

# Potatoes with Vitazyme application

**Researcher:** Robert Kürzinger

**Research organization:** Agro Nord-Kürzinger GbR Testing Center for Potato Research — field trials, plant protection, and phytodiagnostics, Groß Lüsewitz, Mecklenburg-Western Pomerania, Germany

**Research cooperators:** Casper Meiners, Ag Bio Tech

**Location:** Sanitz (Agro Nord test area), Mecklenburg-Western Pomerania, Germany

**Variety:** Goldmarie **Planting date:** May 29, 2024 **Row spacing:** 75 cm **In-row spacing:** 28 cm

**Previous crop:** rapeseed **Soil type:** IS/35

**Soil analysis:** pH = 5.6, humus = 2.2%,  $\text{NO}_3\text{-N}$  = 27 kg/ha,  $\text{NH}_4\text{-N}$  = 2 kg/ha, S = 29 kg/ha, P = 4.4 mg/100g, K = 7.5 mg/100 g, Mg = 6.5 mg/100 g, B = 0.2 ppm, Cu = 7.6 ppm, Mn = 14.0 ppm, Zn = 1.4 ppm, Fe = 139 ppm

**Experimental design:** A small-plot potato trial was established in northeastern Germany to evaluate the effects of Vitazyme biostimulant on the growth, quality, and yield of potatoes. Plots were randomly arranged with four replications; they were four rows wide ( $7 \times 3 \text{ m} = 21 \text{ m}^2$ ).

## ① Control ② Vitazyme

**Fertilization:** 13-5-17%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$  fertilizer at 0.8 ton/ha, and a second application at 0.113 ton/ha

**Vitazyme applications:** (1) Seed piece treatment at planting of a dip in a 5% Vitazyme solution; (2) 1 liter/ha sprayed on the leaves and soil at tuber formation on June 21; (3) same as (2) on June 28; (4) 1 liter/ha sprayed on the leaves before harvest on September 27. Total application volume: 3 liters/ha + seed treatment.

**Herbicide applications:** Sencor Liquid, and Cato-Komp two times

**Fungicide applications:** Infinito, Zovec Endavia, Ranman Top, Revus Top, and Canal Flex

**Insecticide treatments:** Bay of Biscay, Coragen, and Teppeki

**Growing season weather:** normal

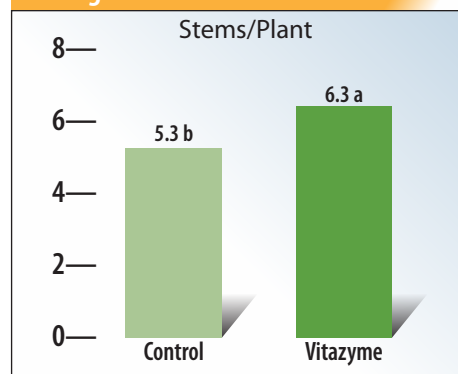
**Plant emergence results:** All plants emerged.

**Stem number results:** Forty plants for each treatment (10 plants per plot) were evaluated for stem number, and averaged for both treatments.

*Increase in stem number per plant  
with Vitazyme: 19%*

There were significantly more stems for the Vitazyme treated potato plants than for the control plants.

Average Stems Per Plant<sup>1</sup>



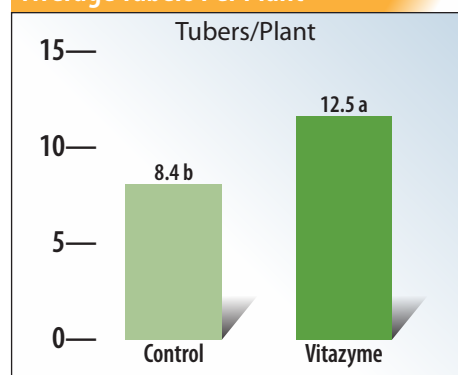
<sup>1</sup>Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

**Tuber number results:** Forty plants for each treatment (10 plants per plot) were evaluated for tuber number, and averaged for both treatments.

*Increase in tubers per plant  
with Vitazyme: 49%*

There were nearly 50% more tubers per plant with Vitazyme treatment compared to the control treatment.

Average Tubers Per Plant<sup>1</sup>



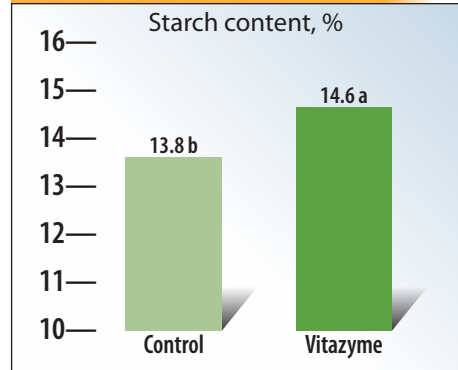
<sup>1</sup>Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

**Starch content results:** Forty plants for each treatment (10 plants per plot) were measured for starch content in a laboratory, and averaged for both treatments.

*Increase in tuber starch content with Vitazyme: 0.8 percentage point*

The tuber starch content was significantly increased with Vitazyme application, increasing by not quite a whole percentage point.

#### Average Tuber Starch Content<sup>1</sup>



<sup>1</sup>Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

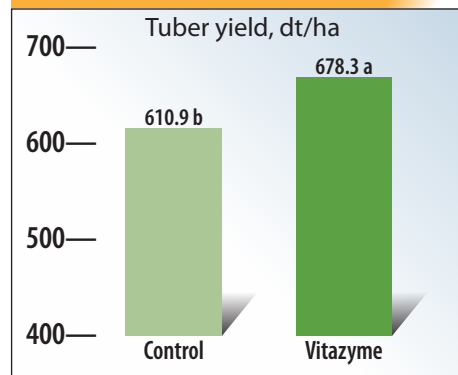
#### Potato tuber yield results:

Treatment	Tuber yield <sup>1</sup> dt/ha	Yield change dt/ha
1. Control	610.9 b	—
2. Vitazyme	678.3 a	67.4 (+11%)

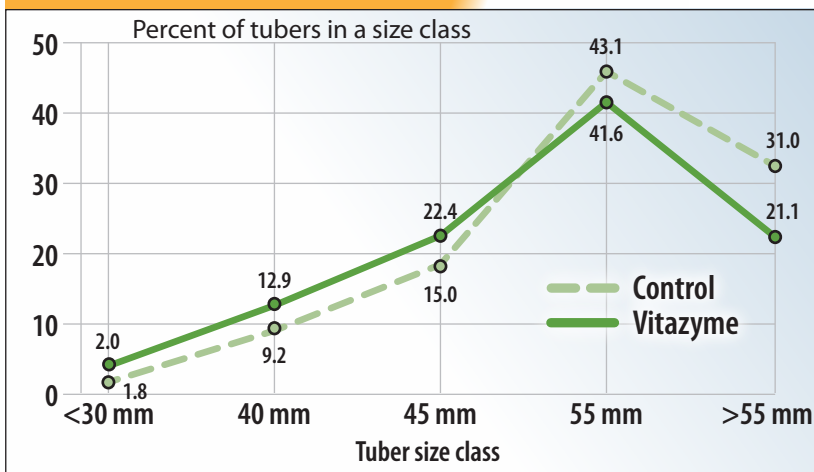
<sup>1</sup>Means followed by the same letter are not significantly different at P = 0.05 (ANOVA).

*Increase in potato tuber yield with Vitazyme: 11%*

#### Tuber Yield



#### Tuber Size



The Vitazyme treatment substantially increased tuber yield (11%), while producing more uniform tubers in the preferred 40-55 mm classes.

**Conclusions:** This small-plot potato trial in Germany, using a seed treatment and three soil and foliar applications of Vitazyme at 1 liter/ha, showed that Vitazyme significantly increased stem number (19%), tuber number (49%), starch content (0.8 percentage-point), and total yield (11%), while producing more uniform tuber sizes compared to the control treatment. These results indicate the great efficacy of Vitazyme as an adjunct to potato growing programs.



# Potatoes with Vitazyme Bio (Organic Vitazyme) application



**Researchers:** Vadim V. Plotnikov

**Research organization:** Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York

**Location:** National Academy of Agrarian Sciences of Ukraine, Podilla Institute of Fodder and Agriculture, Vinnytsia District, Vinnytsia Region, Bohonyky Village, Ukraine; central Ukraine (440-590 mm of rain per year)

**Variety:** Shchedryk Elite **Planting date:** May 22, 2022 **Planting rate:** 55,000 tubers/ha

**Previous crop:** winter wheat

**Tillage:** disking to 6-8 cm, plowing to 23-25 cm, harrowing, pre-plant cultivation to 10-12 cm

**Soil type:** gray podzolic (2.2% organic matter)

**Experimental design:** A potato field was divided into a Vitazyme Bio treated portion, while the remainder of the field was left untreated. The purpose of the trial was to evaluate the effect of Vitazyme Bio on potato tuber yield.

## ① Control ② Vitazyme Bio

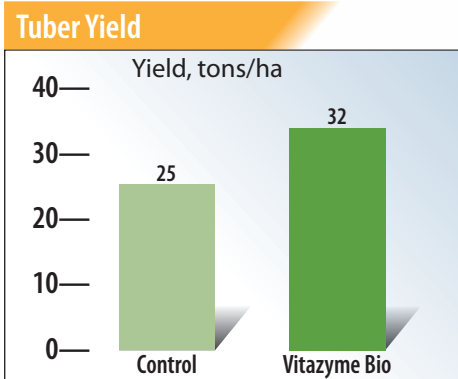
**Fertilization:** 100-50-50 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O broadcast and incorporated by cultivation before planting

**Vitazyme Bio application:** 1 liter/ha sprayed foliar at BBCH 59 (budding) on July 6, 1.0 liter/ha sprayed foliar at BBCH 69 (flowering) on July 21

## Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	25	—
2. Vitazyme Bio	32	7 (+28%)

*Yield increase  
with Vitazyme Bio: 28%*



**Income results:** The 7 tons/ha yield increase netted a substantial income increase of \$1,292/ha.



At harvest, the Vitazyme Bio treated potatoes yielded 28% more than the untreated control.



At midseason at the National Academy of Agrarian Sciences, these Vitazyme Bio treated potatoes are making good progress.

**Conclusions:** A potato split-field trial at the National Academy of Agrarian Sciences of Ukraine utilized two 1.0 liter/ha Vitazyme Bio applications spaced 15 days apart, at budding and flowering. These two foliar applications resulted in an excellent 7 ton/ha yield increase (28%), which netted the grower an additional \$1,292/ha. These results reveal the great value of Vitazyme Bio to complement potato growers' management activities in Ukraine.



# Potatoes with Vitazyme application

**Researcher:** Jon Gilley **Research organization:** R.D. Offutt Corporation, Fargo, North Dakota

**Location:** Atkinson, Nebraska **Variety:** Umatilla **Planting date:** May 21, 2021 **Plant spacing:** 8 to 10 inches

**Experimental design:** A seed potato field was divided into control and Vitazyme treated strips, with Vitazyme applied as a seed piece treatment. Vitazyme treated beds were alternated with untreated beds. The purpose of the trial was to evaluate the effect of the Vitazyme seed treatment on plant growth and yield parameters.

## ① Control ② Vitazyme on the seed pieces

**Fertilization:** Six fertilization operations were made: (1) April 12: 11-52-0 (map) % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O at 2.88 lb/acre;

(2) May 24: 28-0-0 % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O liquid at 13 gal/acre; (3) June 14: 32-0-0 % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O liquid at 5.6 gal/acre;

(4) June 22: 15.5-0-0-19% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-Zn granule Tropicote at 200 lb/acre; (5) July 12: 32-0-0 % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O liquid at 7.5 gal/acre;

(6) July 19: 32-0-0 % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O liquid at 5 gal/acre

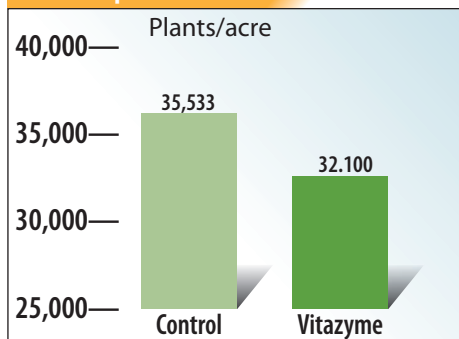
**Vitazyme application:** 13 oz/acre (1 liter/ha) in-furrow at planting

**Growing season weather:** hot and dry, with a serious hailstorm on June 22, which struck just as 50% leaf cover had been reached

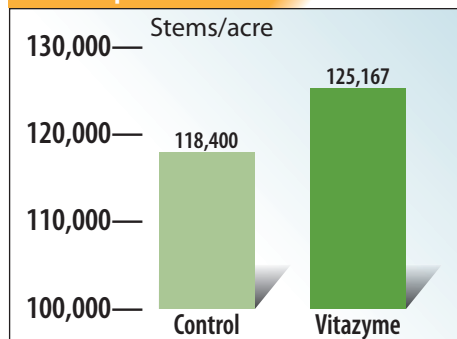
**Sampling date:** September 1, 2021. Ten feet of row were sampled from the center row of six beds, which were alternating control and Vitazyme treated beds.

**Sample results:** The three 10-foot samples for each treatment were averaged and the data is displayed in the graphs.

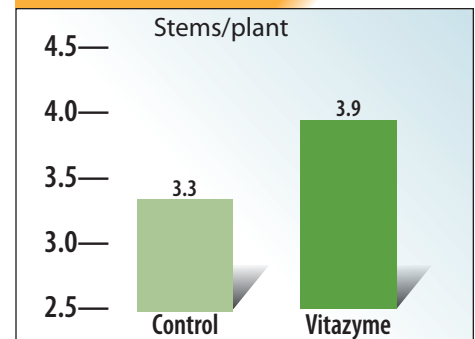
### Plant Population



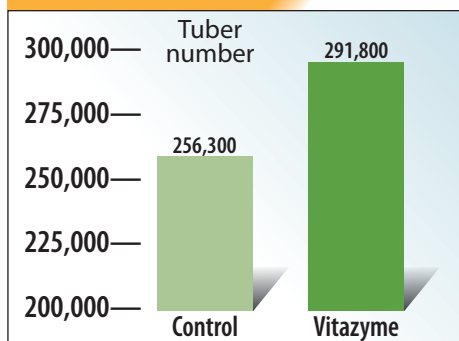
### Stem Population



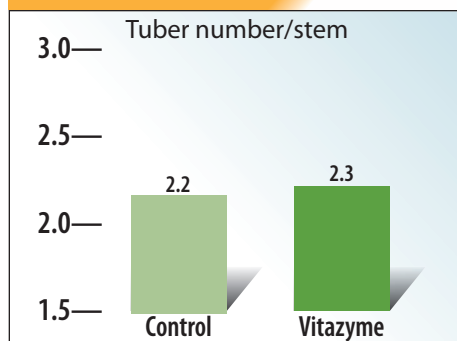
### Stems Per Plant



### Tuber Number



### Tubers Per Stem

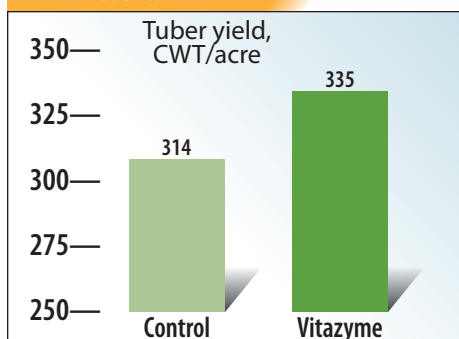


### Increase with Vitazyme

Stem population ..... +6%  
 Stems per plant ..... +18%  
 Tuber number ..... +14%  
 Tubers per stem ..... +5%

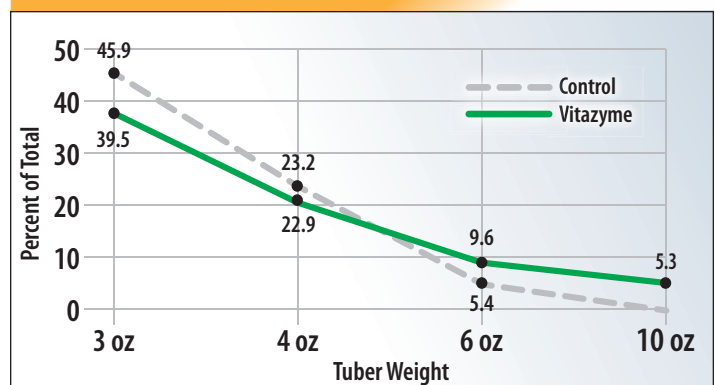
These improvements in plant parameters with Vitazyme occurred despite a 10% lower plant population.

### Yield Results



Increase  
in tuber yield  
with Vitazyme:  
7%

### Tuber Size Distribution



**Conclusions:** A seed potato trial near Atkinson, Nebraska, using Vitazyme as an in-furrow treatment in alternating beds at 13 oz/acre (1 liter/ha), caused several favorable growth responses: 6% more stems, 18% more stems/plant, 14% more total tubers, and 5% more tubers/stem. The yield was enhanced by 7% with Vitazyme, while the tuber size distribution favored larger tubers (6 oz and 10 oz.) with Vitazyme, while the control produced more small tuber (3 and 4 oz). Results were hampered by a hailstorm at 50% leaf cover, but even so Vitazyme is shown to be an excellent tool for raising seed potatoes in Nebraska.



# Potatoes with Vitazyme application

**Researcher:** V.V. Plotnikov

**Research organization:** Agro Expert International, Kaharlyk, Ukraine, and Plant Designs International, Rochester, New York

**Locations:** Continental Farmers Group, Lviv District, Lviv Region, Stariy Yarychiv Village, Ukraine;  
western Ukraine (555-750 mm of rain per year)

**Variety:** Lady Claire, F1 (chipping variety) **Planting date:** May 4, 2021 **Planting rate:** 48,000 tubers/ha

**Previous crop:** winter wheat

**Tillage:** disking to 6-8 cm, plowing to 32-35 cm, pre-plant harrowing to 10-12 cm

**Soil type:** gray-brown podzolic (2.7% organic matter)

**Experimental design:** A potato field was divided into a Vitazyme treated portion, with an untreated portion left as a control, to evaluate the effect of this product on tuber yield for various size grades.

## ① Control ② Vitazyme

**Fertilization:** 220 kg/ha of K<sub>2</sub>O broadcast before fall plowing;  
144-144 kg/ha N-P<sub>2</sub>O<sub>5</sub> in the spring before pre-plant harrowing; 36 kg/ha of N as a summer top-dress

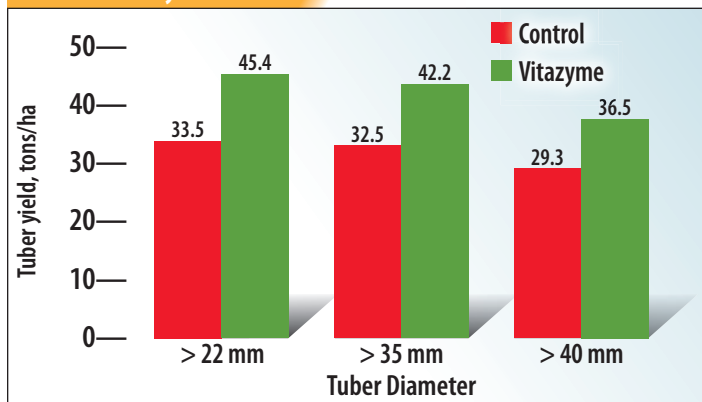
**Vitazyme application:** (1) seed piece treatments to give 1 liter/ha, on May 4; (2) 1 liter/ha as a foliar spray at early blossom on June 17 (BBCH 60-61)

**Yield results:** The tubers were sorted according to size class and weighed.



*Vitazyme applied to the seed pieces at planting, and foliar at early bloom, greatly improved tuber formation, which produced larger and more uniform tubers, increasing yield and income.*

## Tuber Yield by Size Class



## Increase in Size Classes with Vitazyme

> 22 mm .....	36%
> 35 mm .....	30%
> 40 mm .....	25%

**Income results:** For the largest diameter tubers (> 40 mm), the net return to the farmer was increased by \$1,300/ha.

**Conclusions:** A potato study in Ukraine, using Vitazyme on the tubers at planting and foliar at early bloom, revealed that, compared to the untreated control, the treated plants produced greater weights in all three size categories measured. Adding the weight of all tubers >22 mm, Vitazyme increased the weight by 36%; for >35 mm the increase was 30%, and for >40mm it was 25%. For the >40 mm tubers alone the extra yield added \$1,300/ha to the farmer's income.

# Potatoes with Vitazyme application [ Vitazyme is called Globaplant in Colombia.]



**Researcher:** Luis Esneider Acosta and Yeison Torres

**Research organization:** Agroglobal S.A., Bogota, Colombia

**Farmer:** Nicolas Sierra

**Location:** Samaca, Boyaca, Vereda Centro, Colombia

**Variety:** R12

**Planting date:** December 22, 2017

**Experimental design:** A potato trial was initiated on 1.0 hectare of a potato field, where Vitazyme was applied to compare its effects with adjoining untreated control areas.

