



# ***2009 Field Trial Results***

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

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# 2009 Vitazyme Field Trial Results

This edition of Vitazyme crop reports represents the fourteenth year in which this biostimulant has been used successfully across many soil and climatic regimes in many nations.

For those unfamiliar with Vitazyme soil and plant biostimulant and its recommended program, please review the information given below to understand how the material works within the plant-soil system.

## Improved Symbiosis: The Secret of Vitazyme's Action

All plants that grow in soils develop an intimate relationship between the roots and the organisms that populate the root zone. The teeming billions of bacteria, fungi, algae, cyanobacteria, protozoa, and other organisms that grow along the root surfaces — the rhizosphere — are much more plentiful than in the bulk of the soil. This is because roots feed the organisms with dead

and solve essential minerals, and reduced iron releases anionic elements. Organism types include mycorrhizae, cyanobacteria and various other bacteria, fungi, and actinomycetes.

Vitazyme contains “metabolic triggers” that stimulate the plant to photosynthesize more efficiently, fixing more sunlight energy in the form of carbon compounds to increase the transfer of carbohydrates, proteins, and other growth substances into the root zone. These active agents may enter the plant through either

better, thus increasing productivity. Follow this easy-to-use five-point program.

**1** Ideally, analyze the soil at a reputable laboratory and correct deficiencies and imbalances with expert consultation.

**2** Reduce nitrogen fertilizer applications for non-legumes using this test:

Reduce the application each time the fertilizer normally is applied. Legumes normally need no added nitrogen. Vitazyme will accelerate legume nitrogen fixation.

Soil Organic Matter			Previous Crop		Compaction		Soil NO <sub>3</sub> -N Test						
Low(<1.5%)	Medium(1.5-3%)	High(>3%)	Non-legume	Legume	Much	Little	Low	Medium	High				
1	2	3	1	3	1	3	2	4	6				
Total additive score:			15	14	13	12	11	10	9	8	7	6	5
Apply this % of optimum N:			← 50-60% →			← 60-70% →			← 70-80% →				

the leaves or the roots. Root growth and exudation are both enhanced. This enhancement activates the metabolism of the teeming population of rhizosphere organisms to a higher level, triggering a greater synthesis of growth-benefiting compounds and a faster release of minerals for plant uptake. Thus the plant-microbial symbiosis is stimulated.

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

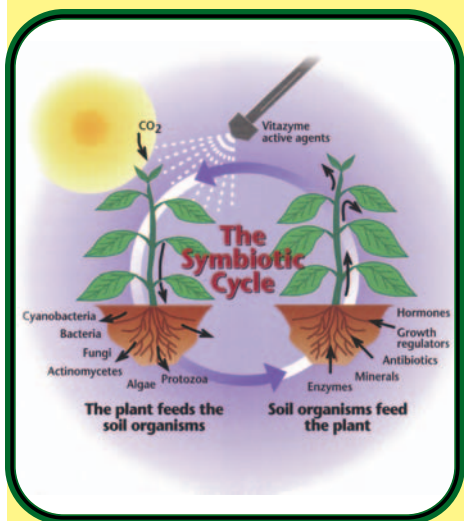
*In short, Vitazyme enables the plant to better express its genetic potential by reducing the stresses that repress that expression.*

Vitazyme should be used within the context of a complete crop management system, never by itself. Vitazyme will optimize your existing program by enabling the plant to grow

**3** Treat the seeds or transplant roots, if possible at planting. Treat seeds with a dilute Vitazyme solution, such as 1 liter of a 5% solution for every 50 kg of seed. Mix the seeds thoroughly in a seed or cement mixer or on a tarp. **For excellent results apply the solution directly on the seed row with a planter attachment. Dip or spray transplant roots with a 1% or 2% solution.**

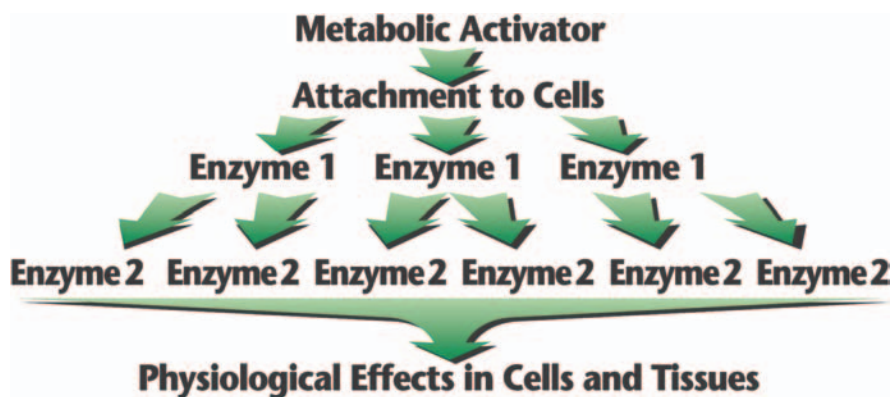
**4** Apply Vitazyme to the soil and/or foliage. Follow instructions for each crop. In most cases from 10 to 20 oz/acre can be applied per application at one to three times during the cropping cycle. A fall application on stubble is effective to accelerate residue breakdown.

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



root epidermal cells as well as compounds exuded from the roots themselves. The plant may inject 25% or more of its energy, fixed in the leaves as carbohydrates, amino acids, and other compounds, into the root zone to feed these organisms, for a very good purpose.

The microorganisms which feed on these exuded carbon compounds along the root surfaces benefit the plant in many ways creating a beautiful symbiotic relationship. The plant feeds the bacteria, fungi, algae, and other microbial species in the rhizosphere, which in turn secrete enzymes, organic acids, antibiotics, growth regulators, hormones, and other substances which are absorbed by the roots and transported to the leaves. The acids help dis-



# Vitazyme Highlights for 2009

This year presented a unique set of cold and wet, conditions across much of the northern United States, followed by dry and cool weather in the western part of the Midwest. Despite these problems, Vitazyme performed very well in these and other areas, on farms and in trials. Several new marketing areas were initiated, as the following highlights will reveal.

## Some Highlights for 2009

**1** As in 2008, studies in Ukraine proved to be highly successful. In replicated trials, canola responded to a fall and spring application with a 26% yield increase. Vetch treated on the seeds and leaves showed a 28% increase, while sunflowers, wheat, barley, sugar beets, and soybeans increased in yield by 8 to 25%. All of these increases were very profitable.

**2** Also in the wake of highly successful 2008 results, the 2009 results from Viet

Nam trials were excellent. Rice yields were increased by up to 7%, while yields of various vegetable crops were improved by up to 19%; these increases proved to be highly profitable as well.

**3** A major effort is being made in China (Hunan area) to gain approval for Vitazyme use, and the first tier of studies have shown big increases in cabbage (11%), cotton (15%), kiwi fruit (10%, with larger fruit and more sugar), tea (11%), Mandarin oranges (15%, plus more sugar and less acid), and watermelons (18%, with larger and sweeter melons).

**4** Another Master's Degree thesis was written at Tarleton State University on Vitazyme as a fertilizer supplement in establishing and maintaining turf grasses.

**5** Results on oranges in California have been impressive this year. Yields with four applications of Vitazyme together with a root stimulator are up 50 to 150%

over untreated neighboring blocks.

**6** Work in Chile is progressing, mostly with grapes. Young Thompson seedless plants developed 10% thicker trunks when treated with Vitazyme, and an array of studies showed consistent increases in grape brix, size, yield, and reduced time to maturity for table grapes.

**7** Other grape studies in New York, with Pinot Noir, Riesling, Cabernet Franc, and Cayuga varieties showed consistent improvements in brix, berry size, and yield. A study on newly planted Niagara vines revealed a remarkable 60% increase in the height, and much greater vigor, of Vitazyme treated vines versus the controls.

**8** In Kenya, Vitazyme together with specific nitrogen fixing organisms called TwinN, plus a humate material, stimulated corn growth by 9% above the control. This result shows Vitazyme's ability to trigger the activity of root zone microbes.

# Vitazyme Field Tests for 2009

## Alfalfa, haylage

Researcher: James Calahan

Location: Maryland Farms, Reaboro, Ontario, Canada

Variety: Pick Seed

Soil type: clay loam

Cutting date: July 15, 2009

Experimental design: A 50-acre silage field in 2008 was divided into two replicates of treated and untreated sections, and silage was made from both sections to determine the feeding value of the forage on the second cutting crop.

### 1. Control

### 2. Vitazyme

Fertilization: 140 lb/acre of 50% potassium magnesium sulfate (18-11-18% N-P<sub>2</sub>O<sub>5</sub>-S) and 50% KCl (0-0-60% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) the fall of 2008; 100 lb/acre of (NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub> + boron (8 lb of 15% B) in the spring of 2009

Vitazyme application: Vitazyme (13 oz/acre) + 1 gal/acre of 8-0-0-10% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-Ca after the first cutting

Silage feeding value: Samples from the untreated hay field, as well as the treated field, were sent to Agri-Food Laboratories, Guelph, Ontario, on July 17, 2009. The results below are reported on a dry basis.

Conclusions: In this Canadian haylage trial, comparing Vitazyme to an untreated control, the treated haylage showed a uniformly superior quality across most parameters. The changes were nearly all positive, and the reductions uncovered were generally for parameters that were favorable with a reduction. These changes are summarized on the next page.

## Silage Feeding Value

Parameter	Unit	Control	Vitazyme	Change
Dry matter, as received	%	69.08	72.33	3.25 (+5%)
Protein (CP), N x 6.25	%	19.05	20.93	1.88 (+10%)
UIP Bypass Est.	% of CP	27.11	30.08	2.97 (+11%)
Fiber				
Acid detergent fiber	%	29.49	27.04	(-) 2.45 (-8%)
Neutral detergent fiber	%	40.38	35.54	(-) 4.84 (-12%)
Lignin	%	4.25	4.44	0.19 (+4%)
Minerals				
Calcium	%	1.48	1.57	0.09 (+6%)
Phosphorus	%	0.27	0.30	0.03 (+11%)
Potassium	%	1.69	1.75	0.06 (+4%)
Magnesium	%	0.17	0.17	0
Sodium	%	0.10	0.03	(-) 0.07 (-70%)
Zinc	ppm	23.80	26.10	2.30 (+10%)
Manganese	ppm	22.62	20.11	(-) 2.51 (-11%)
Copper	ppm	6.90	7.18	0.28 (+4%)
Energy				
TDN (est.)	%	65.34	65.34	0
Non-fiber carbohydrates		30.17	33.13	2.96 (+10%)
Relative feed value		156.27	172.56	16.29 (+10%)
Starch	%	2.85	2.47	(-) 0.38 (-13%)
WTDN		66.48	68.51	2.03 (+3%)
WNEL		1.51	1.58	0.07 (+5%)
WNEG		0.76	0.82	0.06 (+8%)
WNEM		1.48	1.54	0.06 (+4%)
Starch as % of NFC		9.45	7.46	(-) 1.99 (-21%)

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Dry matter	+ 5%	Manganese	-11%
Crude protein	+10%	Copper	+4%
UIP bypass	+11%	Non-fiber carbohydrates	+10%
Acid detergent fiber	-8%	Relative feed value	+10%
Neutral detergent fiber	-12%	Starch	-13%
Lignin	+4%	WTDN	+3%
Calcium	+6%	WNEL	+5%
Phosphorus	+11%	WNEG	+8%
Potassium	+4%	WNEM	+4%
Sodium	-70%	Starch, % of NFC	-21%
Zinc	+10%		



Of particular interest in this study is a large 10% increase in relative feed value with Vitazyme, and a 10% increase in protein, with a commensurate 13% drop in starch content. Fiber also dropped, allowing for more nutritional components such as protein and minerals. All essential minerals except manganese increased in content of the haylage.

*Alfalfa such as this is easy to grow with Vitazyme, usually applied at spring greenup and after each cutting, at 13 oz/acre (1 liter/ha).*

## Apples

Researcher: Francis Otto

Location: Cherry Bay Orchards, Suttons Bay, Michigan

Variety: Gala on M26

Age: 12 years

Soil: stony

Experimental design:

Two blocks of an orchard of Gala apples were selected to compare the effect of Vitazyme on yield and profitability of the crop. The two blocks were separated by some distance, but located on the same slope.



*Gala apples treated with 16 oz/acre three times during the season produced an excellent stimulation of fruit size and quality in Michigan.*



*Notice the significant improvement in size with Vitazyme in this Michigan trial, a 40% yield increase with \$1,835.30 more income per acre!*

### 1. Control

### 2. Vitazyme

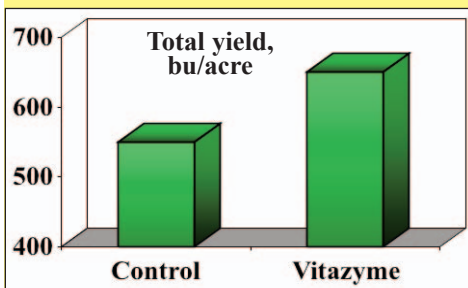
Fertilization: unknown

Vitazyme application: 16 oz/acre sprayed on the leaves at (1) pink, (2) petal fall, and (3) four weeks after petal fall

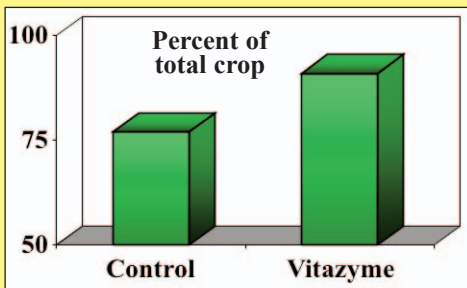
Yield results:

Treatment	Apple yield bu/acre	Yield change bu/acre	Apples > 2.5 in %	Size change %	Yield > 2.5" bu/acre	Yield change bu/acre
Control	550	—	77	—	423.5	—
Vitazyme	651	101 (+18%)	91	14	592.4	168.9 (+40%)

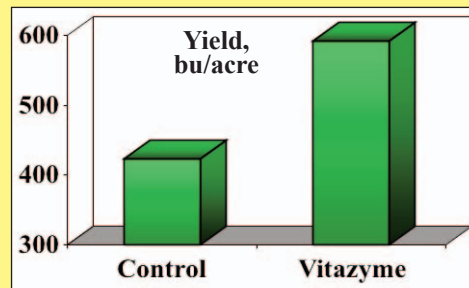
### Apple Yield



### > 2.5 Inch Apples



### Yield of > 2.5 Inch Apples



Income results: An estimated \$11.00/bu is used to calculate these results.

Treatment	Applied yield <sup>1</sup> bu/acre	Apple value \$/acre	Income change \$/acre
Control	423.5	4,658.50	—
Vitazyme	592.4	6,516.40	1,857.90

<sup>1</sup>> 2.5 inch apples for packout.

• **Extra income with Vitazyme:**  
**\$1,857.90/acre**

• **Net return for a 33.60/acre Vitazyme investment:** **\$1,835.30/acre**



**Conclusions:** This Michigan apple trial proved that Vitazyme can greatly increase apple size and total yield of marketable fruit. Apples > 2.5 inches increased by 14 percentage points above the control with Vitazyme, and the total marketable yield was 40% above the control. This increase led to a remarkable \$1,835.30/acre net improvement in income, with a return per dollar invested of \$82.21.

- **Return on Vitazyme cost: \$82.21/dollar invested**
- **Increase in yield with Vitazyme: 18%**
- **Increase in > 2.5 inch apples with Vitazyme: 14 percentage points**
- **Increase in > 2.5 inch apple yield with Vitazyme: 40%**

## Barley

**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

**Seeding rate:** 4 million seeds/ha

**Planting date:** April 13, 2009

**Variety:** Nezabydka

**Previous crop:** corn

**Tillage:** plowing, harrowing, and cultivation

**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 phosphorus, 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 three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either one or two foliar applications on the yield of spring barley.

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

**Fertilization:** 60 kg/ha N, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O.

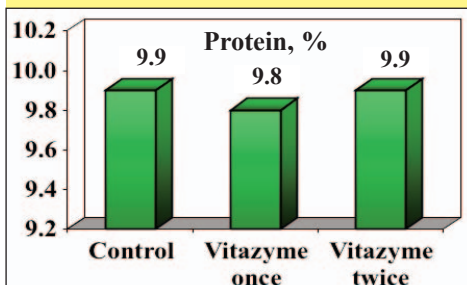
**Vitazyme application:** Treatment 2 received 1.0 liter/ha applied to the leaves and soil on May 15, 2009, and Treatment 3 received this first treatment plus a second foliar/soil treatment of 1.0 liter/ha on June 4, 2009.

**Yield results:**

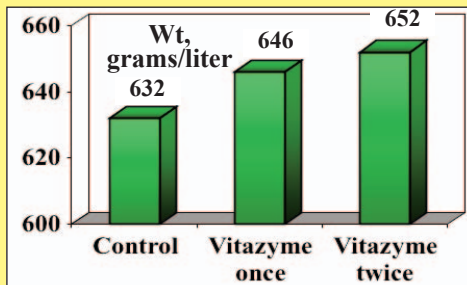
Treatment	Barley yield tons/ha	Yield change tons/ha
1. Control	4.60	—
2. Vitazyme, once foliar	5.03	0.43 (+9%)
3. Vitazyme, twice foliar	5.16	0.56 (+12%)

**Quality results:**

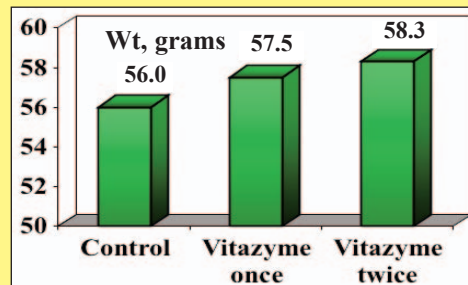
### Crude Protein



### Grain Weight



### 1,000 Grain Weight



**Income results:**

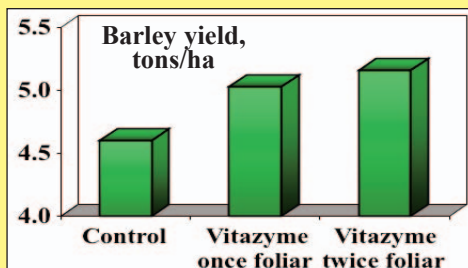
- **Income increase with Vitazyme on seeds: 144 hrn/ha**
- **Income increase with Vitazyme on seeds + leaves: 48 hrn/ha**

**Conclusions:** This spring barley trial in Ukraine, using Vitazyme as either one or two foliar applications at 1.0 liter/ha each time, revealed that both treatments boosted yield significantly. The single applications sprayed on the leaves and soil produced a 9% grain yield increase, whereas two foliar applications produced a 12% yield increase. Vitazyme did not increase grain protein, but increased grain weight per liter (2 to 3%) and 1,000 grain weight (3 to 4%). Such results prove the great value of this program to increase barley yields and profits in Ukraine.



**Vitazyme has a long history of improving barley production. The greater stem strength and length, tillering, and heading are obvious.**

### Barley Yield



## Barley

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Variety:** Skif, superelite

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Location:** Ukraine central forest-steppe area near Vinnytsia

**Previous crop:** corn

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**Tillage:** plowing, harrowing and cultivating      **Seeding rate:** 4 million seeds/ha      **Planting date:** April 13, 2009  
**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.  
**Experimental design:** A uniform field was selected to establish three treatments, of 1.0 ha plots and four replications, to evaluate the effects of Vitazyme on the seeds alone, or on the seeds plus the leaves.

### 1. Control

### 2. Vitazyme once

### 3. Vitazyme twice

**Fertilization:** 60 kg/ha N, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O.

**Vitazyme application:** Vitazyme was applied to the seeds of both treatments at 1.0 liter/ha on April 12, 2009, with an additional 1.0 liter/ha sprayed on the leaves and soil on May 15, 2009. April 30, 2009, at 1.0 liter/ha.

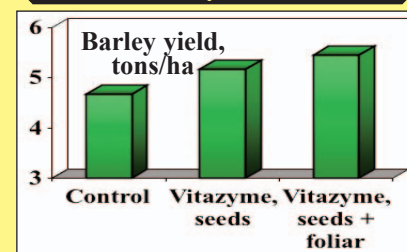
**Yield results:**

Treatment	Barley yield tons/ha	Yield change tons/ha
1. Control	4.67	—
2. Vitazyme, seeds	5.17	0.50 (+11%)
3. Vitazyme, seeds + leaves	5.44	0.77 (+16%)

• **Increase in barley yield with Vitazyme, seed treatment: 11%**

• **Increase in barley yield with Vitazyme, seed + foliar treatment: 16%**

### Barley Yield



**Quality results:**

### Crude Protein

Treatment	Protein Change ----- % -----
1. Control	9.4 —
2. Vitazyme, seeds	9.0 (-)0.4 (-4%)
3. Vitazyme, seeds + leaves	9.6 0.2 (+2%)

### Grain Weight

Treatment	Weight Change --- grams/liter ---
1. Control	627 —
2. Vitazyme, seeds	652 (-)15 (-4%)
3. Vitazyme, seeds + leaves	650 23 (+4%)

### 1,000 Grain Weight

Treatment	Protein Change grams/1,000 grams
1. Control	50.5 —
2. Vitazyme, seeds	51.5 (-)1.0 (+2%)
3. Vitazyme, seeds + leaves	52.0 1.5 (+3%)

**Grain Structure results:**

### Stems Per Square Meter

Treatment	Stems Change --- stems/m <sup>2</sup> ---
1. Control	533 —
2. Vitazyme, seeds	656 32 (+6%)
3. Vitazyme, seeds + leaves	574 41 (+8%)

### Grains Per Head

Treatment	Weight Change --- grams/head ---
1. Control	18 —
2. Vitazyme, seeds	19 (-)15 (-4%)
3. Vitazyme, seeds + leaves	20 23 (+4%)

### Grain Weight Per Head

Treatment	Protein Change --- grams/head ---
1. Control	0.91 —
2. Vitazyme, seeds	0.98 (-)0.07 (+2%)
3. Vitazyme, seeds + leaves	1.04 0.13 (+14%)

**Income results:**

• **Income increase with Vitazyme on seeds: 360 hrn/ha**

• **Income increase with Vitazyme on seeds + leaves: 376 hrn/ha**

**Conclusions:** Barley treated with Vitazyme in this Ukraine test revealed that a 1.0 liter/ha seed application produced an excellent 11% grain yield increase, while an additional foliar 1.0 liter/ha application further improved yield to 16%. Moreover, quality factors were improved with Vitazyme: crude protein (a favorable reduction, or small increase), grain weight (+2 to 4%), and 1,000 grain weight (+2 to 3%). Grain structure factors also improved with Vitazyme, including stem density (+6 to 8%), grains per head (+6 to 11%), and grain weight per head (+8 to 14%).

## Barley

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Variety:** Lofant

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Location:** Ukraine central forest-steppe area near Vinnytsia

**Seeding rate:** 4 million seeds/ha

**Planting date:** April 13, 2009

**Tillage:** plowing, harrowing, and cultivating

**Previous crop:** corn

**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 phosphorus, 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 three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either one or two foliar applications on the yield of spring barley.

### 1. Control

### 2. Vitazyme, once foliar

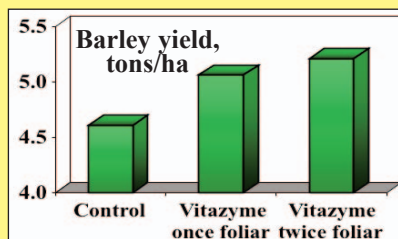
### 3. Vitazyme, twice foliar

**Fertilization:** 60 kg/ha, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O

**Vitazyme application:** Treatment 2 received 1.0 liter/ha applied to the leaves and soil on May 15, 2009, and Treatment 3 received this first treatment plus a second foliar/soil treatment of 1.0 liter/ha on June 4, 2009.

**Yield results:**

Treatment	Barley yield tons/ha	Yield change tons/ha
1. Control	4.61	—
2. Vitazyme, seeds	5.06	0.45 (+10%)
3. Vitazyme, seeds + leaves	5.21	0.60 (+13%)



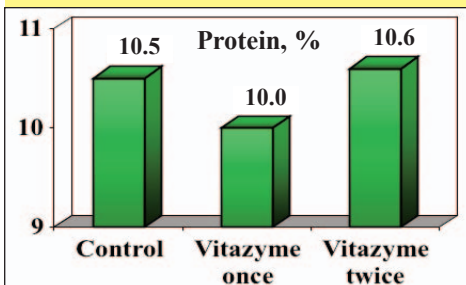
• **Increase in barley yield with Vitazyme, once foliar: 11%**

• **Increase in barley yield with Vitazyme, twice foliar: 16%**

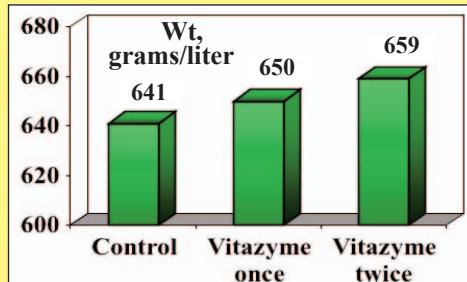


## Quality results:

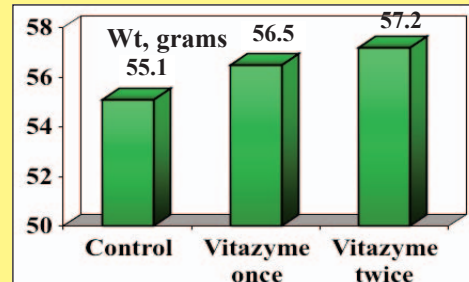
### Crude Protein



### Grain Weight



### 1,000 Grain Weight



• **Income increase with Vitazyme on seeds: 360 hrn/ha**

## Income results:

• **Income increase with Vitazyme on seeds + leaves: 376 hrn/ha**

**Conclusions:** This spring barley trial in Ukraine, using Vitazyme as either one or two foliar applications at 1.0 liter/ha each time, revealed that both treatments boosted yield significantly. The single application sprayed on the leaves and soil produced a 10% yield increase, whereas two foliar applications produced a 13% yield increase. Vitazyme also did not increase grain protein, but increased grain weight per liter and 1,000 grain weight (up to 4%). Such results prove the great value of this program to increase barley yields in Ukraine.

# Bush Beans

## A comparison of two formulations

**Researcher:** Paul W. Syltie, Ph.D. **Variety:** Topcrop **Pot size:** 1 gallon  
**Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas  
**Planting rate:** 10 seeds/pot, thinned to three plants **Planting date:** May 6, 2009  
**Soil:** Bowie fine sandy loam

**Experimental design:** A greenhouse experiment was set up to evaluate the relation merits of two Vitazyme formulations in stimulating bush bean growth.

1. Control 2. Vitazyme formula 1 3. Vitazyme formula 2

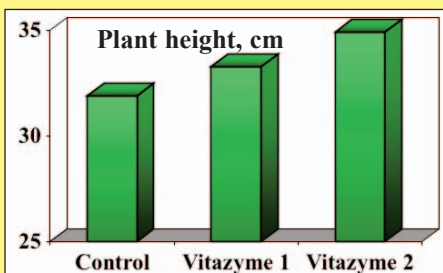
**Vitazyme application:** At planting, 100 ml of a 0.05% solution of Vitazyme for each formulation was applied evenly to the soil surface of each pot. Formula 1: lot from September 5, 2008; Formula 2: lot from 2008 - 4. The control received 100 ml of water only.

**Harvest date:** On June 2, 2009, the plant roots were washed free of soil and dried in a drying oven at about 125° F for 48 hours. Then the dried plants were weighed to the nearest 0.01 gram. Plant heights were determined before drying, measuring to the nearest cm.

## Height results:

Treatment	Plant height cm	Height change cm
3. Vitazyme - 2	34.88 a	3.01 (+9%)
2. Vitazyme - 1	33.28 ab	1.41 (+4%)
1. Control	31.87 b	—
Block P	0.587	
Main effects P	0.227	
Model P	0.488	
CV	10.6%	
LSD <sub>0.1</sub>	2.90 cm	

### Bush Bean Height



**Dry weight results:** Plants were dried in a drying oven for 24 hours at 130° F.

**Conclusion:** In this greenhouse bush bean study, Vitazyme Formula 2 produced plants significantly taller than the control plants (9%), but these were statistically equal to the Formula 1 beans. The dry weights of the three treatments were not significantly different, but the Formula 2 produced plants that were 13% heavier than the control plants, while the Formula 1 plants were 11% greater. Due to the excessively high greenhouse temperatures during the study, there may have been reduced crop response to the two products, but based on these data the Vitazyme Formula 2 performed the best of the two products.

Treatment	Dry weight grams	Weight change grams
3. Vitazyme - 2	3.50 a	0.40 (+13%)
2. Vitazyme - 1	3.43 a	0.33 (+11%)
1. Control	3.10 a	—
Block P	0.902	
Main effects P	0.531	
Model P	0.896	
CV	23.5%	
LSD <sub>0.1</sub>	0.60 gram	

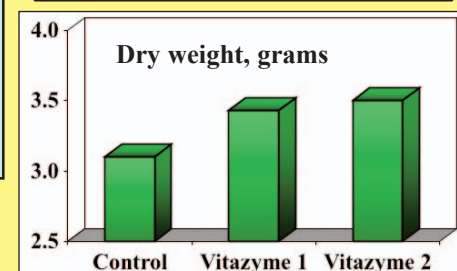


**This greenhouse study revealed that Formula 2 of Vitazyme performed only slightly better than Formula 1.**



**Both formulations improved root and leaf growth, by 11 and 13 % above the control in terms of dry matter weight.**

### Bush Bean Dry Weight





# Bush Beans

## Synergism with Twin N and Revive Plus

**Researcher:** Paul W. Syltje

**Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas

**Variety:** Topcrop

**Planting date:** January 30, 2009

**Soil type:** silt loam

**Planting rate:** 10 seeds/plot, thinned to 3 plants/plot

**Pot size:** 1 gallon

**Experimental design:** A greenhouse study was set up to evaluate the effect of Vitazyme, Twin N, and Revive Plus, alone or together, on the growth of bush beans. Five treatments with seven replicates were utilized.

1. Control      2. Vitazyme (13 oz/acre)

3. Twin N (1.25 grams/ha)

4. Vitazyme + Twin N (2 and 3 combined)

5. Vitazyme + Twin N + Revive Plus (2 and 3 combined, 20 oz/acre)

**Fertilization:** none

**Vitazyme applications:** A simple application was made on the soil surface at 13 oz/acre (1 liter/ha)

**Twin N application:** Twin N is a formulation of several endophytic and free-living nitrogen fixing organisms that are freeze-dried, and reconstituted before an application of 1.25 grams/ha.

**Revive Plus applications:** Revive Plus is 20% natural carboxylic acids, 8% "other proprietary ingredients", and 72% inert ingredients, applied at 20 oz/acre.

**Growth results:** Various plant parameters were measured at harvest on March 11, 2009, 41 days after planting. The plants

### Plant Height

Treatment	Height*	Change
	cm	cm
3. Twin N	44.9 a	5.3 (+13%)
5. Vita + Twin N + R+	43.2 ab	3.6 (+9%)
2. Vitazyme	41.2 bc	1.6 (+4%)
4. Vita + Twin N	41.0 bc	1.4 (+4%)
1. Control	39.6 c	—
Block P	0.042*	
Main effects P	0.027*	
Model P	0.016*	
CV	7.2%	
LSD <sub>0.05</sub>	3.3 cm	

\*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test.

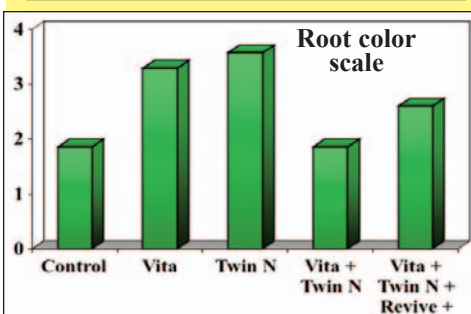
### Increase in plant height

Twin N .....	+13
Vitazyme + Twin N	
+ Revive Plus .....	+9%
Vitazyme .....	+4%
Vitazyme + Twin N .....	+4%

### Increase in set beans

Vitazyme + Twin N	
+ Revive Plus .....	+147%
Vitazyme + Twin N . . .	+77%
Twin N .....	+66%
Vitazyme .....	+14%

### Root Color



### Flower Clusters

Treatment	Clusters	Change
	number	number
5. Vita + Twin N + R+	5.53 a	2.02 (+58%)
4. Vita + Twin N	5.24 a	1.73 (+49%)
2. Vitazyme	4.59 b	1.08 (+31%)
3. Twin N	4.43 b	0.92 (+26%)
1. Control	3.51 c	—
Block P	0.538	
Main effects P	0.000***	
Model P	0.0003***	
CV	12.6%	
LSD <sub>0.1</sub>	0.54	

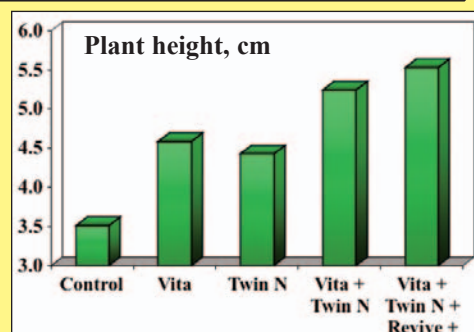
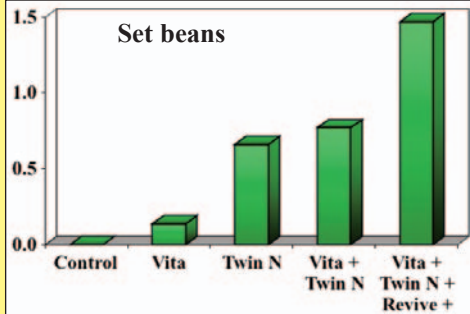
\*\*\*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test.

