statistically analyzed as a completely randomized design.

	Control ¹	Vitazyme ¹	Change
		cm	
Plant height	16.1 b	17.8 a	1.7 (+11%)

¹Means followed by the same letter are not significantly different at P=0.05 according to Tukey's Honestly Significant Difference Test. LSD_{0.05}=1.6 cm.



	Control ¹	Vitazyme ¹	Change
		cm	
Plant height	6.78 b	7.42 a	0.64 (+9%)

¹Means followed by the same letter are not significantly different at P=0.05 according to Tukey's Honestly Significant Difference Test. LSD_{0.05}=0.63 cm.

Conclusions: Vitazyme significantly stimulated the early growth of cabbage transplants, by 11% for height and 9% for leaf width. This early aggressiveness for the plants should translate into more vigorous and profitable growth of mature plants when the product is applied on a commercial scale.

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1999 Crop Results

Vitazyme on Cabbage

Caribbean Chemical International

Researcher: Chris Teixeira, agronomist

Location: Paramin, Trinidad, West Indies

Variety: Salvation

Transplanting date: September 21, 1999

Harvest date: November 30, 1999

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

1. Control

2. Vitazyme

Fertilizer treatments: 8 and 35 days after transplanting, topdress with 15 g/plant 20-10-10% N-P₂O₅-K₂O

Vitazyme application: A 1% Vitazyme solution was sprayed on the leaves and soil on October 5 and 24, 1999.

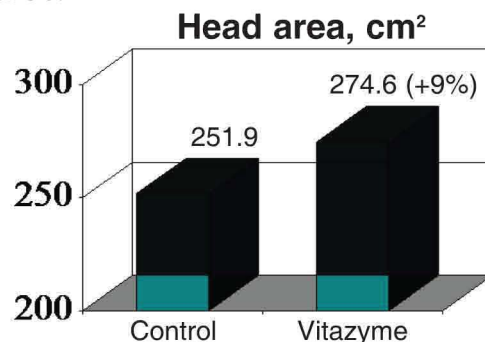
Growth results: Ten representative heads were evaluated from each treatment on each date, and five representative heads were weighed from each treatment for head weight on November 30.

November 10, 1999

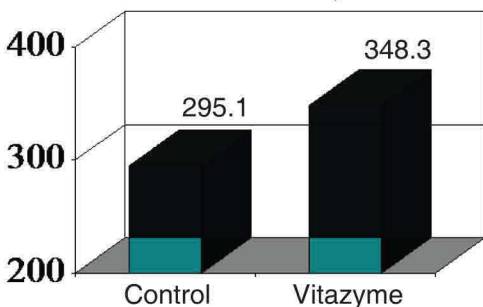
	<u>Head area, cm²</u>	<u>Increase, cm²</u>
Control	251.9	---
Vitazyme	274.6	22.7 (+9%)

At this date there was no major **color** difference.

Head formation was slightly more advanced with Vitazyme.



Head area, cm²



November 30, 1999

	<u>Head area, cm²</u>	<u>Increase, cm²</u>
Control	295.1	---
Vitazyme	348.3*	53.2 (+18%)

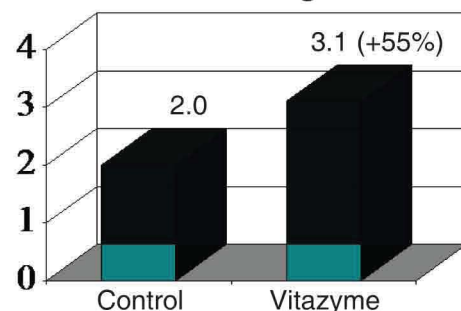
*Significantly greater than the control at p=0.03 (Duncan's test.)