## ① Control ② Vitazyme

**Fertilization:** 15-15-15 % N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O + boron +zinc applied in-furrow at planting

**Vitazyme applications:** (1) 1 liter/ha, plus an insecticide and Proggib applied in-furrow at planting; (2) 1 liter/ha sprayed on the leaves and soil 38 days after planting; (3) 1 liter/ha sprayed on the leaves and soil 88 days after planting

**Applications at 38 days after planting:** Minerva 50 WP fungicide, Peg-p fertilizer, Magestic insecticide, clorpiryfos insecticide, and Yuma fungicide

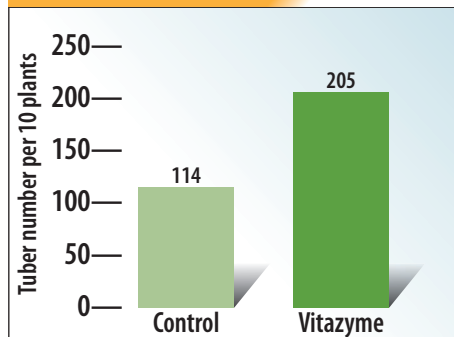
**Applications at 88 days after planting:** Dkp 500, Strike, Carrier, CaMg Nitrons, Green Mix, Irriplant CaMgK, Orthocide, Forum, Diligent, and Chlorpyricol

**Growth and yield results at 143 days after planting:** This sampling was performed 30 days before harvest, due to excessive rains. Ten plants from the treated and control areas were harvested for evaluations.



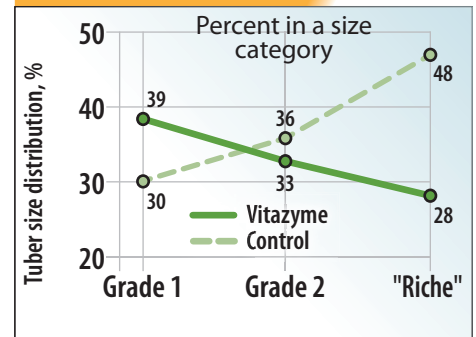
The effect of Vitazyme (Globaplant) to improve not only tuber numbers, but also uniformity of tubers and total yield, is clearly seen in this Colombia study.

### Tuber Number



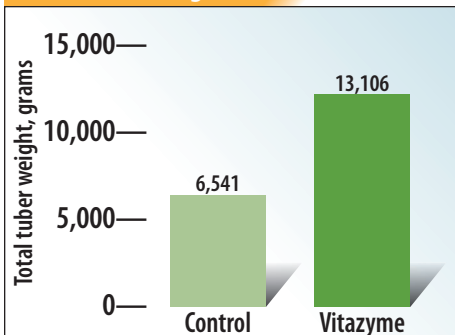
**Increase in tuber number with Vitazyme: 80%**

### Tuber Size Distribution



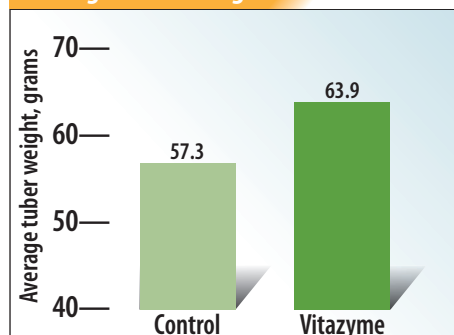
The Vitazyme treated plants had many larger tubers and many fewer small tubers.

### Total Tuber Weight



**Increase in total tuber weight with Vitazyme: 100%**

### Average Tuber Weight



**Increase in average tuber weight with Vitazyme: 12%**

**Conclusion:** A potato field trial in Colombia, using three 1 liter/ha Vitazyme (Globaplant) applications from planting to 88 days after planting, produced excellent results in terms of tubers per plant (+58%), total tuber weight (+100%), and average tuber weight (+12%). The size distribution for Vitazyme was skewed towards the larger sizes versus the untreated control. These results display the great efficacy of Vitazyme (Globaplant) for use with potato production in Colombia.

# Potatoes with Vitazyme application [ Vitazyme is called Globaplant in Colombia.]



**Researcher:** Diana Urrea Ramirez

**Research organization:** Agroglobal S.A., Bogota, Colombia

**Location:** Andes Mountains

**Variety:** unknown

**Planting rate:** unknown

**Planting date:** unknown

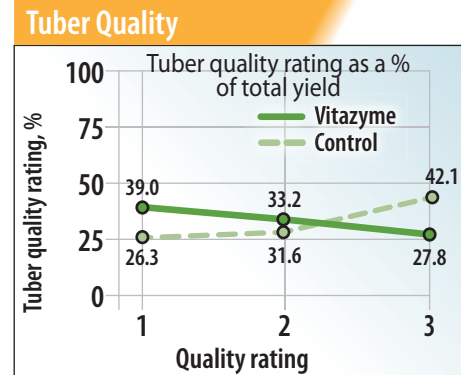
**Experimental design:** A potato field received Vitazyme on one portion, while the remainder of the field was left untreated. Yield and plant quality effects of the product were evaluated.

## ① Control ② Vitazyme

**Fertilization:** unknown

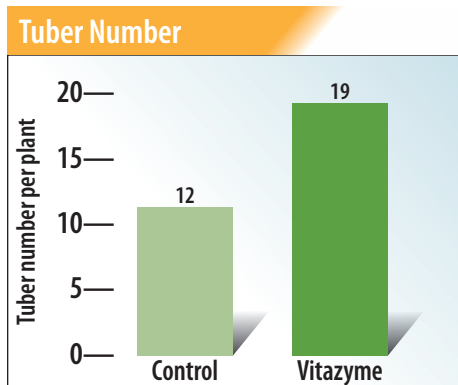
**Vitazyme applications:** (1) 1 liter/ha banded in-furrow at planting; (2) 1 liter/ha sprayed foliar along with a fungicide

**Tuber quality results:** The tubers for representative plants were classified into 3 categories, and calculated as a percentage of the total.

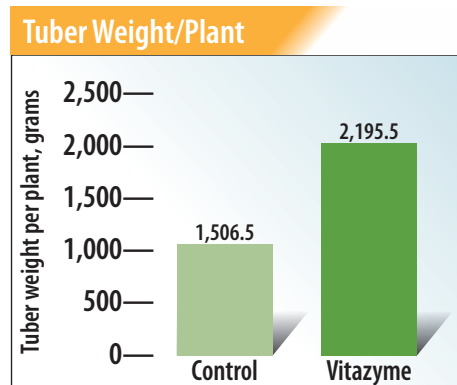


Vitazyme produced a much higher quality of tuber, on average, than the untreated control plants, the number 1 plants being 12.7% higher, with far fewer number 3 tubers as well.

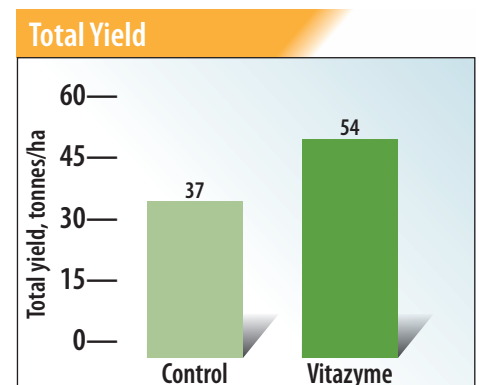
## Tuber yield results:



**Increase in tubers/plant with Vitazyme: 58%**



**Increase in tuber weight/plant with Vitazyme: 46%**



**Increase in yield with Vitazyme: 46%**

**Conclusion:** This potato trial with Vitazyme [Globaplant] in Colombia produced an excellent response from an in-furrow application, plus a foliar spray, both at 1 liter/ha. Compared to the untreated control, Vitazyme caused a 58% increase in

tuber number and a 46% increase in tuber weight per plant and yield. This program is shown to be an excellent addition to the agronomic practices of potato growers in Colombia.



# Potatoes with Vitazyme application [ Vitazyme is called Globaplant in Colombia.]



**Researcher:** Luis Esneider Acosta and Yeison Torres

**Research organization:** Agroglobal S.A., Bogota, Colombia

**Location:** Samaca, Boyaca, Colombia **Variety:** R1

**Experimental design:** A potato field was selected for a Vitazyme (Globaplant) trial, 1.0 hectare of which was treated with the Vitazyme program to compare with the untreated control. The purpose of the trial was to determine the effect of this product on potato growth and yield.

**Fertilization:** unknown

## ① Control ② Vitazyme

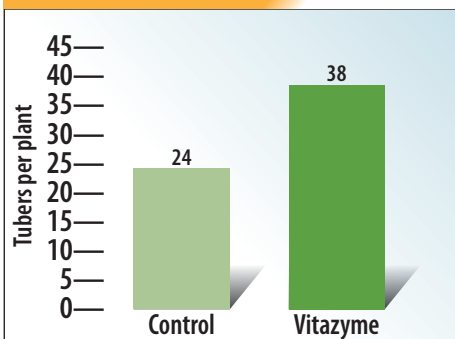
**Vitazyme applications:** (1) 1 liter/ha of Vitazyme (Globaplant) sprayed on the leaves and soil at an unspecified time, mixed with Progibb (a gibberellin growth regular) and an insecticide; (2) 1 liter/ha of Vitazyme (Globaplant) sprayed on the leaves and soil 71 days after the first application.

**Yield results 133 days after planting:** Two plants per treatment were evaluated.



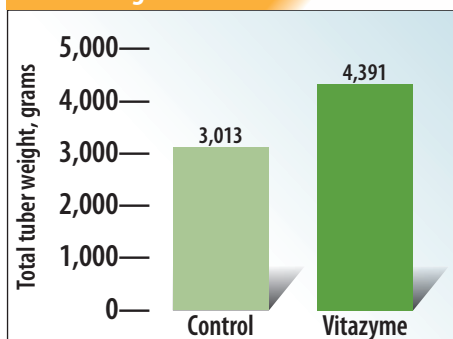
The effects of Vitazyme (Globaplant) on potato growth is obvious in this photo, showing greater top and root mass, more leaf chlorophyll, greater tuber number and size, and thus greater yield potential.

### Tubers Per Plant



*Increase in tuber number with Vitazyme: 58%*

### Tuber Weight Per Plant



*Increase in tuber weight with Vitazyme: 46%*

**Conclusion:** A potato trial in Colombia, using two Vitazyme (Globaplant) applications, revealed that the tuber number per plant was increased by 58% and the tuber weight per plant by 46% with Vitazyme. This program is an excellent one for potato growers in Colombia.

# Potatoes with Vitazyme application

**Researcher:** V.V. Plotnikov

**Research organization:** Plant Designs, Inc, Rochester, New York, and Agro Expert International, Kaharlyk, Ukraine

**Location:** Illintsi District, Vinnytsia Region, Slobodyshche Village, Gontareve Farm, Ukraine

**Variety:** Roko, first generation

**Planting date:** May 9, 2018

**Previous crop:** winter wheat

**Soil type:** typical chernozem (humus = 4.5%)

**Planting rate:** 42,000 tubers/ha

**Field preparation:** disking to 6-8 cm, plowing to 20-22 cm, cultivation to 10-12 cm

**Experimental design:** A potato field was divided into Vitazyme treated and untreated portions to evaluate the effectiveness of this program to increase tuber yield and income.

## ① Control ② Vitazyme

**Fertilization:** in the autumn of 2017, 60 tonnes/ha of manure, and 300-150-360 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O

**Vitazyme application:** (1) 1 liter/ha sprayed on the leaves and soil at 15 to 20 cm plant height on June 14; (2) 1 liter/ha sprayed on the plants at early bloom on June 25

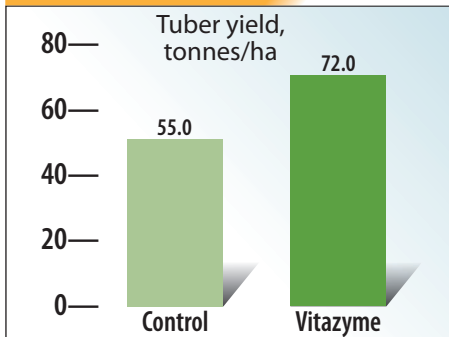
### Yield results:

Treatment	Tuber yield tonnes/ha	Yield change tonnes/ha
Control	55.0	—
Vitazyme	72.0	17.0 (+31%)



*Vitazyme applied to potatoes enhances chlorophyll development, thus fixing more carbon dioxide and sunlight energy for greater tuber production.*

### Tuber Yield



*Tuber yield increase with Vitazyme: 31%*

**Income results:** The tuber yield increase of 17 tonnes/ha provided \$2,006/ha more income

**Conclusions:** This Ukrainian potato study, which utilized two 1 liter/ha foliar/soil applications, at 15 to 20 cm height and at early bloom, caused a remarkable yield increase of 31%, leading to \$2,006/ha more income. This program is thus shown to be highly effective for potato growers in Ukraine.



# Potatoes with Vitazyme application

**Researcher:** W. H. "Butch" Palmer

**Palmer Research organization:** Reality Research, Williamson, New York

**Location:** Williamson, New York

**Variety:** Atlantic

**Planting date:** June 24, 2017

**Tillage:** Conventional

**Row spacing:** 3 feet

**In-row spacing:** 8 inches

**Plant population:** 21,780 plants/acre

**Experimental design:** A randomized complete block design with six replications was selected for a potato trial, using plots that were 12 x 100 feet. Five treatments were used, including Vitazyme and WakeUp Summer, alone and in combination, to evaluate the effects of these treatments on tuber yield, plant growth, and tuber quality.

**Fertilization:** See the table to the right.

**Vitazyme application:** See the table to the right.

**WakeUp Summer application:** See the table to the right. WakeUp Summer is a vegetable-based adjuvant.

**Yield, quality, and growth results:** Harvest occurred on August 27, 2017. In all cases, means followed by the same letter are not significantly different at P=0.10.

Treatment	Fertilizer <sup>1</sup>	Vitazyme <sup>2</sup>	WakeUp Summer <sup>3</sup>
1. Control	0	0	0
2. Vitazyme + Fert	x	x	0
3. WakeUp + Fert	x	0	x
4. Vita + WakeUp+ Fert	x	x	x
5. Fertilizer only	x	0	0

<sup>1</sup>1,000 lb/acre of a 15-15-15 dry fertilizer to give 150-150-150 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O; applied June 29.  
<sup>2</sup>(1) 13 oz/acre (1 liter/ha) in-furrow at planting on June 24; (2) 13 oz/acre (1 liter/ha) sprayed on the leaves and soil at tuber initiation (July 28); (3) 13 oz/acre (1 liter/ha) sprayed on the leaves at tuber bulking (August 28).  
<sup>3</sup>(1) 4 oz/acre (0.3 liter/ha) in-furrow at planting on June 24; (2) 4 oz/acre (0.3 liter/ha) sprayed on the leaves and soil at tuber initiation (July 28); (3) 4 oz/acre (0.3 liter/ha) sprayed on the leaves at tuber bulking (August 28).

Treatment	Emerged plants, 7-11	Plant height, 8-3	Leaf chlorophyll, 8-4	Leaf length, 8-4	Leaf width, 8-4	Plant height, 8-29	Plant width, 8-29	Plant width, 8-3
	%	in	value	cm	cm	in	in	in
1. Control	24.2 d	19.0 d	39.3 c	—	—	15.7 b	15.5 d	26.0 cd
2. Vitazyme	84.2 ab	24.8 a	46.2 a	6.5 a	4.2 ab	19.5 a	43.0 b	31.2 bc
3. WakeUp	90.0 a	24.0 ab	42.6 b	6.2 b	4.0 b	21.2 a	40.8 b	27.0 cd
4. Vitazyme + WakeUp	70.8 b	21.0 c	46.6 a	6.5 ab	4.3 a	22.0 a	50.2 a	24.3 d
5. Fertilizer only	53.3 c	23.0 b	—	—	—	22.1 a	25.7 c	45.8 a

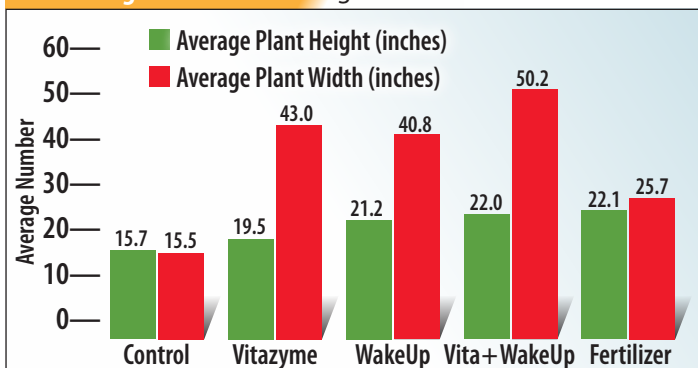
Treatment	Tubers per plants, 8-3	Total tuber weight, 8-3	Average tuber weight, 8-3	Tubers per plant, 8-29	Total tuber weight, 8-29	Average tuber weight, 8-29	Root weight fresh, 8-3
		g	g		g	g	g
1. Control	5.2 b	50.5 c	10.8 a	8.0 a	190.5 c	25.2 d	108 a
2. Vitazyme	9.3 ab	104.7 ab	13.4 a	10.3 a	772.6 ab	78.3 bc	222 a
3. WakeUp	10.5 a	101.5 abc	11.1 a	9.8 a	577.6 b	64.2 c	176 a
4. Vitazyme + WakeUp	8.5 ab	58.0 bc	10.0 a	9.7 a	715.2 ab	79.6 abc	180 a
5. Fertilizer only	7.2 ab	114.7 a	16.5 a	10.0 a	943.5 a	97.4 ab	248 a

Treatment	Foliage wt. fresh, 8-3	Root wt. fresh, 8-29	Total wt. sellable Chfs	Dry matter in roots, 9-5	Foliage wt. fresh, 8-29	Total wt. sellable, As	Dry matter in foliage, 8-14	Total wt. sellable, Bs
	kg	g	cwt/acre	%	kg	cwt/acre	%	cwt/acre
1. Control	0.46 a	80 a	0 c	23.8 a	0.6 a	89.83 b	64.9 a	40.08 cd
2. Vitazyme	3.21 a	222 a	4.60 c	25.7 a	3.2 a	376.95 a	73.8 a	64.25 a
3. WakeUp	2.21 a	176 a	12.25 c	24.4 a	2.2 a	384.62 a	63.8 a	59.23 ab
4. Vitazyme + WakeUp	4.68 a	180 a	58.77 bc	25.0 a	4.7 a	431.45 a	81.2 a	39.37 cd
5. Fertilizer only	3.48 a	280 a	125.95 a	23.0 a	5.8 a	435.90 a	81.3 a	30.13 d

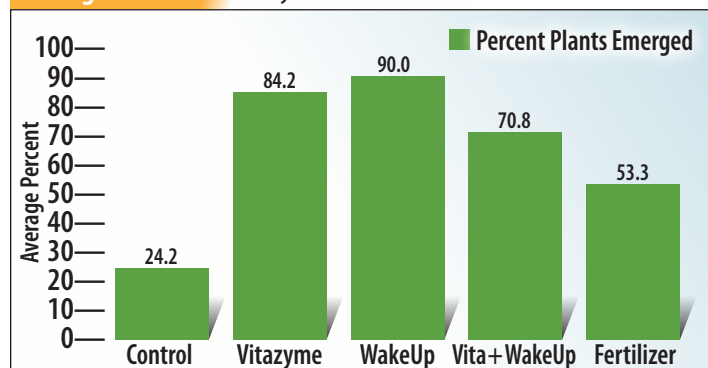
Many other measurements were taken in this study, some of which are summarized in the graphs that follow along with some of the data shown in the graphs on the previous page.