### Set Beans

Treatment	Set beans*	Change
	number	number
5. Vita + Twin N + R+	1.47 a	1.47 (+147%)
4. Vita + Twin N	0.77 b	0.77 (+77%)
3. Twin N	0.66 bc	0.66 (+66%)
2. Vitazyme	0.14 cd	0.14 (+14%)
1. Control	0 d	—
Block P	0.135	
Main effects P	0.003**	
Model P	0.009**	
CV	109.1%	
LSD <sub>0.1</sub>	0.61	

\*\*\*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test.

### Set beans



### Increase in flower clusters

Vitazyme + Twin N	
+ Revive Plus .....	+58%
Vitazyme + Twin N ....	+49%
Vitazyme .....	+31%
Twin N .....	+26%

### Open Flowers

Treatment	Flowers	Change
	number	number
1. Control	2.46 a	—
5. Vita + Twin N + R+	2.20 a	(-)0.26 (-11%)
3. Twin N	2.09 a	(-)0.37 (-15%)
2. Vitazyme	1.84 a	(-)0.62 (-25%)
4. Vita + Twin N	1.37 a	(-)1.09 (-44%)
Block P	0.319	
Main effects P	0.672	
Model P	0.483	
CV	71.0%	
LSD <sub>0.05</sub>	1.56	

### Decrease in open flowers

Vitazyme + Twin N	
+ Revive Plus .....	-11%
Twin N .....	-15%
Vitazyme .....	-25%
Vitazyme + Twin N ....	-44%

### Rhizobium Nodules

### Plant Dry Weight

### Root Color (continued)

Treatment	Nodules number	Change number
2. Vitazyme	0.29 a	0.29 (+29%)
1. Control	0 b	—
3. Twin N	0 b	0 (0%)
4. Vita + Twin N	0 b	0 (0%)
5. Vita + Twin N + R+	0 b	0 (0%)
Block P	0.448	
Main effects P	0.078	
Model P	0.179	
CV	381.9%	
LSD <sub>0.05</sub>	0.24	

Treatment	Dry weight grams	Change grams
3. Twin N	13.26 a	3.27 (+33%)
4. Vita + Twin N	12.28 a	2.29 (+23%)
5. Vita + Twin N + R+	12.10 a	2.11 (+21%)
2. Vitazyme	10.32 b	0.33 (+3%)
1. Control	9.99 b	—
Block P	0.234	
Main effects P	0.002**	
Model P	0.009**	
CV	13.1%	
LSD <sub>0.1</sub>	1.39	

Treatment	Root color <sup>1</sup> scale	Change scale
3. Twin N	3.57 a	1.71 (+92%)
2. Vitazyme	3.29 a	1.43 (+77%)
5. Vita + Twin N + R+	2.60 ab	0.74 (+40%)
4. Vita + Twin N	1.86 b	0 (0%)
1. Control	1.86 b	—
Block P	0.744	
Main effects P	0.038*	
Model P	0.182	
CV	43.8%	
LSD <sub>0.05</sub>	1.33	

\*\*Means followed by the same letter are not significantly different according to Mo Student-Newman-Keuls Test.

<sup>1</sup>Root color scale: 1=very dark; 5=very light  
\*Means followed by the same letter are not significantly different according to Mo Student-Newman-Keuls Test.

#### Increase in rhizobium nodules

Vitazyme ..... +29

#### Increase in dry weight

Twin N ..... +33%  
Vitazyme + Twin N .... +23%  
Vitazyme + Twin N  
+ Revive Plus ..... +21%  
Vitazyme ..... +3%

#### Increase in root light color

Twin N ..... +66%  
Vitazyme ..... +77%  
Vitazyme + Twin N  
+ Revive Plus ..... +40%

were placed in a drying oven for 24 hours at 130° F.

**Conclusions:** This greenhouse study of bush beans, using Vitazyme, Twin N, and Revive Plus, revealed that Twin N Provided the greatest overall plant

growth stimulation (+33%), though this increase was significantly equal to Vitazyme + Twin N (+ 23%) and Vitazyme + Twin B + Revive Plus (+23%). On the other hand, total flower characters, a good indication of final yield, was highest for all three products combined (+58%), while Vitazyme + Twin N gave a 49% increase. Vitazyme alone gave a 31% flower cluster increase, while Twin N alone provided a 26% increase above the control.

The number of set beans was by far the highest for the three combined products (+147%), which was significantly greater than the other treatments. Plant height was greatest with Twin N, as was the root color ... a light color indicating aggressive disease-free new roots, although Vitazyme and all three products combined provided significantly equal root conditions. Only Vitazyme treatment gave root nodules in a few of the plants. Ironically, the control treatment had the largest number of open flowers, but characters and set beans were least for this treatment.

This study shows that while Twin N stimulated the greatest overall plant growth in terms of plant height, dry weight, and root condition, but the apparent best treatment related to the highest yield potential in the combination of Vitazyme, Twin N, and Revive plus. the number of flower clusters and set beans was highest for this treatment.

## Bush Beans

### Synergism with Revive Plus

#### Plant Height

Treatment	Height* cm	Change cm
1. Vitazyme	46.3 a	4.1 (+10%)
4. Vita + Revive +	45.7 a	3.5 (+8%)
3. Revive Plus	45.3 a	3.1 (+7%)
1. Control	42.2 b	—
Block P	0.465	
Main effects P	0.121	
Model P	0.261	
CV	7.13%	
LSD <sub>0.1</sub>	3.0 cm	

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

**Researcher:** Paul W. Syltie, Ph.D.  
Research Greenhouse, Gladewater, Texas

**Location:** Vital Earth Resources

**Variety:** Topcrop  
1 gallon

**Soil type:** sandy loam **Pot size:**

**Seeding rate:** 10 seeds/pot, thinned to these plants/pot  
January 30, 2009

**Planting date:**

**Experimental design:** A greenhouse study was designed with four treatments and seven replications to evaluate the effects of Vitazyme and Revive Plus, alone and in the combination, on the growth of bush beans.

**1. Control 2. Vitazyme 3. Revive Plus 4. Vitazyme + Revive Plus**

**Fertilization:** none

**Vitazyme application:** 13 oz/acre (1 liter/ha) rate at planting, watered into the soil surface in 100 ml of water (0.0016% solution)

**Revive Plus application:** Revive Plus is a combination of 20% natural carboxylic acids, 72% inert ingredients, and 8% other proprietary ingredients. It was applied at 20 oz/acre (1.5 liter/ha) to the soil surface in 100 ml of water (0.0024% solution).

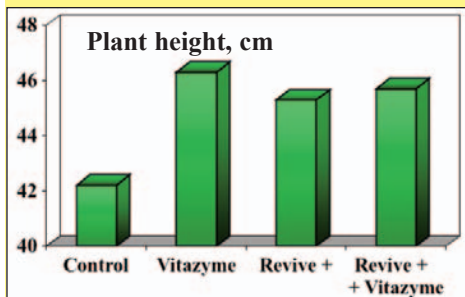
**Growth results:** On March 16, 2009, 45 days after planting, the roots of the beans were washed clean of soil, and various growth parameters were measured. The plants were then placed in a drying oven at 130° F for 24 hours, and the plant dry weight was measured.

*Continued on the next page*

#### Increase in plant height

Vitazyme ..... +13%  
Vitazyme + Revive Plus ... +9%  
Revive Plus ..... +4%

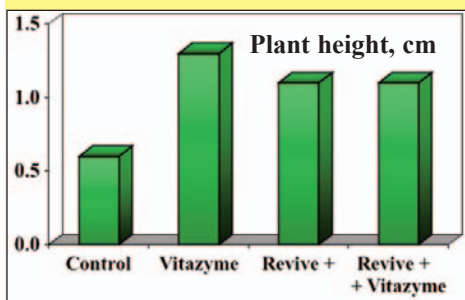
## Plant Height (continued)



## Open Flowers

Treatment	Flowers*	Change
	number	number
2. Vitazyme	1.3 a	0.7 (+117%)
3. Revive Plus	1.1 a	0.5 (+83%)
4. Vita + Revive +	1.1 a	0.5 (+83%)
1. Control	0.6 a	—
Block P	0.300	
Main effects P	0.513	
Model P	0.385	
CV	81.4%	
LSD <sub>0.1</sub>	0.8 cm	

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



## Increase in open flowers

Vitazyme ..... +117%  
 Revive Plus ..... +83%  
 Vitazyme + Revive Plus ... +83%

## Plant Dry Weight

Treatment	Dry weight	Change
	grams	grams
2. Vitazyme	13.94 a	2.92 (+26%)
3. Revive Plus	13.45 ab	2.43 (+22%)
4. Vita + Revive +	12.53 ab	1.51 (+14%)
1. Control	11.02 b	—
Block P	0.850	
Main effects P	0.014*	
Model P	0.131	
CV	12.4%	
LSD <sub>0.1</sub>	1.46 grams	

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

## Flower Clusters

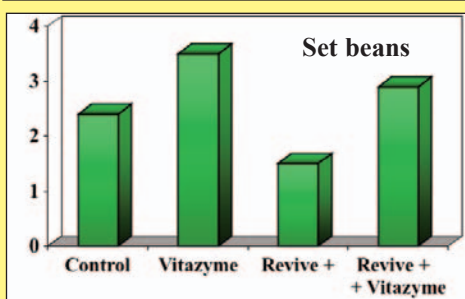
Treatment	Clusters*	Change
	number	number
3. Revive Plus	3.2 a	0.4 (+14%)
2. Vitazyme	3.2 a	0.4 (+14%)
1. Control	3.2 a	0.4 (+14%)
4. Vita + Revive +	2.8 a	—
Block P	0.088	
Main effects P	0.400	
Model P	0.133	
CV	15.86%	
LSD <sub>0.1</sub>	0.5	

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

## Set Beans

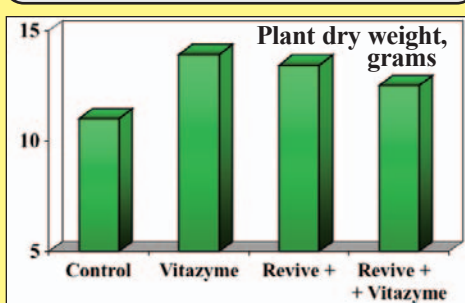
Treatment	Set beans*	Change
	number	number
2. Vitazyme	3.5 a	1.1 (+46%)
4. Vita + Revive +	2.9 ab	0.5 (+21%)
1. Control	2.4 ab	—
3. Revive Plus	1.5 b	(-) 0.9 (-38%)
Block P	0.099	
Main effects P	0.168	
Model P	0.093	
CV	63.5%	
LSD <sub>0.1</sub>	1.5	

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

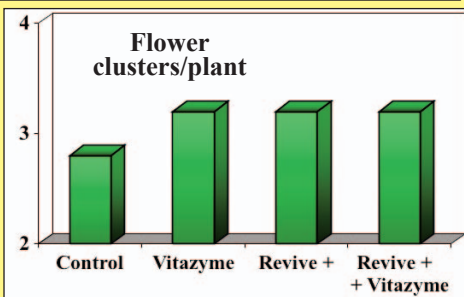


## Increase in set beans

Vitazyme ..... +46%  
 Vitazyme + Revive Plus ... +21%



**Conclusions:** In this greenhouse study with Vitazyme and Revive Plus, Vitazyme proved to be the best material for stimulating dry weight increase (+26%), which was statistically equal to Revive Plus and the two products combined. Vitazyme alone also gave the lightest colored roots (indicating more new root growth), the most open flowers, the most set beans, and also the greatest plant height ... though in most cases the treatment values were not significantly greater than for Revive Plus and the combined products. The study shows that the combined products did not give a synergistic response in this greenhouse growing environment, although Revive Plus by itself oftentimes produced growth responses slightly less than those of Vitazyme.



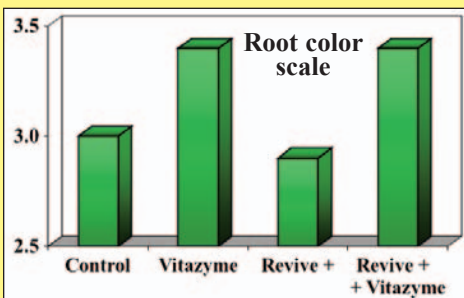
## Increase in flower clusters

Vitazyme ..... +14%  
 Revive Plus ..... +14%  
 Control ..... +14%

## Root Color

Treatment	Root color*	Change
	scale no.	scale no.
2. Vitazyme	3.4 a	0.5 (+17%)
4. Vita + Revive +	3.4 a	0.5 (+17%)
1. Control	3.0 a	—
3. Revive Plus	2.9 a	-0.1 (-3%)
Block P	0.241	
Main effects P	0.546	
Model P	0.337	
CV	28.7%	
LSD <sub>0.1</sub>	0.8	

\*Means followed by the same letter are not significantly different at P=0.1 according to the Student-Newman-Keuls Test. Color scale: 1 = dark roots; 5 = light roots.



## Increase in root color

Vitazyme ..... +17%  
 Vitazyme + Revive Plus ... +17%

## Increase in dry weight

Vitazyme ..... +26%  
 Revive Plus ..... +22%  
 Vitazyme + Revive Plus ... +14%



# 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.

**Fertilization:** unknown

**1. Control**

**2. Vitazyme**

**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).

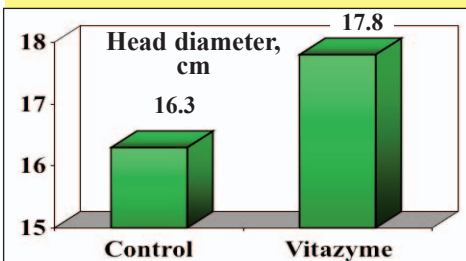
**Harvest date:** unknown

**Yield results:**

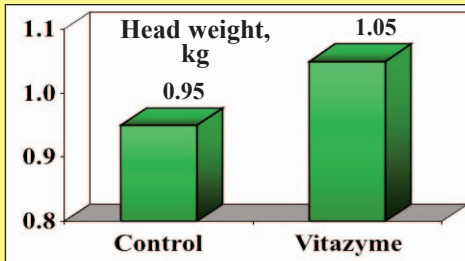
• **Increase in head weight: 11%**

• **Increase in cabbage yield: 11%**

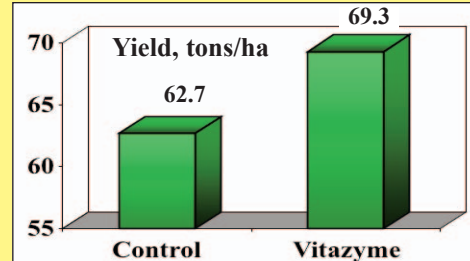
**Head Diameter**



**Head Weight**



**Cabbage Yield**



**Income results:**

• **Increase in income with Vitazyme: 11%**

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

# Canola

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Variety:** Black Giant, super elite

**Seeding rate:** 7 kg/ha

**Seeding date:** August 30, 2008

**Previous crop:** spring barley

**Location:** Ukraine central forest-steppe area near Vinnytsia

**Tillage:** plowing, cultivation, and harrowing

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha, replicated four times, to discover the effect of the product on the canola yield.

**1. Control**

**2. Vitazyme once**

**3. Vitazyme twice**

**Fertilization:** in the fall of 2008, 30 kg/ha N, 60 kg/ha  $P_2O_5$ , and 90 kg/ha  $K_2O$ ; in the spring of 2009, 90 kg/ha of N.



**Early in the spring this winter canola was already displaying a considerable improvement in growth with Vitazyme.**



**At flowering, this same field, receiving both a fall and a spring application, shows a most excellent response.**



**These Ukraine canola samples show the untreated control on the left, one application (center), and two applications (right).**

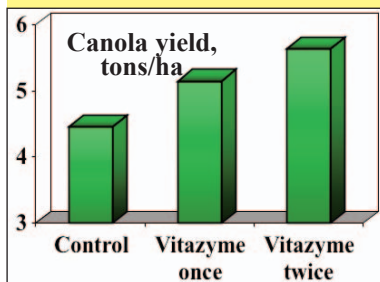
**Vitazyme application:** Treatment 1 received a fall application at 1.0 liter/ha on October 22, 2008, and Treatment 2 received this treatment plus another in the spring on April 30, 2009, at 1.0 liter/ha.

**Yield results:**

Treatment	Canola yield	Change
	tons/ha	tons/ha
1. Control	4.46	—
2. Vitazyme	5.15	0.69 (+15%)
3. Vitazyme, fall + spring application	5.64	1.18 (+26%)

*Continued on the next page*

## Canola yield



**Income results:** • **Increase in income with fall Vitazyme: 1,663 hrn/ha**  
• **Increase in income with fall + spring Vitazyme: 2,786 hrn/ha**

**Conclusions:** This winter canola trial at Vinnytsia, Ukraine, revealed that a single Vitazyme application in the fall, at 1 liter/ha, gave a large yield increase of 15%. An additional spring application at 1 liter/ha provided nearly double the fall-only application: 26%. Both treatments resulted in substantial increases in income, of 1,663 and 2,786 hrn/ha. These results prove the great utility of this product to improve winter canola yields under Ukrainian soil and climatic conditions.

### Increase in canola yield

Fall application ..... +15%  
Fall + Spring application ... +26%

## Celery Cabbage

**Researcher:** unknown

**Variety:** unknown

**Location:** Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam

**Soil type:** unknown

**Planting date:** March, 2009

**Fertilization:** unknown

**Experimental design:** A field of celery cabbage was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

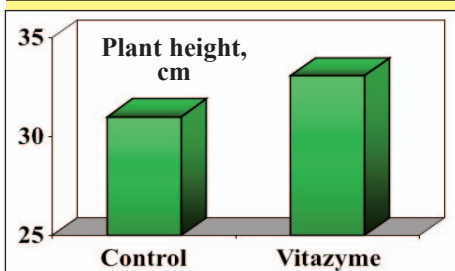
### 1. Control

### 2. Vitazyme twice

**Vitazyme application:** Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

**Height results:** At harvest time the average plant height was determined for each treatment

Treatment	Plant height cm	Height change cm
Control	31.0	—
Vitazyme	33.1	2.1 (+7%)



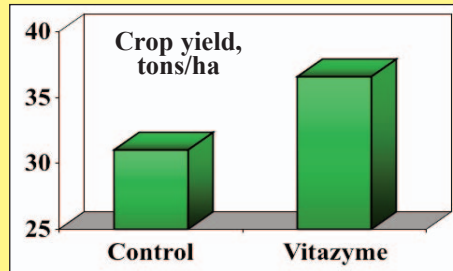
**Yield results:** The crop was harvested in April of 2009.

**Conclusions:** This study on celery cabbage in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased both plant height (7%) and yield (5.59 tons/ha, or 18%). The product's active agents have been shown to greatly stimulate the growth and yield of this vegetable crop in Southeastern Asia.

• **Increase in plant height: 7%**

• **Increase in yield: 18%**

Treatment	Crop yield tons/ha	Yield change tons/ha
Control	31.01	—
Vitazyme	36.60	5.59 (+18%)



## Corn

### Agricultural Custom Research Education Services A study on phosphorus availability for corn

**Researcher:** Bert Schou, Ph.D.

**Variety:** Pioneer 34R67 (Roundup Ready, 108-day maturity, BCOR)

**Tillage:** conventional

**Planting depth:** 2 inches

all plots, Perry Agricultural Lab, Bowling Green, Missouri). CEC, 17.5; pH, 5.8; organic matter, 2.2%; N, 64 lb/acre; S, 18 lb/acre; P<sub>2</sub>O<sub>5</sub>, 264 lb/acre; Ca, 4,766 lb/acre; Mg, 504 lb/acre; K, 495 lb/acre; Na, 51 lb/acre; B, 1.94 lb/acre; Fe, 668 lb/acre; Mn, 94 lb/acre; Cu, 1.8 lb/acre; Zn, 8.2 lb/acre.

**Location:** Cedar Falls, Iowa

**Seeding rate:** 32,00 seeds/acre

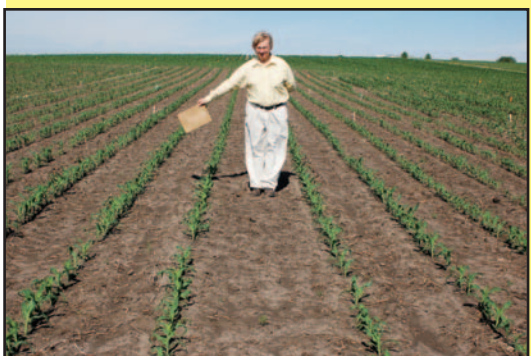
**Planting date:** May 19, 2009

**Soil type:** Kenyon loam

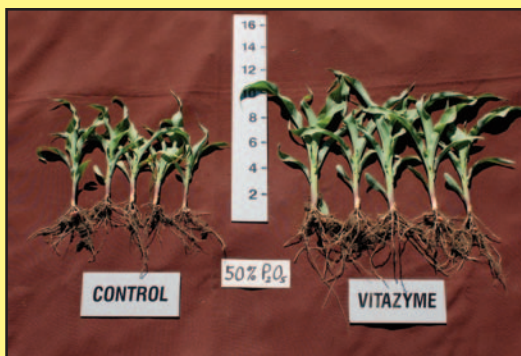
**Previous crop:** soybeans

**Row width:** 30 inches

**Soil test results:** (composite of



This Iowa study shows corn treated with Vitazyme on the left. It is taller and more aggressive than the control on the right.



The early growth of this corn, at the medium phosphorus level, is much greater with Vitazyme treatment.

**Experimental design:** An area of low phosphorus soil was selected and arranged in a six treatment pattern with six replications (Latin Square design), the plots being 15 x 40 feet (0.0138 acre). The center two rows were harvested for yield determinations. The purpose of the study was to determine the ability of Vitazyme to improve corn yields at various levels of phosphorous fertility.



Treatment	Phosphorous	Vitazyme AP <sup>1</sup>	Vitazyme Post <sup>2</sup>
	% of recommended	oz/acre	oz/acre
1	0	0	0
2	0	13	13
3	50	0	0
4	50	13	13
5	100	0	0
6	100	13	13

<sup>1</sup>AP=applied at planting on the seeds.  
<sup>2</sup>Post=applied at the V6 (20-inch) stage to the leaves and soil.

**Fertilization:** Nitrogen was applied as 18-46-0 and 46-0-0% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, to achieve 100 lb/acre of N for all plots. Potassium was adequate and none was applied. Phosphorous was applied as 18-46-0, calculated at levels to give 50 and 100% of the soil test recommendations for plots 3 to 6. All nutrients were applied pre-plant dry.

**Vitazyme applications:** (1) 13 oz/acre in-furrow at planting on May 19, 2009; (2) 13 oz/acre sprayed on the leaves and soil at V6 (20-inch height) on June 23, 2009

**Weed control:** excellent, with glyphosate applied three times

**Seasonal weather:** The 2009 growing season was cool and

wet; rainfall was 45% above normal, and corn harvesting was delayed two to three weeks beyond the norm.

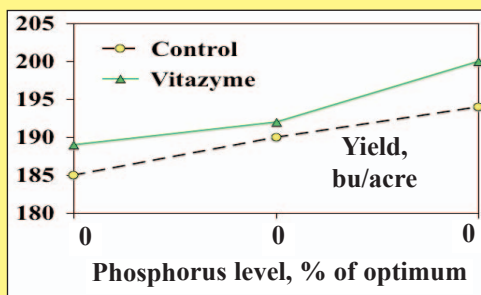
**Harvest date:** November 4, 2009, using an MF 8 plot combine to harvest a 5-foot width

**Yield results:** Plant population was all between 27,117 to 27,572 plants/acre (no significant differences).

Treatment	Yield <sup>1</sup>	Yield change <sup>2</sup>
	bu/acre	bu/acre
1. No P, no Vitazyme	185 a	—
2. No P, + Vitazyme	189 a	4 (+2%)
3. 50% P, no Vitazyme	190 a	—
4. 50% P, + Vitazyme	192 a	2 (+1%)
5. 100% P, no Vitazyme	194 a	—
6. 100% P, + Vitazyme	200 a	6 (+3%)
LSD <sub>0.05</sub>	11.2	
Standard deviation	9.5	
CV	4.93%	
P (Friedman's X2)	0.458	
Grand mean	191.6	

<sup>1</sup>Yields are adjusted to 15.5% moisture. Means followed by the same letter are not significantly different at P=0.05.

<sup>2</sup>Comparisons are made at the same phosphorus level.



### Increase in yield at three P levels

0%P	+2%
50% P	+1%
100%	+3%

**Conclusions:** This plot study in Iowa, to evaluate the effect of three phosphorous levels on

corn yield with and without Vitazyme, revealed no significant yield differences but a **solid trend for higher grain yields with Vitazyme at each phosphorous level**. These increases ranged from 2 to 6 bu/acre, showing that the known mycorrhizae stimulation by Vitazyme's active agents was bringing more phosphorus, and other elements, into the plant for improved growth.

## Corn



The Vinnytsia research station in Ukraine conducted a replicated Vitazyme trial on corn, which produced remarkable results.



Despite only one application, note the excellent crop response. Adding fish to Vitazyme caused an even better response.

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Variety:** Ronaldinio

**Location:** Ukraine central forest-steppe area near Vinnytsia

**Planting date:** May 22, 2009

**Seeding rate:** 22 kg/ha

**Tillage:** plowing, harrowing, and cultivation

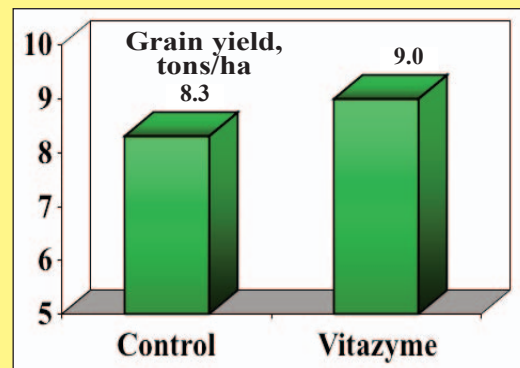
**Previous crop:** winter wheat  
**Soil type:** gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil "hydrolyzed nitrogen", 15.8 mg/100g of soil phosphorous, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**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,



The treatment schedule reveals only one Vitazyme application to the leaves and soil on June 25, short of the usual two sprays.

### Corn Yield



Continued on the next page



on the yield of corn grain.

### 1. Control

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:

• **Increase in corn yield: 8%**

### 2. Vitazyme, once foliar

Income results:

• **Income increase: 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.

## Corn

Researcher: Nathan Temples

Farm cooperator: Donnie and Chris Wondel, D and C Farms

Location: Arbor, Missouri

Planting rate: 29,000 seeds /acre

Irrigation: furrow, six times

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.

Variety: 32 D 78

Soil type: silt loam

Row-spacing: 30 inches

Planting date: May 7, 200

### 1. Control

Fertilization: unknown

### 2. Vitazyme

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

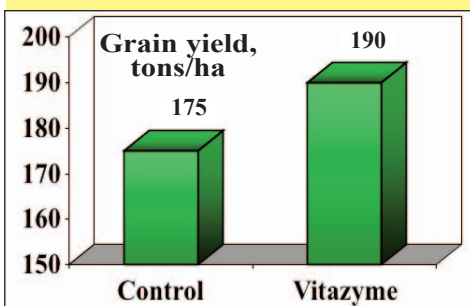
Yield results: see graph at left.

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.



**The usual pronounced root response to Vitazyme is noted in this Missouri corn trial. Ear size was proportional to root growth.**

### Corn Yield



• **Increase in corn yield: 9%**

## Corn

Researcher: Nathan Temples



**This Missouri trial also produced excellent root and ear size responses to Vitazyme. The 5 bu/acre increase was very profitable.**

• **Increase in corn yield: 2.5%**

Farm cooperator: Schlosser Farms

Variety: Pioneer 33 N 58

Planting date: April 20, 2009

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<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O preplant

Vitazyme application: 13 oz/acre with the herbicide, 42 days after planting

Yield results: See graph at right.

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

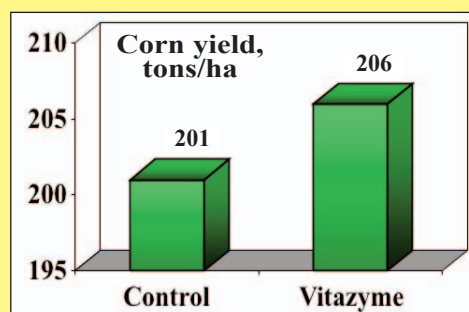
Location: Perkins, Missouri

Soil type: silt loam

Planting rate: 25,000 seeds /acre

Harvest date: October 3, 2009

### Corn Yield



## Corn

Researcher: Nathan Temples

Soil type: sandy  
six times

Experimental design: An 80-acre irrigated corn field was divided into 60 acres treated with Vitazyme, and 20 acres left untreated.

Farm cooperator: Seyer Farms

Planting rate: 29,000 seeds /acre

Planting date: April 22, 2009

Location: Oran, Missouri Variety: DeKalb

Row-spacing: 30 inches Irrigation: furrow,

ed, to determine the product's effect on crop yield.

**1. Control**

**2. Vitazyme**

Fertilization: unknown

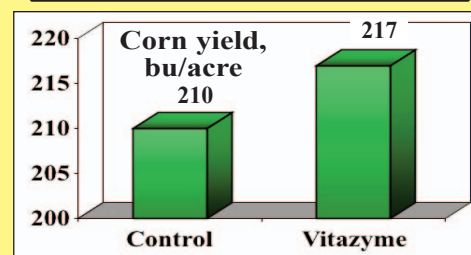
Vitazyme application: 13 oz/acre along with a herbicide

Harvest date: September 14, 2009

Yield results: • **Increase in corn yield: 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.

**Corn Yield**



## Corn

Researcher: Nathan Temples

Location: Sikeston, Missouri

Soil type: sandy loam

Row-spacing: 38 inches

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<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O

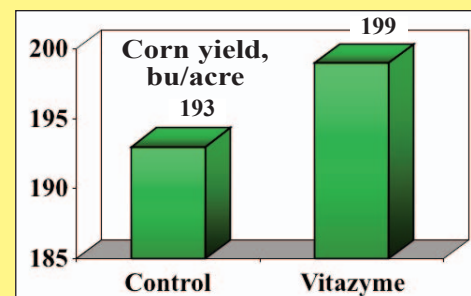
Vitazyme application: 8 oz/acre on the seeds at planting

Harvest date: September 23, 2009

Yield results: • **Increase in corn yield: 3.3%**

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.

**Corn Yield**



## Corn

### Treatment of the cut corn versus molasses

Researcher: Richard Stonewigg

Location: Gicheha Farm, Brooke Side Dairies, Kenya

Variety: unknown

Soil type: unknown

Date of silage preparation: August 15, 2008

Age at chopping: 130 days

Experimental design: Corn was cut for silage and prepared in the two environments, one with Vitazyme and the other with molasses. Comparisons of the feeding value were made with typical silage evaluations.

**1. Vitazyme**

**2. Molasses**

Vitazyme treatment: A silage heap was prepared by layering 10 tons of chopped maize, uniformly sprayed with 200 ml of Vitazyme (20 ml per ton of silage) in 200 liters of water, with another 10 ton layer that received the same Vitazyme treatment. The heap was then covered with a polyethylene tarp, and ensiling continued until August 10, 2009, when samples were collected.

Molasses treatment: In a manner similar to Vitazyme treatment, 20 kg of molasses (2 kg per ton of silage) in 200 liters were sprayed uniformly on two 10 ton layers of silage, and covered with a polyethylene tarp.