Head size increase: 9%

	<u>Head weight, lb</u>	<u>Increase, lb</u>
Control	2.0	---
Vitazyme	3.1	1.1 (+55%)

By harvest time the Vitazyme treated cabbages were **much larger** than the control cabbages. There was also substantially **more root mass** with Vitazyme, and the heads were **visibly "tighter."**

Head weight, lb



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1999 Crop Results

Vitazyme on Transplants

A Greenhouse Study with Red Cabbage, Green Cabbage, and Broccoli

Researcher: Paul W. Syltie, Ph.D. **Location:** Vital Earth Resources Green house, Gladewater, Texas

Varieties: Mammoth Red Rock cabbage, Green Acre cabbage, and Green Sprouting Calabrese broccoli

Seeding date: January 13, 1999 **Pot size:** four-inch

Potting media: Mini-Pot Mix potting soil from Vital Earth Resources (fine pine bark, compost, sand, and minerals)

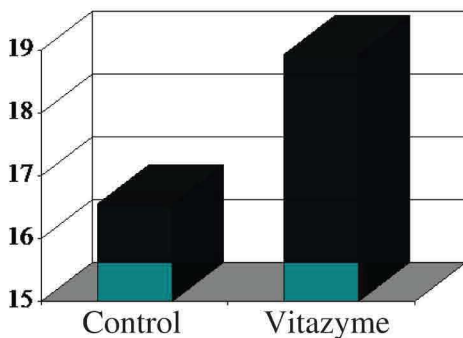
Experimental design: Two flats of 20 pots each were seeded for each variety. Two seeds were planted per pot, and thinned to one plant after germination. One flat of each variety was treated with Vitazyme at planting, and the other flat was left untreated (control). Height measurements were made for each plant on February 15, 1999, 33 days after planting.

Vitazyme treatments: Just after seeding, 10 ml of a 0.01% Vitazyme solution were added to each four-inch pot for appropriate flats.

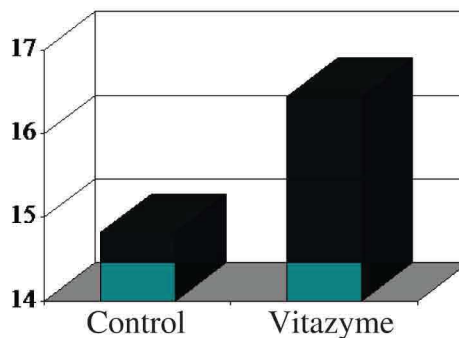
Growth results: Average plant height:

	<u>Red Cabbage</u>	<u>Green Cabbage</u>	<u>Broccoli</u>
Control	16.55 cm	14.82 cm	21.76 cm
Vitazyme	18.94 cm	16.45 cm	23.76 cm
Increase	+ 14%	+ 11%	+ 9%

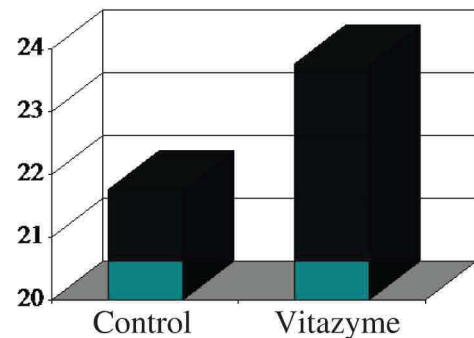
Red Cabbage, height (cm)



Green Cabbage, height (cm)



Broccoli, height (cm)



Comments: For all three varieties there was a significant aphid population on the controls, but no detectable aphids on the Vitazyme treated plants. Apparently the leaf composition of the treated plants provided some insect repellance, perhaps due to fewer free amino acids and/or higher sugar levels, either of which will suppress the activity of sucking insects.

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1999 Crop Results

Vitazyme on Cabbage

Caribbean Chemical International

Researcher: Richard Ramdin, agronomist Location: Trinidad, West Indies Variety: Tropicana

Planting date: April 4 1999 Harvest date: June 5, 1999 (62 days after transplanting)

Experimental design: Three farmers' plots were divided to include a section that was treated with a particular concentration of Vitazyme. About 250 plants were in each treated area.

- 1. Vitazyme at 15 ml/gal with a foliar/soil spray**
- 2. Vitazyme at 20 ml/gal with a foliar/soil spray**
- 3. Vitazyme at 30 ml/gal with a foliar/soil spray**

Fertility treatments: equal for all areas

Vitazyme treatments: The three rates of Vitazyme were prepared at 15, 20, and 30 ml/gal. (about 0.5, 0.7, and 1.0 oz/gal, or 0.5, 0.75, and 1.0%) and sprayed on the plants and soil at transplanting (April 4, 1999), and again 2.5 weeks later (April 23, 1999). The spray was directed over the root zone.