Treatment	Total weight sellable tubers
	cwt/acre
1. Control	89.8 b
2. Vitazyme	376.9 a
3. WakeUp	384.6 a
4. Vitazyme + WakeUp	431.5 a
5. Fertilizer only	435.9 a

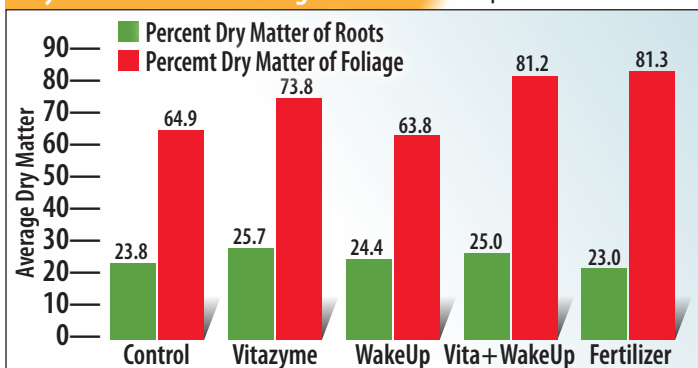
### Plant Height & Width on August 29



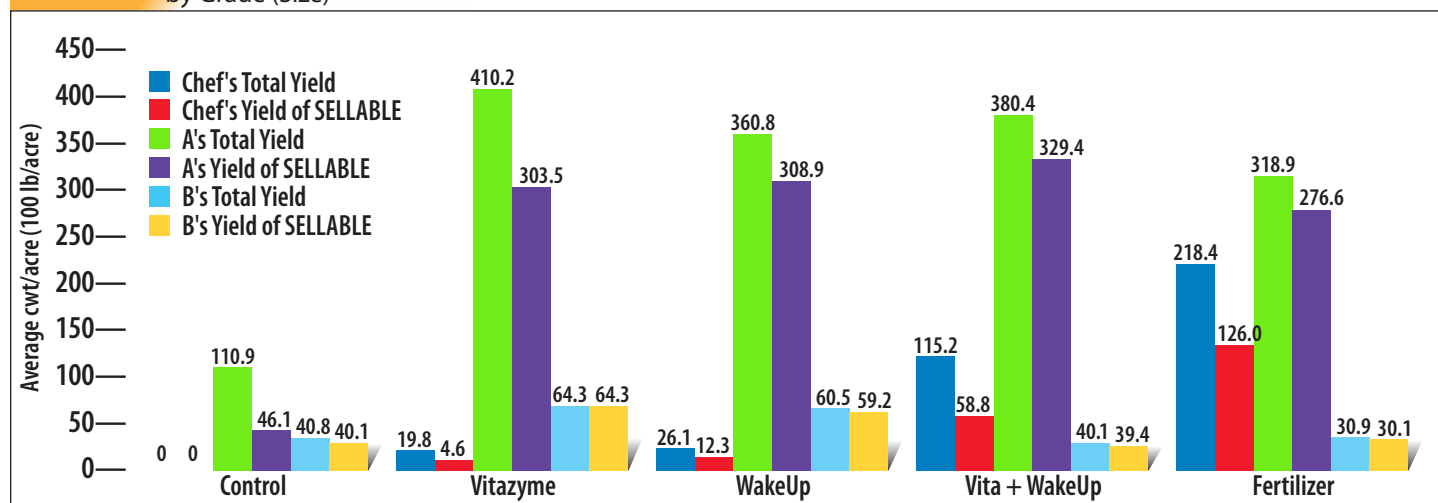
### Emerged Plants on July 11



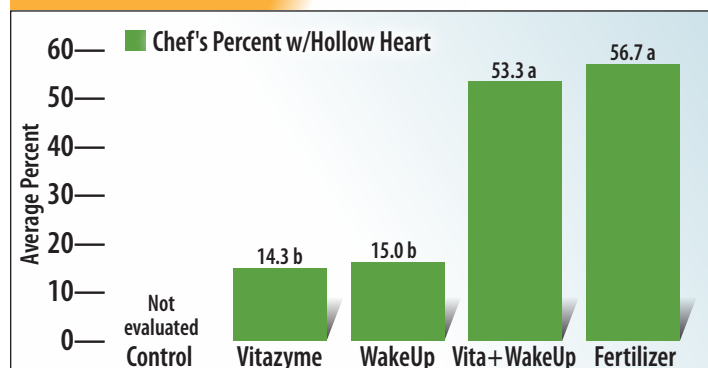
### Dry Matter in Plant Foliage & Roots on September 5



### Tuber Yield by Grade (Size)



### Hollow Heart in Tubers



**Conclusions:** A medium-sized plot potato trial in western New York produced very interesting results in terms of effects of Vitazyme, WakeUp, and fertilizer effects on the crop. All plots were treated with a 15-15-15 fertilizer, except for the control, and Vitazyme and WakeUp were applied in-furrow and twice more foliar—at tuber initiation and at tuber bulking. The statistically analyzed data revealed the following

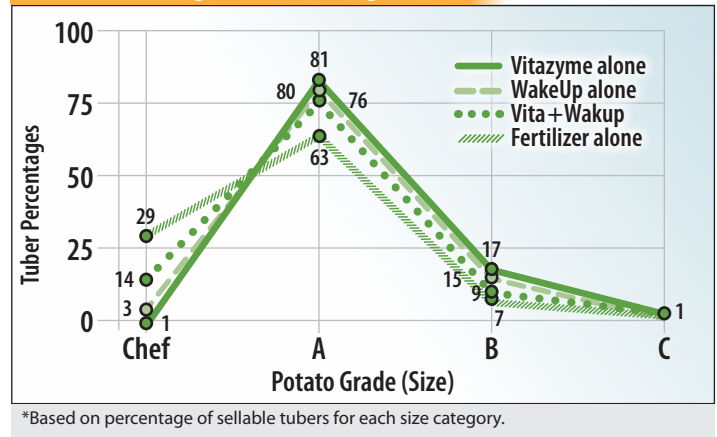
- Significantly faster emergence of plants with Vitazyme and WakeUp, alone and in combination, compared to the control and fertilizer alone
- Greater height and width of plants mid-season for Vitazyme, WakeUp, and the combined products than fertilizer alone or the control



- Higher leaf chlorophyll with Vitazyme and WakeUp than the control, though Vitazyme alone and combined with the WakeUp had significantly more chlorophyll in the leaves than did WakeUp alone
- No significant difference in dry matter of the leaves and roots among the five treatments
- No significant total sellable tuber weight among the four treatments, all of them exceeding the control at  $P=0.10$
- Significantly less hollow heart in Chef grade tubers for both Vitazyme and WakeUp alone (14.3 and 15.0%) compared to the combined products and to fertilizer alone (53.3 and 56.7%)
- Tuber size effects: The Vitazyme, WakeUp, and Vitazyme + WakeUp treatments all produced more medium-sized (Grades A and B) tubers than did the fertilizer treatment alone, though the fertilizer alone produced the greatest number of large (Chef) sized tubers. Note the following size distribution graph to the right.

Vitazyme and WakeUp Summer, alone and in combination, modified the fertilizer effects on potatoes by increasing the number of medium-grade tubers, especially Grade A, while reducing the number of large Chef-sized tubers. Total tuber yields were not significantly different.

**Tuber Percentages in Size Categories\***



# Potatoes with Vitazyme application

**Researcher:** Vadim Plotnikov

**Research organization:** "Gontarevo" Farm, Ukraine, Plant Designs, New York, USA, and Agro Expert International, Ukraine

**Location:** Illintsi District, Vinnytsia Region, Slobodyshe Village, Ukraine

**Variety:** Grenada (generation 1)

**Seeding rate:** 50,000 tubers/ha

**Planting date:** April 25, 2017

**Previous crop:** wheat

**Soil type:** typical Chernozem; humus = 4.5%

**Soil preparation:** disking to 6-8 cm, plowing to 22-24 cm, harrowing to 10-12 cm

**Experimental design:** A potato field was divided into Vitazyme treated and untreated control areas to determine the efficacy of this product in promoting yield increases.

## ① Control ② Vitazyme

**Fertilization:** 40 tons/ha of manure before plowing, the fall of 2016, providing 200-100-240 kg/ha of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O

**Vitazyme application:** 1 liter/ha sprayed on the leaves and soil at flower bud formation (June 11), and 1 liter/ha sprayed on the leaves at mid-flowering (July 1)

**Growing season weather:** dry



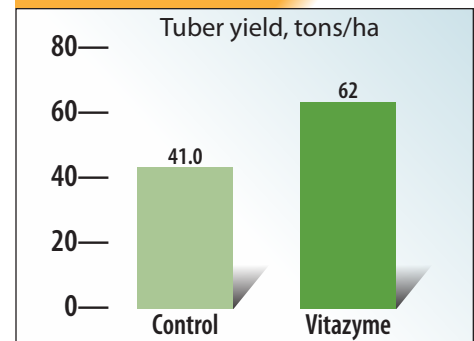
These potatoes grown in Ukraine show a pronounced advantage when treated with Vitazyme. Note the plant size, tuber number, and tuber uniformity.

### Yield results:

Treatment	Tuber yield tons/ha	Yield change ton/ha
1. Control	41.0	—
2. Vitazyme	62.0	21.0 (+51%)

*Yield increase in tuber yield with  
Vitazyme: 51%*

### Tuber Yield



**Income results:** At a price of \$97.95/ton of potatoes, the added 21.0 tons/ha gave an additional \$2,057/ha income.

**Conclusions:** A potato field-scale trial in central Ukraine proved that Vitazyme, applied two times at 1 liter/ha, at flower bud formation and at mid-bloom, yielded an additional 21.0 tons/ha of tubers (51%) compared with the untreated control. This additional yield provided the farmer an additional \$2,057/ha of income, revealing the great efficacy of this program for potato production in Ukraine.



# Potatoes with Vitazyme application

**Researchers:** Martin Perez, Jonathan Pedroza, and Lucero Fernandez

**Farmer:** Virginia Perez Heredia

**Research organization:** Quimica Lucava

**Location:** San Francisco del Rincon, Guanajuato, Mexico

**Variety:** Agatas

**Planting date:** January 31, 2015

**Experimental design:** A 2 ha part of a potato field was treated with three Vitazyme applications to determine the effect of the product on tuber yield and size, and income.



The third application of Vitazyme is being sprayed on the potato crop at San Francisco del Rincon in this Mexican trial.

## 1 Control 2 Vitazyme

**Fertilization:** unknown

**Vitazyme application:** (1) banded over the seed pieces at 1 liter/ha at planting; (2) 1 liter/ha sprayed on the leaves and soil on March 26; (3) 1 liter/ha sprayed on the leaves and soil on April 25.

**Harvest date:** June 3, 2015, 123 days after planting

**Growth observations:** On April 25, plants were evaluated and showed the following:

- A greater number of tubers with Vitazyme
- Better tuber uniformity with Vitazyme
- Greater root development and thicker stems with Vitazyme

**Tuber size evaluation:** Two areas were harvested for each sample listed in the table below.



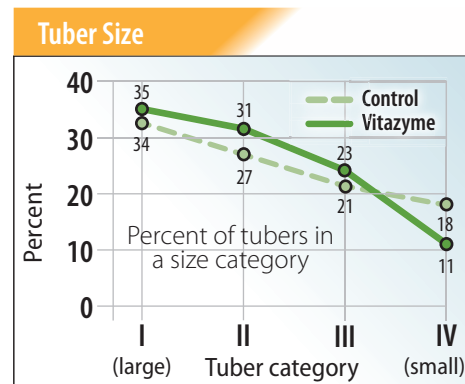
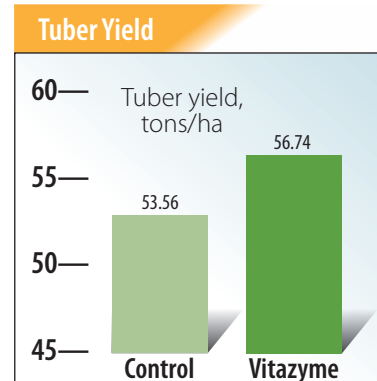
An excellent response to three Vitazyme treatments is shown(right), with greater numbers and uniformity of tubers. Yield increased by 6%.

**Tuber yield:** The number of 100 kg sacks/0.3 ha were counted to determine the yield.

Tuber size						
Treatment	I	II	III	IV	Total	Change
-----tons/ha-----						
Control	18.26	14.32	11.36	9.62	53.56	—
Vitazyme	19.70	17.65	13.26	6.14	56.75	3.19(+6%)

**Increase in tuber yield with Vitazyme: 6%**

**Income results:**



Notice that the Vitazyme treatment had more tubers in the larger categories (I, II, and III) compared to the control, while there were considerably fewer small tubers (IV).

Treatment	Yield	Yield change	Added income <sup>1</sup>	Net income <sup>2</sup>	Cost : Benefit
	kg/ha	kg/ha	USD/ha	USD/ha	
Control	53,560	—	—	—	—
Vitazyme	56,740	3,180	2,639	2,522	21.5

<sup>1</sup>Wholesale potato price = USD 0.83/kg. <sup>2</sup>Vitazyme program cost (with labor) = 117.24 USD/ha.

**Added income with Vitazyme: 2,522 USD/ha**  
**Increased cost : benefit with Vitazyme: 21.5**

**Conclusion:** A potato trial in Guanajuato, Mexico, revealed that three Vitazyme applications produced healthier plants having more roots, stems, and leaves, as well as a greater percentage of large tubers (sizes I, II, and III), and fewer small tubers (size IV) than the untreated control. The tuber yield was increased by 6%, giving a greater profit of 2,522 USD/ha. This income increase produced a cost : benefit of 21.5, showing the excellent efficacy of the program for Mexican potato production.

# Potatoes *with Vitazyme application. A study conducted in 2013*

**Research organization:** Soepenbergl  
and Agro Macaj, Kralova, Slovakia

**Location:** Senci, Slovakia

**Variety:** unknown

**Experimental design:** A potato field was divided into Vitazyme treated and untreated control areas to determine the yield of the crop.

① Control ② Vitazyme

**Fertilization:** unknown

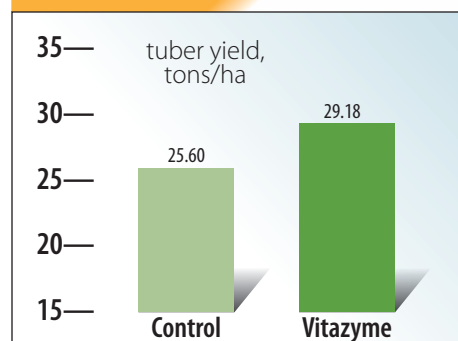
**Vitazyme application:** 1 liter/ha (time unknown)

## Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	25.60	—
Vitazyme	29.18	3.58 (+14%)
Increase in tuber yield with Vitazyme: 14%		

**Conclusions:** Potatoes grown in Slovakia responded very well to Vitazyme, producing a 14% yield increase, showing the efficacy of this program for growers in this region.

## Tuber Yield



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# 2014 Crop Results

## Vitazyme on Potatoes

Researcher: unknown

Research organization: Viva Plus LLC, Ukraine

Location: Brovary District, Kiev Region, Krasylivka Village, Ukraine

Variety: Marphona

Planting date: unknown

Experimental design: A potato field was divided into a control and an adjoining Vitazyme treated area to evaluate the effect of the product on potato tuber yield. All other factors of the experiment were identical for both treatments except for Vitazyme application.

### 1. Control

### 2. Vitazyme

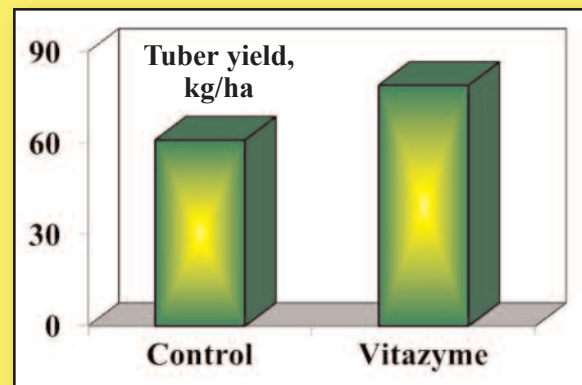
Fertilization: unknown

Vitazyme application: (1) 1 liter/ha sprayed on the leaves at flower bud formation (June 10); (2) 1 liter/ha sprayed on the leaves during bloom (June 24)

Yield results:

Treatment	Yield kg/ha	Yield change kg/ha
Control	61	—
Vitazyme	79	18 (+30%)

**Increase in tuber yield  
with Vitazyme: 30%**



Income results: The net increase in income was 26,390 UAH/ha (\$1,675.77 at 1 UAH = 0.0635 USD).

Conclusions: A considerable tuber yield increase of 30% (18 tons/ha) was achieved in this split-field study with two applications of Vitazyme, at bud formation and bloom. The net income rose by 26,390 UAH/ha (\$1,675.77/ha), showing how effective this program to boost yields and profits for potato growers in Ukraine.

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# **2013 Crop Results**

## **Vitazyme on Potatoes**

Researcher: Israel Calva Pali

Farmer: Armando Ramirez

Location: Free, Puebla, Mexico

Variety: unknown

Experimental design: A potato field was divided into three treatment areas receiving Nutrisorb, Carbon Boost, and Vitazyme in separate areas, applied beneath the seed pieces at planting. The purpose of the trial was to evaluate the relative effectiveness of the three products to influence potato growth and yield.

### **1. Nutrisorb**

### **2. Carbon Boost**

### **3. Vitazyme**

Fertilization: unknown

Vitazyme application: 1 liter/ha applied beneath the seed pieces at planting

Nutrisorb application: 8 liters/ha applied beneath the seed pieces at planting

Carbon Boost application: 0.5 liter/ha applied beneath the seed pieces at planting

Growth results: Evaluations were made during October of 2012, and revealed that Vitazyme outperformed the other two products:

- **Greater overall plant growth**
- **More stems per plant (3.5 versus 2.0)**
- **Greater stalk diameter**
- **Increased tuber number**
- **Improved tuber uniformity**

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

<b>Treatment</b>	<b>Tuber Yield</b>	<b>Yield change*</b>
	tons/ha	tons/ha
Nutrisorb	21	—
Carbon Boost	29	8 (+38%)
Vitazyme	35	14 (+67 )
*Increase of Carbon Boost and Vitazyme over Nutrisorb.		

**Increase in tuber yield with  
Vitazyme**

**Above Nutrisorb ..... 67%**

**Above Carbon Boost .... 21%**

Conclusions: In this Mexican potato trial, Vitazyme greatly increased tuber yield above both Nutrisorb (+67%) and Carbon Boost (+21%), showing this product to be an excellent additive to potato growing programs in Mexico.

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# 2011 Crop Results

## Vitazyme on Potatoes

Researcher: Steven David

Research organization: Organic Farming Systems, Perth, Australia

Location: Manjimup, Western Australia

Variety: Nadine

Planting date: December 1, 2010

Experimental design: A potato field was divided into a Vitazyme treated and untreated area alongside, to determine the effect of the product on tuber yield and quality.

### 1. Control

### 2. Vitazyme

Fertilization: usual farm practice, including TM21 plus Calsap

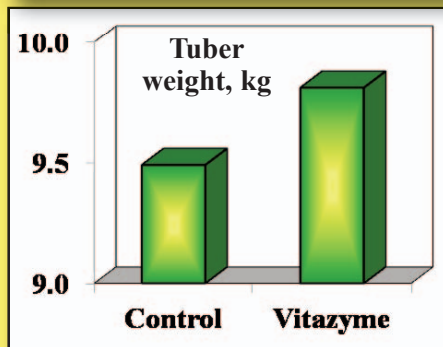
Vitazyme application: (1) 1 liter/ha in-furrow at planting; (2) 1 liter/ha on the leaves and soil at tuber initiation

Tuber quality: The Vitazyme treated tubers were **cleaner** at harvest, with **less skin damage and disease**.

Yield results: The field was sampled on April 14, 2011, 135 days after planting, and total weight, tuber number, and marketable tubers were evaluated.

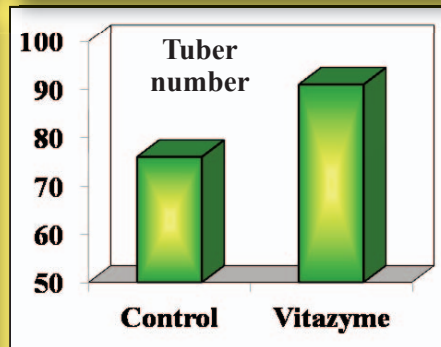
Treatment	Total weight	Tuber number	Marketable tubers
	kg	number	number
Control	9.49	76	50
Vitazyme	9.81 (+3%)	91 (+20%)	70 (+40%)

### Total Weight



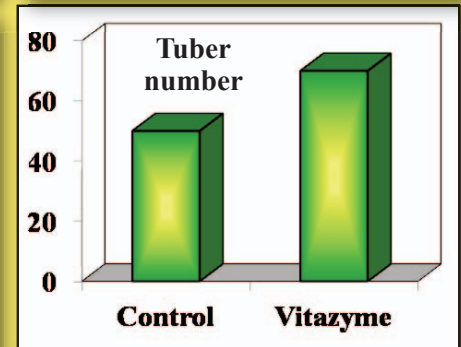
**Increase in yield  
with Vitazyme: 3%**

### Tuber Number



**Increase in tuber  
number with  
Vitazyme: 20%**

### Marketable Tubers



**Increase in market-  
able tubers with  
Vitazyme: 40%**

Conclusion: A potato study in Western Australia revealed that Vitazyme, applied at planting and at tuber initiation, increased the total yield (3%), tuber number (20%), and marketable tubers (40%), while improving skin integrity by reducing skin damage and disease incidence. Vitazyme is shown to be an excellent addition to potato production in Australia.



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# 2011 Crop Results

## Vitazyme on Potatoes

Researcher (farmer): Don Fitzpatrick

Location: Houlton, Maine

Variety: Dark red Norlan

Soil type: gravelly loam

Planting date: May 20, 2011

Row spacing: 34 inches

In-row spacing: 8 inches

Experimental design: A 7-acre field was divided into 3 acres treated with Vitazyme at planting, applied in the seed row, and 4 acres untreated for a control. No other applications were made.

### 1. Control

### 2. Vitazyme

Fertilization: 190-190-75 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O applied through the planter at planting; 200 lb/acre of potassium magnesium sulfate (0-0-22-11-23% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-Mg-S) topdressed in mid-June when the plants were breaking through

Vitazyme application: 13 oz/acre in the seed row at planting through the Admire machine, along with Quadras and one other pesticide

Observations during growth: The Vitazyme treated plants had the following characteristics:

1. Deeper green leaves
2. Longer leaf life; the control area died back earlier.
3. Leaves were shinier, and healthier looking.
4. The untreated area had a severe insect infestation, but the untreated area was fairly insect free, right to the dividing row.