Quality analysis of the silage: On August 10 of 2009 the silage began to be fed to the cattle, at which time samples from each treatment were taken and submitted to an American Breeding Society laboratory for analysis. Results are shown below.

Comments by the general manager of Gichelon Farm: "On silage made by using Vitazyme compared with the known value using molasses,

- **Very good dry matter; the best we have ever achieved was 30.45 at 123 days past germination [versus 32.00% here].**

- **Very high crude protein; the average for maize is 8% crude protein [versus 11.3% here].**

Recommendation: promote Vitazyme as a product for silage making."

Dry Matter	Fat	Crude protein	Crude Fiber	Phosphorus	Ash	Metabolizable energy
%	%	%	%	%	%	kcal/kg dry matter
32	2.65	11.3	21.6	0.01	11.3	10.7

## Corn

### A comparison of two formulations

Researcher: Paul W. Syltie, Ph.D.

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: yellow dent

Soil: Bowie fine sandy loam

Pot size: 1 gallon

Planting rate: 10 seeds/pot, thinned to three plants

Planting date: May 6, 2009

Experimental design: A greenhouse experiment was set up to evaluate the relation merits of two Vitazyme formulations to stimulate corn growth.

**1. Control**

**2. Vitazyme formula 1**

**3. Vitazyme formula 2**

Vitazyme application: At planting, 100 ml of a 0.05% solution of Vitazyme for each formula- Continued on the next page



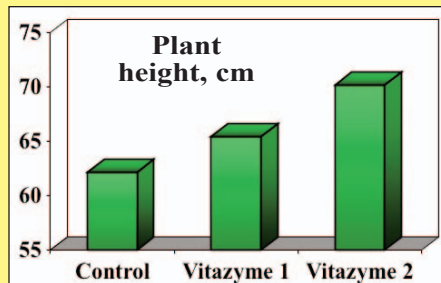
tion was applied evenly to the soil surface of each pot. Formula 1: lot from September 5, 2008; Formula 2: lot from 2008 – 4. The control received 100 ml of water only.

**Harvest date:** On June 2, 2009, the plant roots were washed free of soil and dried in a drying oven at about 125° F for 48 hours. Then the dried plants were weighed to the nearest 0.01 gram. Plant heights were determined before drying, measuring to the nearest cm.

**Height results:**

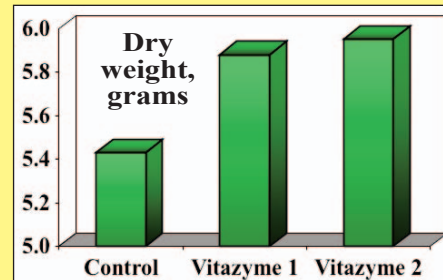
Treatment	Plant height cm	Height change cm
3. Vitazyme - 2	70.14 a	7.98 (+13%)
2. Vitazyme - 1	65.44 ab	3.28 (+5%)
1. Control	62.16 b	—
Block P	0.833	
Main effects P	0.043*	
Model P	0.371	
CV10.6%	9.3%	
LSD <sub>0.05</sub>	6.12 cm	

### Plant Height



**Dry weight results:** the plots were dried in a drying oven for 48 hours at 130° F.

### Plant Dry Weight



Treatment	Dry weight grams	Weight change grams
3. Vitazyme - 2	5.95 a	0.52 (+10%)
2. Vitazyme - 1	5.88 a	0.45 (+8%)
1. Control	5.43 a	—
Block P	0.816	
Main effects P	0.538	
Model P	0.827	
CV	18.3%	
LSD <sub>0.05</sub>	1.05 grams	

**Conclusion:** Vitazyme Formula 1 in this greenhouse study produced significantly taller plants than did the control (+13%), but a statistically equal height to Formula 2, which was 5% taller than the control. However, all dry plant weights were statistically the same even though Vitazyme Formula 1 increased height by 10% above the control, and Formula 2 by 8% above the control. These results show very close similarities in corn response for both formulations, but excessively high greenhouse temperatures may have reduced the response by both materials.

## Corn

### Synergism with Twin N and Revive Plus

**Researcher:** Paul W. Syltie

**Variety:** yellow dent

**Planting rate:** 10 seeds/pot, thinned to 3 plants/pot

**Experimental design:** A greenhouse study was set up to evaluate the effect of Vitazyme, Twin N, and Revive Plus, alone or together, on the growth of corn. Five treatments with seven replicates were utilized.

1. Control
2. Vitazyme (13 oz/acre)
3. Twin N (1.25 grams/ha)
4. Vitazyme + Twin N (same as 2 and 3)
5. Vitazyme + Twin N + Revive Plus (same as 2 and 3, + 20 oz/acre)

**Fertilization:** none

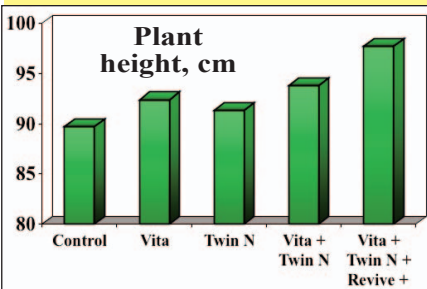
**Vitazyme applications:** A single application was made on the soil surface at 13 oz/acre (1 liter/ha)

**Twin N application:** Twin N is a formulation of several endophytic and free-living nitrogen fixing organisms that are freeze-dried, and reconstituted before an application of 1.25 grams/ha.

**Revive Plus applications:** Revive Plus is 20% natural carboxylic acids, 8% "other proprietary ingredients", and 72% inert ingredients, applied at 20 oz/acre.

**Growth results:** Various plant parameters were measured at harvest on March 9, 2009, 39 days after planting. The plants were placed in a drying oven for 48 hours at 130° F.

### Plant Height



Treatment	Plant height cm	Height change cm
5. Vita + Twin N + R+	97.7 a	8.0 (+9%)
4. Vita + Twin N	93.8 ab	4.1 (+5%)
2. Vitazyme	92.4 ab	2.7 (+3%)
3. Twin N	91.3 b	1.6 (+2%)
1. Control	89.7 b	—
Block P	0.065	
Main effects P	0.049*	
Model P	0.031*	
CV	5.2%	
LSD <sub>0.05</sub>	5.3 cm	

\*Means followed by the same letter are not significantly different according to Mo Student-Newman-Keuls Test.

**Conclusions:** This greenhouse study with corn, to determine the effects of Vitazyme, Twin N, and Revive Plus on plant height and dry weight, revealed that all three products combined gave



**Corn grown in the greenhouse with Vitazyme and two other products showed a good synergism with both.**

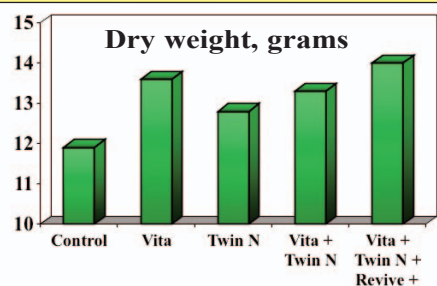


**Twin and Vitazyme together did well, increasing yield by 5%, and by 9% when Revive Plus also added.**

Continued on the next page



## Plant Dry Weight



Treatment	Dry weight grams	Weight change grams
5. Vita + Twin N + R+	14.0 a	2.1 (+18%)
2. Vitazyme	13.6 ab	1.7 (+14%)
4. Vita + Twin N	13.3 ab	1.4 (+12%)
3. Twin N	12.8 bc	0.9 (+8%)
1. Control	11.9 c	—
Block P	0.262	
Main effects P	0.018*	
Model P	0.045*	
CV	8.6%	
LSD <sub>0.05</sub>	1.2	

\*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test.

## Increase in plant height

Vitazyme + Twin N	
+ Revive + .....	+9%
Vitazyme + Twin N ...	+5%
Vitazyme .....	+3%
Twin N .....	+2%

## Increase in dry weight

Vitazyme + Twin N	
+ Revive + .....	+18%
Vitazyme .....	+14%
Vitazyme + Twin ...	+12%
Twin N ....	+8%

the highest crop response for both plant height (+9%) and dry weight (18%). These values were significantly greater than Twin N and the control in both cases, while Vitazyme and Vitazyme + Twin N were statistically the same as for the three products combined. Apparently the growth stimulators working together produced an excellent synergism, although Vitazyme alone gave the second highest dry weight increase of all five treatments (14%), only 4 percentage points less than for the three combined products.

# Corn

## Synergism with Revive Plus



**The corn roots receiving both Vitazyme and Revive Plus produced the greatest root mass in this greenhouse study.**

**Researcher:** Paul W. Syltie

**Variety:** yellow dent

**Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas

**Soil type:** sandy loam **Pot size:** 1 gallon **Planting date:** January 30, 2009

**Seeding rate:** 10 seeds/pot, thinned to three plants/pot

**Experimental design:** A greenhouse study was designed with four treatments and seven replicates to evaluate the effects of Vitazyme and Revive Plus, alone and together, on the growth of field corn.

1. Control 2. Vitazyme 3. Revive Plus 4. Vitazyme + Revive Plus

**Fertilization:** none

**Vitazyme applications:** 13 oz/acre (1 liter/ha) at planting, watered into the soil surface in 100 ml of water (0.0016% solution)

**Revive Plus application:** Revive Plus is a combination of 20% natural carboxylic acids, 72% inert ingredients, and 8% other proprietary ingredients. It was applied at 20 oz/acre (1.5 liters/ha) to the soil surface in 100 ml of water (0.0024% solution).

**Growth results:** On March 9, 2009, 38 days after planting, the corn roots were washed clean of residual soil, and plant height was measured. Then the plants were placed in a drying oven and dried at 130° F for 48 hours before weighing.

**Conclusions:** In this greenhouse corn trial with Vitazyme and Revive Plus, Revive Plus provided the greatest plant height (4%) and dry weight increases (9%), although none of the changes for any treatments were significant. The degree of experimental error was too high to result in significant differences among treatments, except for Revive Plus exceeding the control for plant dry weight.

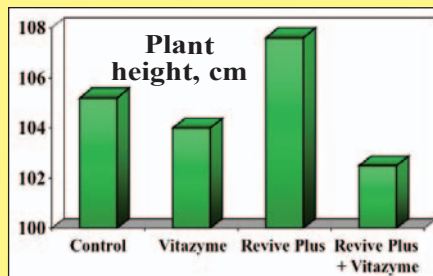
## Increase in plant height

Revive Plus .....	+4%
Vitazyme .....	+1%

## Increase in dry weight

Revive Plus .....	+9%
Vitazyme + Revive Plus ...	+5%
Vitazyme .....	+1%

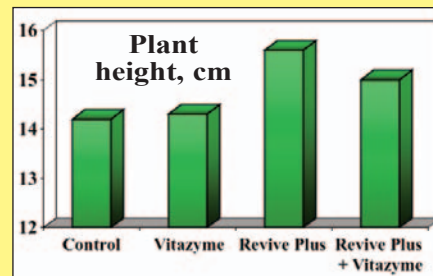
## Plant Height



Treatment	Plant height cm	Height change cm
3. Revive Plus	107.6 a	4.4 (+4%)
2. Vitazyme	104.0 a	0.8 (+1%)
1. Control	103.2 a	—
4. Vita + Revive +	102.5 a	(-) 0.7 (-1%)
Block P	0.992	
Main effects P	0.558	
Model P	0.958	
CV	6.84%	
LSD <sub>0.1</sub>	6.6 cm	

\*Means followed by the same letter are not significantly different (P=0.01) according to the Student-Newman-Keuls Test

## Plant Dry Weight



Treatment	Dry weight* grams	Change grams
3. Revive Plus	15.6 a	1.3 (+9%)
4. Vita + Revive +	15.0 a	0.7 (+5%)
2. Vitazyme	14.3 ab	0.1 (+1%)
1. Control	14.2 b	—
Block P	0.912	
Main effects P	0.237	
Model P	0.673	
CV	9.93%	
LSD <sub>0.1</sub>	1.4 grams	

\*Means followed by the same letter are not significantly different (P=0.01) according to the Student-Newman-Keuls Test

# Cotton

**Researchers:** Wang Zhongyan, Peng Juneal, Cai Jinshu, Yi Chun, Xino Wenzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute; Liu Shibin, Zheng Jinping, and Song Jianping, Changde Jinshi Agricultural Bureau  
**Location:** Xinzhou, Jinshi, Hunan, China  
**Variety:** Jingfeng 1  
**Planting date:** April 14, 2009

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

**1. Control**

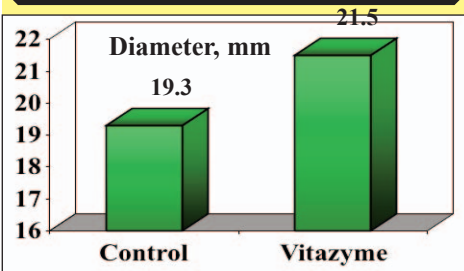
**2. Vitazyme**

**Fertilization:** unknown

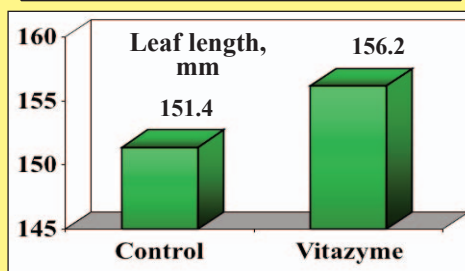
**Vitazyme application:** (1) a seed soak of 5% Vitazyme for 5 minutes (April 14); 1.0 liter/ha sprayed on the leaves and soil at early flowering (July 10)

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

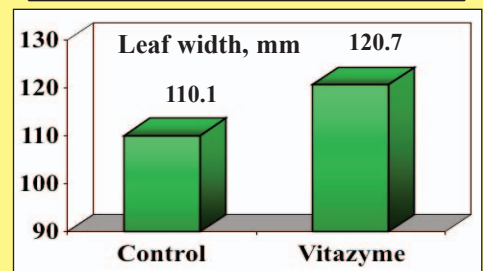
## Stem Diameter



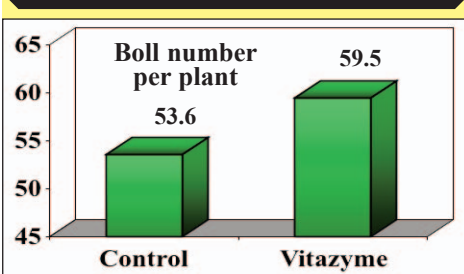
## Leaf Length



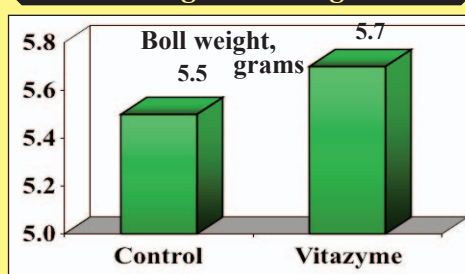
## Leaf Width



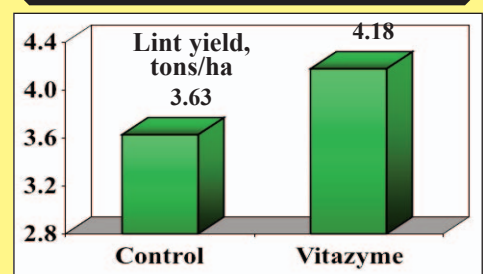
## Bolls Per Plant



## Average Boll Weight



## Cotton Yield



**Harvest date:** unknown

• **Increase in lint yield: 15%**

• **Increase in stem diameter: 11%**

**Yield results:**

• **Increase in income: 15%**

• **Increase in leaf length: 10%**

**Income results:**

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

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

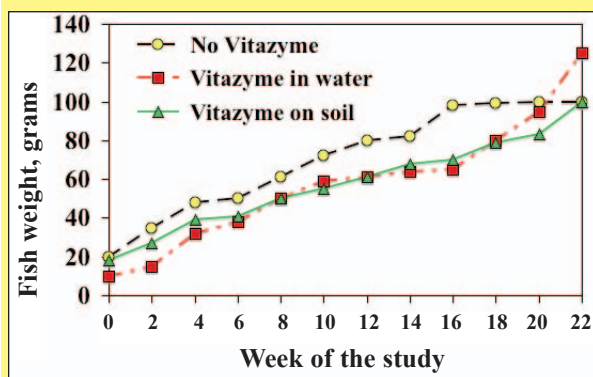
• **Increase in bolls per plant: 11%**

• **Increase in leaf width: 10%**

• **Increase in boll weight: 4%**

# Fish (Tilapia and Catfish)

## Relationship Between Vitazyme Application and Weight of Tilapia



**Researchers:** Nana Oti and Emmanuel N. Aryee

**Location:** Ministry of Fisheries, Ghana

**Experimental design:** Few details on the study are available.

**Tilapia.** A fish pond was treated with Vitazyme (1 liter/ha) on the soil several days before flooding. Another pond received regular additions of Vitazyme to the water, and a third pond received on Vitazyme.

**Catfish.** One fish pond received food not treated with Vitayme, whereas another pond received treated food.

**Results:** Average weights of the fish were taken at frequent intervals, the results displayed on the two figures below.

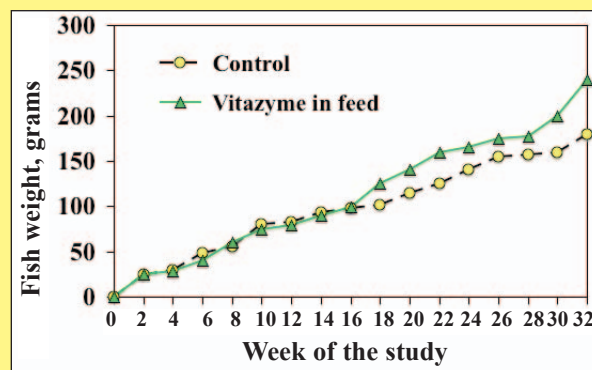
**Increase in weight at the end of the trial: 170 grams (Vitazyme) - 143 grams (control) =**

**27 grams (19%)**



Increase in weight at the end of the trial: 250 grams (Vitazyme) - 200 grams (control)=  
**50 grams (25%)**

### Relationship Between Vitazyme Application and Weight of Catfish



**Conclusions:** This study was plagued by a series of problems, including cloudiness and cold temperatures that slowed food production in the ponds, some female tilapia with what should have been an all-male population, and a resulting reduction in overall growth rates of both species. Nevertheless, Vitazyme added to the water increased the final tilapia weight by 19% (170 grams vs. 143 grams), and the average catfish weight by 25% (250 grams vs. 200 grams). The biggest difference in the growth patterns occurred towards the end of the study for both species, perhaps because more sunlight increased water temperature and growth efficiency at this time. This study has proven a fine potential for Vitazyme use in the Ghana fish industry.

## Grapes

### Response of plants in a young vineyard

**Researcher:** Rafael Jordan

**Location:** Agrícola Chacabuco, Chile

**Variety:** Thompson seedless

**Soil type:** unknown

**Vine spacing:** 3.0 x 3.5 meters

**Vine age:** 3 years (planted in 2007)

**Experimental design:** A grape vineyard of 3.28 ha was selected to apply Vitazyme on a portion of the young vines. The purpose of the trial was to evaluate the effect of the product on vine growth and development as measured by trunk diameter.

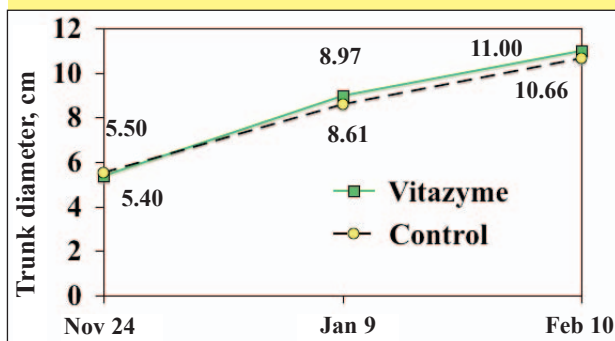
#### 1. Control

#### 2. Vitazyme

**Fertilizer application:** unknown

**Vitazyme treatment:** (1) 1.5 liters/ha on the leaves on November 25, 2008; (2) 1.0 liter/ha on the leaves on December 15, 2008

**Growth results:** Trunk diameter measurements were made on ten representative plants for each treatment at trial initiation (November 24), and also on January 9 and February 10. The results below show the average values for each date and treatment.



### Trunk diameter increase

Treatment	Trunk diameter, cm		
	Initial cm	Final cm	Increase cm
Control	5.50	10.66	5.16 (+94%)
Vitazyme	5.40	11.00	5.60 (+104%)

**Conclusions:** This young grape vineyard study in Chile, using Vitazyme to encourage greater plant vigor and growth, showed that the treated vines (1.5 and 1.0 liter/ha

applications) grew by 104% from the starting distance, whereas the untreated vines increased by 94%, providing a 10% vine diameter increase for the Vitazyme treated vines.. These results show the utility of Vitazyme to stimulate the increase in plant size so that the vineyard can produce more grapes at a younger age.

• **Increase in trunk diameter: 10%**

## Grapes, table use

**Researcher:** unknown

**Farm cooperater:** Santa Marta-Paine, Chile

**Variety:** Crimson Seedless

**Soil type:** unknown

**Experimental design:** A vineyard of Crimson Seedless grapes was divided into three areas: a control and two Vitazyme treatments. The objective of the study was to evaluate the product's effects on fruit maturity, fruit yield, and grape color at harvest.

#### 1. Control

#### 2. Vitazyme, 1.0 liter/ha

#### 3. Vitazyme twice, 1.5 liters/ha

**Fertilization:** unknown

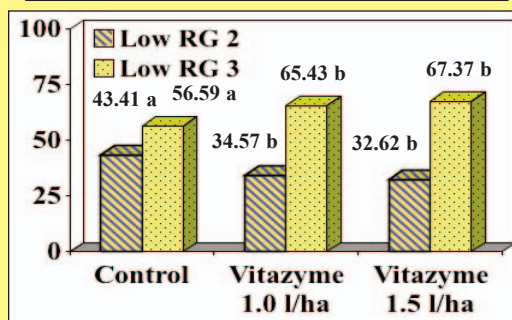
**Vitazyme application:** either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before veraison, and again at the same rate after veraison.

**Color results:** Fruit color was determined at harvest and analyzed statistically. Both Vitazyme treatments improved the development of red color for these Crimson Seedless grapes, increasing the full RG3 values significantly above the control, and reducing the low RG2 levels below the control.

• **Improvement in color with Vitazyme (1.5 liters/ha): 10.78% full RG 3**

**Grape maturity results:** Records were kept of the percent of total harvest for three dates to determine the maturity of the grapes.

### Color Results



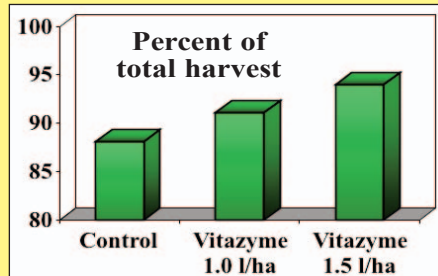
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## Grape Maturity

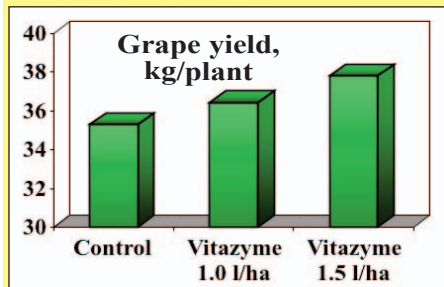
• **Increase in harvest by April, 1.5 liters/ha: 5.9%**

Treatment	Harvest date			Total
	March 19	March 24	April 8	
1. Control	70.6	8.1	9.4	88.1
2. Vitazyme, 1.0 liter/ha	75.1	4.9	11.1	91.1
3. Vitazyme, 1.5 liters/ha	82.1	7.4	4.5	94.0

## Percent of Harvest by Apr. 8



## Total Grape Yield by Apr. 8



**Conclusions:** In this Chilean table grape trial, using Vitazyme at 1.0 and 1.5 liters/ha twice, the grapes responded favorably in terms of maturity, grape color, and final yield. Both Vitazyme rates did well, but the 1.5 liters/ha rate did a bit better than the 1/0 liter/ha rate, improving red color significantly by 10.78% full RG3, maturity by 5.9%, and yield by 7%. These results show the effectiveness of the product for fresh table grape production in Chile.

## Grape Yield

Treatment	Harvest date			Total
	March 19	March 24	April 8	
1. Control	28.26	3.24	3.78	35.28
2. Vitazyme, 1.0 liter/ha	30.03	1.96	4.42	36.41 (+3%)
3. Vitazyme, 1.5 liters/ha	32.85	3.14	1.80	37.79 (+7%)

**Increase in grape yield**  
 Vitazyme, 1.0 liter/ha ..... +3%  
 Vitazyme, 1.5 liters/ha ... +7%

# Grapes, table use

## Quality assessments

**Researcher:** Rodrigo Garcia

**Variety:** Crimson Seedless

**Experimental design:** A vineyard of Crimson Seedless grapes was divided into three sections: a control and two Vitazyme treatments. The objective of the study was to evaluate the product's effect on grape quality with applications before and after veraison and an elimination of the applications at shoot growth and bloom.

**Farm coopereator:** Viticulture and Fruitculture Association, Chile

**Soil type:** unknown

**Fertilization:** unknown

**1. Control**

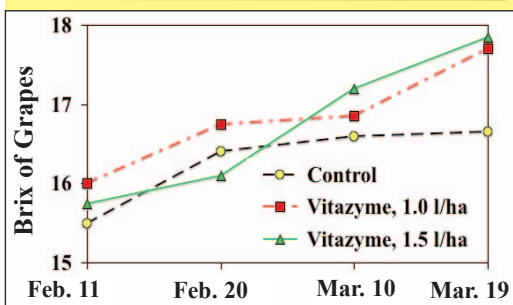
**2. Vitazyme, 1.0 liter/ha**

**3. Vitazyme twice, 1.5 liters/ha**

**Vitazyme application:** either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before veraison and again at the same rate after veraison.

**Quality results:** Brix levels and the maturity of the grapes at various times were measured in this study.

## Brix Levels Over Time

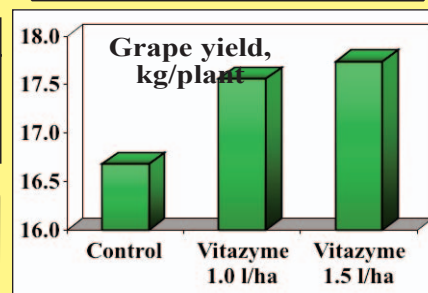


## Fruit Brix (March 19)

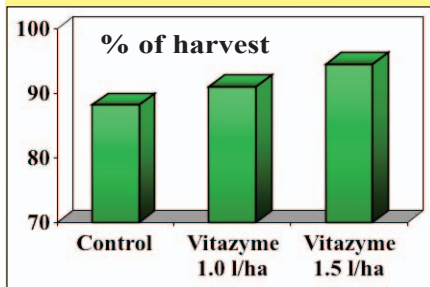
Treatment	Brix	Change
1. Control	16.68	—
2. Vitazyme, 1.0 liter/ha	17.56	0.88
3. Vitazyme, 1.5 liters/ha	17.74	1.06

**Increase in brix**  
 1.0 liters/ha twice ... +0.88%  
 1.5 liters/ha twice ... +1.06%

## Final Brix Levels



## Percent of Harvest by Apr 8

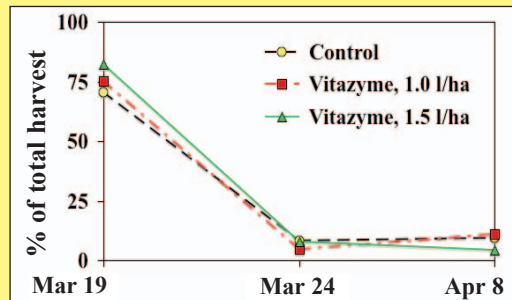


## Grape Maturity

• **Increase in percent harvest, 1.0 liter/ha: 2.87%**  
 • **Increase in percent harvest, 1.5 liters/ha: 6.29%**

**Conclusions:** These Crimson Seedless table grapes in Chile responded excellently to Vitazyme, especially to the 1.5 liters/ha rate applied before and after

## Percent of Total harvest, by Date



veraison. This treatment resulted in a 1.06 points increase in brix, and percent harvested grapes by April 8 of 94.46%. The 1.0 liter/ha Vitazyme rate resulted in a 0.88 point brix increase above the control, and a 91.04% harvest by April 8, versus 88.17% for the control. This product has proven itself in this study to be a powerful adjunct to viticulture in Chile.



# Grapes, table use

## Quality assessments

Researcher: Rodrigo Garcia

Variety: Flame Seedless

Experimental design: A vineyard of Flame Seedless grapes was divided into three sections for a control and two Vitazyme treatments. The objective of the study was to evaluate the product's effect on grape quality with application's before and after veraison, and an elimination of the applications at short growth and bloom.

1. Control

2. Vitazyme twice, 1.0 liter/ha

3. Vitazyme twice, 1.5 liters/ha

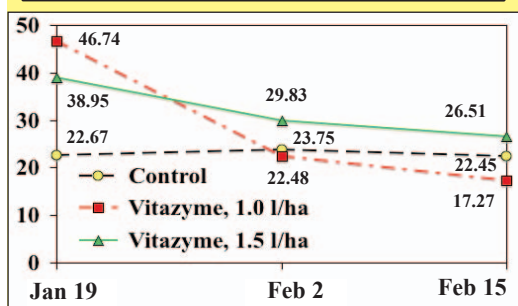
Fertilization: unknown

Vitazyme application: either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before veraison, and again at the same rate after veraison

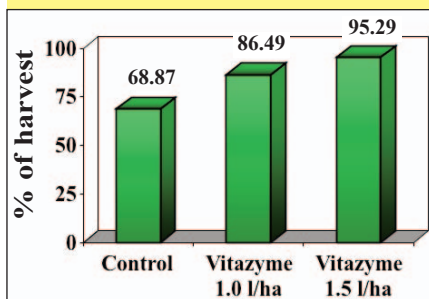
Quality results: Brix levels and the maturity of the grapes at various times were measured in this study.

### Grape Maturity

#### Percent of Total harvest, by Date



#### Percent of Harvest by Feb. 15

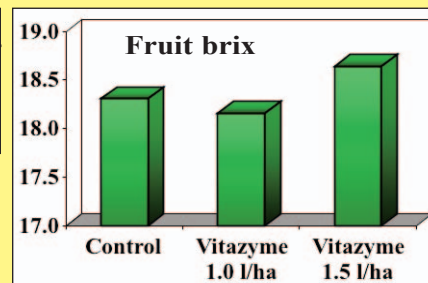


once after veraison, substantially increased grape brix (+0.33) and greatly enhanced the early maturation of the fruit. By February 15, 95.29% of the harvest was already collected with this treatment. In contrast, only 22.68% of the control grapes were harvested on January 19. The Vitazyme 1.0 liter/ha rate, applied twice, gave a small reduction in fruit brix, but enhanced maturity of the grapes substantially, to 86.49% of the total harvest by February 15. The 1.5 liter/ha Vitazyme rate significantly colored the grapes better than the control grapes. Vitazyme, especially at 1.5 liters/ha twice, has been shown by this study to be an excellent treatment for table grapes.

### Fruit Brix (Jan 19)

Treatment	Brix	Change
1. Control	18.31	—
2. Vitazyme, 1.0 liter/ha	18.16	(-) 0.15
3. Vitazyme, 1.5 liters/ha	18.64	+0.33

• **Increase in brix with Vitazyme (1.5 l/ha): 0.33 percentage points**

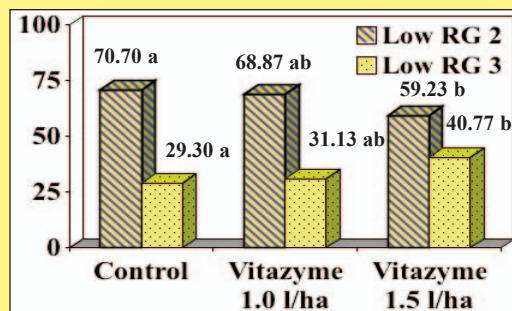


Color results: At harvest, the color of the grapes were measured in terms of red intensity.

The higher treatment level of Vitazyme caused a significant improvement in red coloration versus the untreated control, as evidenced by the higher Full RG3 level and the significantly lower RG2 level. The color improvement with the 1.0 liter/ha Vitazyme rate was midway between the control and 1.5 liter/ha rate.