Fungicide treatments: Fungicides were applied heavily to suppress pepper leaf spot during active growth.

Growth and yield results:

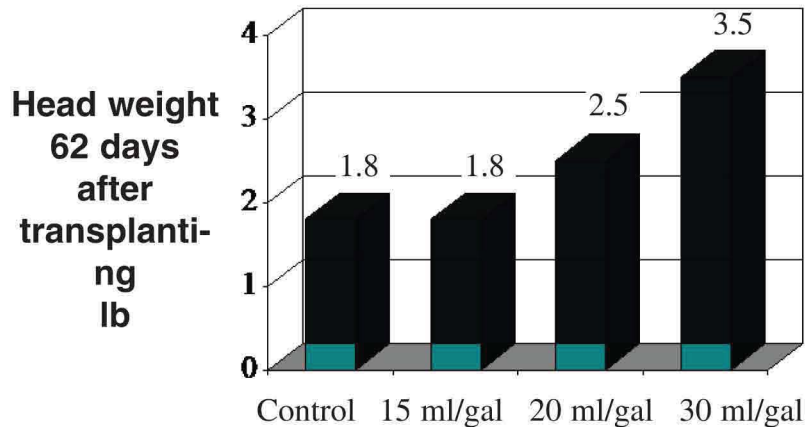
28 days after the transplanting

Parameter	Control	15 ml/gal	20 ml/gal	30 ml/gal
Leaves	Small	Small	Medium	Large
Color	Light green	Light green	Dark green	Dark green
Vigor	Poor	Poor	Medium	High
Stems	Medium	Medium	Thick	Thick
Roots	Poor roots	Medium roots	Good roots	Large tap roots, many fibrous roots
Heads	None	None	10% forming heads	50% forming heads
Pepper spot	50% infected	50% infected	20% infected	5% infected
Uniformity	50% uniform	50% uniform	80% uniform	90% uniform

At harvest (62 days after transplanting)

Parameter	Control	15 ml/gal	20 ml/gal	30 ml/gal
Cabbage weight	1.75lb	1.75lb	2.5lb	3.5lb
Cracking	None	None	None	Some
Harvestable	?	?	75%	80%

Increase in head weight with 30 ml/gal: 94%



Comments:

- (1) Peppery leaf spot reduced the growth and head size of infected plants substantially.
- (2) A lack of water at critical times hurt yields.
- (3) The 30 ml/gal application rate was the best of the three, in terms of marketable yield.
- (4) After harvest, the 30 ml/gal treatment sprouted vigorous lateral buds, that produced heads of 0.25 to 0.5 lb in a short time, unlike the other treatments.

The farmer wishes to use Vitazyme on his crops during the coming months.

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1999 Crop Results

Vitazyme on Cabbage

Observations -- Caribbean Chemical International

Researcher: Saleem Shah, agronomist Farmer: Motee Location: Tortuga, Trinidad, West Indies

Variety: Salvation Planting date: Spring, 1999 Harvest date: unknown

Experimental design: Two Vitazyme spray rates -- 15 and 30 ml/gal -- were used to treat cabbage in a field.

- 1. Control**
- 2. 15 ml/gal, foliar and soil sprayed**
- 3. 30 ml/gal, foliar and soil sprayed**

Fertility treatments: equal for all areas

Vitazyme treatments: Two rates of Vitazyme were used, 15 and 30 ml/gal (about 0.5 and 1 oz/gal, or 0.5 and 1%), with about 4 gallons of each sprayed on 500 to 600 plants, 11 days after transplanting. Enough product was applied to run off the leaves into the root zone soil. A second application was made about 30 days after transplanting.

Growth results: Although no yield checks were made, growth observations were made during the growing season. No differences in the treatments were noted until about 45 days after planting. After that time the Vitazyme treated plants at 30 ml/gal revealed the following advantages over the untreated control and the 15 ml/gal rate:

- 1. Much thicker and larger leaves**
- 2. Much larger heads at harvest**
- 3. A greater root system, especially more fine roots**

The 15 ml/gal spray rate did not improve cabbage growth compared to the control treatment.