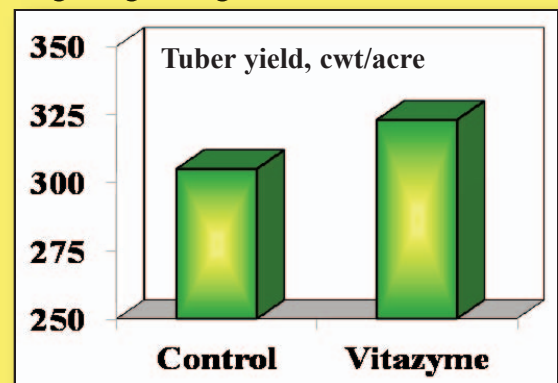
Harvest date: September 19, 2011

Weather: Temperatures were normal, but rain was excessive during the growing season.

Yield results:

Treatment	Tuber yield cwt/acre	Yield change cwt/acre
Control	305	—
Vitazyme	323	18 (6%)

**Increase in yield with  
Vitazyme: 6%**



Conclusion: This potato trial in northern Maine showed that Vitazyme increased tuber yield by 18 cwt/acre, 6% more than the untreated control. The increase was due to only a single application, at planting, and would likely have improved much more had one or two foliar treatments been made later on. The treated plants were more aggressive, healthier, and insect free during the growing season than the control plants.



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**2011 Crop Results**

**Vitazyme on Potatoes**

***Pre-Planting Evaluation***

Researcher: Steven David

Research organization: Organic Farming Systems, Perth, Australia

Location: Manjimup, Western Australia

Variety: Royal Blue

Planting date: December 1, 2010

Experimental design: To evaluate the effect of an early, pre-planting Vitazyme application on potato yield, a potato field was divided into two parts, both receiving at-planting and pre-row closure treatments, but one also receiving a pre-plant Vitazyme application.

**1. Vitazyme twice**

**2. Vitazyme twice + pre-plant**

Fertilization: usual farm practice

Vitazyme application: Both treatments: (1) 1 liter/ha in-furrow at planting; (2) 1 liter/ha on the leaves and soil before row closure. Treatment 2 received an additional 1 liter/ha on the soil before planting during a rotary hoe operation.

Yield results: The treatments were sampled on April 14, 2011, 135 days after planting.

Treatment	Tuber weight	Tuber number
	kg	number
Vitazyme twice	5.14	88
Vitazyme twice + preplant	4.92 (-4%)	83 (-6%)

Conclusion: This potato trial in Western Australia proved that an additional application of Vitazyme pre-plant did not benefit tuber yield and number, when both treatments received two other applications, at planting in the row and at pre-row closure. No untreated control was included in this study.

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# 2009 Crop Results

## Vitazyme on Potatoes

Researchers: Brandon Barranco, Farm Manager, and Alan Perry, President Location: near Pearsall, Texas

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

Planting date: February 9 and 10, 2009

Tillage: conventional, with row hilling

Soil test levels: organic matter, 1.4%; pH, 7.2; N (estimated N release), 48 lb/acre; S (as  $\text{SO}_4$ ), 10 lb/acre; P (as  $\text{P}_2\text{O}_5$ ), 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

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

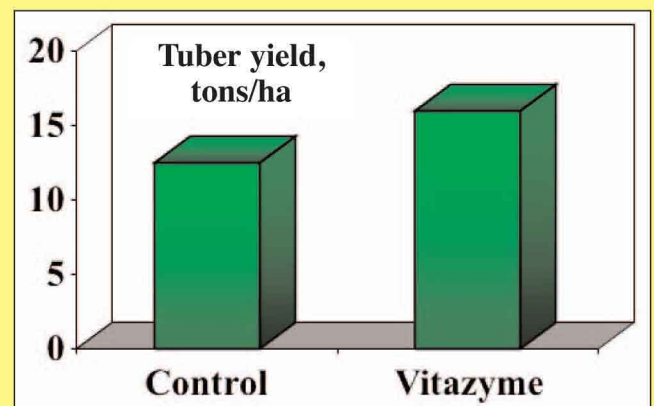
Harvest date: June 10 to 12, 2009

Yield results:

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

**Increase in tuber yield with  
Vitazyme: 28%**

### 2. Vitazyme applied twice



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.



## *Vital Earth Resources*

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# 2009 Crop Results

## Vitazyme on Potatoes

Researcher: Binad Fingh, Ph. D.

Location: Morepur, Harpur, India

Planting date: October 23, 2008

Row spacing: 66 cm

Planting depth: 10 to 12.5 cm

Soil analysis: pH, 8.06; electrical conductivity, 0.36 ds/m; organicmatter, 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 rouging 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,  $P_2O_5$ , and  $K_2O$  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  $ZnSO_4$  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- $P_2O_5$ - $K_2O$  at 2.5 kg/ha; 13-0-45% N- $P_2O_5$ - $K_2O$  at 1.25 kg/ha.

Vitazyme application:

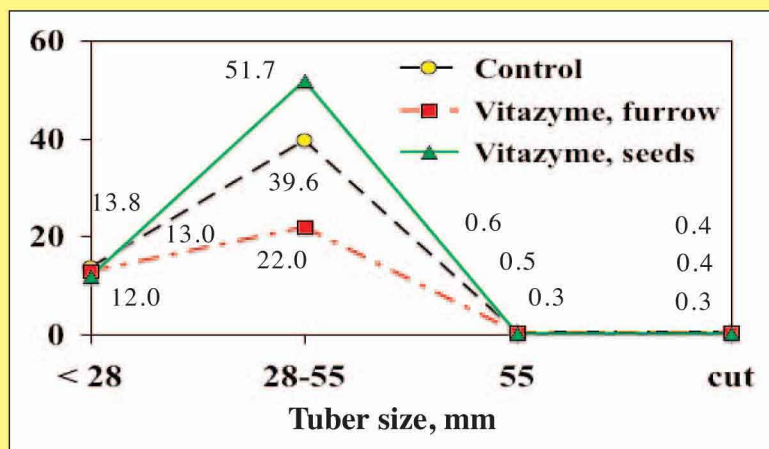
Treatment	Treatment 1	Treatment 2
1. Control (general practice)	none	none
2. Vitazyme in-furrow	in-furrow at planting at 1 liter/ha	leaves and soil at 1 liter/ha
3. Vitazyme seed treatment	on seeds at 1 liter/ha	leaves and soil at 1 liter/ha

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

### Tubers Per Square Meter, by Tuber Size



### Total Tubers Per Square Meter

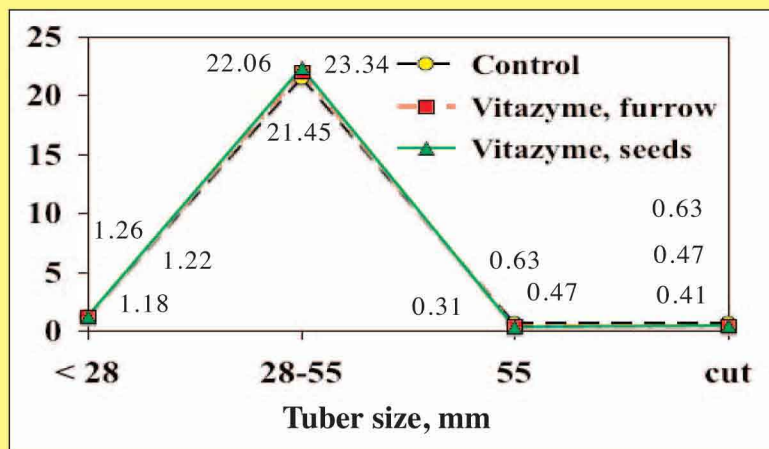
Treatment	Total tubers	Change
	----- tubers/meter <sup>2</sup> -----	
Control	35.9	—
Vitazyme in-furrow	54.4	18.5 (+52%)
Vitazyme on seeds	64.3	28.4 (+79%)

### Increase in tuber number

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

Tuber yield results:

### Tuber Yield, by Tuber Size



### Total Tuber Yield

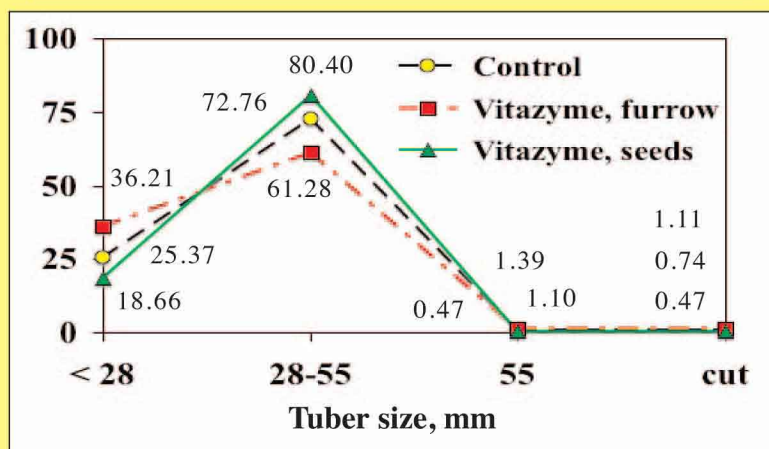
Treatment	Total yield	Change
	----- tons/ha-----	
Control	24.18	—
Vitazyme in-furrow	23.96	(-) 0.22 (-1%)
Vitazyme on seeds	25.28	1.10 (+5%)

**Increase in tuber yield,  
Vitazyme on seeds: 5%**

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:

### Percentage of Total Tubers



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

### Increase in 28 to 55 tubers

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



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

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

**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. 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.

## Vital Earth Resources

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# 2009 Crop Results

## Vitazyme on Potatoes, for seed

Researcher: David Radtke

Research organization: San Luis Hills Farm, Fort Garland, Colorado

Variety: Blazer Russet

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

### 2. Vitazyme

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

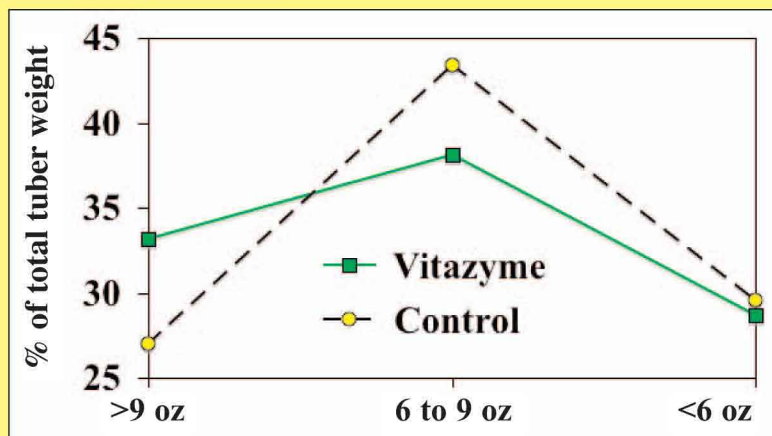
Yield results: Five small-sample replicates of 50 to 62 pounds were dug for each treatment to enable a statistical analysis to be performed. These tubers were weighed and categorized into three size groups.

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.

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

- Increase is >9oz tubers with Vitazyme: 23%
- Decrease in 6 to 9 oz tubers with Vitazyme: 12%



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.

## Vital Earth Resources

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# 2009 Crop Results

## Vitazyme on Potatoes

Researcher: Binad Fingh, Ph. D.

Organization: Merino Industries

Soil type: sandy loam

Row spacing: 66 cm

Seed piece size: >55 mm cut in two

Previous crop: rice

Soil analysis: pH, 8.42; electrical conductivity, 0.33 ds/m; organicmatter, 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

Fertilizer over all areas: (1) Basal treatment: 12.5 tons/ha vermicompost; 200, 150, and 175 kg/ha of N,  $P_2O_5$ , and  $K_2O$  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  $ZnSO_4$  was broadcast at planting.

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

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

(4) Foliar during growth: 19-19-19% N- $P_2O_5$ - $K_2O$  at 2.5 kg/ha; 13-0-45% N- $P_2O_5$ - $K_2O$  at 1.25 kg/ha.

Vitazyme application:

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		

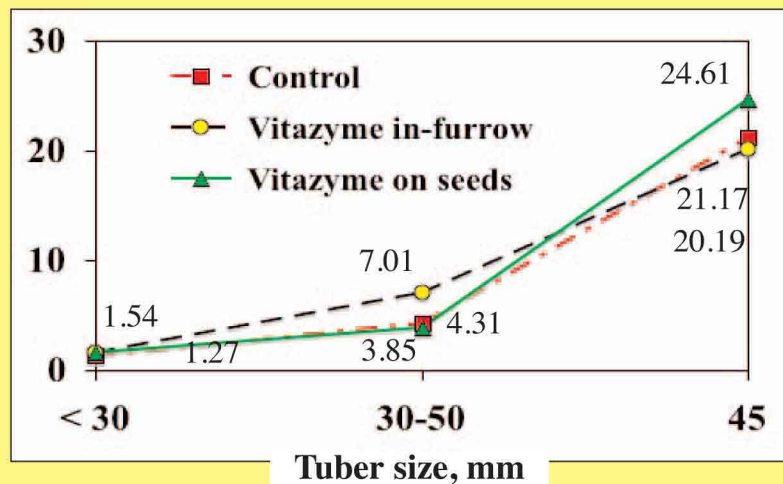
Pesticide applications: Jassid white flies and aphids: 0.25% Thiamethoxam and 0.5% Imidachlorprid; late blight: 2.5 ml/liter Mancozeb, 3 ml/liter Cymoxanil, and 2.5 ml/liter Metaxyl + Mancozeb.

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:

#### ***Tuber Yield, by Tuber Size***



#### ***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%)

#### **Yield increase with Vitazyme**

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

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				
	<30 mm	30-45 mm	>45 mm	Total	Increase
	----- 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%)

**Vitazyme in-furrow: 3.5**

**Vitazyme on seeds: 5.8**

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.



## Vital Earth Resources

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# 2009 Crop Results

## Vitazyme on 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.

### 1. Control

### 2. Vitazyme at emergence

### 3. Vitazyme at blooming

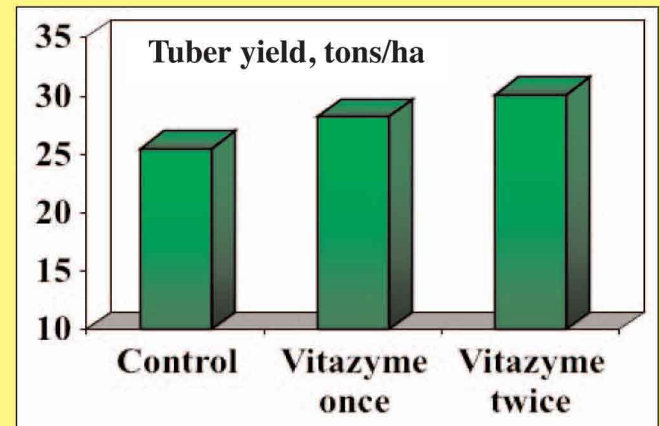
Fertilization: 90 kg/ha N, 60 kg/ha P<sub>2</sub>O<sub>5</sub>, and 60 kg/ha K<sub>2</sub>O

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:

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

**Increase in tuber yield with  
Vitazyme: 11 to 18%**



Income results:

**Income increase with Vitazyme applied once: 11%**

**Income increase with Vitazyme applied twice: 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.



## Vital Earth Resources

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# 2008 Crop Results

## Vitazyme on Potatoes

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

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

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

**Variety:** Finka Elite

**Seeding rate:** 2.8 tons/ha

**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:** May 12, 2008

**Previous crop:** winter wheat

**Tillage:** plowed to 22-24 cm, and harrowed to 10-12 cm

**Experimental design:** A uniform field area was selected to place 1.0 ha plots, replicated four times, over the test area. The objective was to determine if Vitazyme could favorably influence crop yields for this gray forest soil area of Ukraine.

### 1. Control

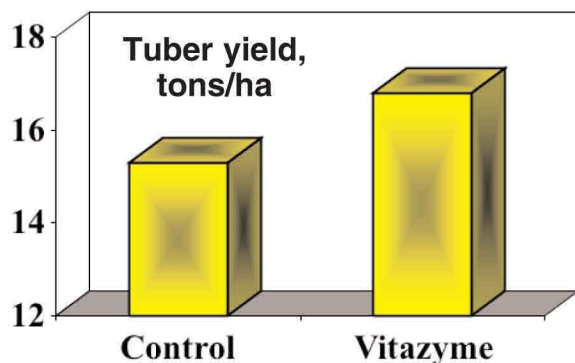
### 2. Vitazyme applied once

**Fertilization:** In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O was made.

**Vitazyme application:** 1 liter/ha applied on July 8, 2008, at bloom

**Harvest date:** unknown

**Yield results:**



Treatment	Tuber yield	Yield increase	
	tons/ha	tons/ha	%
1. Control	15.3	—	—
2. Vitazyme	16.8	1.5	10

**Increase in tuber yield with  
Vitazyme: 10%**

**Income results:** Based on current potato prices, the increase in income with Vitazyme was 1,674 hrn/ha.

**Conclusions:** In this Ukraine potato study on a gray forest-steppe soil, Vitazyme at only 1 liter/ha at blossom prompted an excellent 10% yield increase, and a great income improvement of 1,674 hrs/ha. Had Vitazyme been applied at least once more — especially at planting — and preferably three to four times total, the yield increase would likely have been much greater.

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# 2007 Crop Results

## Vitazyme on Potatoes A Quality Study

Farmer: confidential

Location: Hancock, Wisconsin

Variety: Russet Burbank

Soil parameters: Results of four analyses in different sectors of the field: exchange capacity, 4.71 to 5.66 meq/100 g; pH, 6.4 to 6.7; organic matter, 1.3 to 1.6%; N, 46 to 52 lb/acre;  $\text{SO}_4\text{-S}$ , 20 to 32 lb/acre;  $\text{P}_2\text{O}_5$ , 702 to 849 lb/acre; Ca, 1,108 to 1,416 lb/acre; Mg, 226 to 284 lb/acre; K, 200 to 394 lb/acre; Na, 37 to 69 lb/acre; B, 1.16 to 1.34 lb/acre; Fe, 812 to 1,008 lb/acre; Mn, 136 to 216 lb/acre; Cu, 2.6 to 5.0 lb/acre; Zn, 47.6 to 57.0 lb/acre; percent base saturations for Ca (56 to 63%), Mg (20 to 21%), K (5 to 9%), Na(5%), H (5 to 9%).

Soil texture: loamy sand

Row width: 36 inches

Plant population: unknown

Planting date: April 20 to April 23

Experimental design: A potato field was divided into Vitazyme treated and untreated areas, with the objective of evaluating the effects of the product on tuber quality and yield.

### 1. Control

### 2. Vitazyme

Fertilization: All areas received the following: 2,000 lb/acre 80-89 grade lime, 500 lb/acre 0-0-60%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$ , 586 lb/acre 7-28-14-5.4-2.2-1.23-1.55-1.15%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O-S-Ca-Mg-B-Zn}$ , 0.5 lb/acre B, 428 lb/acre  $(\text{NH}_4)_2\text{SO}_4$ , 322 lb/acre urea, 500 lb/acre Cal-Sul, 5 lb/acre 0-50-30-5-1%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O-Ca-Mg}$ , 5 lb/acre 20-20-20%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O}$ , 20 ga/acre 18-0-0-5-1%  $\text{N-P}_2\text{O}_5\text{-K}_2\text{O-Ca-Mg}$ . In addition, the Vitazyme treatment received a total of 4 lb/acre  $\text{MgSO}_4$  and 6.25 lb/acre Beau-Ron (B).

Vitazyme application: (1) 13 oz/acre on May 17, and (2) 13 oz/acre on June 27.

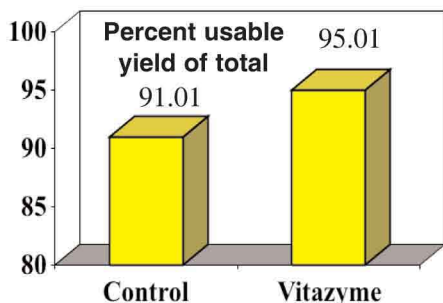
Weather conditions: a very warm and dry mid-summer period

Harvest date: unknown

Tuber quality: About 700 to 850 pounds of tubers were sampled per treatment, and half of this weight was graded.