Conclusions: This table grape study in Chile revealed that Vitazyme at 1.5 liters/ha, applied twice, once before and

### Color Results



- **Increase in percent green grapes, 1.0 l/ha: 17.62%**
- **Increase in percent green grapes, 1.5 l/ha: 26.42%**
- **Improvement in color with Vitazyme (1.5 liters/ha): 11.47% full RG3**

# Grapes, table use

## Quality assessments

Researcher: Rodrigo Garcia

Variety: Thompson Seedless

Experimental design: A vineyard of Thompson Seedless grapes was divided into three sections for a control and two Vitazyme treatments. The objective of the study was to evaluate the product's effect on grape quality with applications before and after veraison, and an elimination of the applications at shoot growth and bloom.

1. Control

2. Vitazyme, 1.0 liter/ha

3. Vitazyme twice, 1.5 liters/ha

Fertilization: unknown

Vitazyme application: either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before veraison and again at the same rate after veraison.

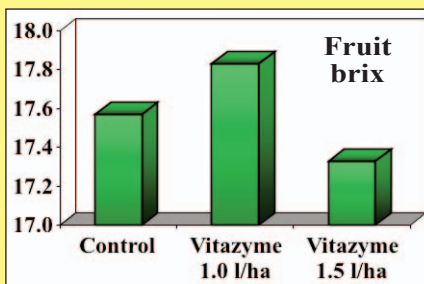
Quality results: Brix levels and the maturity of the grapes at various times were measured in this study.

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## Fruit Brix

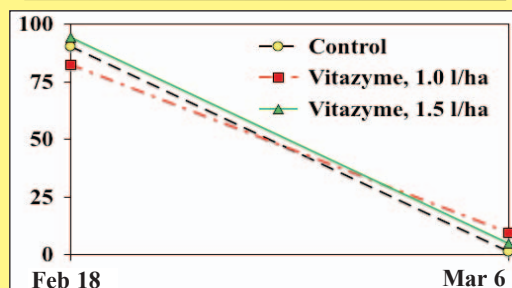
Treatment	Brix	Change
1. Control	17.57	—
2. Vitazyme, 1.0 liter/ha	17.83	0.26
3. Vitazyme, 1.5 liters/ha	17.33	(-) 0.24

- **Increase in brix with Vitazyme (1.0 l/ha): 0.26 percentage points**



## Grape Maturity

### Percent of Total harvest, by Date



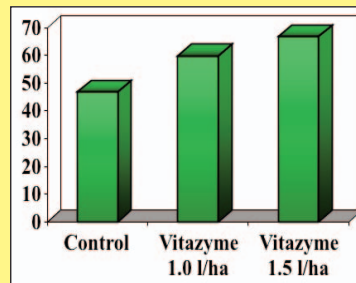
## Fruit Color at Harvest

Treatment	Percent of bunches			
	Lack color	Light green	Green	Yellow green
1. Control	16.34	18.59	46.76	18.31
2. Vitazyme, 1.0 liter/ha	10.22	10.84	59.75	19.10
3. Vitazyme, 1.5 liters/ha	11.60	8.40	66.67	13.33

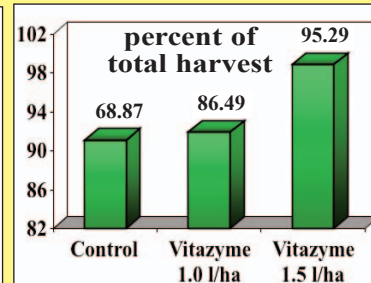
The green-colored grapes are the best quality. Of this color, the changes with Vitazyme are given below

- **Increase in percent green grapes at 1.0 l/ha: 12.99%**
- **Increase in percent green grapes at 1.5 l/ha: 19.91%**

### Percent Green Grapes



### % of Harvest by Mar 15



- **Increase in percent harvest, 1.5 l/ha: 7.76%**

**Conclusions:** This Syngenta test of Vitazyme, at 1.0 and 1.5 liters/ha applied twice — once before and once after veraison — revealed that the product did little to alter the sugar (brix) content of the fruit at harvest, but enhanced maturity of the fruit, especially at the 1.5 liters/ha rate. The 1.5 liters/ha rate increased harvestable bunches by 7.76% at the last recorded harvest date. Fruit color was also enhanced with Vitazyme, the desired green color being 19.91% higher at the 1.5 liters/ha rate than for the control; the 1.0 liter/ha rate gave to 12.99% increase. The greater percentage of green fruit was likely due to the product's chlorophyll enhancing effect throughout the plant, including the fruit skins. Vitazyme is shown to be an excellent adjunct to table grape production in Chile, enhancing maturity as well as grape color.

## Grapes, table use

### Quality assessments

**Researcher:** Rodrigo Garcia

**Varieties:** Thompson Seedless and Crimson Seedless

**Soil type:** unknown

**Farm cooperator:** Fdo. San Luis de la Morera, Codegua, Region VI, near Santiago, Chile

**Vineyard age:** mature

**Plant spacing:** 3.5 x 3.5 meters

**Irrigation volume:** 800 liters/ha

**Plant density:** 816 plants/ha

**Experimental design:** Two seedless table grape varieties were used to evaluate the effectiveness of Vitazyme, Biozyme TF, and Citogrower for improving table grape quality. a randomized complete block design was used with four replications and six plants per plot. The vineyards were uniform in soil quality and management.

Treatment	Rate	Stage				Verasion
		1	2	3	4	
	liters/ha					
1. Control	—					
2. Vitazyme	1.0	X	X	X	X	X
3. Biozyme TF	2.0	X	X	X	X	
4. Citogrower	2.0	X	X	X	X	
*GA (Thompson)	ppm	25	40	40	30	
*GA (Crimson)	ppm	10	20	0	0	

\*GA = gibberellic acid.

**Fertilizer applications:** unknown

**Vitazyme applications:** See the notes and timing in the above table.

**Biozyme TF application:** This product is 1.0% phytohormones, 0.6% amino aids, and 1.8% oligoelements. It was applied at 2.0 liters/ha three times as shown above.

**Citogrower application:** This is a solution of soluble phosphorus, potassium, and adenine, applied at 2.0 liters/ha, with timing as shown in the table above.

## Thompson Seedless

Treatment	Brix level*	Change	Berry size*	Change
			mm	mm
1. Control	18.66 a	—	19.69 a	—
2. Vitazyme 5x	18.36 a	-0.30	20.35 a	0.66 (+3%)
3. Biozyme TF 4x	18.07 a	-0.59	20.08 a	0.39 (+2%)
4. Citogrower 4x	17.92 a	-0.74	20.24 a	0.55 (+3%)

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

**Harvest quality data:** The Thompson Seedless grapes were harvested February 15, 2009, and the Crimson Seedless grapes were harvested on March 10, 2009. Brix levels and berry size were measured for both varieties.

- **Increase in berry size with Vitazyme: 0.66 mm**



These Thompson seedless grapes showed a lower, though nonsignificant, brix reading with all three treatments versus the control. The grape size was increased by all three treatments, though not significantly, but the most by the Vitazyme treatment.

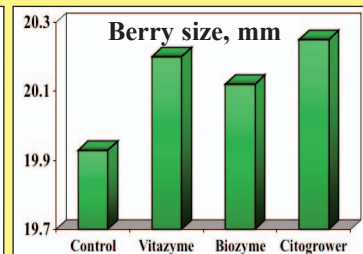
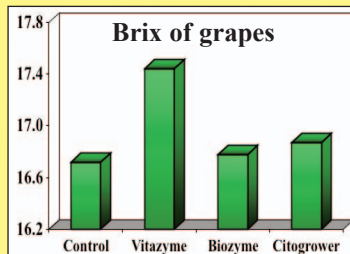
## Crimson Seedless

### Brix Level

### Berry Size

Treatment	Brix level*	Change	Berry size*	Change
			mm	mm
1. Control	16.72	—	19.93 a	—
2. Vitazyme 5x	17.44 a	0.72	20.20 a	0.27 (+1%)
3. Biozyme TF 4x	16.78 a	0.06	20.12 a	0.19 (+1%)
4. Citogrower 4x	16.87 a	0.15	20.25 a	0.32 (+2%)

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



These Crimson Seedless grapes produced juice that was not significantly different amongst all four treatments, but the five Vitazyme applications produced by far the greatest sugar increase above the control: 0.72 percentage point. Berry size was improved, though nonsignificantly, for all three treatments, the Vitazyme and Citogrower treatments giving the biggest increase: 0.27 mm and 0.32 mm, respectively.

**Conclusions:** This table grape study in Chile revealed that Vitazyme produced consistent improvements in grape berry diameter for both varieties, about equal to Citogrower, although these increases were not significant. The increases for Vitazyme were 0.66 mm for Thompson Seedless and 0.27 mm for Crimson Seedless. For some reason, all three treatments caused brix levels to be slightly lower than the control for the Thompson Seedless grapes, but these differences were not significant. For the Crimson Seedless grapes, however, Vitazyme improved the brix level by 0.72 percentage point; again, this difference was not significantly greater than the control. Despite lack of significant differences in the data, Vitazyme produced, on average, the best overall brix levels and largest berry sizes in this table grape study.

• Increase in brix: 0.72%

• Increase in berry size: 0.27 mm

## Grapes, table use

### Quality assessments

**Researcher:** Rodrigo Garcia

**Varieties:** Thompson Seedless (Parcel 221) and Crimson Seedless (Parcel 20)

**Farm cooperator:** Javier Polanco and Juan Alessandrini, Polpaico, Region Metropolitana, near Santiago, Chile

**Soil type:** unknown

**Plant density:** 816 plants/ha

**Plant spacing:** 3.5 x 3.5 meters

**Vineyard age:** mature

**Irrigation:** 800 liters/ha

**Experimental design:** Two varieties of seedless grapes were selected in vineyards having uniform soils and management. The design was randomized complete blocks, with four replications, and six plants per plot. The purpose of the trial was to evaluate the brix level and grape size of the two varieties in response to Vitazyme, Biozyme TF, and Citogrower applications.

Treatment	Rate	1°	2°	3°	Verasion	Shoot 30 cm	Berry 2 mm	Fruit set
	liters/ha							
1. Control	0							
2. Vitazyme	1.0	X	X	X	X			
3. Vitazyme	1.0				X	X	X	X
4. Biozyme TF	2.0	X	X	X				
5. Citogrower	2.0	X	X	X				

**Fertilizer:** unknown

**Vitazyme applications:** See the rates and timing in the above table.

**Biozyme TF application:** This product is 1.0% phytohormones, 0.6% amino acids, and 1.8% oligoelements. it was applied at

2.0 liters/ha three times at the timing shown above.

**Citogrower application:** Citogrower is a solution of soluble phosphorus, potassium, and adenine, applied at 2.0 liters/ha with timing as shown in the table above.

**Harvest quality date:** Thompson seedless grapes were harvested February 12, 2009, and the Crimson seedless grapes on March 10, 2007. Brix levels and berry size were measured for each plot of both varieties.

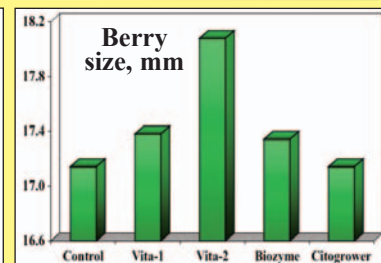
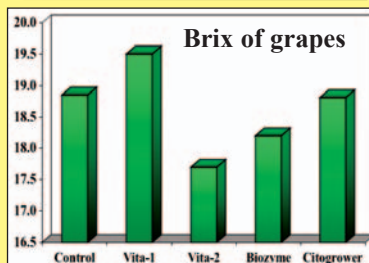
## Thompson Seedless

### Brix Level

### Berry Size

Treatment	Brix level*	Change	Berry size*	Change
			mm	mm
1. Control	18.85 a	—	17.14 a	—
2. Vitazyme 1, 4x	19.50 a	+0.65	17.38 a	0.24 (+1%)
3. Vitazyme 2, 4x	17.70 a	-1.15	18.08 a	0.94 (+5%)
4. Biozyme TF, 3x	18.20 a	-0.65	17.34 a	0.20 (+1%)
5. Citogrower, 3x	18.80 a	-0.05	17.14 a	0 (0%)

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



The brix levels and berry sizes were not significantly different for the five treatments, although the first Vitazyme regime gave a 0.65 percentage point increase in brix, whereas both Vitazyme regimes. especially the second one, gave the largest berry sizes; the second Vitazyme regime gave a 0.94 mm average berry size increase.

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• **Increase in brix: 0.65%**

With this variety, the control for some reason gave the greatest brix level of the grapes. but this value was statistically the same as all but the first Vitazyme regime. Berry size was significantly greater with the first Vitazyme regime than for all other treatments: an increase of 0.76 mm above the control was 4% greater with Vitazyme.

• **Increase in berry size: 0.76 mm**

**Conclusions:** In this Chilean table grape study using Vitazyme (two regimes, applied four times), Biozyme TF, and Citogrower, with two varieties, Vitazyme performed the best by increasing brix by up to 0.65 percentage point above the control (Thompson Seedless), and berry size by 0.94 mm (Thompson Seedless) and 0.76 mm (Crimson seedless) above the control. Vitazyme is shown to be an excellent product for improving both brix and berry size of table grapes in Chile ... the only exception being the brix levels of Crimson Seedless, where all four treatments were less than the control.

• **Increase in berry size: 0.94 mm**

**Crimson Seedless**

Treatment	Brix level*	Change	Berry size*	Change
			mm	mm
1. Control	18.68 a	—	17.13 b	—
2. Vitazyme 1, 4x	17.10 b	-1.58	17.89 a	0.76 (+4%)
3. Vitazyme 2, 4x	17.85 ab	-0.83	17.13 b	0 (0%)
4. Biozyme TF	18.10 a	-0.58	17.11 b	-0.02 (0%)
5. Citogrower	18.20 a	-0.48	17.34 b	0.21 (+1%)

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

## Grapes

### New planting assessments

**Researcher:** Chris Becker, Ph.D.

**Variety:** Niagara

**Planting date:** June 12, 2009

**Experimental design:** Half of a new planting of 100 Niagara rooted grapes were treated with Vitazyme to determine the effect of the product on root development and growth of new plantings. They were planted in alternate sections of 25 treated and 25 untreated.

**1. Control**

**2. Vitazyme root soak**

**Vitazyme treatment:** Fifty vines received a 12 hour soaking of their roots in a 1.0% Vitazyme solution before planting ; the control vines were soaked in water only.

**Growth results:** Growth differences were noted by two weeks after planting. On July 12, one month after planting, a Vigor rating was given to the vines based on shoot length, leaf size, and shoot number. On August 3, 2009, height measurements were taken of ten plants on either side of the treatment borders, and a statistical analysis of the data was conducted.

Treatment	Visual vigor*	Change
Control	2.09	—
Vitazyme soak	6.50	4.41 (+211%)

\*10=best, and 1 = poorest, averaged from 50 plants per treatment.

• **Increase in vigor: 211%**

At season's end another growth evaluation was made, of all 100 vines.

#### Shoot Length

Treatment	Shoot Length	Change
	inches	inches
Control	26.6	—
Vitazyme soak	36.6	10.0 (+38%)

• **Increase in shoot length: 38%**

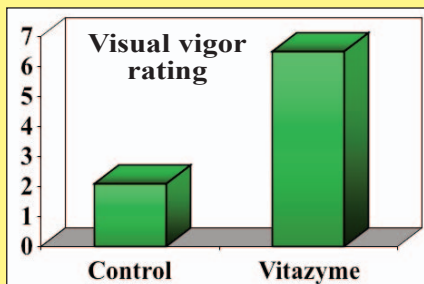
**Conclusions:** Vitazyme applied to the newly planted Niagara grapes in New York, as a root soak for 12 hours, greatly stimulated early rooting and top growth of the plants, improving vigor by 211%, and increasing plant height by 60% above the control for a selection of 20 plants in August, and by 38% for all plants later on. This product is thus shown to possess great utility for helping quickly established new vineyard plantings.

**Location:** Phelps, New York

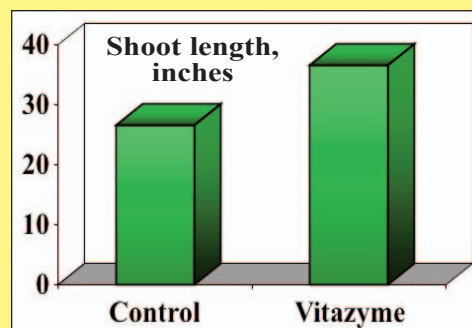
**Soil type:** clay loam



**A remarkable response to a Vitazyme root soak in this New York study produced a 60% increase in height midseason, and a 211% improvement in plant vigor.**

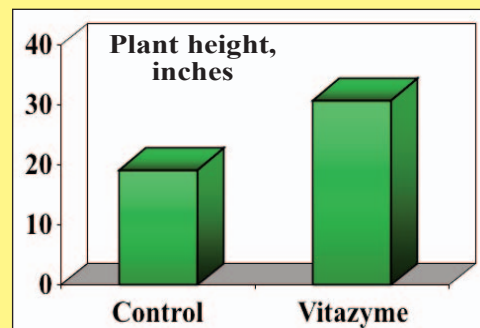


• **Increase in height: 60%**



#### Plant Height

Treatment	Plant height	Height change
	inches	inches
Control	19.2 b	—
Vitazyme soak	30.8 a	11.6 (+60%)
Main effects P	0.0002***	
Model P	0.0002***	
CV	22.5%	
LSD <sub>0.005</sub>	5.3 inches	





# Grapes

Researcher: Chris Becker

Location: Hosmer Vineyards, Ovid, New York

Variety: Cayuga

Soil type: unknown

Vine age: mature

Experimental design: In this study, with the purpose of determining Vitazyme effects of grape yield, a 5-acre block of grapes was split into two 2.5-acre parcels, with one parcel treated with Vitazyme.

**1. Control**

**2. Vitazyme**

Fertilization: unknown

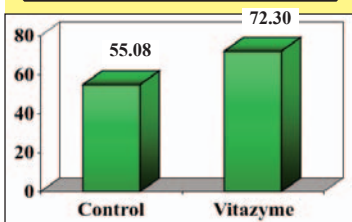
Vitazyme applications: (1) 13 oz/acre sprayed on leaves prebloom (about June 15); (2) 13 oz/acre postbloom (about June 24); (3) 13 oz/acre at veraison

Yield results: A day or two before harvest, (October 7, 2009), 10 clusters from four vines were collected from locations in the four quadrants of the treated and untreated parcels. Data collected were berry number per cluster and berry weight per cluster, and from this the individual berry weight was calculated. Each 10-cluster sample was then crushed, and brix values were determined using a refractometer.

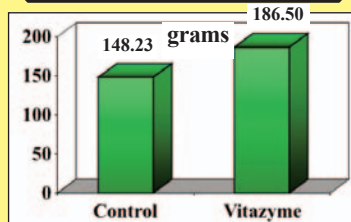


*Cayuga grapes treated with Vitazyme in New York have fuller bunches, greater cluster weight, and more grapes/cluster.*

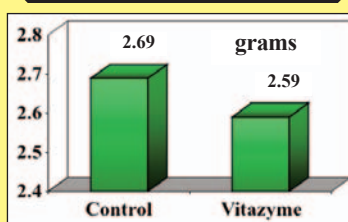
## Berries Per Cluster



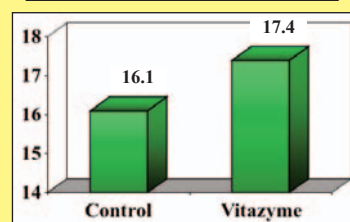
## Weight Per Cluster



## Weight Per Berry



## Brix



**Conclusions:** This New York grape study, using Vitazyme on the Cayuga variety, revealed that three applications greatly increased berries per cluster (37%) as well as weight per cluster (26%), resulting in a slight reduction in berry weight (4%) versus the control. Brix of the grapes was increased with Vitazyme, by 1.3 percentage points. These results prove that this product is an excellent adjunct to typical vineyard programs intent upon increasing both the yield and quality of grapes.

- **Increase in berries**  
per cluster: 31%
- **Increase in weight**  
per cluster: 26%
- **Decrease in weight**  
per berry: 4%
- **Increase in brix:**  
1.3 %-points

# Grapes

Researcher:

Chris Becker

Location: Anthony Road, New York

Variety: Cabernet Franc

Soil type: unknown

Vine age: mature

Fertilization: unknown

Experimental design: In this study, with the purpose of determining Vitazyme effects of grape yield, a 10-acre block of grapes was split into two five-acre parcels. Five acres were treated with Vitazyme.

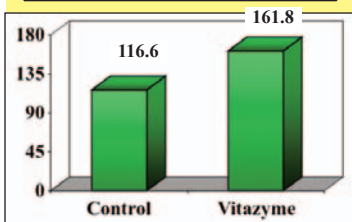
**1. Control**

**2. Vitazyme**

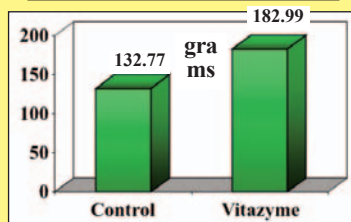
Vitazyme applications: (1) 13 oz/acre sprayed on leaves prebloom (about June 15); (2) 13 oz/acre postbloom (about June 24); (3) 13 oz/acre at veraison

Yield results: A day or two before harvest, 10 clusters from four vines were collected from locations in the four quadrants of the treated and untreated five acres. Data collected were berry number per cluster and berry weight per cluster, and from this the individual

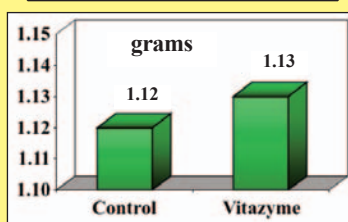
## Berries Per Cluster



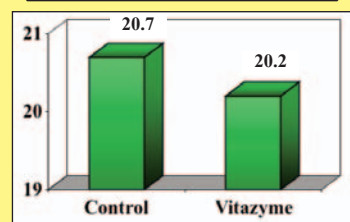
## Weight Per Cluster



## Weight Per Berry



## Brix



berry weight was calculated. Each 10 cluster sample was then crushed, and brix values were determined using a refractometer.

**Conclusions:** This split-vineyard trial in New York revealed that Vitazyme greatly improved berries per cluster (39%) and weight per cluster (38%). Weight per berry was changed little, and brix level was reduced slightly with Vitazyme.

- **Increase in berries**  
per cluster: 39%
- **Increase in weight**  
per cluster: 38%
- **Decrease in weight**  
per berry: 1%
- **Increase in brix:**  
0.5 %-point

# Grapes



**Researcher:** Chris Becker, Ph.D. **Soil type:** unknown  
**Location:** Rooster Hill, Penn Yan, New York **Vine age:** mature  
**Varieties:** Pinot Noir, Riesling, Cabernet Franc **Fertilization:** unknown  
**Experimental design:** At this vineyard, three cultivars of grapes had two blocks each, of about 3 acres per block, all on the same soil type. About one acre from each cultivar was treated with Vitazyme. The purpose of the study was to evaluate the effects of this product on grape growth and yield.

## 1. Control 2. Vitazyme

**Vitazyme application:** (1) 13 oz/acre sprayed on leaves prebloom (about June 15); (2) 13 oz/acre postbloom (about June 24); (3) 13 oz/acre at veraison  
**Chlorophyll results:** On August 3, 2009, chlorophyll determine were made on 30 representative leaves from both treatments of the Riesling variety.  
**Yield results:** A day or two before harvest, 10 clusters from four vines were collected from locations in the four quadrants of each treated and untreated block. Data collected were berry number

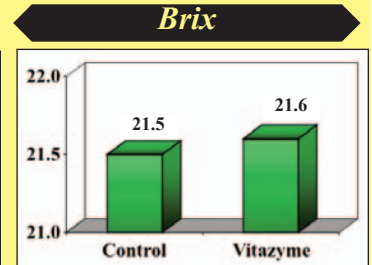
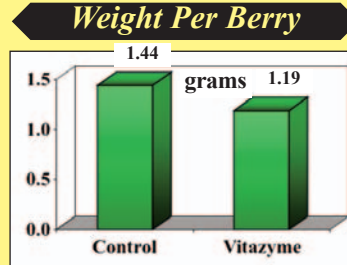
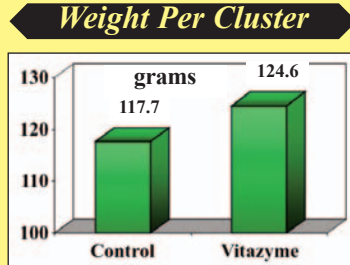
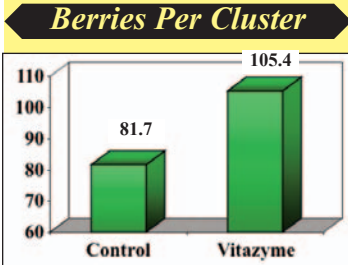
**At Rooster Hill Vineyard, New York, Vitazyme improved berries per cluster, cluster weight, and fruit yield for both Pinot Noir and Riesling grapes.**

per cluster and berry weight per cluster, and from this the individual berry weight was calculated. Each 10 cluster sample was then crushed, and brix values were determined using a refractometer.

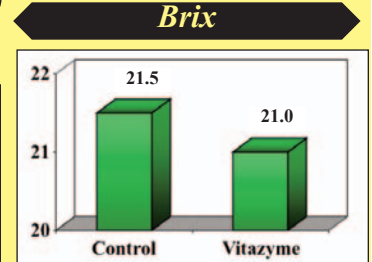
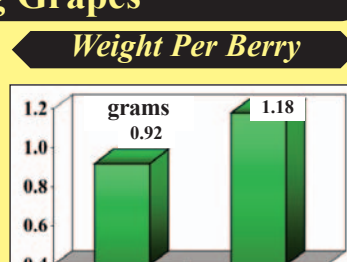
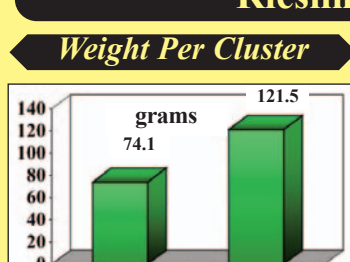
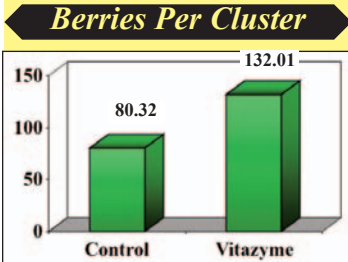
Treatment	SPAD value	Change
Control	30.1	—
Vitazyme	32.6	2.5

• **Increase in leaf chlorophyll: 2.5 SPAD units**

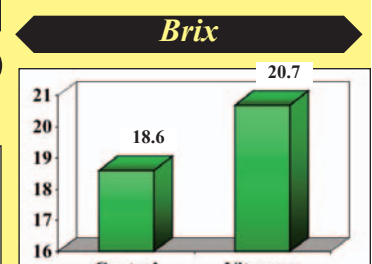
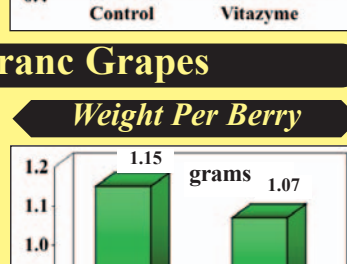
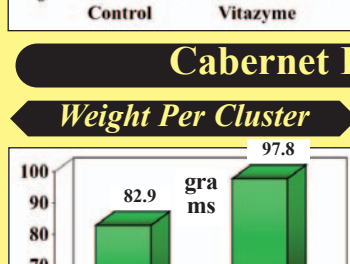
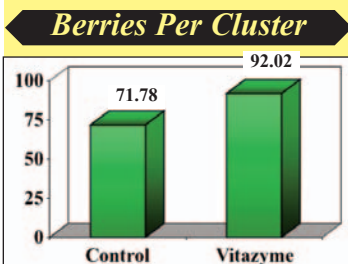
## Pinot Noir Grapes



## Riesling Grapes



## Cabernet Franc Grapes



**Conclusions:** This series of three grape trials with Vitazyme in New York showed that, in all cases, the yield of grapes was much greater with Vitazyme as measured by berries per cluster and weight per cluster: increases were from 28% (Cabernet Franc) to 64% (Riesling) for berries per cluster, and from 6% (Pinot Noir) to 64% (Riesling) for weight per cluster. Berry weight was increased by 28% for Riesling grapes with Vitazyme, but reduced by 7 to 17% for the other varieties. The Pinot Noir and Riesling varieties changed little for brix with Vitazyme, but Cabernet Franc increased 2.1 points. In terms of grape yield, Vitazyme greatly improved production in this study.

Variety	Pinot Noir	Riesling	Cabernet Franc
Berries Per Cluster	+29%	+64%	+28%
Weight Per Cluster	+6%	+64%	+18%
Weight Per Berry	-17%	+28%	-7%
Brix	+0.1%-point	-0.5%-point	+2.1%-point



# Grapes, for wine

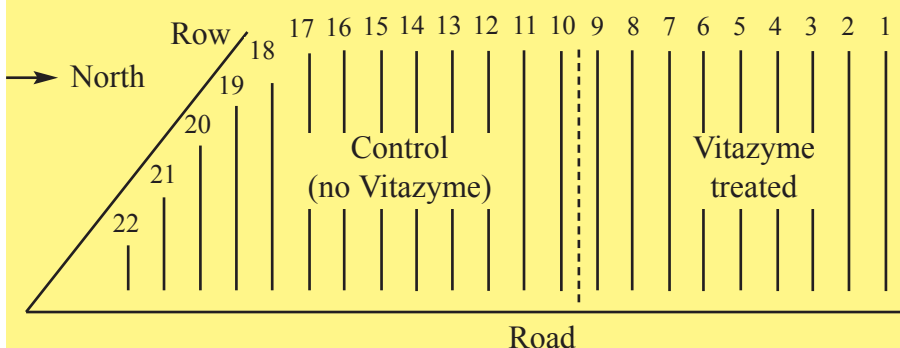
## Quality and yield assessments

Researcher: John Broecker  
Plants/acre: 605  
Vineyard: Mand J Fronty Vineyard  
Grafting: none (self-rooted)  
Bunch thinning: yes  
Pruning: spur  
Soil type: loam, high-calcium subsoil, low organic matter  
Grape plant age: 9 years (sixth harvest)

Location: San Miguel, California  
Variety: Cabernet Sauvignon  
Yield goal: 3.5 tons/acre  
Irrigation: drip  
Row spacing: 12 x 6 feet  
Shoot trimming: yes

Experimental design: A vineyard of grapes of equal age was partially treated with Vitazyme during the growing season to evaluate effects on grape yield and winemaking quality; all other treatments were identical. The same rows were treated as in previous years. Both treatments were to be evaluated for overall effects on grape and wine quality by following through the pre-harvest period, and on to the actual wine itself after fermentation and aging.

[vineyard continues west]



**As for the past several years, Vitazyme increased the yield of Cabernet Sauvignon grapes in San Miguel, and also fruit sugar.**

Irrigation: semi-dryland system: four times of deep irrigation (18 to 20 hours of drip irrigation) from mid-June to late August

Fungicides: applied as needed

Fertilization: Ca (NO<sub>3</sub>)<sub>2</sub> was the main nitrogen source, plus urea (low biuret) added to the foliar spray. A 9-18-9 (+ micronutrients) was applied with urea every two to three weeks at 2 to 3 gallons/acre during much of the growing season, usually with sulfur after vera-

sion; no sulfur was applied after July 1. A blue-green algae solution was applied in the irrigation water periodically

Tillage: cover crop disked in

Vitazyme application: (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break; (2) 13 oz/acre at bloom; (3) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at BB-sized fruit; (4) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at veraison; (5) 13 oz/acre 8 weeks before harvest (the end of August)

Harvest date: October 10, 2009

Weather conditions: The year was drier than normal, resulting in greater irrigation water needs.

Vine growth: The researchers noted that there was more leaf and vine growth for the Vitazyme treated grapes, perhaps 25% more total leaf mass than for the control plants. An analysis of canes for the plants of the two treatments revealed more cane growth with Vitazyme application as well.

Wine quality: On December 29, 2009, an analysis of wine from the two lots was made by Baker Wine and Grape Analyses, Paso Robles, California.

Treatment	Ethanol	pH	Total acid	Malic acid	Lactic acid	RS	GF	Density	FSO <sub>2</sub>	VA
	%		gtar/100 ml	g/L	g/L	g/100 ml	g/100 ml	g/ml	mg/L	g aa/100 ml
Control	12.12	3.75	0.61	0.15	0.89	0.06	0.05	0.9967	12	0.037
Vitazyme	13.02	3.78	0.61	0.42	0.69	0.09	0.09	0.9956	15	0.036

The two wine lots are very similar except that the Vitazyme treated wine has more alcohol, by 0.9%. This increase is a reflection of the higher sugar (brix) of the treated grapes at harvest. The Vitazyme treated wine also has more malic acid and less lactic acid than the control wine.