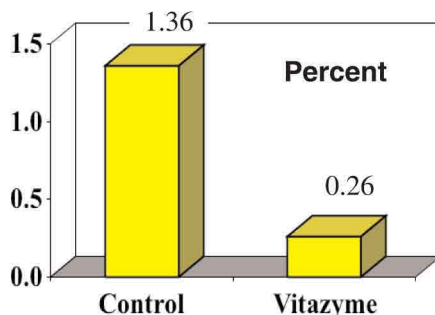
## Tuber Size Distribution

### Usable Yield



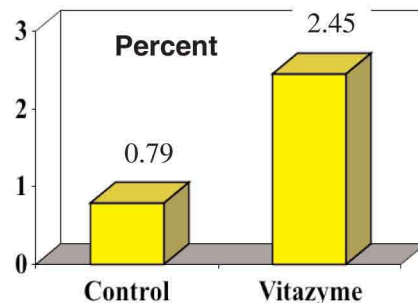
**Increase in usable yield**  
**+4.0 percentage points**

### Hollow Heart

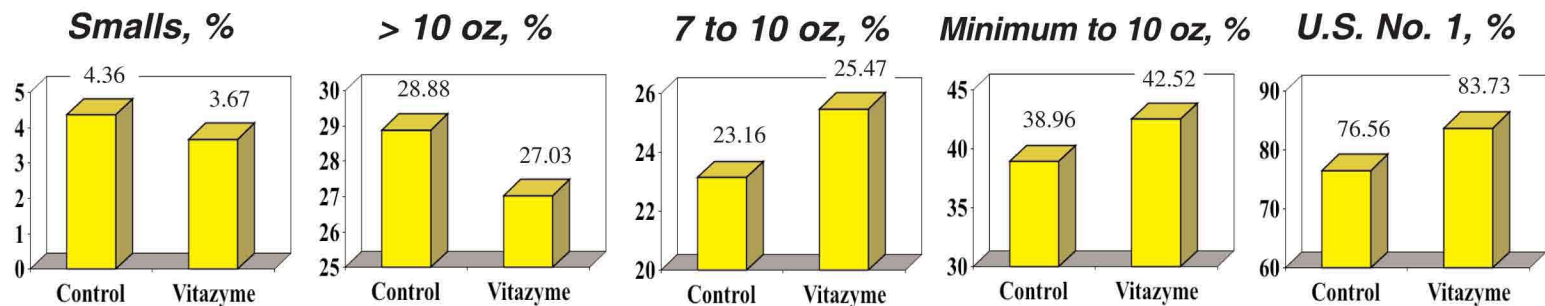


**Reduction in hollow heart**  
**-1.10 percentage point**

### Soft Rot



**Reduction in soft rot**  
**-1.66 percentage point**



**Reduction in Small Tubers With Vitazyme**

Small .....	-0.69 percentage point
>10 oz .....	-1.85 percentage points

**Increase in Large Tubers With Vitazyme**

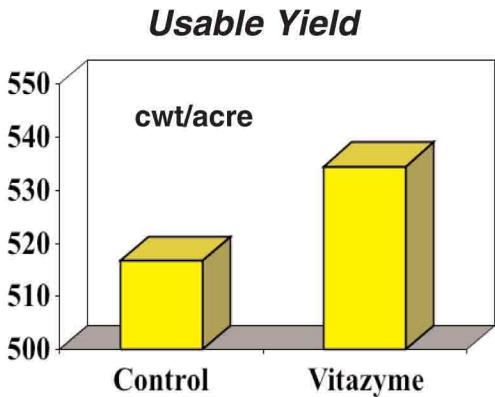
7 to 10 oz .....	+2.31 percentage points
Min. to 10 oz .....	+3.56 percentage points
U.S. No. 1 .....	+7.17 percentage points

Vitazyme improved all of the quality parameters noted here, including usable yield, hollow heart, soft rot, and size distribution of the tubers. Of special note is the increase in number of U.S. number 1 grade tubers (7.17 percentage points more).

Yield results: A truck collected the tubers from a measured row length, and the load was weighed.

Treatment	Total yield cwt/acre	Usable yield %	Usable yield cwt/acre	Yield change cwt/acre
Control	568	91.01	516.9	—
Vitazyme	562	95.01	534.5	17.5 (+3%)

**Increase in usable yield: 3%**



Conclusions: This north central Wisconsin potato trial revealed that Vitazyme, together with MgSO<sub>4</sub> and additional boron, produced superior potatoes and 3% more usable tubers. Of this improved usable yield, there were 7.17% more U.S. number 1 grade tubers, and more 7 to 10 oz and minimum to 10 oz sizes. Besides, there was a reduction in small tubers, and those less than 10 oz. Percent usable yield was 4.0 percentage points higher, hollow heart (caused by boron deficiency) was reduced by 1.1 percentage points, and soft rot was decreased by 1.66 percentage points. This program caused a definite improvement in production and quality.

Another field nearby did not produce quite as great an improvement in tuber quality, but the U.S. Number 1 grade was increased by 1.79 percentage points, and the minimum to 7 oz size was improved by 3.12 percentage points with Vitazyme.



## Vital Earth Resources

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# 2007 Crop Results

## Vitazyme on Potatoes

Researcher: Sergei Velichko and Zhenya Moskalov

Location: Dnepropetrovsk, Agro Oven, Ukraine

Planting date: April 30, 2007

Soil type: mollisol

Experimental design: A field was divided into a Vitazyme treated and untreated area to determine the effect of the product on increasing tuber yield. Another product, called Amcolon B, a fertilizer, was added to Vitazyme to evaluate a possible synergism.

### 1. Control

Fertilization: autumn of 2006, 300 kg/ha of 16-16-16% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O; spring of 2007, before planting, 150 kg/ha of 16-16-16% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O

Vitazyme application: three foliar treatments of 1 liter/ha each time: (1) bud formation; (2) flower initiation (25 days after the first application); (3) four weeks before harvest, on August 23, 2007

Amcolon application: A 30-0-22.5-3.5 (Mg)-1.5 (B) + TE product (applied with Vitazyme at an unknown rate)

Harvest date: September 28, 2007

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
1. Control	37.0	—
2. Vitazyme	47.0	10.0 (+27%)
3. Vitazyme + Amcolon	48.7	11.7 (+32%)

**Tuber increase with Vitazyme: 27%**

Organization: Agrimatco – Ukraine, Kiev, Ukraine

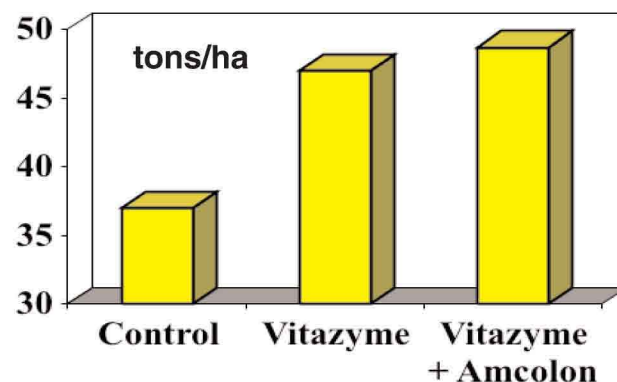
Variety: Sante

Watering: center-pivot irrigation

Planting rate: unknown

### 3. Vitazyme + Amcolon

*Tuber Yield*



Conclusions: In this Ukrainian sugar potato using Vitazyme and Amcolon B, the beet yield responded very well to Vitazyme with a 27% yield increase. Amcolon B increase yield an additional 5%. This added yield substantially increased production and profits for this potato grower.



## Vital Earth Resources

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# 2006 Crop Results

## Vitazyme on Potatoes

Researcher: unknown

Location: Ukraine

Variety: unknown

Planting date: unknown

Planting rate: unknown

Experimental design: A potato plot (“Area 6”) was divided into a Vitazyme treated and an untreated area (0.6 ha each) to evaluate the product’s effects on yield.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

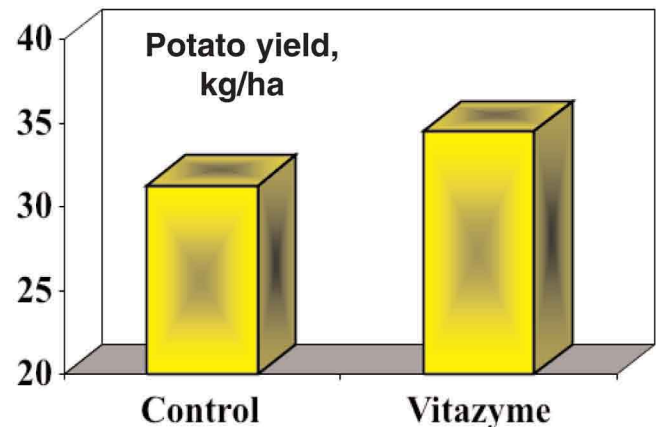
Vitazyme application: 1 liter/ha on the leaves and soil, at unknown dates

Harvest date: August 21, 2006

Yield results:

Treatment	Yield, 0.6 ha	Yield, 1.0 ha	Change
	kg	kg/ha	kg/ha
Control	18.8	31.3	—
Vitazyme	20.7	34.5	3.2 (+10%)

**Increase in potato yield: 10%**



Conclusions: In this Ukraine Vitazyme study, potatoes were improved in yield by 10% with the treatments given, a significant increase on these fertile Eastern European soils.

## Vital Earth Resources

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# 2005 Crop Results

## Vitazyme on Potatoes

Farmer: Barbaro Galvan

Location: Matanzas Province, Cuba

Variety: Romano

Soil type: red ferralitic

Previous crop: unknown

Planting date: unknown

Irrigation: row irrigation

Experimental design: A potato field was treated with Vitazyme once over 5.4 hectares, while the rest of the field was left untreated, to evaluate the product's effect on tuber yield.

### 1. Control

### 2. Vitazyme

Fertilizer: the same for both treatments: 1,341 kg/ha of a 9-13-17% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O fertilizer

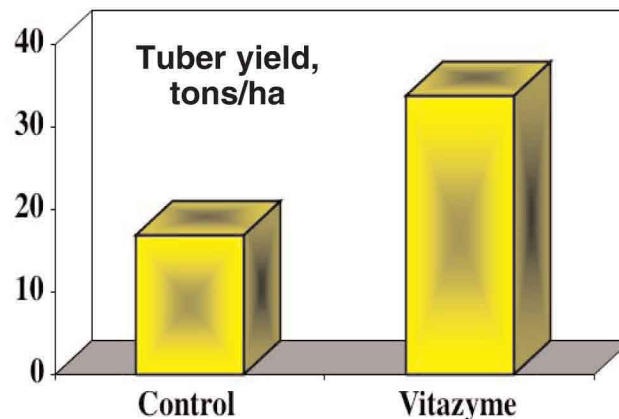
Vitazyme application: 3.44 liters/ha to the leaves and soil at 60 days after planting

Harvest date: unknown

Yield results:

Treatment	Tuber yield	Change
	tons/ha	tons/ha
Control	16.95	—
Vitazyme	33.82	16.87 (+100%)

**Tuber yield increase: +100%**



Conclusions: Vitazyme applied only one time, but at a high rate (3.49 liters/ha), doubled the tuber yield in this Cuban on-farm potato trial. Both treatments were treated equally in all other ways. These results illustrate the potential of Vitazyme to benefit potato yields in Cuba.

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# 2005 Crop Results

## Vitazyme on Potatoes

Farmer: Jim Echevierria  
Alamosa, Colorado

Soil type: sandy loam

Row spacing: 34 inches

Experimental design: A center-pivot irrigated, uniform potato field was partially treated with Vitazyme (30 acres), and an adjoining area of 30 acres was left untreated. The object of the study was to compare the effects of Vitazyme on tuber yield.

Researcher: Jon Gilley and Bill Crowder, Agro-Engineering,

Location: Hooper, Colorado

Previous crop: barley

In-row spacing: 11 inches

Variety: Norkotah 296

Planting date: May 3, 2005

### 1. Control

Fertilization: preplant, 286 lb/acre  $(\text{NH}_4)_2\text{SO}_4$  and 167 lb/acre KCl; at planting, 42 lb/acre 10-34-0 N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, 3.5 lb/acre Thiosol 12-0-0-29 (S), and 2 lb/acre ammoniated Zn; in-season, 25 lb/acre 28-0-0-5 (S)

Vitazyme application: 13 oz/acre shortly after plant emergence, through the irrigation system of the first irrigation; 13 oz/acre at tuber initiation through the irrigation system

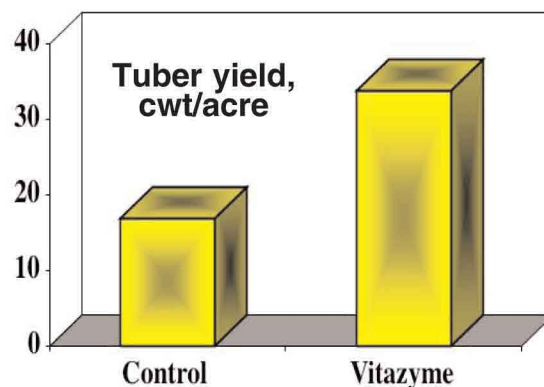
Harvest date: September 20, 2005

Yield results: All weights were gathered by weighing trucks on a scale from both treatments.

Treatment	Truck weight	Yield	Change
	lb	cwt/acre	cwt/acre
Control	17,300	504.0	—
Vitazyme	18,140	528.2	24.2 (+5%)

**Increase in tuber yield: 5%**

**Increase in income: \$181.50/acre**



Income results: At \$7.50/cwt bulk price, then 24.2 cwt/acre would gross the farmer \$181.50/acre more income.

Conclusions: This potato study in the San Luis Valley of southern Colorado provided a 5% yield increase with Vitazyme, which meant \$181.50/acre more income for the farmer. This result is consistent with tests conducted in the same locale for several years that have shown increases in yield with Vitazyme of up to 10%, along with a more uniform tuber size with more tubers in the most valuable size classes.

## Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

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

# 2005 Crop Results

## Vitazyme on Potatoes

Researchers: unknown

Planting date: February 10, 2004

Previous crop: tomatoes

Location: Los Mochis, Sinaloa, Mexico

Planting density: 70,000 pieces/ha

Row spacing: 90 cm

Variety: Mondial

Irrigation: trickle

Soil type: Barriol

Experimental design: A potato field was selected to evaluate the effectiveness of Vitazyme to improve tuber yield and quality. A portion of the field was divided into nine plots, each two rows wide (1.8 meters) x 30 meters long. Three treatments were replicated three times in a randomized complete block design.

### 1. Control

### 2. Vitazyme two times

### 3. Vitazyme four times

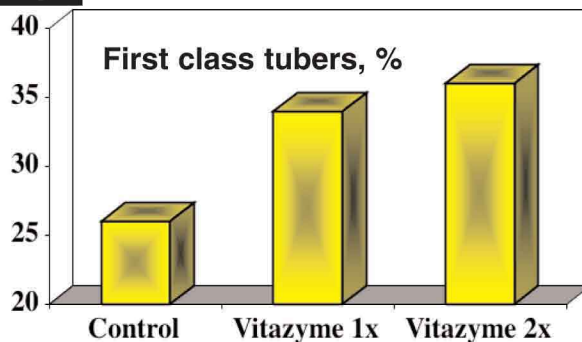
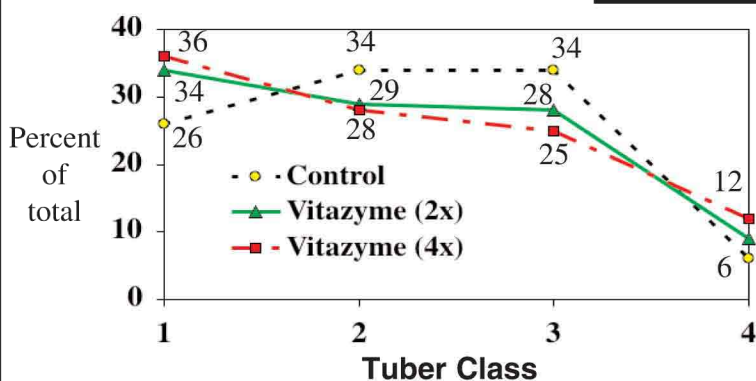
Fertilization: 194-206-238-7-47 lb/acre of N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O, Mg, and Ca, distributed during the growing season as 72-150-91 pre-plant, 19-38-19-1 (Mg) at emergence, 52-11-58 5(Mg)-19(Ca) at tuber initiation, 41-7-54-1(Mg)-19(Ca) at tuber filling, and 10-0-16-9(Ca) at ripening

Vitazyme application: Treatment 2: 1 liter/ha on the seed pieces at planting, and 1 liter/ha 2 weeks later on the leaves and soil; Treatment 3: the same first two applications as for Treatment 2, plus 1 liter/ha on the leaves and soil 3 weeks after the second application, and 800 ml/ha 3 weeks after the third application

Fungicide and insecticides: Syngenta products

Growth results: The tubers were harvested, weighed, and classified on June 7, 2004.

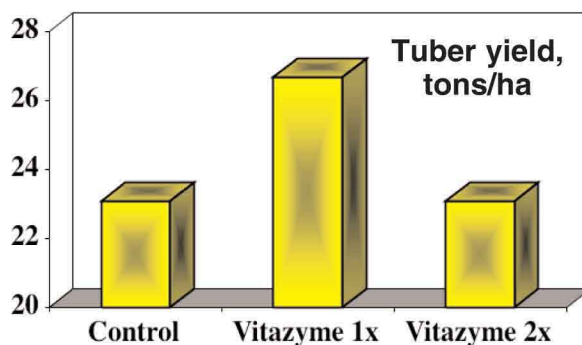
### Tuber Quality



### Tuber Yield

Treatment	Tuber yield	Yield change
	tons/ha	tons/ha
1. Control	23.08 b	—
2. Vitazyme 2 times	26.67 a	3.59 (+16%)
3. Vitazyme 4 times	23.08 b	0

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





*Income results:* Treatment 2 produced 3.59 tons/ha more potatoes, and at 3,000 pesos/ton the extra income generated was 10,770 pesos/ha. With a product cost of 470 pesos/ha, the net increase in income was 10,300 pesos/ha.

*Conclusions:* In this Mexican potato study, Vitazyme applied at 1 liter/ha at planting and again two weeks later produced an excellent, significant (at  $P=0.05$ ), 16% yield increase. This increase translated into 10,300 pesos/ha more net income, while increasing the percentage of first class tubers from 26% in the control to 34% with Vitazyme. Four Vitazyme applications did not increase yield but improved the tuber quality even further, by producing 36% first class tubers. Vitazyme at two applications per cropping cycle is an excellent potato treatment in Mexico.

## Vital Earth Resources

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# 2005 Crop Results

## Vitazyme on Potatoes

Research organization: Guira de Melena VCE, Havana Province, Cuba

Farms: Fregat 1, Fregat 2, and Mamey

Variety: Chieftan

Soil type: red ferrallitic

Planting date: unknown

Previous crop: unknown

Irrigation: center pivot

Experimental design: Three potato fields received Vitazyme on one portion of the test field (Fregat 1, 26.84 ha; Fregat 2, 29.52 ha; Mamey, 40.26 ha), to evaluate the product's effectiveness to improve tuber yield under equal fertilization.

### 1. Control

### 2. Vitazyme

Fertilizer: All fields received 1,490 kg/ha of 9-13-17% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O.

Vitazyme application: 3 liters/ha, although application times were not specified.

Harvest date: unknown

Income results: Based on a potato price of 209.84 Ps/ton, the Vitazyme treatment for Fregat 1 produced an economic benefit of 402.53 Ps/ha. [Economic effect = (Value – Cost of Vitazyme treatment) – (Value – Cost of Control treatment)]

Yield results:

Treatment	Tuber yield tons/ha	Change tons/ha
<b>Fregat 1</b>		
Control	25.49	—
Vitazyme	26.97	1.48 (+6%)
<b>Fregat 2</b>		
Control	26.04	—
Vitazyme	26.25	0.21 (+1%)
<b>Mamey</b>		
Control	18.10	—
Vitazyme	22.83	4.73 (+26%)

**Tuber yield increases:  
+1%, 6%, and 26%**

Conclusions: Despite several problems in the conduct of this study including delayed planting times, severe *Phytophthora* infestations, and inadequate irrigation water, Vitazyme increased tuber yields by up to 26% in this Cuban potato trial. Fertilizer reductions of 10 to 25% would likely have shown benefits in cost savings, but even so the economic benefit of Vitazyme was 402.53 Ps/ha.

## Vital Earth Resources

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# 2005 Crop Results

## Vitazyme on Potatoes

Research organization: Batabano VCE, Havana Province, Cuba

Farm: Farm 14

Variety: Ajiba

Soil type: red ferralitic

Previous crop: unknown

Planting date: unknown

Irrigation: center pivot

Experimental design: Two potato fields received Vitazyme on one portion (8.05 ha), with a small fertilizer reduction on the treated portion, to evaluate the productive effects on potato tuber yield and quality.

### 1. Control (100% fertilizer)

### 2. Vitazyme (90% fertilizer)

Fertilization: Field 1, Control: 1,490 kg/ha of a 9-13-17% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O fertilizer; Vitazyme: 1,341 kg/ha of the same fertilizer. Field 2, Control: 1,341 kg/ha; Vitazyme: 1,207 kg/ha.

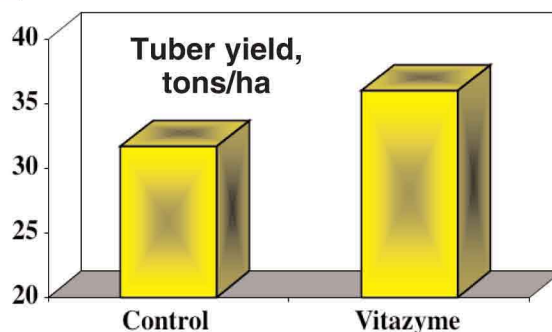
Vitazyme application: 3 liters/ha, although application times were not specified.

Harvest date: unknown

Yield results:

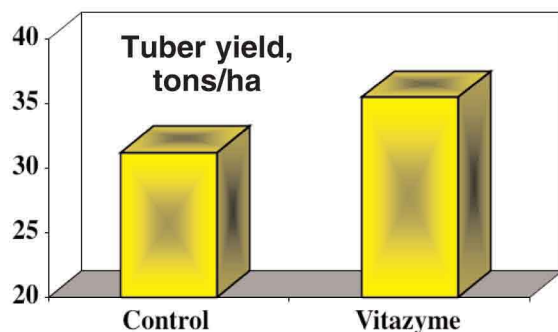
### Field 1

Treatment	Tuber yield tons/ha	Change tons/ha
Control	31.67	—
Vitazyme	35.97	4.30 (+14%)



**Tuber yield increase: +14%**

### Field 2



Treatment	Tuber yield tons/ha	Change tons/ha
Control	31.19	—
Vitazyme	35.45	4.26 (+14%)

**Tuber yield increase: +14%**

Economic results: Vitazyme and a fertilizer reduction resulted in an increased income of 1,105.66 Ps/ha for Field 1.

Quality results: Vitazyme treatment produced a higher dry matter content by 1.0 percentage point (18.7% vs. 17.7%), and more starch by 0.9 percentage point (12.3% vs. 11.4%) versus the control in Field 1. Field 2 showed very slight advantages for dry matter and starch with Vitazyme.

Conclusions: This Cuban potato trial, using 3 liters/ha of Vitazyme, proved that this product produced a consistent 14% yield increase, and also improved potato quality.



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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: Mitchell Chandler

Location: Presque Isle, Maine

Variety: Shepody

Market: McCains Foods

Planting date: May 22, 2004

Row spacing: 34 inches

In-row spacing: 16 inches

Soil type: gravely loam

Experimental design: A farmer's field was divided into Vitazyme treated and control areas, all other treatments of the entire field being the same

### 1. Control

### 2. Vitazyme

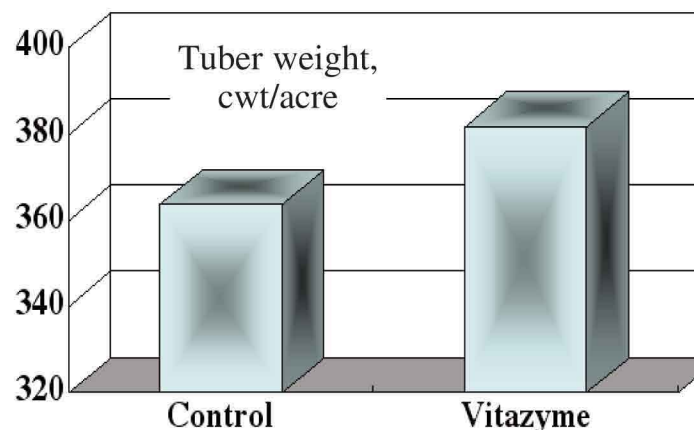
Fertilization: 1,300 lb/acre of 12-15-15% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O on May 13

Vitazyme application: (1) 13 oz/acre on the leaves and soil on June 25; (2) 13 oz/acre on the leaves and soil on July 12, 2004

Yield results: Tuber weights were determined during harvest by measuring load weights.

Treatment	Tuber weight cwt/acre	Change cwt/acre
Control	363.6	—
Vitazyme	381.6	18.0 (+ 5%)

**Increase in tuber weight: + 5%**



Income results: The increased yield of 18.0 cwt/acre, at \$5.30/cwt, produced additional income of \$95.40/acre

Conclusions: Vitazyme in this split field potato study in Main revealed that the product increased yield by 18 cwt/acre (+5%), that meant \$95.40 more income/acre for the farmer.

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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: Ron Barnes

Location: Foss Farm, Fort Fairfield, Maine

Variety: Norwis

Row spacing: 34 inches

In-row spacing: 6.6 inches

Soil type: gravely loam

Planting date: May 16, 2004

Market: seed

Experimental design: A potato field was divided into two parts, one treated with Vitazyme and the other left untreated. All other treatments were the same for both sides.

### 1. Control

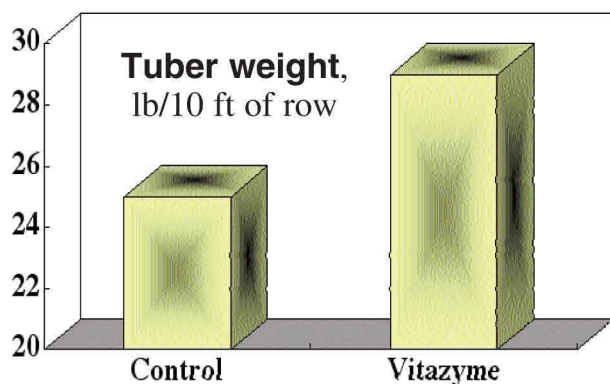
### 2. Vitazyme

Fertilization: 1,100 lb/acre of 12-15-15% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O plus other materials

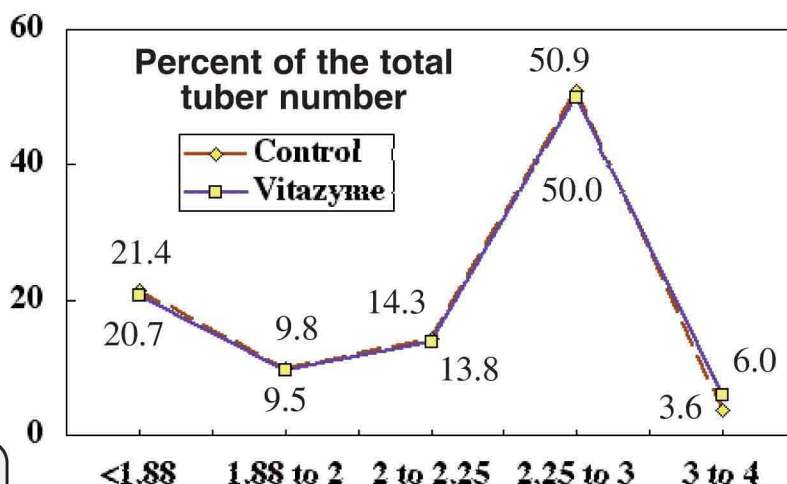
Vitazyme application: (1) 13 oz/acre on the leaves and soil on June 15, 2004; (2) 13 oz/acre on the leaves and soil on July 1, 2004

Yield results: Ten-foot row sections were dug for each treatment, and the tubers were weighed, counted, and sized. Each 10-foot section had 13 plants.

Treatment	Tuber weight lb/10 ft of row	Change lb/10 ft of row	Tuber number number	Change number
Control	25.0	—	112	—
Vitazyme	29.0	4.0 (+ 16%)	116	4 (+ 4%)



**Increase in tuber yield: + 16%**



There was little difference in the size distribution of the tubers for the two treatments, except for a small tendency for Vitazyme to produce larger potatoes, especially at the largest size (3 to 4 inches).

Conclusions: This in-field potato study in northern Maine showed that Vitazyme increased tuber yield by 16% while slightly increasing the average tuber size. There were also **significantly more roots noted with Vitazyme treated plants**, noticed particularly at digging.

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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: John Myers

Location: Center, Colorado

Row spacing: 34 inches

Soil test results: NO<sub>3</sub>-N, 48 lb/acre

Researcher: Jon Gilley, Agro-Engineering, Alamosa, Colorado

Variety: Norkotah 8

In-row spacing: 11 inches

Previous crop: potatoes

Planting date: May 1, 2004

Soil type: loamy sand

Harvest date: October 1, 2004

Experimental design: A potato field under center pivot irrigation was split into a control (untreated) area and a Vitazyme treated area to determine the effect of Vitazyme on tuber weight classifications.

### 1. Control

### 2. Vitazyme

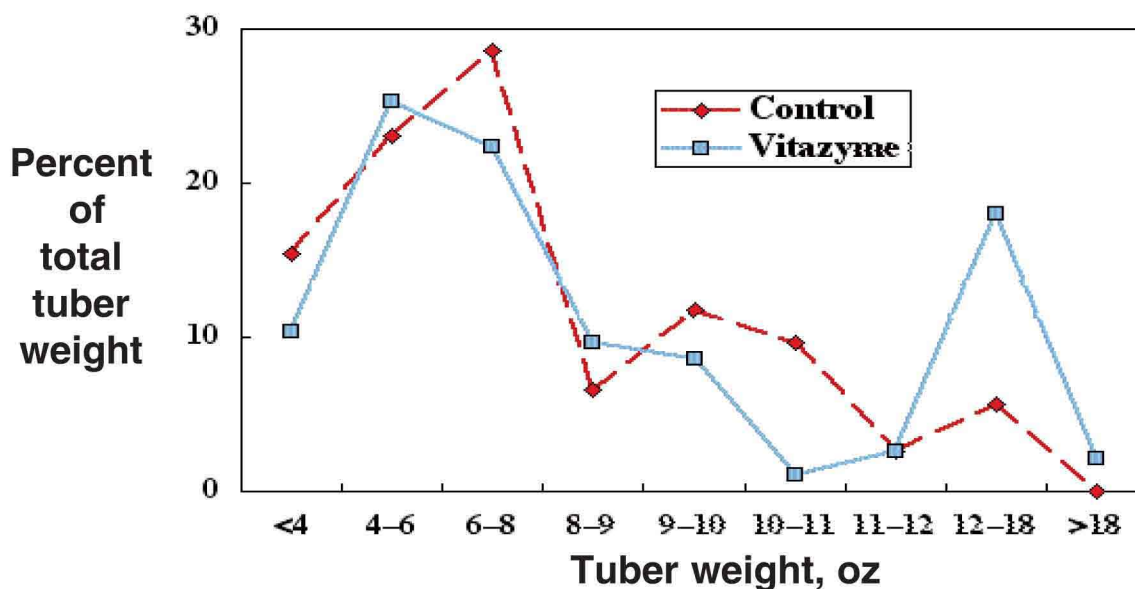
Fertilization: 168-199.5-30.5 lb/acre of N-P-K, 70 lb/acre S, 2.5 lb/acre Zn

Vitazyme application: (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

Tuber size results: Samples were dug and weighed for both treatments, and a sack of tubers was collected for each. These tubers were individually weighed and recorded for later analysis, when they were arranged according to size units.

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz
Control	15.4%	23.1%	28.6%	6.6%	11.8%	9.7%	2.6%	5.6%	0
Vitazyme	10.3%	25.3%	22.4%	9.6%	8.6%	1.1%	2.6%	18.0%	2.1%

### Tuber Weight Distribution

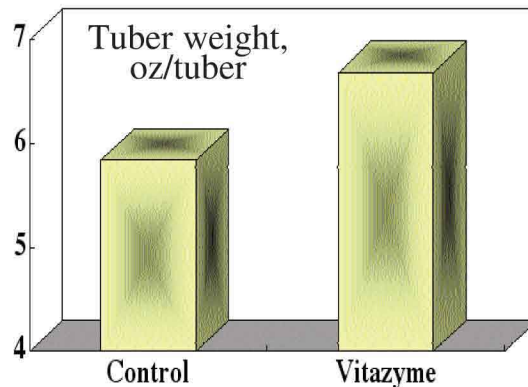




## Average Tuber Weight

Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	5.84	—
Vitazyme	6.68	0.84 (+ 14%)

**Increase in tuber weight: + 14%**



**Conclusions:** In this San Luis Valley potato trial, Vitazyme produced considerably larger tubers, on average, than the control treatment, by 14%. Especially for the 12 to 18 ounce grouping, the treated plants produced heavier tubers, and a lower percentage of the lighter categories as well,

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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: McNitt Produce

Location: Monte Vista, Colorado

Row spacing: 34 inches

Previous crop: potatoes

Researcher: Jon Gilley, Agro-Engineering, Alamosa, Colorado

Variety: Norkotah 296

In-row spacing: 11 inches

Soil test results: pH, 7.6; NO<sub>3</sub>-N, 28 lb/acre; P, 118 units; K, 186 mg/l; S,

55 mg/l; Zn, 3.89 mg/l; Fe, 17 mg/l; Cu, 1.07 mg/l; Mn, 9.6 mg/l; Na, 1% of CEC; salinity hazard, low; lime hazard, none.

Experimental design: To evaluate the effect of Vitazyme on potato yield, a field irrigated by a center pivot system was divided into treated and untreated parts. All other treatments were the same throughout the field.

### 1. Control

### 2. Vitazyme

Fertilization: 186.5-101-230 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, and 107 lb/acre of S

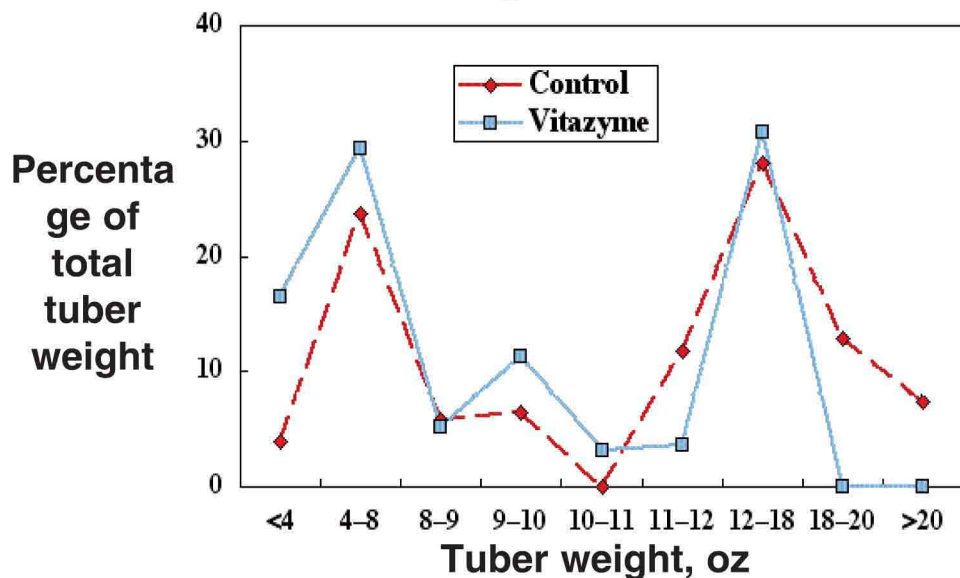
Vitazyme application: (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

Harvest date: September 30, 2004

Tuber size results: Tubers were dug and weighed with a truck for both treatments, and a sack of tubers for each treatment was collected. These tubers were weighed and recorded for later analysis to group by weight categories.

Treatment	<4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-10oz	>20oz
Control	4.0%	23.7%	5.8%	6.4%	0	11.7%	28.1%	12.8%	7.4%
Vitazyme	16.5%	29.4%	5.2%	11.3%	3.2%	3.6%	30.8%	0	0

### Total Weight Distribution



Treatment	Tuber weight	Change
	oz/tuber	oz/tuber
<b>Control</b>	9.43	—
<b>Vitazyme</b>	6.65	(-) 2.78 (- 29%)

**Decrease in tuber size: - 29%**

Vitazyme led to a reduction of average tuber weight in this sampling. There were no large tubers (>18 oz) with Vitazyme.

**Yield results:** Trucks for each treatment holding a harvested yield for half an acre were weighed.

Treatment	Truck weight	Yield	Change
	lb	cwt/acre	cwt/acre
<b>Control</b>	31,400	628.0	—
<b>Vitazyme</b>	30,760	615.2	(-) 12.8 (-2%)

**Decrease in tuber yield: - 2%**

There was a very small yield reduction for the Vitazyme treatment. Normally there is a yield increase, as obtained in all other Vitazyme tests in the San Luis Valley in 2004.

**Income results:** Tuber weight categories were multiplied by the price for the particular weights to give a total value for the samples.

Treatment	Tuber yield	Tuber price	Total income	Income change
	cwt/acre	\$/cwt	\$	\$
<b>Control</b>	628.0	4.70	2,951.60	—
<b>Vitazyme</b>	615.2	4.80	2,952.96	(-) 1.36

**Conclusions:** This Vitazyme potato study in the San Luis Valley of Colorado revealed that the product did not, for some unknown reason, initiate a yield increase. On the other hand, the material produced somewhat smaller average tubers without the very large, less valuable tubers, which resulted in a higher value for the treated tubers. This higher value produced an income that was about the same as for the untreated control.



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# 2004 Crop Results

## Vitazyme on Potatoes

Farm: 4 A Farms

Location: Center Colorado

Soil: loamy sand

Soil test results: pH, 8.2; NO<sub>3</sub>-N, 80 lb/acre; P, 96units; K, 317 mg/l; S, 34 mg/l; Zn, 1.71 mg/l; Fe, 7.1 mg/l; Cu, 0.63mg/l; Mn, 8.6mg/l; Na, 4% of CEC; salinity hazard, low; lime hazard, low.

Previous crop: potatoes

Researcher: Jon Gilley, Agro-Engineering, Alamosa, Colorado

Variety: Norkotah 296

Planting date: April 27, 2004

Row spacing: 34 inches

In-row spacing: 9, 10, and 11 inches

Harvest date: September 27, 2004

Experimental design: A center pivot irrigated field of potatoes was divided into two parts, Vitazyme treated and untreated, but all other treatments across the field were identical. The effects of Vitazyme on tuber yield and size were then evaluated.

### 1. Control

### 2. Vitazyme

Fertilization: 197.5-199.5-100 lb/acre of N-P-K, 128.5 lb/acre of S, and 3 lb/acre of Zn

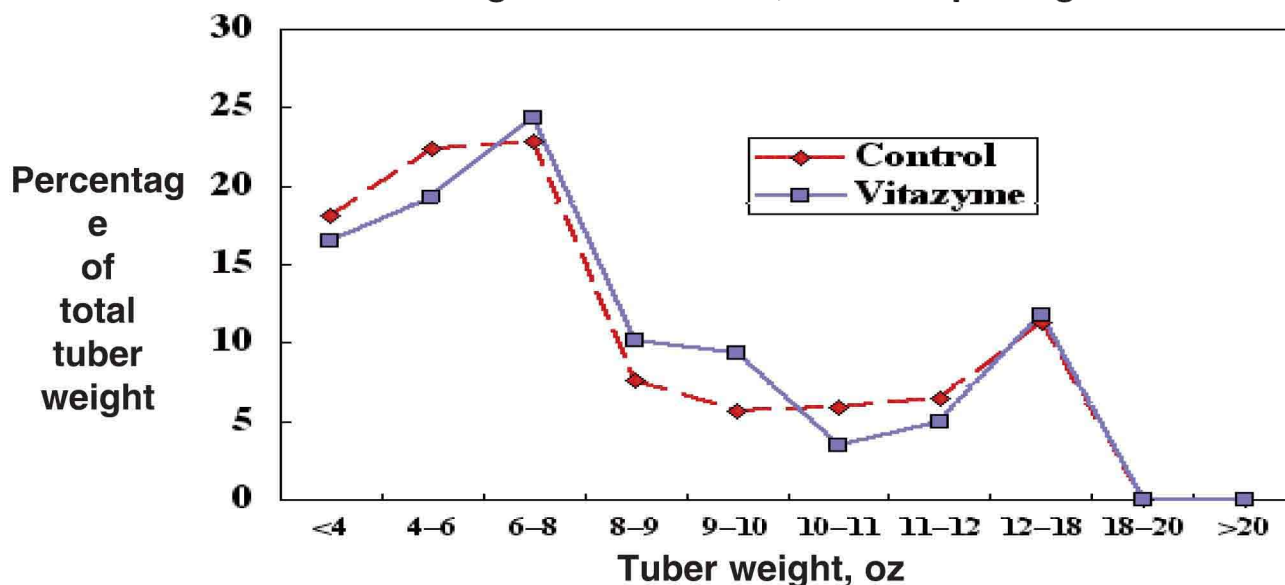
Vitazyme application: (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

Tuber size results: Samples were dug and weighed for both treatments, and a sack of tubers was collected for each. These tubers were individually weighed and recorded for later analysis, when they were arranged according to size units.