### • Increase in alcohol: 0.9 percentage point

Yield results: Grape yields were recorded for both treatments on the eastern end of the vineyard where soil characteristics were uniform. A border area between the treatments was avoided to remove possible product drift effects. Because of severe frost damage in 2008, the plants did not perform at the optimum levels, especially the Vitazyme treated rows, which were injured more severely in 2008 than the control vines. At the end of the growing season, towards the first frost, there were more total foliage and more actively synthesizing leaves for the Vitazyme treatment.

Treatment	Grape yield per vine	Grape yield per acre	Yield change
	lb/vine	lb/acre tons/acre	lb/acre
Control	7.096	4,293 2.148	—
Vitazyme soak	7.856	4,753 2.376	460 (+11%)

\*Based on 605 plants per acre

With more green, photosynthesizing leaves remaining on the treated plants, they were able to fix more energy for plant growth the following year.

Wine making: On October 10, 2009, a half ton of grapes from both treatments was picked and crushed, and that day the winemaking process began. See the schedule on the next page for details.

*Continued on the next page*



**October 10.** The grapes were destemmed and cold soaked for 48 hours. During this time tartaric acid was added to raise the acidity to 0.7.

**October 12.** Yeast was added to the destemmed grapes, as well as yeast nutrient (diammonium phosphate, yeast cell walls, and other items), and Color Pro (an enzyme material to extract more color from the skins, and stabilize the color).

**October 20.** After 8 days of fermentation, the juice was pressed from the mash. At this point there was 3% sugar left. Malic acid bacteria were added at this point to convert the malic acid to lactic acid. The fermenting wine was then placed in stainless steel barrels. Each barrel yielded 148 gallons of juice per ton of grapes.

**November 24.** After 4 more days, half of the wine from each treatment was put in an identical oak barrel; the remaining wine was retained in a stainless steel barrel.

Conclusions for the sixth year: The sixth year of this California wine grape study, using the same treated rows as in previous years, revealed a recovery of the plants to some degree after severe frost damage in 2008. This year the Vitazyme treatment produced **11% more yield** than the untreated control, compared to the 29% average increase for the first four years of the study. Even with an 11% yield increase, the results of this program are highly profitable, especially considering that **the wine produced with Vitazyme treated grapes has been shown to be equivalent, if not superior to, wine produced from untreated grapes alongside.** **Of special note is a higher alcohol content of the Vitazyme-treated wine, by 0.9 percentage point; both wine lots for 2009 are very similar.**

## Grass

### A testimonial

I expect to be using Vitazyme for many years to come. Two lawns next door to each other were seeded the same day with the same seed. My lawn was 50% bare after I had killed all undesirable grass and weeds and my neighbors lawn was about 20% bare after killing the undesirables. I applied Vitazyme to my lawn the day after the seedlings began to emerge. Both lawns are about 10% bare now, and my lawn is by far the greener of the two. So far I have gotten one renovation job as a result of the lawn's progress. I seeded a lawn several weeks ago, and it was making typical progress in regards to germination. I applied Vitazyme last week and the very next day saw improvement in color, and the seedlings seem to be kick-started as well. On my third test site, I seeded and applied Vitazyme at half the recommended rate, plus ICT instant compost tea, kelp, and humic acid. It has been less than two weeks since the seeding, and the homeowner called me a couple of days ago to tell me that he has never been so pleased with money spent on his lawn. I am considering applying Vitazyme at the recommended rate once per month for the entire growing season.

Jerry Cobb, A Touch of Nature  
Nicholasville, Kentucky

## Kiwi Fruit



Researcher: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xiao Wanzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute

Location: Hunan Horticulture Research Institute Research Orchard, Mapoling, Changsha, Hunan China

Vine age: six years

Trellis: pergola

Variety: Cuiyu (green flesh)

Row spacing: 3 x 4 meters

Experimental design: An orchard area was selected to provide a Vitazyme and a control treatment, each with 10 plants per plot. Each treatments was replicated three times.

#### 1. Control

#### 2. Vitazyme

Fertilization: unknown

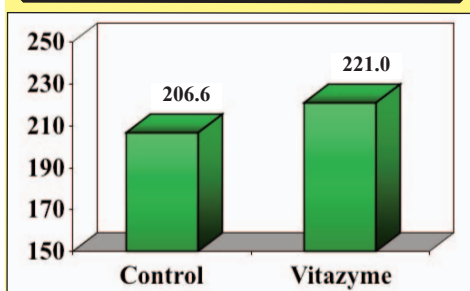
Vitazyme application: (1) 1.5 liters/ha on the soil 10 days before bud burst (March 5); (2) 1.5 liters/ha on the leaves 10 days before flowering (April 8), and (3) 1.5 liters/ha on the leaves 14 days after flowering (May 18)

Harvest date: unknown

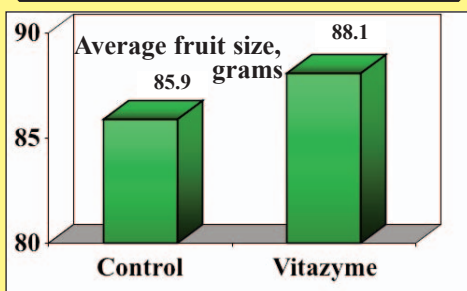
Yield and quality results:

**Kiwi fruit in China, New Zealand, and the United States have responded very well to Vitazyme, in this study producing an 11% yield increase and 5% more solids.**

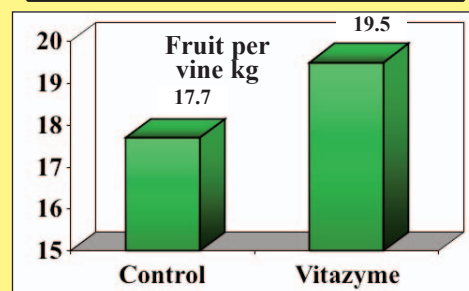
#### Fruit Per Vine



#### Fruit Size



#### Yield Per Vine



#### Income results:

Treatment	Income	Change
	----- RMB/ha -----	
Control	65,500	—
Vitazyme	72,150	6,650 (+10%)

#### • Increase in income: 10%

**Conclusions:** Vitazyme in this Chinese kiwi fruit study improved the yield, quality, and income of the fruit in every category. The fruit per vine were increased by 7%, fruit size by 3%, yield per vine by 10%, percentage of large fruit by 11%, and percent soluble solids by 5%. Income was improved by 10%. These results prove that Vitazyme substantially improves the quality and yield of kiwi fruit in China.

#### • Increase in fruit number: 7%

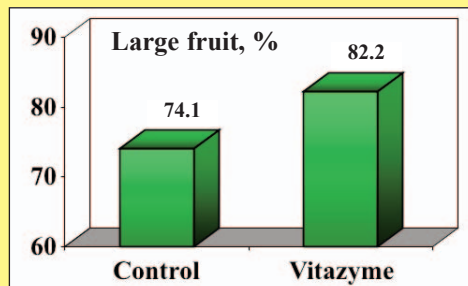
#### • Increase in fruit per vine: 10%

#### • Increase in fruit size: 3%

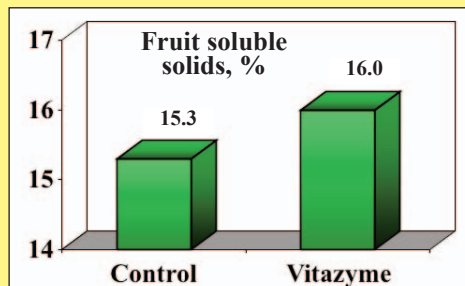
#### • Increase in percentage of large fruit: 11%

#### • Increase in percent of fruit soluble solids: 5%

#### Percentage of Large Fruit



#### Soluble Solids of Fruit



## Malabar Nightshade

**Researcher:** unknown

**Variety:** unknown

**Location:** Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam

**Soil type:** unknown

**Planting date:** March, 2009

**Experimental design:** A field of Malabar Nightshade was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

#### 1. Control

#### 2. Vitazyme twice

**Fertilization:** unknown

**Vitazyme application:** Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

**Height results:** At harvest time the average plant height was determined for each treatment

**Yield results:** The crop was harvested in April of 2009.

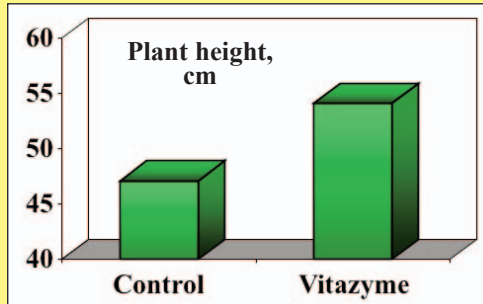
**Conclusions:** This study on Malabar nightshade in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased both plant height (14%), and yield as well, by 3.06 tons/ha (14%). The product's active agents have been shown to greatly stimulate the growth and yield of this widely used specialty vegetable in this Southeastern Asian country.

#### • Increase in plant height: 15%

#### • Increase in yield: 14%

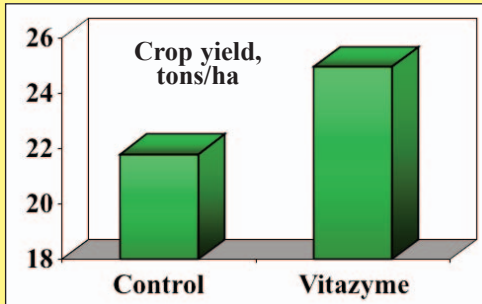
#### Plant Height

Treatment	Plant Height	Height change
	cm	cm
Control	47.1	—
Vitazyme	54.1	7.0 (+15%)



#### Nightshade Yield

Treatment	Yield	Yield change
	cm	cm
Control	21.80	—
Vitazyme	24.86	3.06 (+14%)



## Mandarin Oranges

**Researchers:** Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xiao Wanzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute; Tao Dihui, Changsha Agricultural School

**Location:** Hunan Horticultural Research Institute Research Orchard, Mapoling, Changsha, Hunan, China

**Variety:** Satsuma Mandarin – Miyagawa Wase

**Tree age:** 17 years

**Row spacing:** 3 x 3 meters

**Trellis:** pergola

**Experimental design:** An orchard area was selected to provide a Vitazyme and a control treatment, each with 10 trees per plot. Each treatment was replicated three times.

#### 1. Control

#### 2. Vitazyme

**Fertilization:** unknown

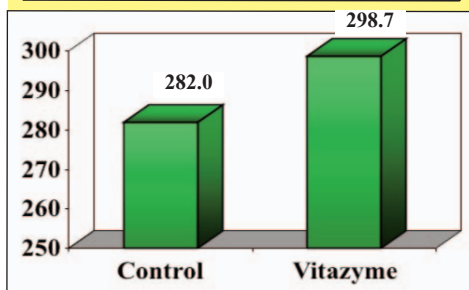
**Vitazyme application:** 1.5 liters/ha sprayed on the leaves of the trees at (1) early bud burst (March 31), (2) early flowering (April 8), (3) early fruit growth (May 18), and (4) rapid fruit growth (July 9)

**Harvest date:** unknown

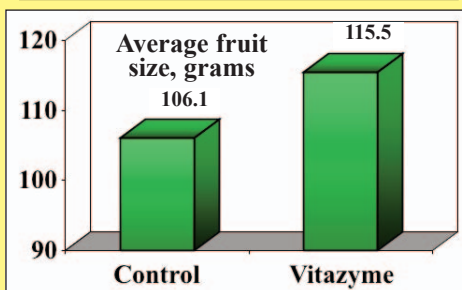
**Yield and quality results:**

Continued on the next page

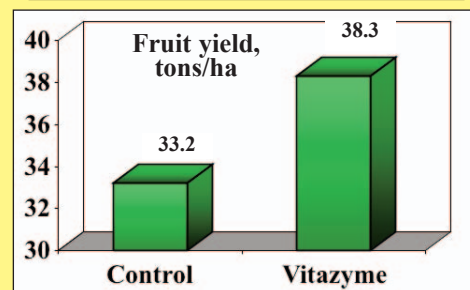
### Fruit Number Per Tree



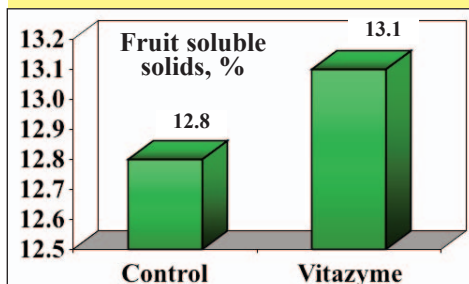
### Fruit Size



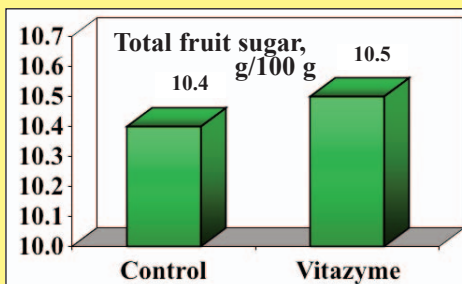
### Fruit Yield



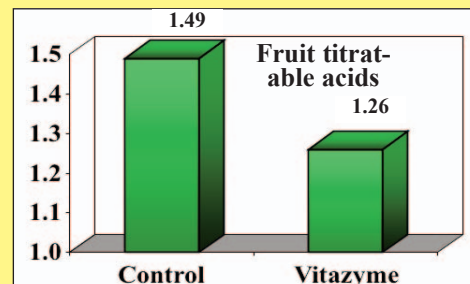
### Soluble Solids in Fruit



### Total Sugars in Fruit



### Titrateable Acids of Fruit



#### Income results:

Treatment	Income	Change
	----- RMB/ha -----	
Control	33,200	—
Vitazyme	38,300	5,100 (+15%)

#### • Increase in income: 15%

**Conclusions:** In this Mandarin orange study in China with Vitazyme, four applications produced excellent yield and quality responses, as shown in this summary chart.

Besides substantially improving yield, number, and size of the fruit, the quality of the fruit was also improved with more sugars and much less acidity. Vitamin C, however, was reduced somewhat. The

income of the crop was increased by an impressive 15%.

#### • Increase in fruit number: 6%

#### • Increase in fruit size: 9%

#### • Increase in fruit yield: 15%

#### • Increase in total fruit sugar: 1.0%

#### • Decrease in fruit Vitamin C: 17%

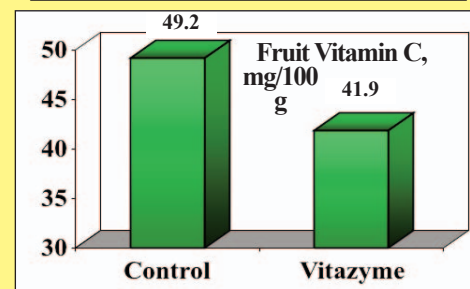
#### Parameter Change with Vitazyme

Fruit number per tree .....	+6%
Fruit size .....	+9%
Fruit yield .....	+15%
Soluble solids .....	+2.3%
Total sugars .....	+1.0%
Titrateable acids .....	-18%
Vitamin C .....	-17%

#### • Increase in soluble solids: 2.3%

#### • Decrease in titrateable acid: 18%

### Fruit Vitamin C



## Oranges

### A testimonial



*The orange crop set in 2009 at Monte Vista Ranches, Lindsay, California, is one of the best ever, largely due to four Vitazyme applications plus a root stimulant.*

We are extremely excited with our navel orange crop this coming year (2009-2010). The navel industry as a whole is up 15% from last season, while everything that we farm is up 50-150%!! This is the first time I can remember that all of our acreage as a whole (not just individual blocks), have set such large crops. What do I attribute it to? This is the first year that we applied Vitazyme on everything in a precise and timely manner. Twice foliar to help set the crop, and twice soil applied for overall health and cell wall strength. Also, in conjunction with Vitazyme I began using a soil applied Root Stimulant four times a year in timely applications from mid-March through mid-October. The root stimulant is made by New Era Farm Services and is derived from composted dairy manure that has gone through a thermophilic controlled biological oxidative process, and also has colloidal minerals, humic acid derivatives, *Ascomyces Nodosum* seaweed extract, and yucca for antistress.

Together with the use of Vitazyme and New Era's Root Stimulant, I think I may have found the **Holy Grail of citrus production!** Hopefully you will be here this coming year for a visit and to see our crop sets. I'm very excited!

Jody Wollenman, Monte Vista Ranches, Lindsay, California



# Olives

**Researcher:** Jose Luis Cisternas

**Administrator:** Alejandro Apra

**Varieties:** Arbequina and Arbosana

**Research Organization:** Society of Agriculture San Jorge Ltda, Santa Sara, Chile

**Soil type:** unknown

**Planting date:** 2007

**Experimental design:** A young olive grove of 7.0 hectares was divided into a Vitazyme treated area and a control area to determine the effect of the product on tree growth. This growth was determined by trunk diameter.

## 1. Control

## 2. Vitazyme

**Fertilizer applications:** unknown

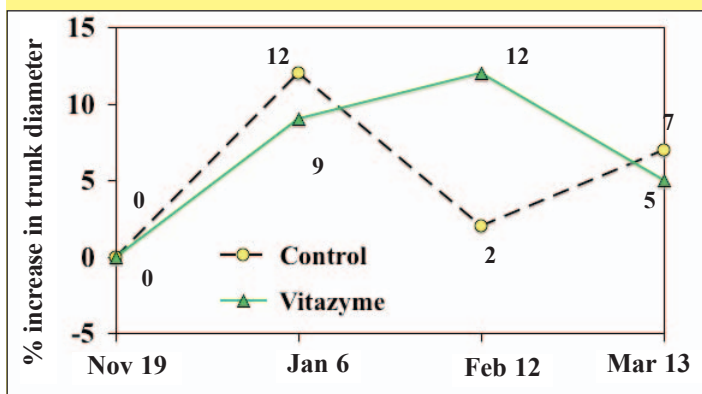
**Vitazyme applications:** (1) 1.0 liter/ha on the leaves and soil on November 6, 2008; (2) 1.0 liter/ha on the leaves and soil on December 15, 2008.

### Arbosana Olives

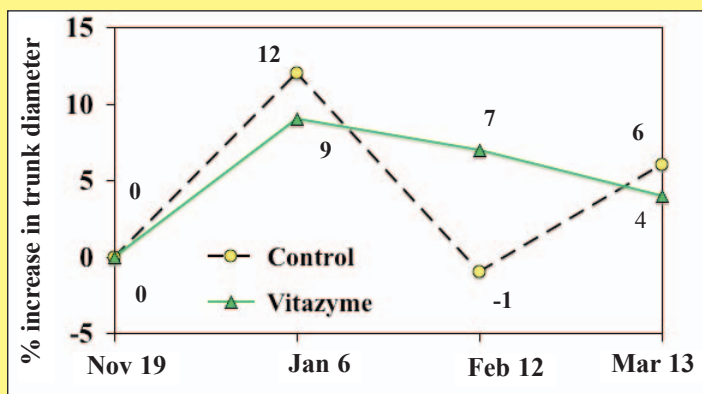
### Arbequina Olives

Treatment	Trunk diameter				Change	Trunk diameter				Change
	Nov. 19	Jan 6	Feb. 12	Mar. 13		Nov. 19	Jan. 6	Feb. 12	Mar 13	
	cm					cm				
Control	11.38	12.75	12.99	13.84	2.46 (+22%)	11.84	13.26	13.20	13.98	2.14 (+18%)
		(+12%)	(+2%)	(+7%)			(+12%)	(-1%)	(+6%)	
Vitazyme	8.68	9.47	10.62	11.12	2.44 (28%)	10.56	11.48	12.26	12.82	2.26 (+21%)
		(+9%)	(+12%)	(+5%)			(+9%)	(+7%)	(+4%)	

### Trunk Diameter Change



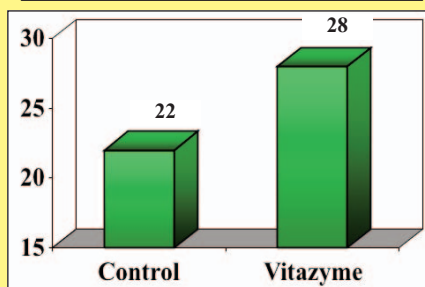
### Trunk Diameter Change



**Olives treated with Vitazyme have performed exceptionally well, not only in young orchards as in this Chilean trial, but also in California and New Zealand.**

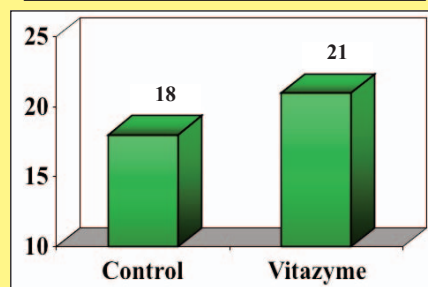
### Arbosana Olives

#### Percent increase in trunk diameter



### Arbequina Olives

#### Percent increase in trunk diameter



**Improved increase in trunk diameter with Vitazyme**  
 Arbosana olives ..... +6%  
 Arbequina olives ..... +3%

**Conclusions:** When Vitazyme was applied twice to olives at 1 liter/ha each time, the increase in trunk diameter with this product compared to the untreated control was 6% for Arbosana olives and 3% for Arbequina olives. These results show that Vitazyme is able to substantially improve olive growth and maturation in the Chilean environment.

# Potatoes, for seed



**In the San Luis Valley of Colorado, Vitazyme improved root development and growth of potatoes, and tuber size.**

**Researcher:** David Radtke  
**Research organization:** San Luis Hills Farm, Fort Garland, Colorado  
**Soil type:** unknown  
**Planting date:** May 19, 2009  
**Watering:** center pivot (a long drought period due to well problems)  
**Experimental design:** A potato field having uniform soils was selected for a potato trial, wherein one portion was set off to receive two applications of Vitazyme. The objective was to evaluate the effort of this product on yield and quality of the tubers.

## 1. Control

**Fertilization:** uniform across the test area, with a total application for the crop of 200-180-150-70-3 of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-S-Zn, applied preplant or through the irrigation system

**Vitazyme application:** (1) 13 oz/acre (1.0 liter/ha) in the seed furrow at planting; (2) 13 oz/acre (1.0 liter/ha) on the leaves and soil with a fungicide on July 29, 2009 (well past tuber initiation)

**Harvest date:** unknown

**Yield results:** Five small-sample replicates of 50 to 62 pounds were dug for each treatment to enable a statistical analysis to be performed. These tubers were weighed and categorized into three size groups. The marketable yields of the two treatments were nearly identical.

## Tuber weight results:

It is obvious that Vitazyme stimulated a higher percentage of large (>9 oz) tubers, while reducing the percentage of 6 to 9 oz tubers. These

Treatment	Market yield*	Change
	cwt/acre	cwt/acre
1. Control	277 a	—
2. Vitazyme	273 a	(-) 4 (-1%)

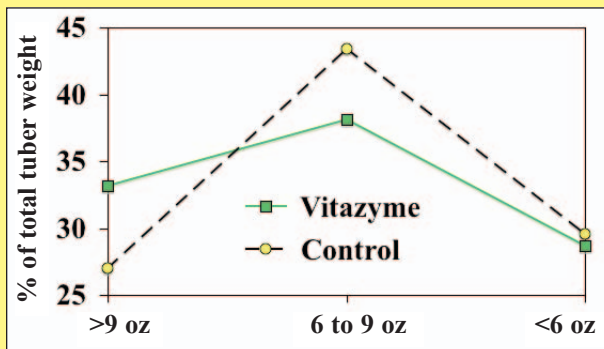
\*Means followed by the same letter are not significantly different at P=0.05.

changes were significant at P=0.12 and P=0.17, respectively.

**Conclusions:** This potato trial on Blazer Russets in southern Colorado showed that Vitazyme, while not improving yield, significantly increased the tuber size. The >9 oz tubers were increased by 23% over the untreated control, while the medium-sized tubers (6 to 9 oz) were significantly increased by 12% more than the control. Tuber numbers were not evaluated, but it is presumed that a Vitazyme application at tuber initiation would have increased tuber numbers — an important issue for seed growers — which would make this product an especially valuable product for potato seed production. The drought period, induced when the irrigation well would not operate, also likely affected the results adversely.

## 2. Vitazyme

## Tuber Weight



• **Increase in > 9 oz tubers: 23%**

• **Decrease in 6 to 9 oz tubers: 12%**

# Potatoes

**Researchers:** Brandon Barranco, Farm Manager, and Alan Perry, President

**Location:** near Pearsall, Texas

**Variety:** Frito Lay 1867

**Organization:** Black Gold Potato, Pearsall, Texas. and Bedrock Soil Balancing Services, Farm Technologies Network, Presque Isle, Maine

**Seeding rate:** 34-inch rows, 10 inches in the row

**Soil type:** sandy

**Irrigation:** center pivot

**Planting date:** February 9 and 10, 2009

**Previous crop:** unknown

**Tillage:** conventional, with row hilling

**Soil test levels:** organic matter, 1.4%; pH, 7.2; N (estimated N release), 48 lb/acre; S (as SO<sub>4</sub>), 10 lb/acre; P (as P<sub>2</sub>O<sub>5</sub>), 409 lb/acre; Ca, 1,927 lb/acre; Mg, 311 lb/acre; K, 706 lb/acre; Na, 110 lb/acre; B, 2.3 lb/acre; Fe, 386 lb/acre; Mn, 106 lb/acre; Cu, 1.6 lb/acre; Zn, 9.0 lb/acre; base saturations, 64% Ca, 17% Mg, 12% K, 3% Na, 4% other bases.

**Experimental design:** A uniform field under center-pivot irrigation was divided into Vitazyme treated and untreated portions, with the purpose of discovering the effect of Vitazyme on tuber yield and quality.

## 1. Control

## 2. Vitazyme applied twice

**Fertilization:** unknown

**Vitazyme application:** (1) 1 liter/ha applied on February 12, 2009, along with Dual herbicide by a ground sprayer rig; (2) 1 liter/ha applied May 28, two weeks before harvest

**Harvest date:** June 10 to 12, 2009



**This Black Gold study in Texas proved the ability of Vitazyme to greatly improve tuber yield (28%), while improving uniformity.**



### Yield results:

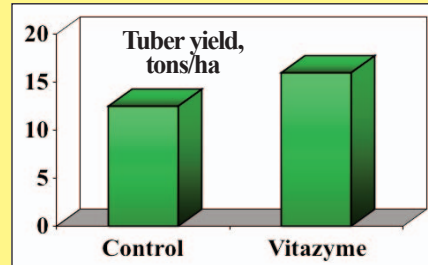
Treatment	Yield tons/ha	Yield change tons/ha	%
Control	12.5	—	—
Vitazyme	16.0	3.5	28

**Quality results:** The tubers at harvest were more uniform on the Vitazyme treated area, than in the control treatment.

**Conclusions:** In this south Texas potato trial, Vitazyme triggered a 28% yield increase above the untreated control, and also produced more uniform tubers, which was a beneficial effect for this variety on top of the tuber increase.

- **Increase in tuber yield: 28%**

### Potato Yield



## Potatoes

**Researchers:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Planting rate:** 2.8 tons/ha

**Variety:** Agave, elite

**Planting date:** April 27, 2009

**Previous crop:** winter wheat

**Tillage:** plowing, harrowing, and cultivating

**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/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** One-hectare plots were arranged in a randomized complete block design to apply two Vitazyme treatments, in an effort to evaluate the effects of this product on potato yield.



**Potato responses to Vitazyme in Ukraine have been consistently positive. This study, with two sprays, improved yield 18%.**

1. Control
2. Vitazyme at emergence
3. Vitazyme at blooming

**Fertilization:** 90 kg/ha N, 60 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O

**Vitazyme application:** (1) 1 liter/ha to the leaves and soil at emergence, and (2) the first treatment plus 1 liter/ha to the leaves at bloom

**Yield results:** See table at right.

**Income results:**

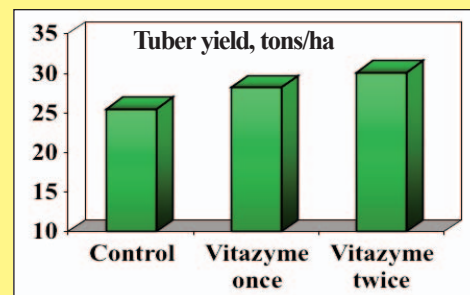
- **Increase in tuber yield: 11 to 18%**

Treatment	Tuber yield tons/ha	Change tons/ha
Control	25.5	—
Vitazyme early	28.2	2.7 (+11%)
Vitazyme early + bloom	30.1	4.6 (+18%)

**Conclusions:** This potato trial in Ukraine, with Vitazyme at emergence, and at emergence and bloom, resulted in excellent increases of tuber yield by 11 and 18%. Income was substantially increased as well. This program is highly viable for Ukrainian conditions.

- **Increase in income with Vitazyme, once: 11%**
- **Increase in income with Vitazyme, twice: 18%**

### Potato Yield



## Potatoes

**Researcher:** Binad Singh, Ph. D.

**Location:** Usha Agro Farms, Garh, India

**Organization:** Merino Industries

**Variety:** Bahar

**Soil type:** sandy loam

**Row spacing:** 66 cm

**Planting date:** November 3, 2008

**Planting depth:** 10 to 12.5 cm

**In-row spacing:** 15 cm

**Seed piece size:** >55 mm cut in two

**Previous crop:** rice

**Soil analysis:** pH, 8.42; electrical conductivity, 0.33 ds/m; organic matter, 0.52%; P, 30 kg/ha; K, 288 kg/ha; Zn, 0.83 ppm; Fe, 6.63 ppm; Mn, 2.68 ppm; Cu, 0.60 ppm.

**Experimental design:** A field was divided into three portions, two treated with Vitazyme, to evaluate the effect of this product on potato yield, tuber size, and profitability

1. Control
2. Vitazyme in-furrow + 50 DAP
3. Vitazyme on seeds + 50 DAP

**Vitazyme application:** see table

**Fertilizer over all areas:** (1)

Basal treatment: 12.5 tons/ha vermicompost; 200, 150, and 175 kg/ha of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O as urea, DAP (diammonium phosphate), and MOP (monorthophosphate), with 40% of urea, 100% of DAP, and 67% of MOP as a basal dose; 25 kg/ha ZnSO<sub>4</sub> was broadcast at planting.

(2) Side-dressing at 30 days after planting: 33% of the MOP; 30% of the urea.

Treatment	Treatment 1	Treatment 2
1. Control (general practice)	none	none
2. Vitazyme in-furrow	in-furrow at planting at 1 liter/ha	leaves and soil at 1 liter/ha*
3. Vitazyme seed treatment	on seeds at 1 liter/ha	leaves and soil at 1 liter/ha*
*At 50 days after planting		

*Continued on the next page*



(3) Side-dressing at 40 days after planting: 30% of the urea.

(4) Foliar during growth: 19-19-19% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O at 2.5 kg/ha; 13-0-45% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O at 1.25 kg/ha.

**Pesticide applications:** Jassid white flies and aphids: 0.25% Thiamethoxam and 0.5% Imidachlorpid; late blight: 2.5 ml/liter Mancozeb, 3 ml/liter Cymoxanil, and 2.5 ml/liter Metaxyl + Mancozeb.

**Harvest date:** March 1, 2009, 99 days after planting

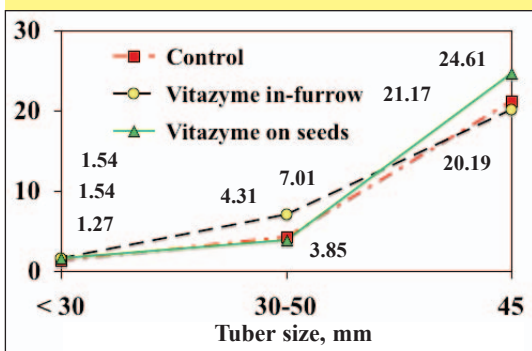
**Germination results:** Vitazyme treated seed tubers germinated first, followed by the in-furrow treatment, and then the control treatment.

**Tuber yield results:**

### Total Tuber Yield

Treatment	Tuber yield tons/ha	Change tons/ha
Control	26.75	—
Vitazyme in-furrow	28.74	1.99 (+8%)
Vitazyme on seeds	30.00	3.25 (+12%)

### Tuber Yield, by Tuber Size



**These potato plants show the type of response usually noted with Vitazyme application: more roots and tops.**



**The tubers removed from the plants on the left display the greater size and uniformity expected with Vitazyme use.**

### Yield increase with Vitazyme

In-furrow .....	+8%
On seeds .....	+12%

### Income increase with Vitazyme

In-furrow .....	+3.5%
On seeds .....	+5.8%

**Income results:** The value of each tuber size was calculated for the yield data, and totaled in the table below.

At a cost for Vitazyme of 2188 Rs./ha, the cost:benefit ratio for Vitazyme is as follows:

Treatment	Income per tuber size, and totals				Increase
	<30 mm	30-45 mm	>45 mm	Total	
	Rs./ha				
Control	3810	17240	84680	105730	—
Vitazyme in-furrow	4620	28040	80760	113420	7690 (+7%)
Vitazyme on seeds	4620	15400	98440	118460	12730 (+12%)

**Conclusions:** This potato trial in India showed that Vitazyme greatly increased total tuber yield, by 8% for the in-furrow applications and by 12% for the seed application. Both Vitazyme treatments increased the percentage of largest (>45 mm) tubers above the control treatment. Income was increased as well for both Vitazyme treatments above the control, by 7% for the in-furrow treatment and by 12% for the seed treatment. Cost-benefit

ratios for these two regimes were highly attractive: 3.5 for in-furrow application and 5.8 for the seed application. Clearly, Vitazyme is a highly effective management tool for improving potato tuber yield and size, and raising profitability in India.

## Potatoes

**Researcher:** Binad Fingh, Ph. D.

**Variety:** Chip-1

**Row spacing:** 66 cm

**Soil analysis:** pH, 8.06; electrical conductivity, 0.36 ds/m; organic matter, 0.66%; P, 7.5 kg/ha; K, 210 kg/ha; Zn, 1.99 ppm; Fe, 12.2 ppm; Mn, 1.48 ppm; Cu, 0.58 ppm.

**Weed control:** hand weeding on December 10 and December 28, 2008

**Experimental design:** A field was divided into three portions, two treated with Vitazyme, to evaluate the effect of this product on potato yield, tuber size, and profitability

### 1. Control

### 2. Vitazyme in-furrow + 50 DAP

### 3. Vitazyme on seeds + 50 DAP

**Fertilizer over all areas:** (1) Basal treatment: 12.5 tons/ha vermicompost; 200, 150, and 175 kg/ha of N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O as urea, DAP (diammonium phosphate), and MOP (monorthophosphate), with 40% of urea, 80% of DAP, and 67% of MOP as a basal dose; 25 kg/ha ZnSO<sub>4</sub> was broadcast at planting.

(2) Side-dressing at 30 days after planting: 20% of the DAP; 33% of the MOP; 30% of the urea.

(3) Sidedressing at 40 days after planting: 30% of the urea.

(4) Foliar during growth: 19-19-19% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O at 2.5 kg/ha; 13-0-45% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O at 1.25 kg/ha.

**Vitazyme application:**

**Pesticide applications:** Jassid white flies and aphids: 0.25% Thiamethoxam and 0.25% Imidachlorpid; late blight: 2.5 ml/liter Mancozeb, 3 ml/liter

Treatment	Treatment 1	Treatment 2
1. Control (general practice)	none	none
2. Vitazyme in-furrow	in-furrow at planting at 1 liter/ha	leaves and soil at 1 liter/ha
3. Vitazyme seed treatment	on seeds at 1 liter/ha	leaves and soil at 1 liter/ha

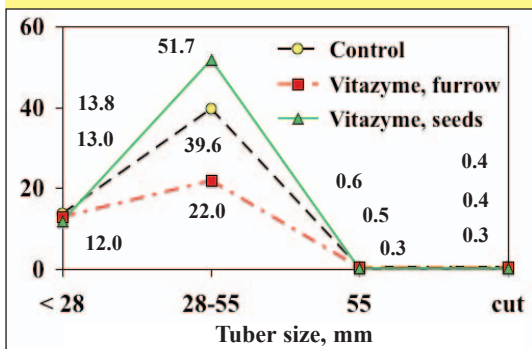
Cymoxanil, and 2.5 ml/liter Metaxyl + Mancozeb.

**Germination results:** Both Vitazyme treatments increased the speed of germination above the control, but the tuber treatments gave the greatest boost.

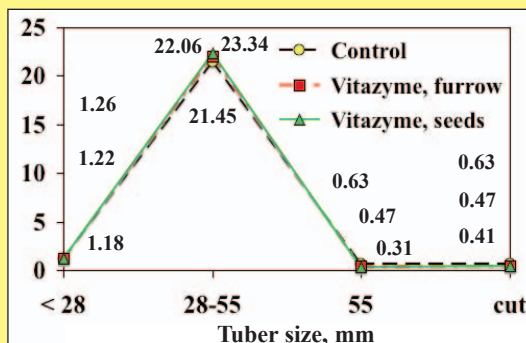
**Tubers per area results:** The tubers were harvested on March 3, 2009, 92 days after planting.

**Tuber yield results:**

### Tubers Per Square Meter, by Tuber Size



### Tuber Yield, by Tuber Size



NOTE: The low yield results for Vitazyme in this report do not correlate with the tuber numbers reported above. Since the tuber numbers are much greater for both Vitazyme treatments (52% and 79%), and in both treatments the proportion of the 28 to 55 mm tubers is considerably greater than for the same sized tubers of the control, then the yield of both Vitazyme treatments should be at least 52% and 79% greater than the control yield.

**Tuber size results:**

Vitazyme use, especially on the seeds, produced a much higher proportion of the preferred 28 to 55 mm tubers than did the control.

**Income results:** The value of each tuber size was calculated for the yield data, and totaled in the table below.

### Total Tubers Per Square Meter

Treatment	Total tubers	Change
	----- tubers/meter <sup>2</sup> -----	
Control	35.9	—
Vitazyme in-furrow	54.4	18.5 (+52%)
Vitazyme on seeds	64.3	28.4 (+79%)

### Total Tuber Yield

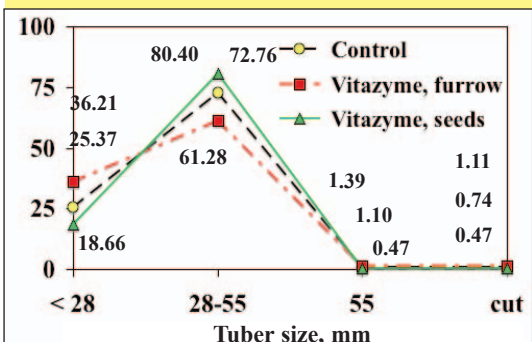
Treatment	Total yield	Change
	----- tons/ha -----	
Control	24.18	—
Vitazyme in-furrow	23.96	(-) 0.22 (-1%)
Vitazyme on seeds	25.28	1.10 (+5%)

### Increase in tuber number

Vitazyme in-furrow ..... +52%  
 Vitazyme on seeds ..... +79%

### • Increase in tuber yield, Vitazyme on seeds: 5%

### Percentage of Total Tubers



### Increase in 28 to 55 tubers

Vitazyme in-furrow ..... +14%  
 Vitazyme on seeds ..... +24%

higher than reported. Likewise, the modest income improvements with Vitazyme should be higher than the above chart shows. It is apparent from this study that Vitazyme does indeed improve potato production and profits in India.

**Conclusions:** This potato trial in India, which investigated the effects of Vitazyme on potato growth, yield, and income, showed that the seed and in-furrow treatments, plus a foliar-soil application, hastened emergence and early growth. At harvest, the Vitazyme treatments greatly increased tuber number, by 79% for the seed treatments and by 52% for the in-furrow treatment. The valuable 28 to 55 mm tuber size was much greater for the Vitazyme applications: 24% for the seed treatment and 14% for the in-furrow treatment. The yield increases for Vitazyme treatments presented in the report were small — 5% for the seed treatment — but based upon much greater tuber numbers and considerably higher percentage of 28 to 55 mm tubers for both Vitazyme treatments, these two yields should have been much higher than reported.

Treatment	Income per tuber size, and totals					
	<28 mm	28-55 mm	>55 mm	Cut	Total	Increase
	----- Rs./ha -----					
Control	570.33	1286.91	16.71	1.11	1875.07	—
Vitazyme in-furrow	399.54	1528.68	13.24	0.74	1942.19	67.12
Vitazyme on seeds	293.93	1688.49	5.60	0.47	1988.49	113.42

## Rice

**Researcher:** Wang Ahongyan, Hunan Horticultural Research Institute, and Liu Shibia, Changde Jingshi Agriculture Bureau; Liu Shi, Zhang Jinping, and Song Jianping, Changde Jingshi Agriculture Bureau.

**Location:** Xinzhou, Jinshi, Hunan, China

**Seeding rate:** unknown

**Variety:** Xiangzaoxian 17

**Planting date:** March 26, 2009

**Experimental design:** A rice field was divided into Vitazyme treated and untreated plots (0.4 ha each), and the two treatments were replicated three times. The purpose of the study was to determine the effects of Vitazyme, applied twice, on crop growth and yield.

### 1. Control

### 2. Vitazyme

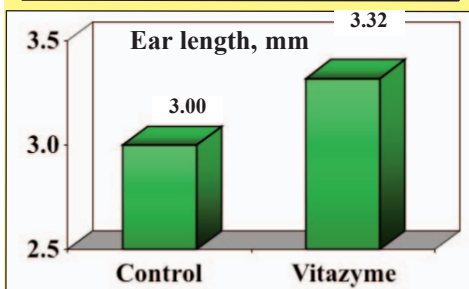
**Fertilization:** unknown

**Vitazyme application:** (1) 5% seed soak for 24 hours before planting; (2) 1.0 liter/ha sprayed on the leaves at the early boot stage (June 9); (3) 1.0 liter/ha sprayed on the leaves at early flowering (June 16)

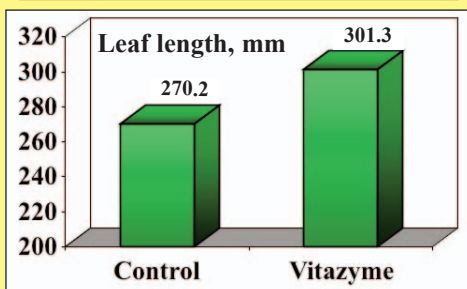
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## Growth results:

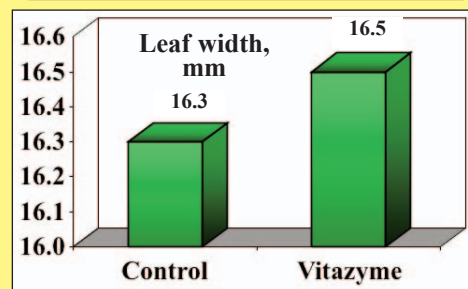
### Tillers



### Length of Last Leaf

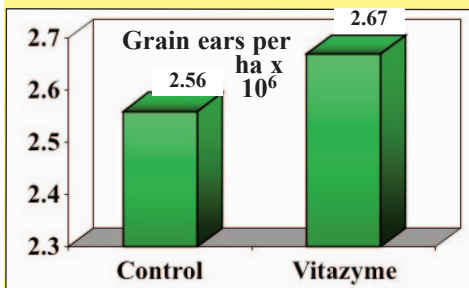


### Width of Last Leaf

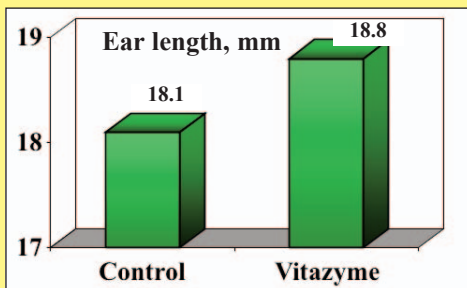


## Yield results:

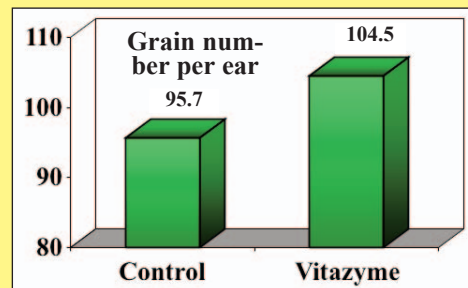
### Effective Leaves



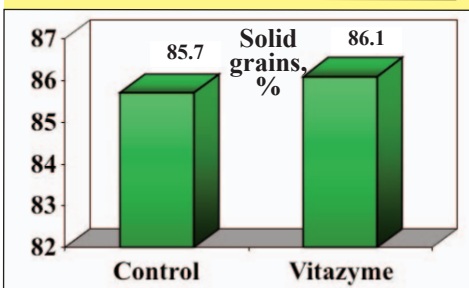
### Ear Length



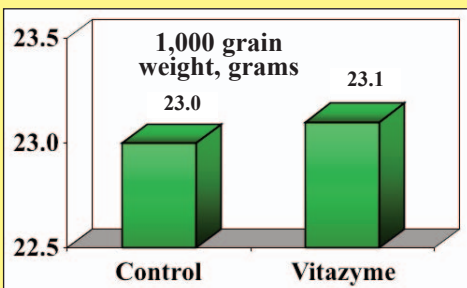
### Grains Per Ear



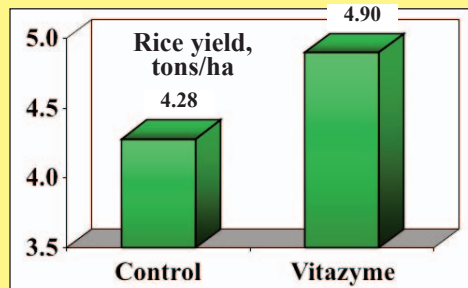
### Percent of Solid Grains



### Weight of 1,000 Grains



### Grain Yield



## Income results: See below.

### • Increase in income: 15%

Treatment	Income	Change
	----- RMB/ha -----	
Control	7,704	—
Vitazyme	8,820	1,116 (+15%)

Conclusions: This replicated rice trial in China revealed that Vitazyme improved rice yield by 14% (0.62 tons/ha). Moreover,

income was increased by 15%. This improvement was the result of a broad spectrum of improvement of the rice plants, as summarized on the left. Vitazyme is proven to be a most excellent product for the improvement of rice yield and quality in China.

### Parameter Change with Vitazyme

Tillers .....	+11%
Length of last leaf .....	+12%
Width of last leaf .....	+1.2%
Effective leaves .....	+4.3%
Ear length .....	+4%
Grains per ear .....	+9%
Percent of solid grains .....	+0.5%
1,000 grain weight .....	+0.4%
Grain yield .....	+14%

- Increase in tillers: 11%
- Increase in last leaf length: 12%
- Increase in last leaf width: 1.2%
- Increase in grains per ear: 9%
- Increase in rice grain yield: 14%

- Increase in ear length: 4%

- Increase in effective ears per ha: 4.3%
- Increase in percentage of solid grains: 0.5%
- Increase in 1,000 grain weight: 0.4%

# Rice

Researcher: agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

Location: Thu Thua, Long An Province, South Viet Nam

Planting date: Nov.-Dec., 2008

Fertilization: unknown

Experimental design: A Vitazyme study was designed in Long An Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m<sup>2</sup> for each of the following three treatments (on next page).

Variety: OM4625

Soil type: unknown

Seeding rate: unknown



Treatment	Vitazyme, days after planting			Rate liters/ha
	20	40	60	
Control	O	O	O	0
Vitazyme 1	X	O	X	1.0
Vitazyme 2	X	X	X	1.2

**Vitazyme application:** Rates were 1.0 or 1.2 liters/ha, applied 20, 40, or 60 days after planting to the soil and leaf surfaces of the plots. "Vitazyme 2" is termed the "Farmer treatment", likely because it is close to the pro-

gram a typical farmer would use in the area.

**Growth results:** During plant growth the height, leaf width, and panicle length of the plants were measured.

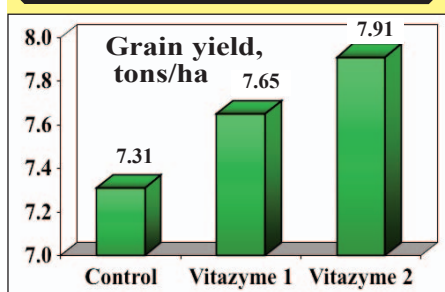
Treatment	Plant Height		Leaf Width		Panicle Length	
	Height	Change	Width	Change	Length	Change
	cm	cm	cm	cm	cm	cm
Control	79.40	—	1.27	—	1.32	—
Vitazyme 1	86.44	7.04 (+9%)	1.34	0.07 (+6%)	1.34	0.02 (+2%)
Vitazyme 2	84.32	4.92 (+6%)	1.29	0.02 (+2%)	1.32	0 (0%)



In Viet Nam, rice grown with three Vitazyme applications show much better root development and leaf area, meaning greater yield potential.

**Yield results:**

### Grain Yield



• Increase in plant height: 6 to 9%

• Increase in leaf width: 2 to 6%

• Increase in panicle length: 2%

### Increase in yield with Vitazyme

1 liter/ha twice .....	+5%
1.2 liters/ha three times .....	+8%

**Conclusions:** This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by 2 to 6%, but panicle length very little. The yield of grain was boosted by 5 to 8%, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

## Rice

**Researcher:** agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

**Fertilization:** unknown

**Location:** Tieu Can, Tra Vinh Province, South Viet Nam

**Planting date:** Nov.-Dec., 2008

**Soil type:** unknown

**Variety:** OM 4900

**Seeding rate:** unknown

**Experimental design:** A Vitazyme study was designed in Tra Vinh Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m<sup>2</sup> for each of the following three treatments.

Treatment	Vitazyme, days after planting			Rate liters/ha
	20	40	60	
Control	O	O	O	0
Vitazyme 1	X	O	X	1.0
Vitazyme 2	X	X	X	1.2

**Vitazyme application:** Rates were 1.0 or 1.2 liters/ha, applied 20, 40, or 60 days after planting to the soil and leaf surfaces of the plots. "Vitazyme 2" is termed the "Farmer treatment", likely because it is close to the program a typical farmer would use in that area.

**Growth results:** During plant growth the height, leaf width, and panicle length of the plants were measured.

**Growth results:** During plant growth the height, leaf width, and panicle length of the plants were measured.

Treatment	Plant Height		Leaf Width		Panicle Length	
	Height	Change	Width	Change	Length	Change
	cm	cm	cm	cm	cm	cm
Control	69.48	—	1.52	—	20.13	—
Vitazyme 1	71.30	1.82 (+3%)	1.54	0.02 (+1%)	21.06	(-)0.07 (0%)
Vitazyme 2	71.35	1.87 (3%)	1.62	0.10 (+7%)	20.28	0.15 (+1%)

**Conclusions:** This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by 3%, leaf width by up to 7%, but panicle length very little. The yield of grain was boosted by 6 to 7%, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

• Increase in panicle length: 1%

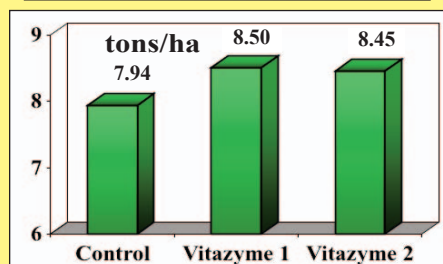
• Increase in plant height: 3%

• Increase in leaf width: 1 to 7%



In a rice trial in Viet Nam, the superior leaves and roots from Vitazyme are clearly visible in this photograph.

### Grain Yield



### Increase in yield with Vitazyme

1 liter/ha twice .....	+5%
1.2 liters/ha three times ...	+6%

# Rice

**Researcher:** agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

**Variety:** VD20

**Location:** Ba Tri, Ben Tre Province, South Viet Nam

**Planting date:** Nov.-Dec., 2008

**Soil type:** unknown

**Seeding rate:** unknown

**Experimental design:** A Vitazyme study was designed in Ba Tri Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m<sup>2</sup> for each of the following three treatments.

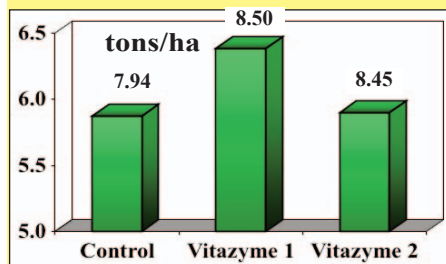
Treatment	Vitazyme, days after planting			Rate liters/ha
	20	40	60	
Control	O	O	O	0
Vitazyme 1	X	O	X	1.0
Vitazyme 2	X	X	X	1.2

**Fertilization:** unknown

**Vitazyme application:** Rates were 1.0 or 1.2 liters/ha, applied 20, 40, or 60 days after planting to the soil and leaf surfaces of the plots. "Vitazyme 2" is termed the "Farmer treatment", likely because it is close to the program a typical farmer would use in the area.

**Growth results:** During plant growth the height, leaf width, and panicle length of the plants were measured.

## Rice Grain Yield



**Increase in yield with Vitazyme**  
1 liter/ha twice ..... +9%

• Increase in plant height: 1 to 2%

• Increase in panicle length: 2%  
• Increase in leaf width: 2 to 6%

Treatment	Plant Height		Leaf Width		Panicle Length	
	Height cm	Change cm	Width cm	Change cm	Length cm	Change cm
Control	98.89	—	1.27	—	22.49	—
Vitazyme 1	100.65	1.76(+2%)	1.34	0.07 (+6%)	22.84	0.35 (+2%)
Vitazyme 2	99.05	0.16 (+0%)	1.29	0.02 (+2%)	22.79	0.30 (+1%)

**Conclusions:** This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by up to 2%, leaf width by from 2 to 6%, but panicle length very little, from 1 to 2%. The yield of grain was boosted very little with the 1.2 liters/ha applications, but by 9% by Vitazyme applied twice at 1.0 liter/ha, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

# Rice

**Researcher:** Ngo Dang Vu  
Viet Nam

**Location:** An Phu Village, Chau Doc District, An Giang Province (Mekong Delta),

**Variety:** OM6561

**Soil type:** alluvial

**Planting date:** December 15, 2008

**Soil fertility level:** low

**Experimental design:** A rice field was divided into two treatments, the Vitazyme plot having a reduced fertilizer regime, to determine the effect of Vitazyme on rice yield. The control plot was the farmer's usual practice.

1. Control (farmer's practice)

2. Vitazyme (farmer's practice with reduced fertilizer)

**Fertilizer applications:**

Time	Control	Vitazyme
days after sowing	kg/ha	kg/ha
10	50 urea + 80 DAP*	50 urea + 80 DAP*
20	100 urea + 80 DAP*	80 urea + 50 DAP*
30	50 urea + 50 NPK**	None
50	50 urea + 50 KCl***	50 urea + 50 KCl***

**Vitazyme application:** (1)

1 liter/ha on the soil one hour before sowing; (2) 1 liter/ha on the leaves and soil 30 days after sowing; (3) 1 liter/ha on the leaves and soil 50 days after sowing

## Total nutrients applied

Treatment	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
	kg/ha	kg/ha	kg/ha
Control	152	82	34
Vitazyme	106	60	30
Percentage reduction, Vita	30%	27%	12%

\*DAP = diammonium phosphate (18-46-0% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O)

\*\*NPK = mixed fertilizer (16-16-8% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O)

\*\*\*KCl = potassium chloride (0-0-60% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O)

**Yield results:** Actual yields are not available, but the Vitazyme treated plot yielded 600 kg/ha more rice than the normal farmers' practice.

Days after sowing	Fertilizer savings with Vitazyme
	kg/ha
10	0
20	20 urea + 30 DAP
30	50 urea + 50 NPK
50	0

**Fertilizer savings with Vitazyme:** Fertilizer was reduced with Vitazyme applications by the following amounts:

**Conclusions:** This Vietnamese rice study revealed that Vitazyme applied three times — an hour before sowing, 30 days after sowing, and 50 days after sowing, each time at liter/ha — together with reductions in fertilizer from the farmers' tradition practices of 30% N, 27% P<sub>2</sub>O<sub>5</sub>, and 12% K<sub>2</sub>O, resulted in a 600 kg/ha increase in grain production. Vitazyme contributed to improved nitrogen, phosphorus, and

potassium utilization, which resulted in a substantial yield improvement, thus saving the farmer on import costs and improving his total salable crop.

# Rice

**Researcher:** unknown

**Location:** Cianjur, West Java, Indonesia

**Variety:** Cigeulis (local variety)

**Soil type:** unknown

**Population:** unknown

**Planting date:** spring, 2009

**Experimental design:** A replicated plot trial on rice was established in Indonesia to evaluate the effect of Vitazyme on rice yield, with full and reduced fertilizer applications. These replications were used in a randomized complete block design. An additional treatment called "farmer practice" was used to compare with the other three treatments.

**1. Normal fertilizer    2. Normal fertilizer + Vitazyme    3. 50% fertilizer + Vitazyme    4. "Farmer practice"**

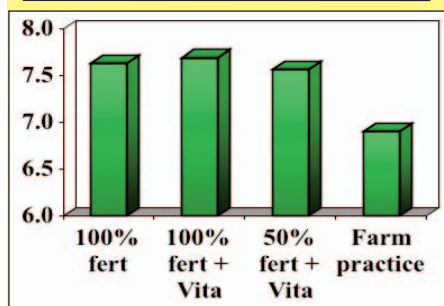
**Fertilization:** Normal (100%) level: 250 kg/ha urea (45% N), 200 kg/ha superphosphate 36 (48% P<sub>2</sub>O<sub>5</sub>), and 50 kg/ha KCl (60% K<sub>2</sub>O). The 50% application for Treatment 3 received 50% of these levels.

**Vitazyme application:** 1.0 liter/ha applied twice

**Growth results:** The number of tillers and plant height were measured at eight different times during the growth cycle, but none of the data revealed significant differences; thus, this data is not presented. One-thousand grain weight, the number of productive panicles, and panicle length also showed no significant differences.

**Yield results:** The plots were harvested in June of 2009.

## Grain Yield

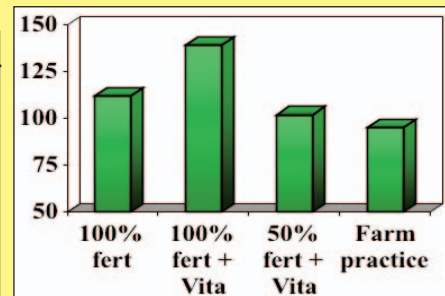


Treatment	Rice yield*	Yield change**
	tons/ha	tons/ha
1. 100% fertilizer	7.63 a	0.73 (+11%)
2. 100% fert + Vita	7.69 a	0.79 (+11%)
3. 50% fert + Vita	7.56 a	0.66 (+10%)
4. Farmer practice	6.90 b	—

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

\*\*The comparisons here are made with the "farmer practice".

## Seed Per Panicle



Treatment	Seeds**	Seed change**
	tons/ha	tons/ha
1. 100% fertilizer	112 ab	17 (+18%)
2. 100% fert + Vita	139 a	44 (+46%)
3. 50% fert + Vita	102 b	7 (+7%)
4. Farmer practice	95 b	—

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

\*\*The comparisons here are made with the "farmer practice".

## Rice yield increase above "farm practice"

100% fert. + Vita ..... +11%  
 100% fert. only ..... +11%  
 50% fert. + Vita ..... +10%

## Seeds per panicle above "farm practice"

100% fert. + Vita ..... +46%  
 100% fert. .... +18%

**Conclusions:** In this Indonesian rice study, using normal (100%) fertilizer, with and without Vitazyme, and 50% fertilizer with Vitazyme, all three treatments were statistically equal in yield, and all significantly exceeded the "farm practice" treatment. This result proved that Vitazyme applied twice, along with a 50% reduction in fertilizer, produced a yield equal to the 100% fertilizer treatment without fertilizer. This result is highly important for Indonesian rice farmers, who need to minimize fertilizer inputs due to high costs.

Vitazyme applied with 100% fertilizer also greatly improved seed number per panicle of rice at harvest, being 46% above the farm practice and 28% greater than the 100% fertilizer treatment; this great seed per panicle increase was not observed with the 50% fertilizer plus Vitazyme treatment.

# Shallots

**Researcher:** Unknown

**Location:** Kemukten Brebes, Central Java, Indonesia

**Variety:** unknown

**Plant spacing:** 10 cm x 15 cm

**Seeds per hole:** 1 to 2 seeds

**Soil type:** unknown

**Planting date:** in 2009

**Experimental design:** An experiment with shallots was set up in a randomized complete block design, using three treatments and nine replications. Plots were 1.2 m x 5.0 m. The purpose of the trial was to evaluate Vitazyme's ability to improve shallot yield, quality, and profitability.

**1. Control (normal fertilizer)    2. Normal fertilizer + Vitazyme    3. 50% fertilizer + Vitazyme**

**Fertilization:** 300 kg/ha urea, 250 kg/ha 0-46-0% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, and 150 kg/ha 0-0-60% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O; 50% of these amounts for Treatments 3

**Vitazyme application:** four applications at 1.0 liter/ha each time, starting 7 days after planting and every 2 weeks for three more times.

**Quality results:** Samples of shallots were selected to analyze for four quality factors.

Factor	Improvement with Vitazyme vs. Control
Smell	Stronger (preferred by farmers)
Taste	Hottest (preferred by farmers)
Crispness	Greater
Texture	Same as control

to analyze for four quality factors.

**Growth results:**

Treatment	Yield*	Yield change
	tons/ha	tons/ha
1. 100% fertilizer	14.50 b	—
2. 100% fertilizer + Vitazyme	16.72 a	2.22 (+15%)
3. 50% fertilizer + Vitazyme	15.50 ab	1.00 (+7%)

\*Means followed by the same letter are not significantly different at P=0.05 according to Duncan's Multiple Range Test.

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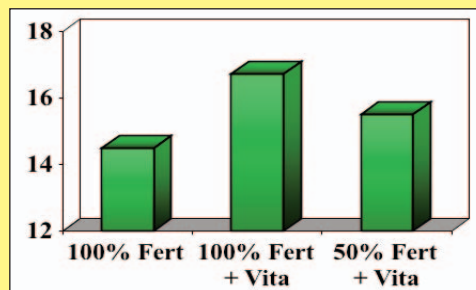


The number of leaves and plant height were measured six times during the growth cycle. None of the differences were significantly different at  $P=0.05$  according to Duncan's Multiple Range Test.

**Conclusions:** This shallot study in Indonesia showed how Vitazyme will improve both the yield and quality of this important food crop. The smell, taste, and crispness of the bulbs were enhanced by the treatment, and the yield was improved by 15% for the full fertilizer + Vitazyme treatment, and by 7% for the 50% fertilizer + Vitazyme treatment. These data show that this product can increase yield despite a 50% reduction in fertilizer application, an important point when saving on fertilizer costs has become so prominent nowadays.

• **Increase in yield with Vitazyme: 7 to 15%**

### Seed Per Panicle



## Soybeans, Organic

**Researcher:** Dennis Demel

**Soil type:** Cuma sandy loam

**Tillage:** conventional

**Experimental design:** A soybean field was divided into a Vitazyme treated area (treated seeds only), and an untreated control area, with the objective to evaluate the effect of this product on the yield of soybeans grown under organic, irrigated conditions.

**Location:** Ogallala, Nebraska

**Plant population:** unknown

**Planting date:** unknown

**Variety:** Blue River 29A7C

**Watering:** center pivot

### 1. Control

### 2. Vitazyme

**Fertility treatments:** In the fall of 2008 the field was subsoiled, and through drop tubes on the subsoiler were injected 0.5 gal/acre liquid humate, 1 gal/acre nitrogen (Summit), 0.5 gal/acre molasses, and 0.25 gal/acre fish. Also applied over all areas in the fall through the center pivot were 3 gal/acre nitrogen (Summit) with molasses and fish. In the spring, manganese, molasses, 1.4 gal/acre compost extract, and 1 oz/acre SP1 (Agri-Energy) were applied through the center pivot to all areas. At planting, 0.75 gal Dram 1 fish and Chilean nitrate, with Vitazyme, were applied in-furrow.

**Rhizobium application:** liquid, on the seeds at planting

**Mycorrhizae application:** 4 oz/acre in the seed box

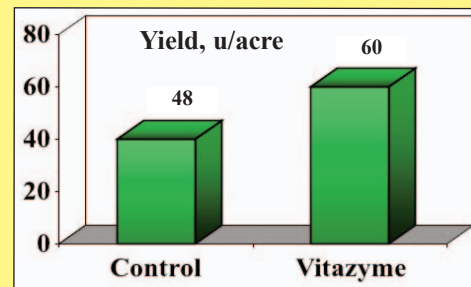
**Vitazyme application:** 13 oz/acre in the furrow at planting

**Test weight results:** Both treatments produced soybeans weighing 57 lb/bushel.

**Yield results:** At harvest, eight rows were harvested from each side of the treatment boundary, with a 16-row separation between the strips that were 20 x 2,640 ft (1.212 acre). A weigh wagon was used to measure the yield.