## 9-Inch Spacing

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	18.1%	22.4%	22.8%	7.6%	5.4%	5.9%	6.5%	11.3%	0	0
Vitazyme	16.5%	19.3%	24.3%	10.2%	9.4%	3.5%	5.0%	11.8%	0	0

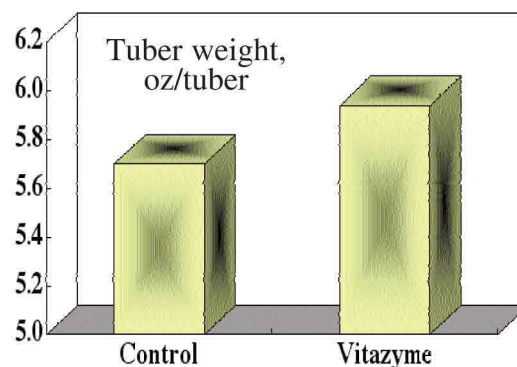
Tuber Weight Distribution, 9-Inch Spacing



### Average Tuber Weight, 9-Inch Spacing

Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	5.70	—
Vitazyme	5.94	0.24 (+ 4%)

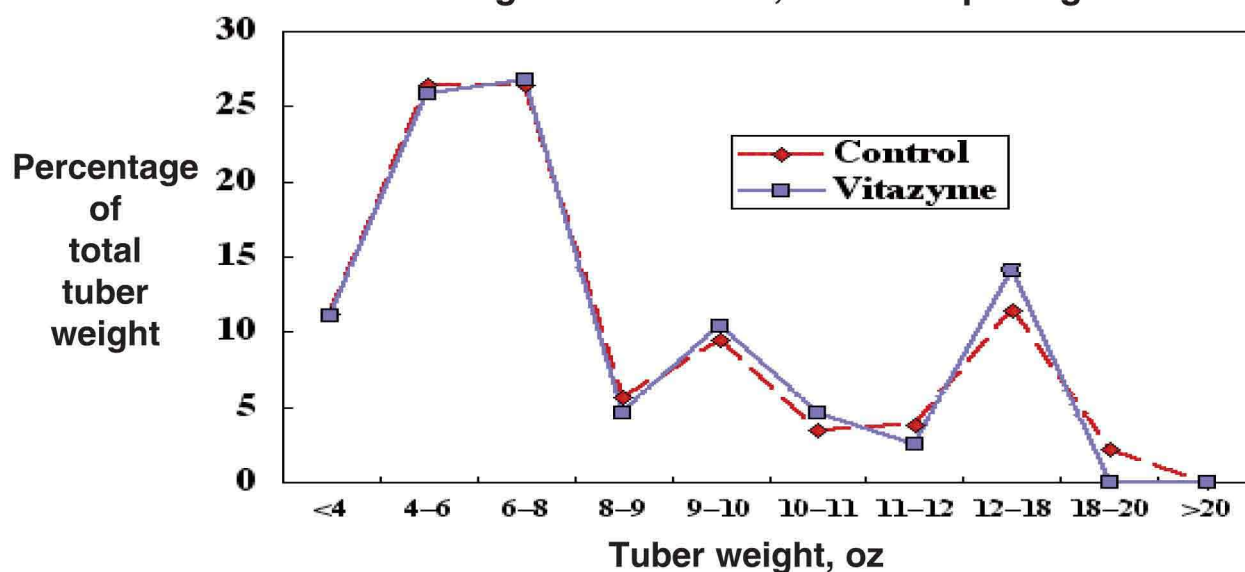
**Increase in tuber weight: + 4%**



### 10-Inch Spacing

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	11.2%	26.4%	26.4%	5.7%	9.5%	3.5%	3.8%	11.4%	2.2%	0
Vitazyme	11.1%	25.9%	26.8%	4.6%	10.4%	4.6%	2.5%	14.1%	0	0

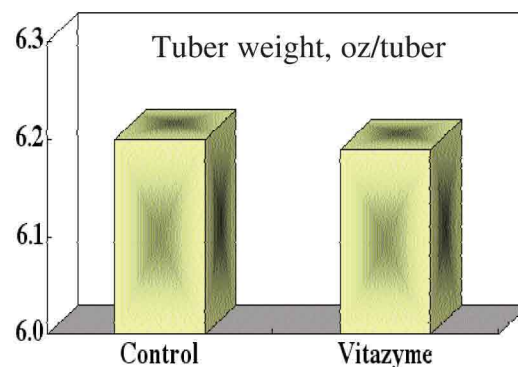
### Tuber Weight Distribution, 10-Inch Spacing



### Average Tuber Weight, 10-Inch Spacing

Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	6.20	—
Vitazyme	6.19	(-) 0.01 (0%)

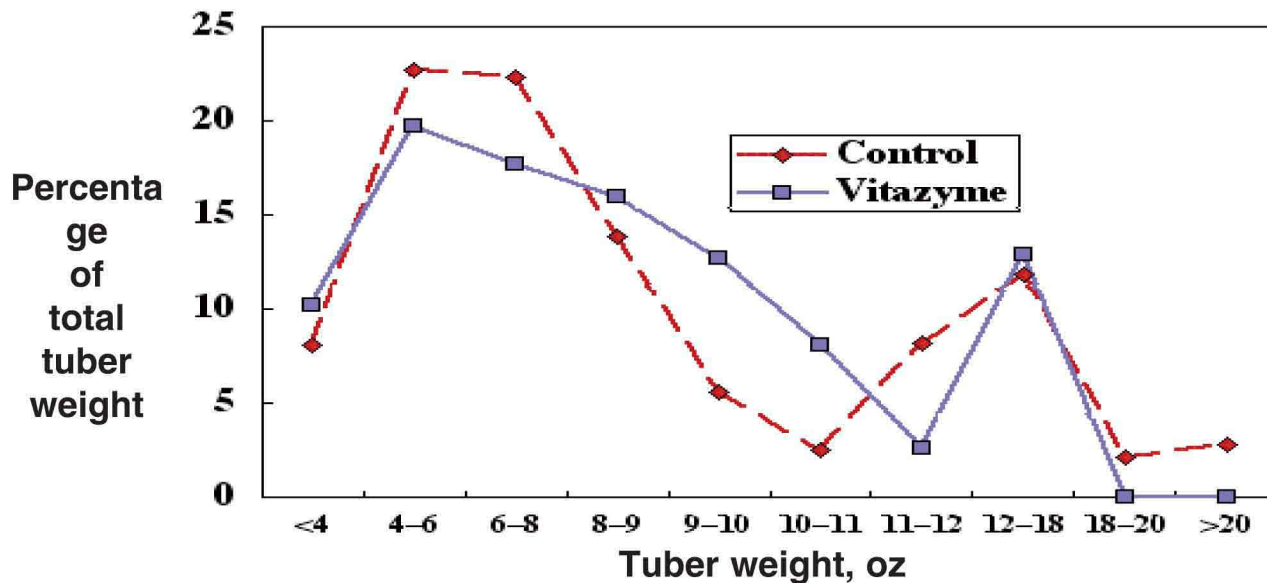
**Decrease in tuber weight: 0 %**



## 11-Inch Spacing

Treatment	<4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	>20oz
Control	8.1%	22.7%	22.3%	13.8%	5.6%	2.5%	8.2%	11.8%	2.1%	2.8%
Vitazyme	10.2%	19.7%	17.7%	16.0%	12.7%	8.1%	2.6%	12.9%	0	0

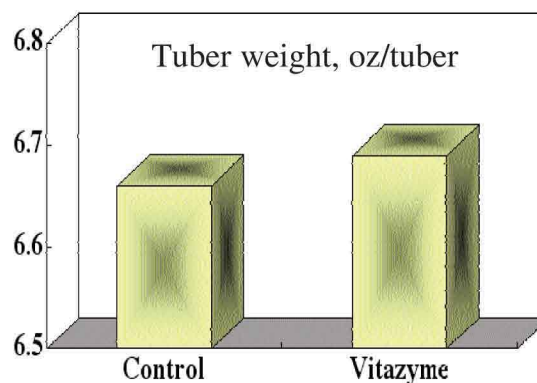
**Tuber Weight Distribution, 11-Inch Spacing**



**Average Tuber Weight, 10-Inch Spacing**

Treatment	Tuber weight	Change
	oz/tuber	oz/tuber
Control	6.66	—
Vitazyme	6.69	0.03 (+ 0.5%)

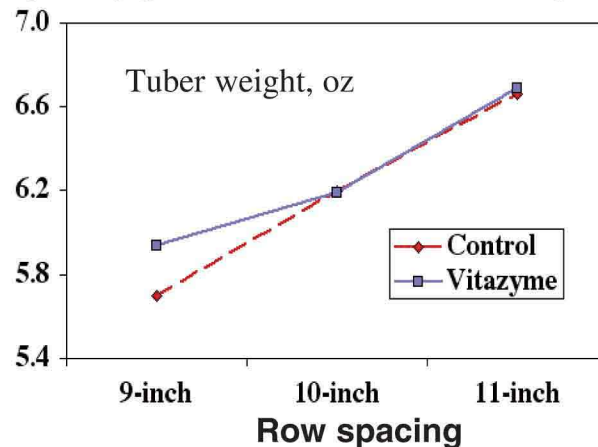
**Increase in tuber weight: + 0.5 %**



Vitazyme tended to increase average tuber weight, especially for the 9-inch spacing, moving the average weight towards the larger size while, in general, increasing the mid-range sizes of 9 to 18 oz. This effect was especially pronounced with the 11-inch spacing. The net effect was to move the size ranges towards those that were more profitable, as will be shown later in this report.

As expected, average tuber weight increased with increased in-row plant spacing for both treatments. See the accompanying graph.

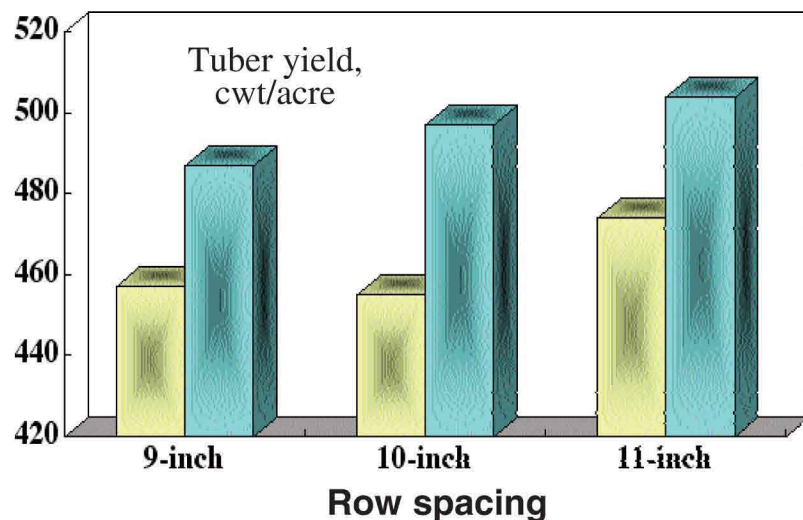
**Yield results:** Samples for each treatment were weighed on a scale and calculated to determine per acre yields. See the results on the next page. Yield increases were consistent for all three row spacings, ranging from 6 to 7%.





Treatment	Tuber weight cwt/acre	Change cwt/acre
<b>9-inch spacing</b>		
Control	457	—
Vitazyme	487	30 (+7)
<b>10-inch spacing</b>		
Control	455*	—
Vitazyme	497*	42 (+9%)
<b>11-inch spacing</b>		
Control	474	—
Vitazyme	504	30 (+6%)

\*Average of two samples.



**Income results:** Each tuber size category was weighted to a percentage of the total weight, and that percentage was multiplied by the price for that category. When added, those sums gave a total value for the crop.

**For all row spacings Vitazyme increased potato income substantially. This increase was not only due to higher yields, but also due to a higher average price for tubers that were of higher valued weight classes.**

**Conclusions:** In this Colorado potato study, Vitazyme increased yields at 9, 10, and 11-inch row spacings from 6 to 9% over the controls. These increases produced tubers that were of higher value than the control due to better weight distribution, so that yields were increased by \$160.25 to \$243.90/acre.

### **Tuber Weight Increase**

**9-inch spacing: + 7%**  
**10-inch spacing: + 9%**  
**11-inch spacing: + 6%**

Treatment	Tuber weight cwt/acre	Tuber price*	Total income \$/acre	Income increase \$/acre
<b>9-inch spacing</b>				
Control	457	4.53	2,070.21	—
Vitazyme	487	4.58	2,230.46	160.25
<b>10-inch spacing</b>				
Control	455	4.64	2,111.20	—
Vitazyme	497	4.72	2,345.84	234.64
<b>11-inch spacing</b>				
Control	474	4.77	2,260.98	—
Vitazyme	504	4.97	2,504.88	243.90

\* Potato prices per cwt in the San Luis Valley of Colorado for November, 2004, are \$1.00 (<4oz), \$4.50 (4-8oz), \$5.51 (8-9oz), \$6.15 (9-10oz), \$6.82 (10-11oz), \$7.42 (11-12oz), \$6.00 (12-18oz), \$2.00 (18-20oz), and \$1.00 (>20oz).

### **Increase in income with Vitazyme**

**9-inch spacing: \$160.25/acre**  
**10-inch spacing: 234.64/acre**  
**11-inch spacing: \$243/acre**

**These income increases revealed an income:cost benefit of about \$16 to \$24 per dollar invested in product.**

## Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

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

# 2004 Crop Results

## Vitazyme on Potatoes

**Farmer:** Beiringer Farms

**Location:** Hooper, Colorado

**Soil:** loamy sand

**Previous crop:** sudan grass

**Soil test results:** pH, 8.5; NO<sub>3</sub>-N, 110 lb/acre; P, 49 units; K, 562 mg/l; S, 49 mg/l; Zn, 1.12 mg/l; Fe, 9.1 mg/l; Cu, 0.7 mg/l; Mn, 7.5mg/l; Na, 3% of CEC; salinity hazard, low; lime hazard, low.

**Experimental design:** A potato field with center pivot irrigation was divided into Vitazyme treated and control areas for three different in-row spacings — 10, 11, and 12 inches — to determine effects on tuber yield and size.

- (1) 10-inch spacing: Control      (2) 10-inch spacing: Vitazyme  
(3) 11-inch spacing: Control      (4) 11-inch spacing: Vitazyme  
(5) 12-inch spacing: Control      (6) 12-inch spacing: Vitazyme

**Fertilization:** 149-201-30 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, 22 lb/acre of S, 2.5 lb/acre of Zn

**Vitazyme application:** (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

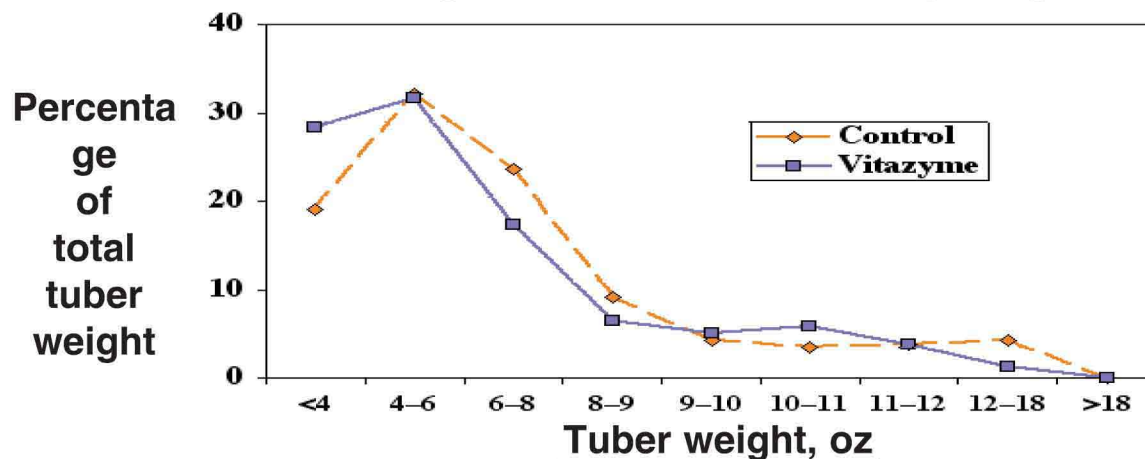
**Harvest date:** September 27, 2004

**Tuber size results:** Samples were dug and weighed for each treatment, and a sack of tubers for each treatment was collected. These tubers were individually weighed and recorded for later analysis, when they were arranged according to size units.

### 10-Inch Spacing

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	≥18oz
Control	19.1%	32.2%	23.6%	9.2%	4.2%	3.5%	3.8%	4.3%	0
Vitazyme	28.4%	31.7%	17.4%	6.5%	5.1%	5.8%	3.8%	1.3%	0

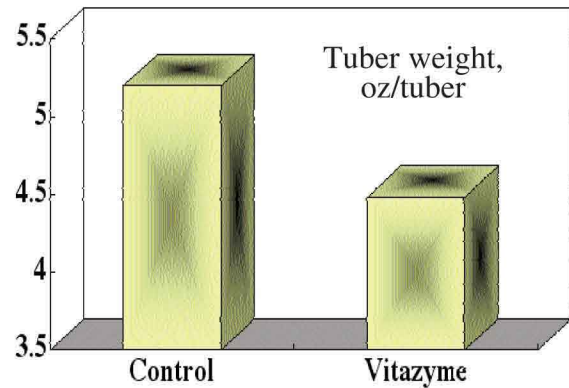
### Tuber Weight Distribution, 10-Inch Spacing



### Average Tuber Weight, 10-Inch Spacing

Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	5.20	—
Vitazyme	4.48	(-) 0.72 (-14%)

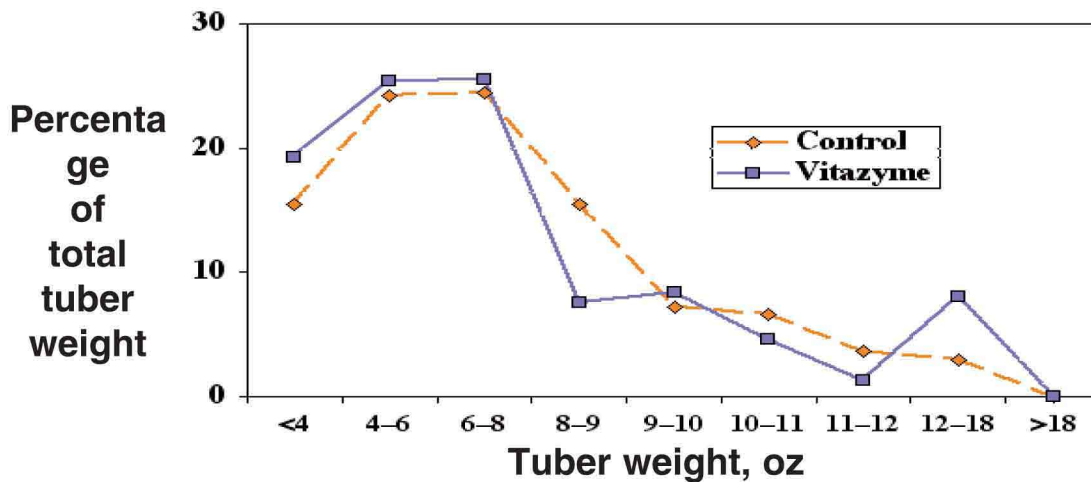
**Decrease in tuber weight: - 14%**



### 11-Inch Spacing

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	≥18oz
Control	15.5%	24.2%	24.4%	15.5%	7.2%	6.6%	3.7%	2.9%	0
Vitazyme	19.3%	25.4%	25.5%	7.6%	8.4%	4.6%	1.3%	8.0%	0

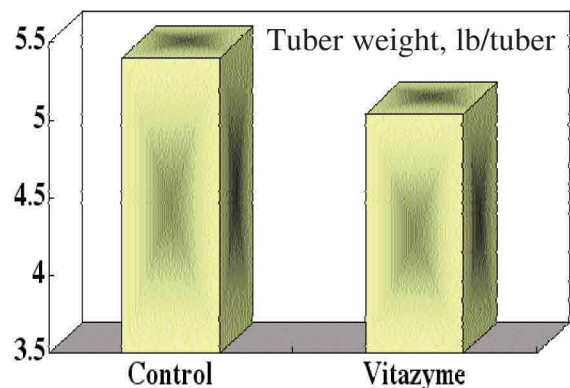
### Tuber Weight Distribution, 11-Inch Spacing



### Average Tuber Weight, 11-Inch Spacing

Treatment	Tuber weight lb/tuber	Change lb/tuber
Control	5.40	—
Vitazyme	5.04	(-) 0.36 (- 7%)

**Decrease in tuber weight: - 7%**

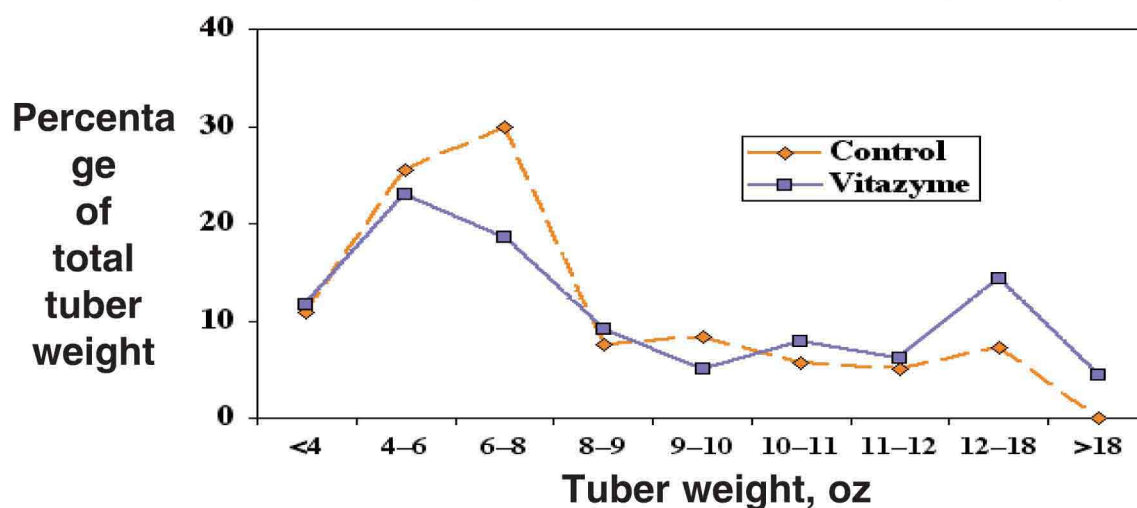




## 12-Inch Spacing

Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	≥18oz
Control	10.9%	25.5%	29.9%	7.5%	8.4%	5.7%	5.0%	7.2%	0
Vitazyme	11.7%	23.0%	18.6%	9.1%	5.0%	7.8%	6.1%	14.3%	4.4%

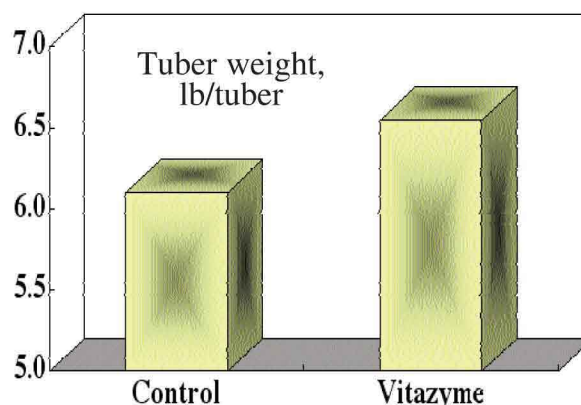
### Tuber Weight Distribution, 12-Inch Spacing



### Average Tuber Weight, 12-Inch Spacing

Treatment	Tuber weight lb/tuber	Change lb/tuber
Control	6.10	—
Vitazyme	6.55	0.45 (+ 7%)

**Increase in tuber weight: + 7%**



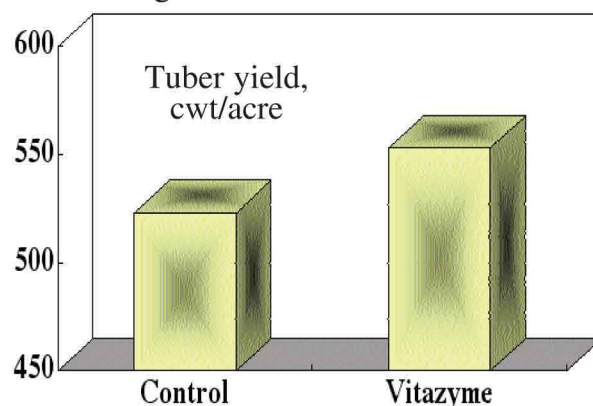
Vitazyme reduced average tuber size at both the 10 and 11-inch spacings (-14% and -7%, respectively), but at the 12-inch spacing Vitazyme increased tuber size by 5%. At the 12-inch spacing the largest tubers were also produced, 4.4% of them being over 18oz in weight. As the graph shows, all sizes above 10oz were increased by Vitazyme, especially the 12 to 18oz range. On the other hand, the lightest (<4oz) tubers were increased at both 10 and 11-inches.