**Conclusions:** This organic soybean study in western Nebraska, under irrigation, revealed that Vitazyme increased bean yield by 25%, a very big increase. This large boost in yield with the product substantiates results with other organic producers, which have shown similar large yield improvements with the program. The grower was surprised with the degree of yield increase, but the weigh wagon had been properly calibrated.

### Soybean Yield



• **Increase in yield: 25%**

## Soybeans

### A long term study: year 2

**Researcher:** Bertel Schou, Ph.D.  
Environmental Services), Cedar Falls, Iowa

**Planting date:** May 21, 2009

**Tillage:** conventional (field cultivated and harrowed)

**Research organization:** ACRES (Agricultural Custom Research and

**Planting rate:** 62 lb/acre

**Planting depth:** 2 inches

**Variety:** Pioneer 92M40 (BBCH: BSOY)

**Row width:** 30 inches

**Previous crop:** corn

**Experimental design:** The same plots from the first year of this long-term study were preserved for the second year. These plots were arranged in a randomized complete block design, with five replicates and two treatments. The study is designed to assess the long-term effects of Vitazyme on the yield and growth of corn and soybeans in rotation, and especially the effects on the physical, chemical, and microbial properties of the soil.

### 1. Control

### 2. Vitazyme

**Fertilization:** none

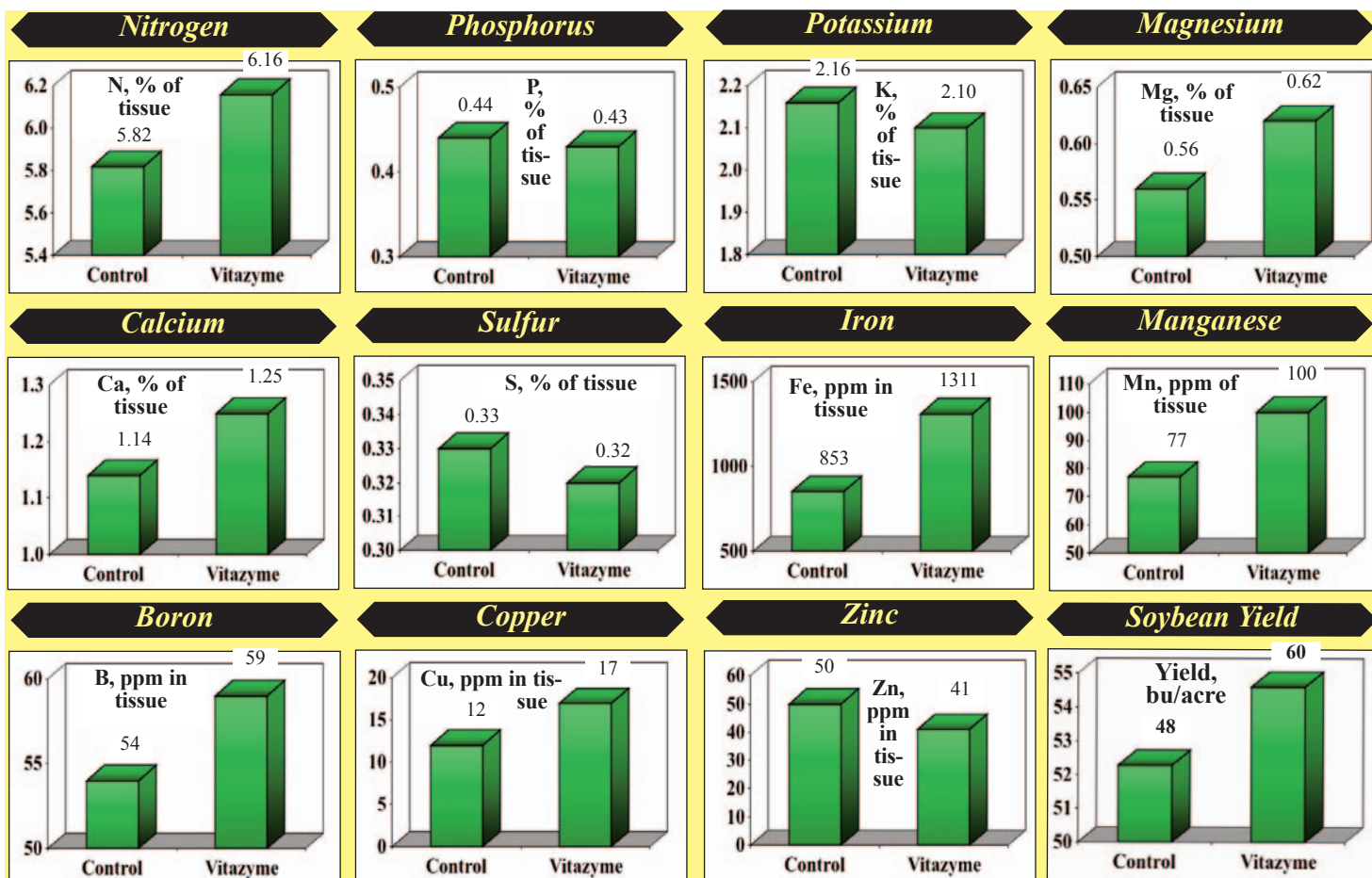
**Vitazyme application:** 13 oz/acre (1 liter/ha) in the seed furrow at planting (May 21, 2009), and 13 oz/acre (1 liter/ha) sprayed on the leaves and soil on June 23, 2009, at the V3 stage

**Weed control:** glyphosate

**Plant analyses:** One sampling of leaves from the two treatments was made and sent to Midwest Laboratories, Omaha, Nebraska. Leaves were received on June 24, 2009, as a composite of the five replicates for each treatment.



**This long-term study in east central Iowa, on the same plots as last year, revealed that soybean yield was significantly increased.**



### Change in soybean tissue elements with Vitazyme

N .....	+6%	Fe .....	+54%
P .....	-2%	Mn ....	+30%
K .....	-3%	B .....	+8%
Mg ....	+11%	Cu .....	+42%
Ca ....	+10%	Zn .....	-18%
S .....	-3%		

**Harvest date:** The crop was harvested on September 29, 2009, with a Massey Ferguson 8 plot combine. Two rows 40 feet long were harvested from each plot.

**Grain moisture:** There was no major difference in the moisture content of the two treatments.

**Control moisture: 14.10**

**Vitazyme moisture: 14.07**

Treatment	Bean yield*	Yield increase
	bu/acre	bu/acre
Control	52.28 a	—
Vitazyme	54.60 b	2.32 (+4%)
LSD (0.10)	2.13	
Standard deviation	1.58	
Coeff. of variation	2.96	
Replicate F	5.98	
Replicate probability	0.056	
Treatment F	5.38	
Treatment probability	0.081	

• **Increase in yield: 25%**

**Yield results:** All soybean yields were adjusted to 13.0% moisture.

**Conclusions:** This long-term soil and crop study in Iowa, with soybeans grown the second year, revealed that the yield was significantly improved by 2.32 bu/acre (4%) with Vitazyme. Soil and plant analyses results showed improvements in tissue contents of N, Mg, Ca, Fe, Mn, B, and, Cu. These values will be monitored each year as the study progresses, as will other physical, chemical, and microbiological parameters.

## Soybeans

**Farmer:** David Herbst

**Location:** Herbst/Tierney Farms, Chaffee, Missouri, in cooperation with the University of Missouri Extension Service, Cape Girardeau and Jackson, Missouri

**Variety:** Nashville (Merschman)

**Irrigation:** furrow, on a leveled field

**Soil type:** silt loam

**Previous crop:** wheat, harvested before soybeans were planted (double-cropped)

**Population:** 140,000 seeds/acre

**Planting date:** June 7, 2008

**Row spacing:** 30 inch

**Experimental design:** A soybean field was divided into plots that were 24 rows wide, and replicated two times, with a check (untreated) plot between each treatment. The purpose of the trial was to evaluate the relative effects of several biostimulants and foliar fertilizers.

1. Vitazyme
2. Foliar Blend
3. Impact
4. Foliar Blend + GroMax

5. GroMax
6. GroMax Plus
7. Headline (fungicide)
8. Control (no treatment)

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Fertilization: none

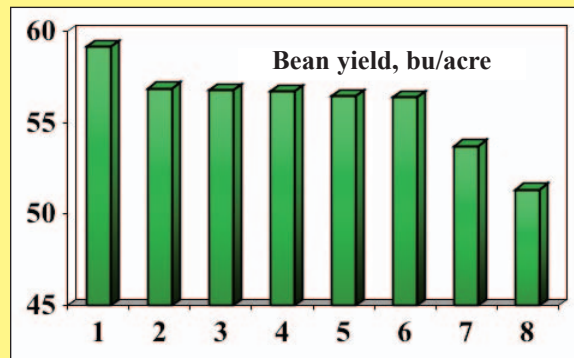
Product applications: 13 oz/acre at R4 to R5

Yield results: The data below are from the higher yielding of the two plots from each treatment.

Conclusions: This soybean crop in a wheat-soybean double cropping situation revealed that, of all products used, Vitazyme performed the best, increasing the yield by 15% (7.81 bu/acre) above the control. This increase was 2.27 bu/acre above the next highest yield increase (Foliar Blend). Vitazyme was shown in this trial to be a highly effective soybean yield booster.

Treatment	Yield	Yield change
	bu/acre	bu/acre
1. Vitazyme	59.15	7.81 (+15%)
2. Foliar Blend	56.88	5.54 (+11%)
3. Impact	56.79	5.45 (+11%)
4. Foliar Blend + GroMax	56.70	5.36 (10%)
5. GroMax	56.45	5.11 (+10%)
6. GroMax Plus	56.40	5.06 (+10%)
7. Headline	53.72	2.38 (+5%)
8. Control	51.34	—

• **Increase in yield: 15%**



## Soybeans

Researcher: Nathan Temples

Variety: Crows 4817

Planting date: June 3, 2009

Experimental design: A 40-acre soybean field had 24 rows in the middle of the field treated with Vitazyme directly in the seed row. The objective was to evaluate the potential of this product to increase bean yields.

Farm cooperator: Halford farms

Soil type: gumbo (high clay)

Row-spacing: 30 inches

Location: Bell City, Missouri

Planting rate: 150,000 seeds/acre

Irrigation: none

1. Control

2. Vitazyme

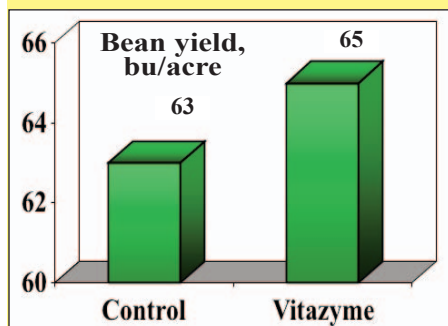
Fertilization: unknown

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

Harvest date: October 15, 2009

Yield results: Yields were determined by combining a strip in the 24 treated rows and an adjacent untreated strip.

### Soybean Yield



• **Increase in yield: 3%**



In Missouri, earl soybean development of roots and leaves is obviously superior with only one Vitazyme treatment.

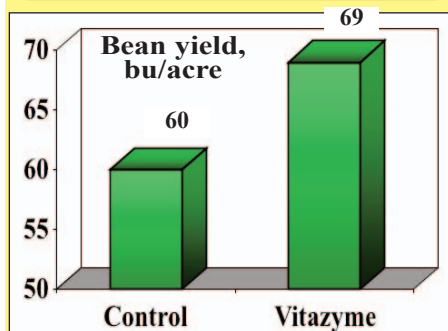


Note the excellent soybean development at harvest time; these beans yielded 65 bu/acre, a good increase.

Conclusions: This Missouri study proved that Vitazyme, applied at 8 oz/acre to the seeds at planting, increased yield by 3%.

## Soybeans

### Soybean Yield



• **Increase in yield: 15%**



The Vitazyme treated soybeans from this Missouri test have more pods and shorter internodes, yielding 15% more.



Note the greater number of pods with Vitazyme treatment from the plant sample shown on the left.



Researcher: Nathan Temples

Variety: Dyna-Gro

Planting date: June 18, 2009

Experimental design: A soybean field was divided into Vitazyme treated (with the herbicide) and the untreated areas to determine the effects of the product on bean yield.

Farm cooperator: David Murray Farms

Soil type: sandy loam

Row-spacing: 30 inches

Location: Sikeston, Missouri

Planting rate: 60 lb/acre

Irrigation: four times

### 1. Control

### 2. Vitazyme

Fertilization: unknown

Vitazyme application: 13 oz/acre with the herbicide, 21 days after planting

Harvest date: November 13, 2009

Yield results:

Conclusions: In this Missouri study, Vitazyme applied along with a herbicide increased soybean yield by 15% over the untreated control.

## Soybeans

Researcher: Nathan Temples

Location: Arbor, Missouri

Planting rate: 140,000 seeds /acre

Planting date: May 20, 2009

Experimental design: In a 55-acre soybean field, 24 rows were treated with Vitazyme on the seeds at planting, in an effort to evaluate the product's effects on soybean yield.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

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

Harvest date: October 20, 2009

Farm cooperator: Donnie and Chris Wondel, D and C Farms

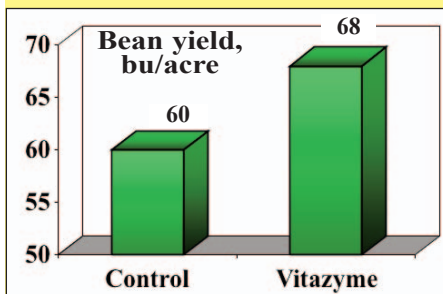
Variety: Asgrow 4922

Row-spacing: 30 inches

Soil type: gumbo (high clay)

Irrigation: none

### Soybean Yield



• **Increase in yield: 13%**



As for the study above, Vitazyme seed treatment produced large, well-filled pods that were closely spaced.



The pod number for the plants selected in the left-hand picture show a distinct advantage (13%) for the treated plot.

Conclusions: This Missouri soybean study, with Vitazyme applied to the seeds at planting at 8 oz/acre, resulted in a substantial 8 bu/acre yield increase (+13%). This increase occurred in spite of a very high bean yield, showing that even with maximum yield the product works very well.

## Soybeans

Researcher: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

Variety: Podil'ska 416, super elite

Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

Location: Ukraine central forest-steppe area near Vinnytsia

Planting date: May 2, 2009

Previous crop: winter wheat

Seeding rate: 800,000 seeds/ha

Tillage: plowing, harrowing, and cultivation

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 three 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 soybeans.

### 1. Control

### 2. Vitazyme on seeds

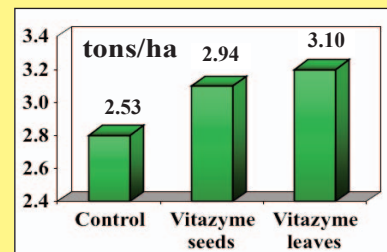
### 3. Vitazyme on seeds + leaves

Fertilization: 30 kg/ha N, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O

Vitazyme application: Treatment 2 received 1.0 liter of Vitazyme per ton of seed on May 1, 2009, and Treatment 3 received this treatment plus a foliar treatment of 1.0/liter/ha on June 20, 2009, at branching.

Conclusions: In Ukraine in 2009, this Vitazyme study with soybeans using either a seed treatment alone, or a seed treatment plus a foliar treatment, proved that this product increased yield by 16% (seed treatment) or 23% (seed and foliar treatment); income was also substantially increased in both cases. These excellent improvements show the great utility of this product in soybean culture in Ukraine.

### Soybean Yield



• **Increase in yield, Vitazyme once: 16%**

• **Increase in yield, Vitazyme twice: 23%**

• **Income increase, Vitazyme once: 1,104 hrn**

• **Income increase, Vitazyme twice: 1,343 hrn**

# Sugar Beets

Researcher: unknown

Variety: Alexandria

Experimental design: A field of sugar beets was divided into a control (untreated) and a Vitazyme treated area, for the purpose of determining the effect of this product on sugar beet yield and sugar yield.

**1. Control**

**2. Vitazyme**

Fertilization: unknown

Vitazyme application: two spray applications at 1.0 liter/ha each time

Yield results:

Treatment	Beet yield	Change	Sugar content	Change	Super yield	Change
	tons/ha	tons/ha	%	%	tons/ha	tons/ha
Control	48	—	20.0	—	9.6	—
Vitazyme	60	12 (+25%)	21.5	1.5 (+8%)	12.9	3.3 (+34%)

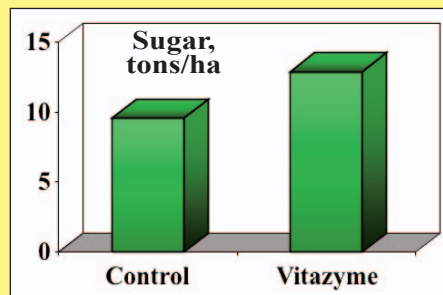
• **Increase in beet yield: 25%**

• **Increase in sugar content: 8%**

• **Increase in sugar yield: 34%**

Conclusions: This Ukrainian sugar beet study revealed that two Vitazyme applications increased the beet yield (25%), the sugar content of the beets (1.5 percentage points), and the total sugar yield (34%). This great boost in sugar production reveals the potential of this product to aid Ukraine's agriculture.

## Sugar Yield



# Sugar Beets



*This replicated study at Vinnytsia, Ukraine, shows very healthy growth of sugar beets with Vitazyme.*

*For the four treatments shown here, Vitazyme alone produced the greatest root tonnage and the highest sugar level.*

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: April 14, 2009

Seeding rate: 100,000 seeds/ha

Varieties: Oleksandria, Karmelita,

and Yustina

Tillage: plowing, harrowing, and

cultivating

Previous crop: winter wheat

Harvest: unknown

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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

Experimental design: A series of replicated plots (two reps) at the experiment station was established to grow three varieties of sugar beets, using two applications of Vitazyme on the treated area. The objective was to determine the effect of Vitazyme on the crop's yield, sugar content, and total sugar production.

**1. Control**

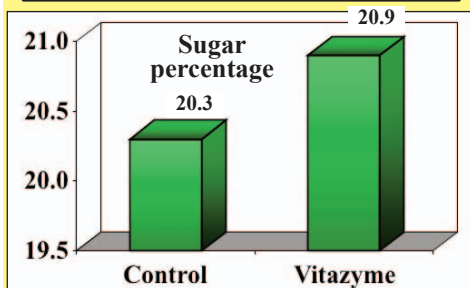
**2. Vitazyme**

Fertilization: 60 kg/ha N, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O; N applied in the spring, P and K in the fall

Vitazyme application: (1) 1 liter/ha on the plants and soil on June 20, 2009; (2) 1 liter/ha on the plants and soil on July 10, 2009

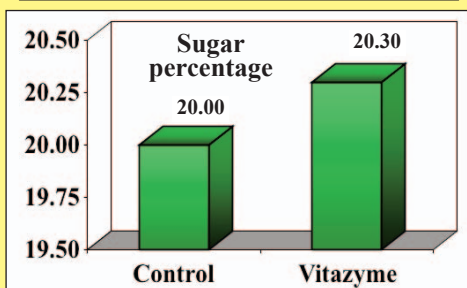
Sugar content results: At harvest time, the sugar percentage of each variety was determined.

## Oleksandria



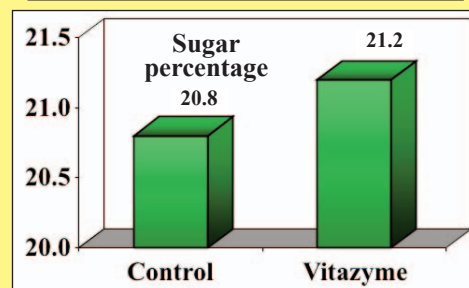
**Increase in sugar**  
0.6 percentage point

## Karmelita



**Increase in sugar**  
0.3 percentage point

## Yustina

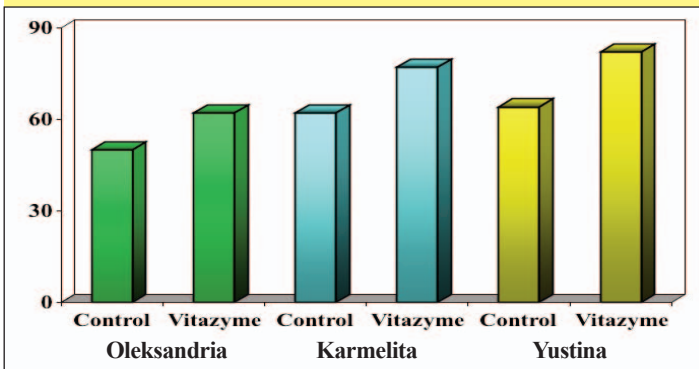


**Increase in sugar**  
0.4 percentage point



**Yield results:** The crop was harvested the fall of 2009, with the following results.

### Beet yield, tons/ha

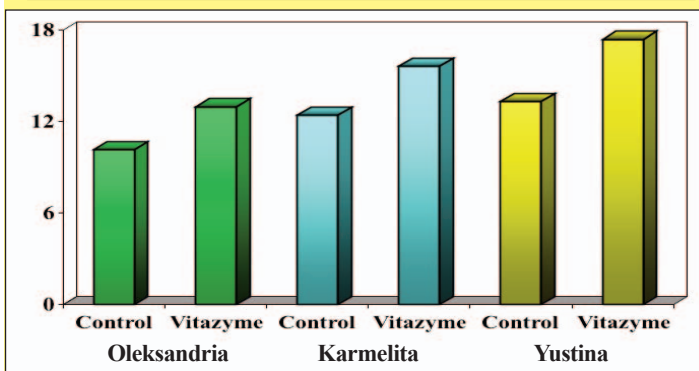


### Increase in beet yield

Oleksandria .....	+24%
Karmelita .....	+24%
Yustina .....	+28%

**Sugar yield results:**

### Sugar yield, tons/ha



### Increase in sugar yield

Oleksandria .....	+26%
Karmelita .....	+24%
Yustina .....	+31%

Treatment	Beet yield tons/ha	Yield change tons/ha
Oleksandria		
Control	50.0	—
Vitazyme	62.0	12.0 (+24%)
Karmelita		
Control	62.0	—
Vitazyme	77.0	15.0 (+24%)
Yustina		
Control	64.0	—
Vitazyme	82.0	18.0 (+28%)

Treatment	Sugar yield tons/ha	Yield change tons/ha
Oleksandria		
Control	10.15	—
Vitazyme	12.96	2.81 (+28%)
Karmelita		
Control	12.40	—
Vitazyme	15.63	3.23 (+26%)
Yustina		
Control	13.31	—
Vitazyme	17.38	4.07 (+31%)



**Note the excellent size and integrity of the root tissue of the Vitazyme treated sugar beet roots on the right. This improved growth yielded 26 to 31% more sugar.**

**Conclusions:** This Vitazyme study on three sugar beet varieties in Ukraine proved that only two applications of Vitazyme can markedly increase beet yield — from 24 to 28% — while at the same time increase the sugar content of the beets, from 0.3 to 0.6 percentage points. These improvements brought about total sugar yield increases of from 26 to 31%, huge enhancements of total sugar output with these very low application levels of active agents. These highly profitable results show that Vitazyme is a very viable option for sugar beet growers in Ukraine, and in other countries of Eastern Europe.

## Sugar Beets

**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

**Seeding rate:** 100.000 seeds/ha

**Tillage:** plowing, harrowing, and cultivation

**Variety:** Snizhana

**Planting date:** April 14, 2009

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Vitazyme application:** (1) 1 liter/ha on the leaves on June 20, 2009; (2) 1 liter/ha on the leaves on July 10, 2009.

**Fertilization:** See the table on the next page

**Experimental design:** A sugar beet field was established having two replications, using four fertility levels, to determine the effectiveness of Vitazyme in affecting beet yield, sugar content, and sugar yield. See the table on the next page



Treatment	Vitazyme	Fertilizer <sup>1</sup>		
		Nitrogen	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O
		----- kg/ha -----		
1. No fertilizer	0	0	0	0
2. No fert + Vitaz	Yes	0	0	0
3. 50% fertilizer	0	80	60	80
4. 50% fert + Vita	Yes	80	60	80
5. 75% fertilizer	0	120	90	120
6. 75% fert + Vita	Yes	120	90	120
7. 100% fertilizer	0	160	120	160
8. 100% fert + Vita	Yes	160	120	160

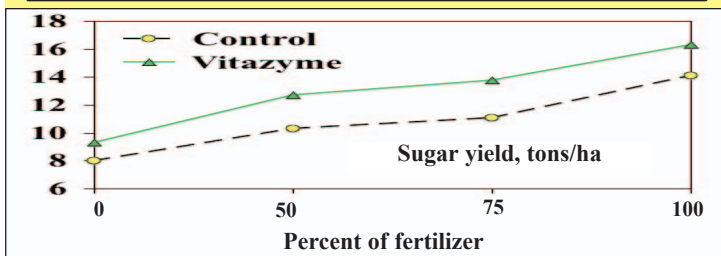
<sup>1</sup>P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O were applied the fall of 2008; N was applied the spring of 2009.

#### Yield results:

Treatment	Beet yield		Sugar content		Sugar yield		Added income <sup>1</sup>
	tons/ha	Change <sup>1</sup>	%	Change <sup>1</sup>	tons/ha	Change <sup>1</sup>	
1. No fertilizer	40.0	—	20.3	—	8.0	—	—
2. No fert + Vitaz	45.5	5.5 (+14%)	20.5	0.2 (+1%)	9.3	1.3 (+16%)	975
3. 50% fertilizer	50.5	—	20.4	—	10.3	—	—
4. 50% fert + Vita	61.0	10.5 (+21%)	20.8	0.4 (+2%)	12.7	2.4 (+23%)	2,225
5. 75% fertilizer	55.0	—	20.1	—	11.1	—	—
6. 75% fert + Vita	67.5	12.0 (+22%)	20.4	0.3 (+1%)	13.8	2.7 (+24%)	2,600
7. 100% fertilizer	70.0	—	20.1	—	14.1	—	—
8. 100% fert + Vita	80.5	10.5 (+15%)	20.3	0.2 (+1%)	16.3	2.2 (+16%)	2,225

<sup>1</sup>Comparisons at the same fertilizer level.

### Sugar Yield



**Conclusions:** This Ukrainian sugar study revealed that, at every fertilizer level, Vitazyme increased the sugar production, first by increasing the beet yield, and then the sugar percentage at each level. Besides, the added income for each fertilizer level was substantial. These results prove that Vitazyme is a highly viable sugar beet amendment for Ukrainian agriculture.

## Sunflowers

**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

**Seeding rate:** 5 kg/ha

**Planting date:** May 22, 2009

**Variety:** Gelio 06 AK0324

**Tillage:** plowing, harrowing, 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 sunflowers.

#### 1. Control

**Fertilization:** 45 kg/ha N

**Vitazyme application:** Treatment 2 received 1.0 liter applied to the leaves and soil on June 25, 2009, at "basket" formation.

**Yield results:**

#### 2. Vitazyme, once foliar



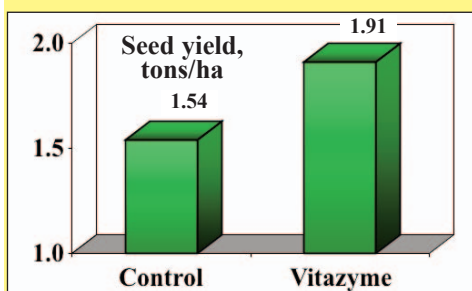
**Sunflowers treated with Vitazyme in a replicated trial responded with much more vigor and larger, better filled heads.**



**Notice the superior root development of plants from this same study in response to one Vitazyme application in June.**



**The head size of these Vinnytsia treatments shows the reason for the 24% seed yield increase noted in this study.**



**• Increase in seed yield with Vitazyme: 24%**

**Income results:**

**• Increase in income: 632 hrn/ha**

**Conclusions:** Sunflowers raised with Vitazyme (foliar at 1 liter/ha) in Ukraine produced 24% more seeds, and 632 hrn/ha more income compared to the control treatment. This product has proven itself to greatly improve sunflower production and profits in Ukraine.

# Tea

**Researchers:** Wang Zhongyan, Hunan Horticultural Research Institute; Wang Xu, Luo Yi, and Kang Yankai of the Hunan Tea Research Institute  
**Location:** Hunan Tea Research Institute Research Orchard, Gaoqiao, Changsha, Hunan, China

**Variety:** Zhuyeqi

**Tree age:** 8 years

**Management:** standard

**Experimental design:** A tea orchard was divided into Vitazyme treated and untreated areas, each plot being 0.4 hectare. These treatments were repeated three times. The purpose of the trial was to evaluate the effects of Vitazyme on the growth and production of tea.

## 1. Control

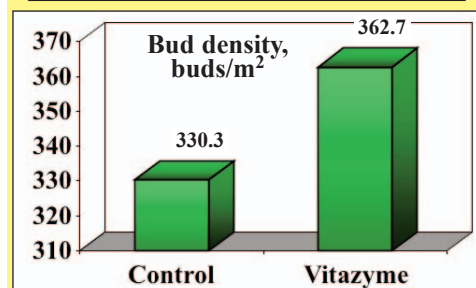
## 2. Vitazyme

**Fertilization:** unknown

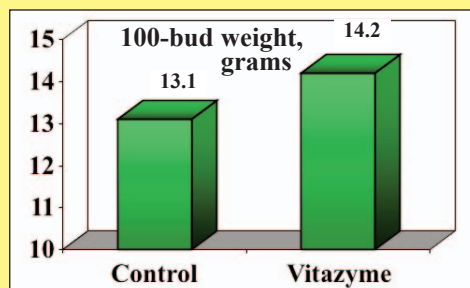
**Vitazyme applications:** (1) 1.5 liters/ha sprayed on the leaves at early spring flush (March 14); (2) 1.0 liter/ha sprayed on the leaves at early summer flush (May 8); (3) 1.0 liter/ha sprayed on the leaves at early autumn flush.

**Yield and growth results:**

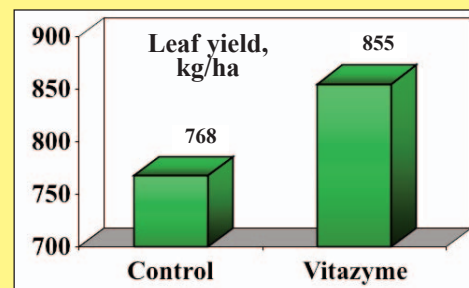
### Bud Density



### Weight of 100 Buds



### Leaf Width



**Income results:**

• **Increase in income: 11%**

• **Increase in bud density: 10%**

Treatment	Income	Change
	----- RMB/ha -----	
Control	46,080	—
Vitazyme	51,300	5,220 (+11%)

**Conclusions:** This Chinese tea study with Vitazyme revealed that the product caused an excellent improvement in the growth of new buds (+10%), and also of the size (weight) of the buds (+8%). These factors combined to produce an 11% increase in tea leaf yield, an excellent result for the benefit of China's tea industry. This benefit is especially noteworthy considering that Vitazyme improved grower return by 11%.

• **Increase in 100-bud weight: 8%**

• **Increase in tea leaf yield with Vitazyme: 11%**

# Vetch

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

**Variety:** Pribuz'ka super elite

**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

**Location:** Ukraine central forest-steppe area near Vinnytsia

**Planting rate:** 1.8 million seeds/ha

**Tillage:** plowing, harrowing, and cultivation

**Planting date:** April 14, 2009

**Previous crop:** barley

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha, replicated four times, to discover the effect of the product on the vetch cover crop. Both Vitazyme treatments had a seed treatment, while one of them received an additional foliar/soil application.

## 1. Control

## 2. Vitazyme on the seeds

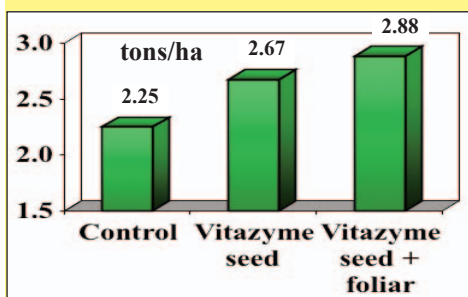
## 3. Vitazyme on the seeds and leaves

**Fertilization:** 10 kg/ha N, 10 kg/ha P<sub>2</sub>O<sub>5</sub>, and 30 kg/ha K<sub>2</sub>O.

**Vitazyme application:** Both Treatments 2 and 3 received a 1.0 liter/ton of seed Vitazyme application at planting (April 4, 2009), while Treatment 3 received an additional 1.0 liter/ha sprayed on the leaves and soil on June 6, 2009, at branching.

**Yield results:**

### Vetch Yield



**Income results:** See results at the bottom of this page.

**Conclusions:** This Ukraine study on vetch revealed that the harvested yield was improved considerably with Vitazyme applied to the seeds (+19%), but especially when an additional 1.0 liter/ha was applied to the leaves and soil (+28%). Income also increased substantially with both Vitazyme treatments. Vitazyme is shown to be an excellent material to add to the usual cultural program for more effective use of soil and fertilizer nutrients, to improve yield and profitability.

### Increase in vetch yield with Vitazyme

Seed treatment .....	+19%
Seed + foliar treatment .....	+28%

• **Income increase with Vitazyme, on seeds: 820 hrn/ha**

• **Income increase with Vitazyme, on seeds + leaves: 1,040 hrn/ha**



# Water Morning Glory

**Researcher:** unknown

**Location:** Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam

**Variety:** unknown

**Soil type:** unknown

**Planting date:** March, 2009

**Experimental design:** A field of water morning glory was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

**1. Control**

**2. Vitazyme twice**

**Fertilization:** unknown

**Vitazyme application:** Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

**Height results:** At harvest time the average plant height was determined for each treatment

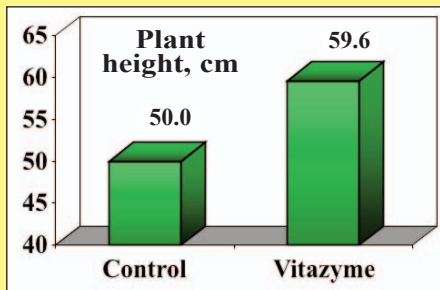
**Yield results:** The crop was harvested in April of 2009.

**Conclusions:** This study on water morning glory in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased not only plant height (19%), but yield as well, by 2.87 tons/ha (12%). The product's active agents have been show to greatly stimulate the growth and yield of this widely used vegetable in this Southeastern Asian country.

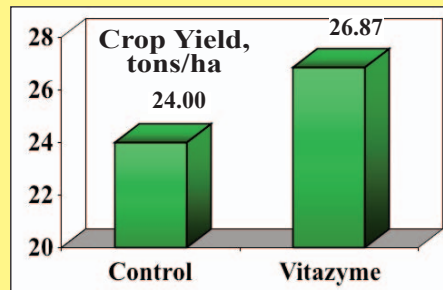
• **Increase in plant height: 19%**

• **Increase in yield: 12%**

## Morning Glory Height



## Morning Glory Yield



# Watermelons

**Researcher:** Wang Zhongyang, Hunan Horticultural Research Institute, and Tao Chuanhui, Ningxian Xianzikou Watermelon Farm

**Location:** Xiangzikou Watermelon Farm, Ningziang County, Hunan, China

**Variety:** Sugar Baby

**Planting rate:** unknown

**Planting date:** April 15

**Experimental design:** A watermelon field was divided into Vitazyme treated and untreated plots, arranged with three replications. Each plot was 0.4 hectare. The purpose of the study was to evaluate the effects of Vitazyme on watermelon yield and quality.

**1. Control**

**2. Vitazyme**

**Fertilization:** unknown

**Vitazyme application:** (1) 24-hour seed soak with a 5% solution (April 14); (2) 1.0 liter/ha leaf spray 20 days after transplanting (May 5); (3) 1.0 liter/ha leaf spray 40 days after transplanting (May 25); (4) 1.0 liters/ha leaf spray 60 days after transplanting (June 15).

**Harvest date:** unknown

**Growth results:**

**Seed germination:** more rapid and uniform with Vitazyme

**Overall plant growth:** healthier with Vitazyme

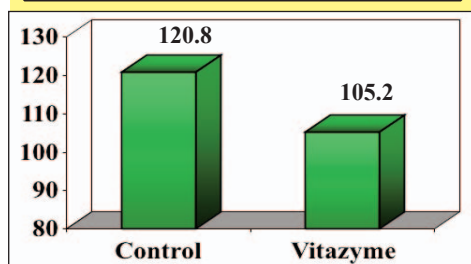


**A replicated watermelon study in China revealed how Vitazyme can stimulate melon development. This is the control.**

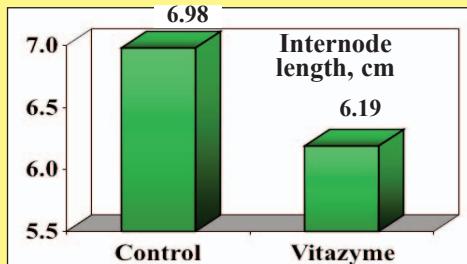


**When Vitazyme was applied to the seeds as a soak, and three more times during the season, melon yield increased by 18%.**

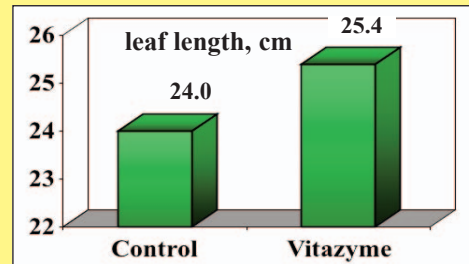
## Shoot Length



## Internode Length



## Leaf Length

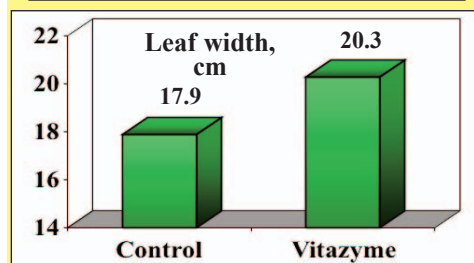




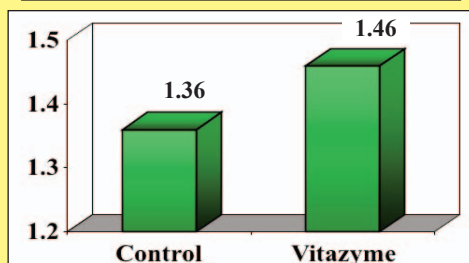
Although the shoot length was reduced with Vitazyme, the interlude length was also reduced so that leaf number was not reduced. Besides, the size of the leaves was increased with Vitazyme, with an estimated increase in leaf area of 19% (assuming a round leaf, and 344.5cm<sup>2</sup> per leaf for the control, and 409.9 cm<sup>2</sup> per leaf for the Vitazyme treatment).

#### Yield results:

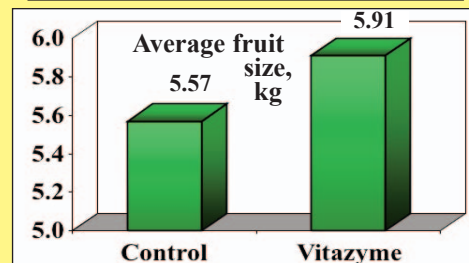
#### Leaf Width



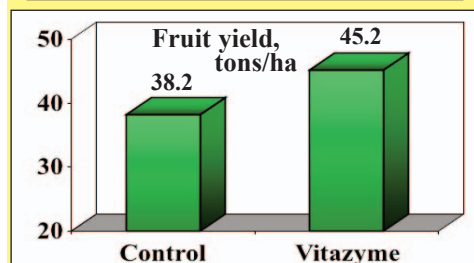
#### Fruit Per Vine



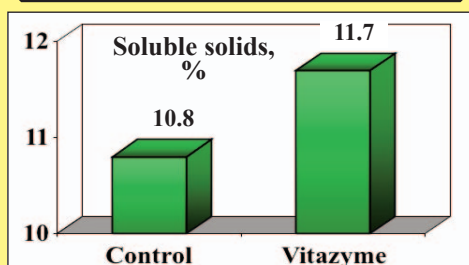
#### Fruit Size



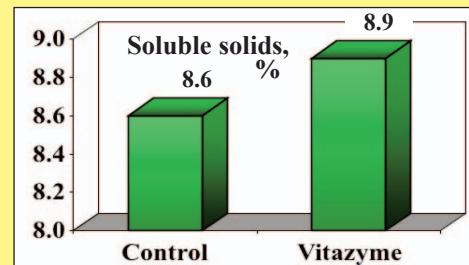
#### Fruit Yield



#### Fruit Soluble Solids - Center



#### Fruit Soluble Solids - Edge



#### Income results:

Treatment	Income	Change
	----- RMB/ha -----	
Control	38,200	—
Vitazyme	45,200	7,000 (+18%)

**Conclusions:** This Chinese study on watermelons in 2009 showed that Vitazyme substantially improved crop performance, improving the speed and uniformity of germination, plus increasing leaf size and photosynthetic area; this occurred despite shorter vines with Vitazyme, but shorter internodes meant more leaves per length of vine. More fruit per vine (7%), and a larger fruit size (6%), led to an 18% yield increase with Vitazyme. Moreover, this greater yield was more flavorful, having 8.3% more soluble solids in the center of the melons and 3.5% more solids at the melon edges. Especially important was the income increase of 18%. This program has been shown to be an excellent adjunct to watermelon cultivation in China.

- **Increase in income: 18%**
- **Decrease in shoot length: -15%**
- **Decrease in internode length: -13%**
- **Increase in leaf length: 6%**
- **Increase in leaf width: 13%**
- **Increase in fruit yield: 18%**
- **Increase in fruit per vine: 7%**
- **Increase in fruit size: 6%**
- **Increase in fruit soluble solids at fruit center: 8.3%**
- **Increase in fruit soluble solids at fruit edge: 3.5%**

## Wheat

**Researcher:** Nathan Temples

**Variety:** Pioneer 25R47

**Planting date:** October 10, 2009

**Experimental design:** An 80-acre field was divided into two 40-acre portions, one of them treated with Vitazyme and the other with the fungicide Quilt to determine the effect of each on fungal suppression and yield.

**Farm cooperator:** Seyer Farms

**Soil type:** sandy loam

**Row-spacing:** 7.5 inches

**Location:** Oran, Missouri

**Planting rate:** 2 bushels/acre

**Irrigation:** none

**Fertilization:** unknown

**1. Quilt fungicide**

**2. Vitazyme**

• **Increase in yield: 33%**

**Vitazyme application:** 20

oz/acre at the flat-leaf stage

**Quilt application:** 21 oz/acre

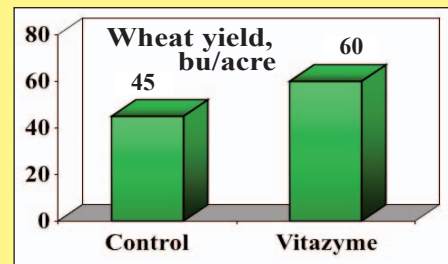
**Harvest date:** June 20, 2009

**Income results:**

Treatment	Income <sup>1</sup>	Product cost <sup>2</sup>	Net income <sup>3</sup>	Income change
	\$/acre	\$/gal    \$/acre	\$/acre	\$/acre
Quilt	225.00	150.00    24.61	200.39	—
Vitazyme	300.00	60.00    9.38	290.62	+90.23

<sup>1</sup>Based on \$5.00/bushel; <sup>2</sup>Vitazyme cost of \$60.00/gal (\$0.469/oz), and Quilt cost of \$150.00/gal (\$1.172/oz); <sup>3</sup>Net income of crop income – product cost.

#### Wheat Yield



**Conclusions:** This Missouri wheat vs. fungicide study showed that Vitazyme did a much better job of controlling

yield-limiting fungi, and boosting grain yield, than did Quilt fungicide. This income was 33% higher with Vitazyme than with the standard fungicides, and the net return was \$90.23/acre higher, or \$9.62 per dollar invested for Vitazyme.

# Wheat, spring

**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 rate:** 6 million seeds/h

**Previous crop:** winter canola

**Variety:** Pecheryanka, super elite

**Planting date:** April 13, 2009

**Tillage:** plowing, harrowing, cultivating

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha plots, replicated four times, to discover the effect of the product on spring wheat yield and quality factors. Both Vitazyme treatments received product on the seed, and one of these had Vitazyme applied to the leaves as well.

## 1. Control

## 2. Vitazyme once

## 3. Vitazyme twice

**Fertilization:** 60 kg/ha N, 30 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O.

**Vitazyme application:** Both treatments received a seed treatment at planting, at 1.0 liter/ha, on April 12, 2009. Treatment 3 received an additional 1.0 liter/ha foliar and soil application on June 4, 2009.

**Yield results:**

Treatment	Wheat yield tons/ha	Yield change tons/ha
1. Control	4.33	—
2. Vitazyme	4.76	0.43 (+10%)
3. Vitazyme, seed + leaves	4.94	0.61 (+14%)

## Crude Protein

Treatment	Protein ----- % protein -----	Change
1. Control	10.6	—
2. Vitazyme	11.1	0.5 (+5%)
3. Vitazyme, seed + leaves	11.6	1.0 (+9%)

• **Increase in crude protein: 5 to 9%**

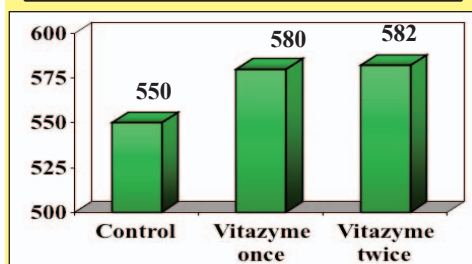
• **Increase in gluten: 8 to 11%**

• **Increase in grain weight: 1 to 3%**

• **Increase in 1,000 grain weight: 3 to 6%**

**Grain structure results:**

## Stem Density



• **Increase in stem density: 5 to 6%**

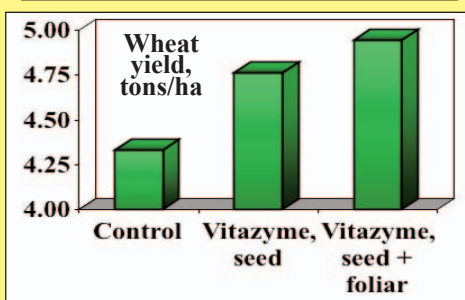


**In Vinnytsia, Ukraine, wheat treated with Vitazyme shows stronger early growth than the control treatment.**



**Young plants dug from the control treatment (right) and the Vitazyme treatment (left) show how the product benefits roots.**

## Wheat Yield



## Grain Weight Per Liter

Treatment	Weight ----- grams -----	Change
1. Control	740	—
2. Vitazyme	751	9 (+1%)
3. Vitazyme, seed + leaves	759	19 (+3%)

## Increase in wheat yield with Vitazyme

Seed treatment ..... +10%  
Seed + foliar treatment ... +14%

**Quality results:**

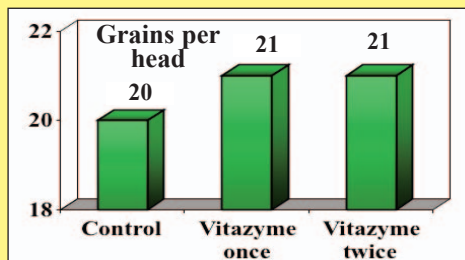
## Grain Gluten

Treatment	Gluten ----- % gluten -----	Change
1. Control	25.6	—
2. Vitazyme	27.6	2.0 (+8%)
3. Vitazyme, seed + leaves	28.3	2.7 (+11%)

## 1,000 Grain Weight

Treatment	Weight --- grams/1,000 grains ---	Change
1. Control	41.1	—
2. Vitazyme	42.3	1.2 (+3%)
3. Vitazyme, seed + leaves	43.5	2.4 (+6%)

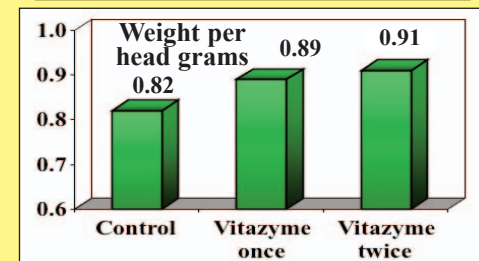
## Grain number Per Head



• **Increase in grain weight per head: 9 to 11%**

• **Increase in grains per head: 5%**

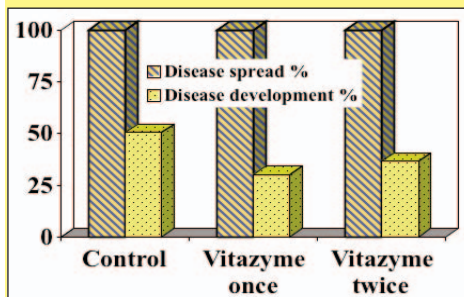
## Grain Weight Per Head



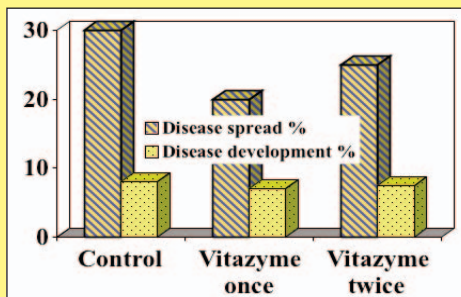


## Disease results:

### Farinaceous Mildew



### Septoria Fungus



**Conclusions:** This Ukrainian spring wheat trial proved that Vitazyme on the seeds at planting increased the yield by 10%, whereas an additional 1.0 liter/ha application added 4% more yield. Grain quality was also enhanced with Vitazyme in terms of gluten (+8 to 11%), crude protein (+5 to 9%), grain weight per liter (+1 to 3%), and 1,000 grain weight (+3 to 6%). Stem density, grain number per head, grain weight per head, and disease susceptibility were also increased with Vitazyme.

- **Income increase with Vitazyme on the seeds: 367 hrn/ha**
- **Income increase with Vitazyme, on seeds + leaves: 342 hrn/ha**

## Wheat, winter

**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

**Sowing rate:** 6 million seeds/ha

**Planting date:** September 30, 2008

**Tillage:** plowing and cultivating

**Previous crop:** spring vetch

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** A field was divided into four fertility levels, replicated four times, and each regime had either Vitazyme or no Vitazyme. Yields were evaluated in response to Vitazyme.

**Variety:** Liona, super elite



Young wheat plants dug from the Vitazyme treatment on the right display superior rooting at this early growth stage.

Treatment	Vitazyme	Nitrogen	Phosphorus	Potassium
----- kg/ha -----				
1. No Fertilizer	0	0	0	0
2. 50% fertilizer	0	65	30	45
3. 75% fertilizer	0	100	45	70
4. 100% fertilizer	0	130	60	90
5. No fert + Vita	x	0	0	0
6. 50% fert + Vita	x	65	30	45
7. 75% fert + Vita	x	100	45	70
8. 100% fert + Vita	x	130	60	90

**Fertilization:** See the amounts applied in the table above.

**Vitazyme application:** Two spring applications of Vitazyme were made at 1 liter/ha each time, on the leaves and soil.

**Yield results:**

### Increase in grain yield with fertilizer\*

No fertilizer ..... 3.53 tons/ha  
 50% fertilizer ..... 5.91 tons/ha (+67%)  
 75% fertilizer ..... 6.46 tons/ha (+83%)  
 100% fertilizer ... 6.88 tons/ha (+95%)

### Increase in grain yield with Vitazyme

With no fertilizer ..... +13%  
 With 50% fertilizer .... +12%  
 With 75% fertilizer .... +12%  
 With 100% fertilizer ..... +12%

\*Values are averaged for Vitazyme treated and untreated treatments.

**Quality results:**

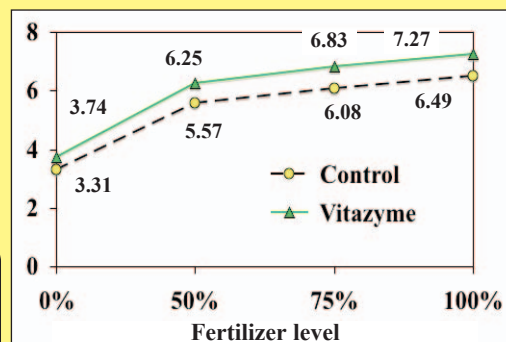
### Grain Weight

Fertilization	Control	Vitazyme	Change
----- grams/liter -----			
None	815	834	19 (+2%)
50%	826	844	18 (+2%)
75%	832	850	18 (+2%)
100%	832	852	20 (+2%)

### 1,000 Grain Weight

Fertilization	Control	Vitazyme	Change
----- grams -----			
None	44.5	46.0	1.5 (+3%)
50%	45.0	47.5	2.0 (+4%)
75%	46.0	48.0	2.0 (+4%)
100%	46.0	48.1	2.1 (+5%)

### Grain Yield, tons/ha



Treatment	Grain yield	Yield change*
----- kg/ha -----		
1. No Fertilizer	3.31	—
2. 50% fertilizer	5.57	—
3. 75% fertilizer	6.08	—
4. 100% fertilizer	6.49	—
5. No fert + Vita	3.74	0.43 (+13%)
6. 50% fert + Vita	6.25	0.68 (+12%)
7. 75% fert + Vita	6.83	0.75 (+12%)
8. 100% fert + Vita	7.27	0.78 (+12%)

\*Comparisons are made between Vitazyme treated and untreated treatments at the same fertility level. Thus, 1 and 5, 2 and 6, 3 and 7, and 4 and 8 were compared.

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## Gluten

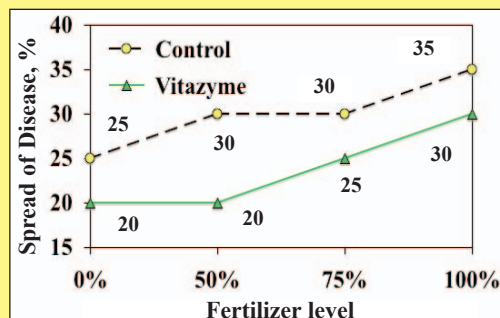
Fertilization	Control	Vitazyme	Change
	----- % gluten -----		
None	14.0	17.6	3.6 (+26%)
50%	23.6	27.6	4.0 (+17%)
75%	24.8	28.8	4.0 (+16%)
100%	27.1	30.0	2.9 (+11%)

## Crude Protein

Fertilization	Control	Vitazyme	Change
	----- % protein -----		
None	8.3	9.8	1.5 (+18%)
50%	9.9	11.4	1.5 (+15%)
75%	10.3	11.5	1.2 (+12%)
100%	11.4	12.0	0.6 (+5%)

## Disease results: Septoria disease effects

### Disease Spread



## Grain structure results:

### Stem Density

Fertilization	Control	Vitazyme	Change
	----- stems/m <sup>2</sup> -----		
None	415	455	40 (+10%)
50%	615	658	43 (+7%)
75%	644	682	38 (+6%)
100%	651	691	40 (+6%)

### Grain Number Per Head

Fertilization	Control	Vitazyme	Change
	----- grains/head -----		
None	18	19	1 (+6%)
50%	20	22	2 (+10%)
75%	22	23	1 (+5%)
100%	23	24	1 (+4%)

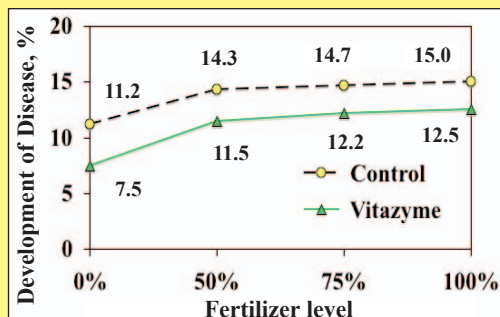
## Income results: see results below.

**Conclusions:** This winter wheat study in Ukraine, using Vitazyme at four fertility levels with and without Vitazyme, revealed that this product gave a remarkable yield increase of 12 to 13% above the untreated control for each treatment comparison. This yield increase with Vitazyme was similar to the increase in yield with fertilizer: 12 to 13% increase at each fertility increment. Quality analyses revealed that grain weight, 1,000 grain weight, gluten, and crude protein all increased with Vitazyme, and disease incidence and spread were reduced as well. Stem density, grain number per load, and weight per head were all improved with Vitazyme, as was income: by 120 hrn/ha (no fertilizer) to 507 hrn/ha (100% fertilizer). These data clearly show that Vitazyme works together with fertilizer elements to improve wheat yield in a significant way, and this program is highly effective for improving the productivity and income of wheat growers in Ukraine.

### Grain Weight Per Head

Fertilization	Control	Vitazyme	Change
	----- grams/head -----		
None	0.80	0.87	0.07 (+9%)
50%	0.91	1.04	0.13(+14%)
75%	1.00	1.10	0.10 (+10%)
100%	1.06	1.15	0.09 (+18%)

### Disease Development



- **Income increase at 0% fertilizer with Vitazyme: 120 hrn/ha**
- **Income increase at 50% fertilizer with Vitazyme: 410 hrn/ha**
- **Income increase at 75% fertilizer with Vitazyme: 477 hrn/ha**
- **Income increase at 100% fertilizer with Vitazyme: 507 hrn/ha**

# Wheat, winter

**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 rate:** 6 million seeds/ha

**Tillage:** plowing and cultivation

**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 phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Experimental design:** A uniform field was divided into Vitazyme treated and untreated plots of 1.0 plots, replicated four times, to discover the effect of the product on winter wheat yield.

### 1. Control

**Fertilization:** 60 kg/ha N

**Vitazyme application:** The Vitazyme treatment received a foliar/soil application at 1.0 liter/ha on April 30, 2009, and a second application on May 15, 2009.

**Yield results:**

Treatment	Wheat yield	Yield change
	tons/ha	tons/ha
1. Control	4.9	—
2. Vitazyme	5.8	0.9 (+18%)

- **Increase in 1,000 kernel weight: 5%**

### 2. Vitazyme twice

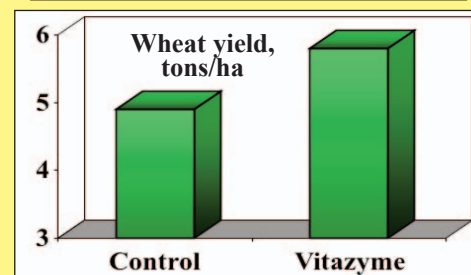
- **Increase in wheat yield: 18%**
- **Increase in gluten: 21%**
- **Increase in liter weight: 2.4%**

**Variety:** Bilosnizhka, super elite

**Planting date:** September 3, 2008

**Previous crop:** winter canola

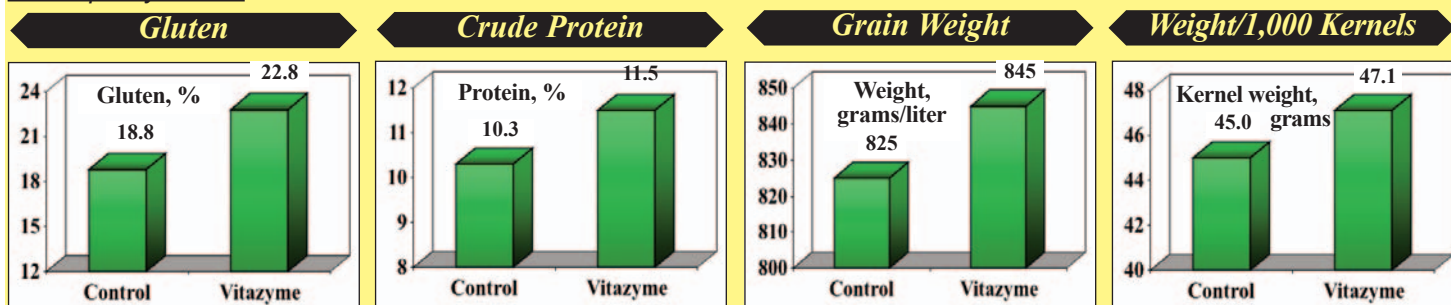
### Wheat Yield



- **Increase in crude protein: 12%**



### Grain quality results:



### Income results:

• **Income increase with Vitazyme: 473 hrn/ha**

**Conclusions:** This winter wheat trial at Vinnytsia, Ukraine, revealed that two spring applications of Vitazyme, at 1 liter/ha each time, gave a large yield increase of 18%. The grain was improved in gluten (+21%), protein (+12%), liter weight (+2.4%), and weight per 1,000 kernels (+5%), and the crop income was improved by 473 hrn/ha. Such large yield, quality, and income increases with two simple product application show that this program is a very good production practice for Ukrainian farmers.

## Wheat, winter

**Researcher:** unknown

**Organization:** Ukerzernoprom

**Location:** Berdichiv Raion, Zhitomerski Oblast, Ukraine (central forest-steppe are

**Variety:** Olecia

**Tillage:** tilled to 4-5cm

**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/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

**Planting date:** September 7, 2008

**Experimental design:** This winter wheat trial was established to evaluate the effect of Vitazyme, as a seed or foliar treatment, to enhance grain yield.

1. Control 2. Vitazyme on seeds 3. Vitazyme on leaves and soil

**Fertilization:** none

**Vitazyme treatment:** Treatment 2: 1.0 liter/ha at planting (September 7) with the seeds; Treatment 3: 1.0 liter/ha sprayed on the leaves and soil on October 22, 2008.



Early spring growth of these winter wheat samples show a decided advantage for Vitazyme treatment, and 14% more yield.

Treatment	Wheat yield tons/ha	Yield change tons/ha
1. Control	2.8	—
2. Vitazyme, on seeds	3.1	0.3 (+11%)
3. Vitazyme, on leaves (fall)	3.2	0.4 (+14%)

### Yield results:

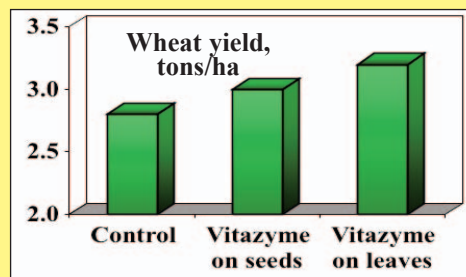
**Conclusions:** This Ukraine winter wheat demonstration trial, using Vitazyme without fertilizer additions on the seeds only, or the leaves and soil only,

revealed that the seed treatment produced an excellent 11% yield increase. A fall foliar/soil application alone increased the grain yield even more: 14%. Use of Vitazyme on either the seeds, or applied to the foliage, is shown to be an excellent practice in Ukraine.

### Increase in wheat yield with Vitazyme

Fall, on seeds ..... +11%  
Fall, on leaves and soil ... +14%

### Grain Yield



## Wheat, winter

**Researcher:** unknown

**Organization:** Ukerzernoprom

**Location:** Berdichiv area, Ukraine

**Variety:** Olesa

**Soil type:** unknown

**Planting date:** September 7, 2008

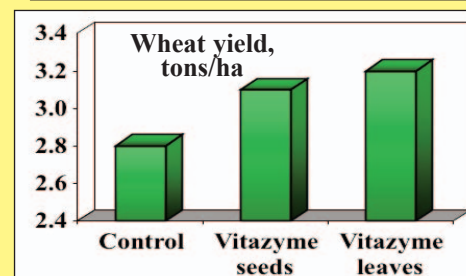
**Experimental design:** A wheat field was divided into Vitazyme treated and untreated areas, with the purpose of evaluating the effect of this product on grain yield.

1. Control  
2. Vitazyme on seeds  
3. Vitazyme on leaves

**Fertilization:** unknown

**Vitazyme application:** (1) Seeds treated with Vitazyme at 1 liter/ton of seed, on September 7, 2008, for Treatment 2; (2) leaves sprayed with Vitazyme at 1 liter/ha

### Grain Yield



Continued on the next page



on October 22, 2008, when the plants were a few inches tall.

Yield results:

Treatment	Wheat yield	Yield change
	tons/ha	tons/ha
1. Control	2.8	—
2. Vitazyme, on seeds	3.1	0.3 (+11%)
3. Vitazyme, on leaves (fall)	3.2	0.4 (+14%)

Conclusions: This Ukraine winter wheat study revealed that Vitazyme, applied to the seeds at 1 liter/ton of seeds, increased grain yield by 11%. A foliar application in the fall increased yield by 14%. These results prove the great utility of this product to improve wheat yields in Ukraine.



*This beautiful stand of wheat is in response to Vitazyme applied to the seeds at planting, and again to the leaves and soil in the fall.*

- **Increase in wheat yield with Vitazyme: 11 to 14%**



**Left:** New plantings were more vigorous, having greater girth after just one season compared to the untreated trees in the foreground.

**Replicated trials in western Michigan revealed how Vitazyme can help give apple growers greater success!**



**Above:** Honeycrisp apples, which are difficult to grow, responded excellently to Vitazyme with greater new shoot growth and more fruit (see on the left). The Vitazyme treated trees also had more chlorophyll than did leaves from untreated trees.



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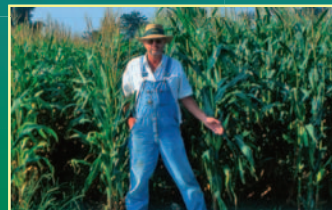


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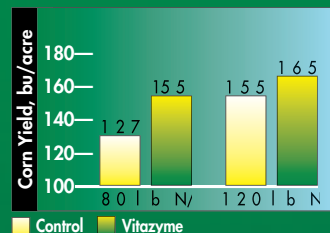
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