**Yield results:** Samples for the two 12-inch spacing treatments were weighed on a scale and calculated to determine tuber weight on a truckload for the same area of each treatment.

### 12-inch row spacing yield

Treatment	Truck weight lb	Area yield cwt/acre	Change cwt/acre
Control	26,160	523.2	—
Vitazyme	27,640	552.9	29.7 (+ 6%)

**Increase in tuber weight: + 6%**



**Income results:** Tuber weight categories were weighted for value according to the price for each category, and the totals for both of the two 12-inch spacing treatments were determined.

<b>Treatment</b>	<b>Tuber yield</b>	<b>Tuber price*</b>	<b>Total income</b>	<b>Income increase</b>
	cwt/acre	\$/cwt	\$/acre	\$/acre
Control	523.2	4.72	2,469.50	
Vitazyme	552.9	4.73	2,615.22	145.72

\*Potato prices per cwt in the San Luis Valley of Colorado for November, 2004, are \$1.00 (<4oz), \$4.50 (4-8oz), \$5.51 (8-9oz), \$6.15 (9-10oz), \$6.82 (10-11oz), \$7.42 (11-12oz), \$6.00 (12-18oz), \$2.00 (18-20oz), and \$1.00 (>20oz).

Vitazyme increased the value of these two harvested potato samples by \$145.72/acre.

**Conclusions:** This Colorado potato study utilizing 10, 11, and 12-inch row spacings revealed that Vitazyme increased the overall tuber yield of the 12-inch spacing by 6%; yields for the other two spacings were not determined. Vitazyme increased the average tuber size at the 12-inch spacing, but did not for the 10 and 11-inch spacings. Income was increased by Vitazyme by \$145.72/acre at the 12-inch spacing.

## Vital Earth Resources

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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: Jamie Hart

Location: Monte Vista, Colorado

Row spacing: 34 inches

Soil test results: pH, 6.8; NO<sub>3</sub>-N, 100 lb/acre; P, 81 units; K, 115 mg/l; S, 8 mg/l; Zn, 5.16 mg/l; Fe, 14.5 mg/l; Cu, 0.67 mg/l; Mn, 9.1 mg/l; Na, 2% of CEC; salinity hazard, low; lime hazard, none.

Previous crop: potatoes

Researcher: Jon Gilley, Agro-Engineering, Alamosa, Colorado

Variety: Norkotah 223

Planting date: May 5, 2004

In-row spacing: unknown

Soil type: cobbly loam

Harvest date: October 1, 2004

Experimental design: A center pivot irrigated potato field was divided into Vitazyme treated and untreated portions to determine the product's effects on tuber yield and weight classifications.

### 1. Control

### 2. Vitazyme

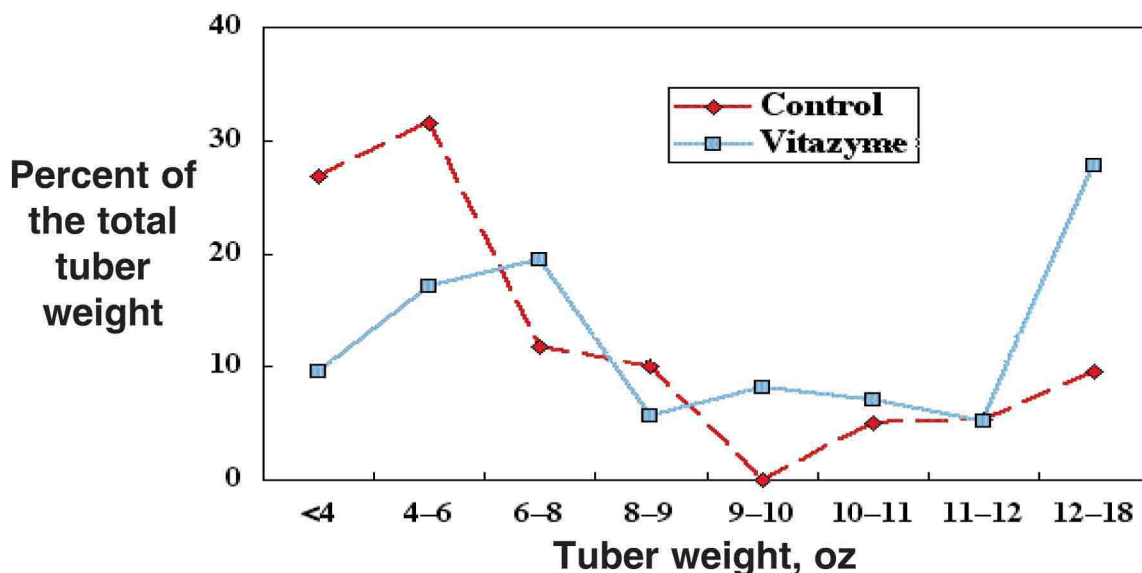
Fertilization: 164.5-180-230 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, 68.5 lb/acre S, 1 lb/acre Zn

Vitazyme application: (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

Tuber size results: Samples were dug and weighed for both treatments, and a sack of tubers was collected for each. These tubers were individually weighed and recorded for later analysis, when they were arranged according to size units.

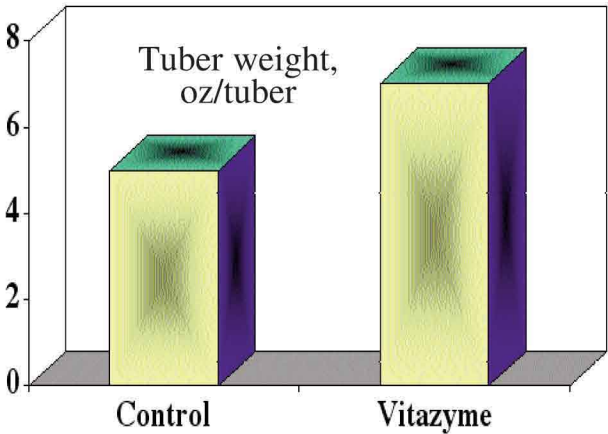
Treatment	≤4oz	4.1-6oz	6.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz
Control	26.8%	31.5%	11.8%	10.1%	0	5.0%	5.3%	9.5%
Vitazyme	9.6%	17.1%	19.5%	5.7%	8.2%	7.1%	5.1%	27.8%

### Tuber Weight Distribution



# Average Tuber Weight

Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	5.00	—
Vitazyme	7.02	2.02 (+ 40%)



**Increase in tuber weight: + 40%**

In this field, Vitazyme greatly increased average tuber size (+ 40%), and skewed the weight towards the larger weight categories. There were many more tubers less than 6 oz with the control than with Vitazyme, and many more large tubers above 12 oz as well.

Tuber yield results: A four-row section of each treatment (0.33 acre) was harvested and weighed.

Treatment	Tuber yield cwt/acre	Change sacks/acre
Control	357	
Vitazyme	345	(-) 12 (- 3%)

**Change in tuber  
yield: - 3%**

Income results: Prices for the various weight ranges were multiplied by those weights, and the totals were added on a percentage basis to give a value for the samples.

Treatment	Tuber yield cwt/acre	Tuber price \$/cwt	Income \$/acre	Change \$/acre
Control	357	4.08	1,456.56	—
Vitazyme	345	5.09	1,756.05	299.49

**Increase in income: \$299.49/acre**

Conclusions: Vitazyme in this sample of potatoes grown in the San Luis Valley of Colorado caused a slight yield reduction, but caused a **dramatic increase in tuber weight (+ 40%)**. **This increased tuber size resulted in a substantial improvement in tuber value (a \$1.01/cwt increase in value), which netted the farmer an extra \$299.49/acre in income.**



## Vital Earth Resources

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# 2004 Crop Results

## Vitazyme on Potatoes

**Farmer:** Jim Echeverria

**Location:** Hooper, Colorado

**Soil:** loamy sand

**Previous crop:** wheat

**Soil test results:** pH, 8.3; NO<sub>3</sub>-N, 12 lb/acre; P, 74 units; K, 376 mg/l; S, 41 mg/l; Zn, 1.05 mg/l; Fe, 4.4 mg/l; Cu, 0.39 mg/l; Mn, 8.4 mg/l; Na, 3% of CEC; salinity hazard, low; lime hazard, high.

**Experimental design:** A center pivot irrigated field was divided into Vitazyme treated and untreated areas for three different in-row spacings — 9, 10, and 11 inches — to determine effects on tuber yield and tuber size.

(1) 9-inch spacing: Control

(2) 10-inch spacing: Control

(3) 11-inch spacing: Control

(4) 9-inch spacing: Vitazyme

(5) 10-inch spacing: Vitazyme

(6) 11-inch spacing: Vitazyme

**Fertilization:** 195-209-50 lb/acre of N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, 78.5 lb/acre of S, 4 lb/acre of Zn

**Vitazyme application:** (1) 13 oz/acre with the first irrigation; (2) 13 oz/acre at tuber initiation (hook stage) through the irrigation system

**Harvest date:** September 25, 2004

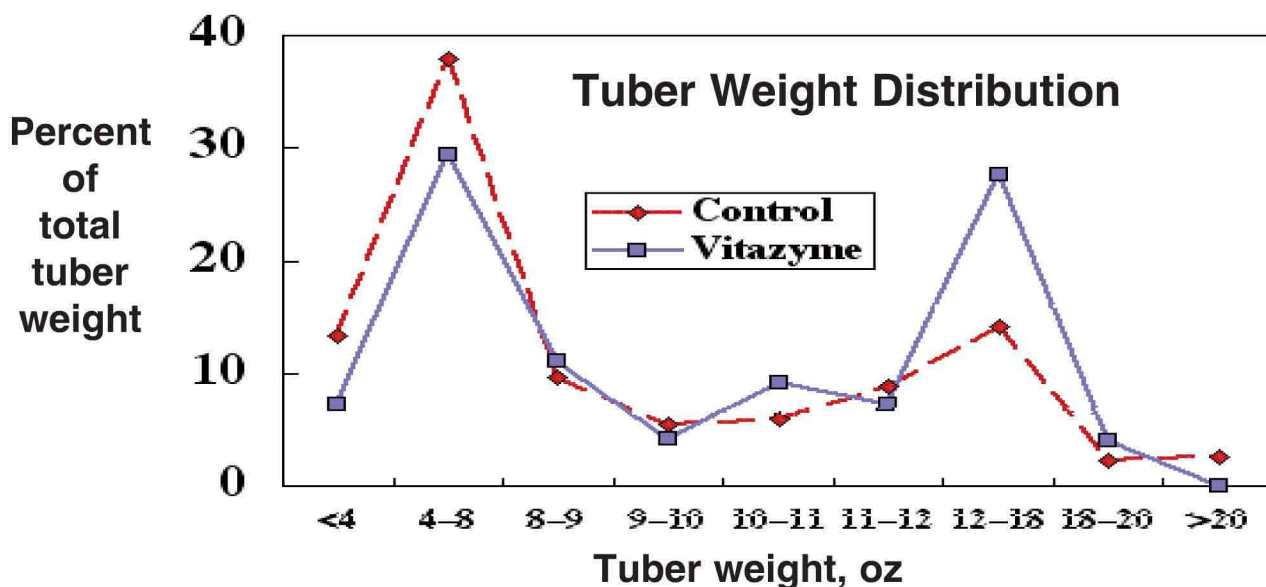
**Tuber size results:** Samples were dug and weighed for each treatment, and a sack of tubers for each treatment was collected. These tubers were all weighed and recorded for later analysis, when they were arranged within different size units.

### 9-Inch Spacing

Treatment	≤4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
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Control	13.3%	37.9%	9.7%	5.4%	6.0%	8.9%	14.1%	2.2%	2.6%
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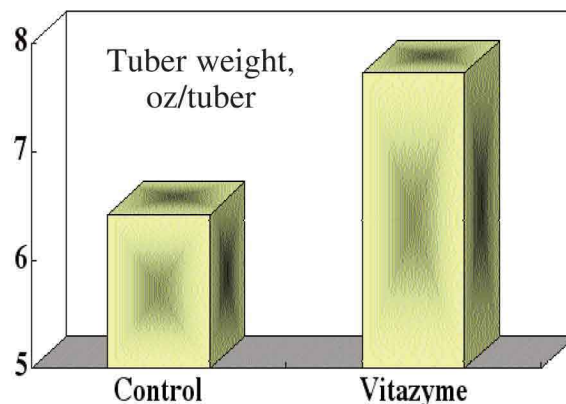
Vitazyme	7.3%	29.4%	11.1%	4.1%	9.1%	7.3%	27.6%	4.0%	0
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## Average Tuber Weight

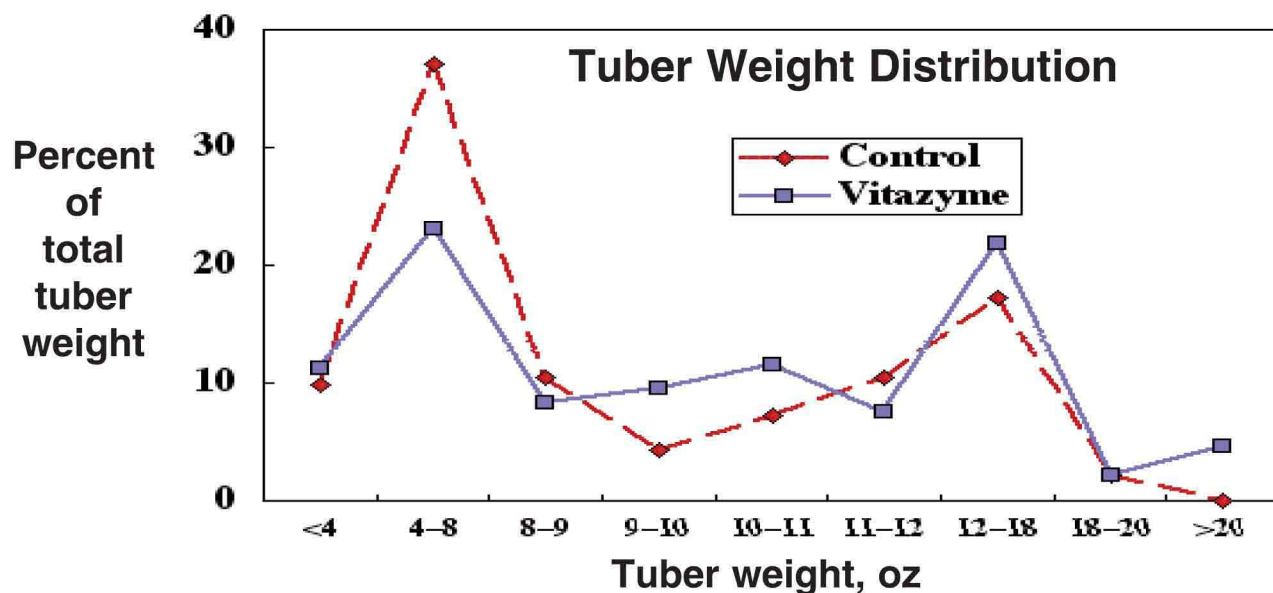
Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	6.42	—
Vitazyme	7.73	+1.31 (+ 20 %)

**Increase in tuber weight: + 20%**



## 10-Inch Spacing

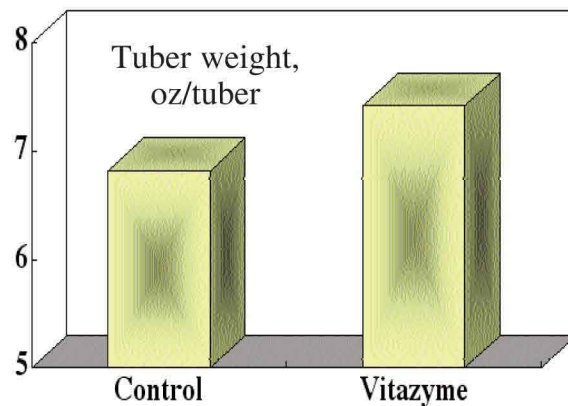
Treatment	≤4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
Control	9.9%	37.1%	10.5%	5.3%	7.2%	10.5%	17.3%	2.2%	0
Vitazyme	11.3%	23.1%	8.3%	9.5%	11.5%	7.6%	21.9%	2.2%	4.6%



## Average Tuber Weight

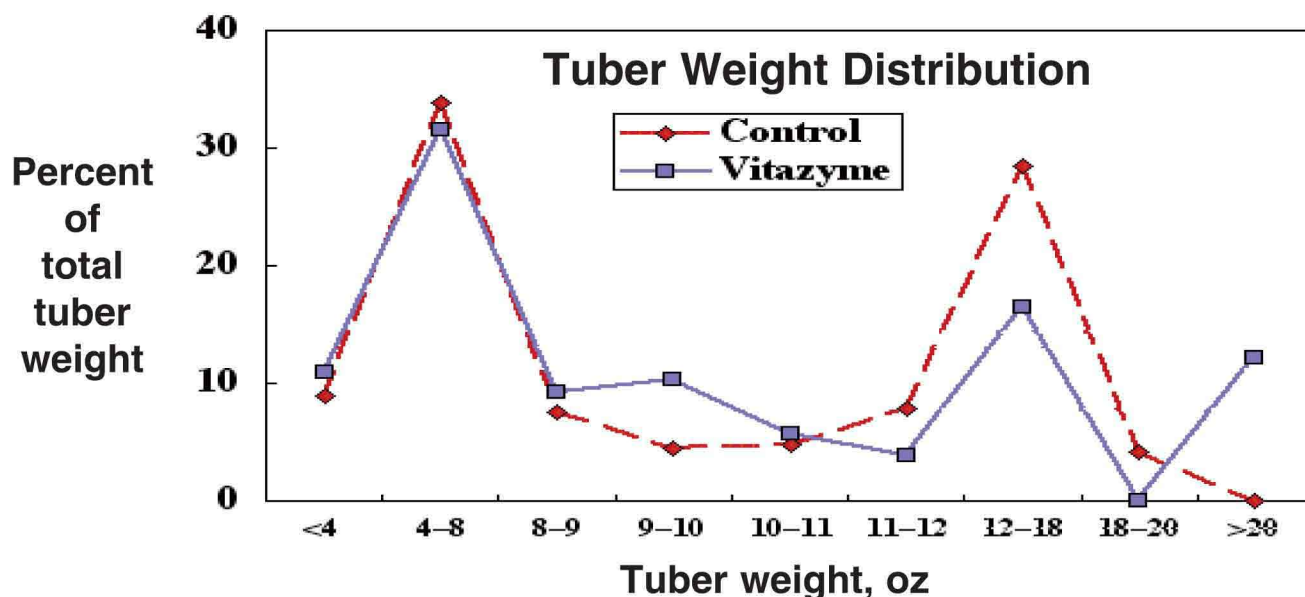
Treatment	Tuber weight oz/tuber	Change oz/tuber
Control	6.82	—
Vitazyme	7.42	+0.60 (+ 9%)

**Increase in tuber weight: + 9%**



## 11-Inch Spacing

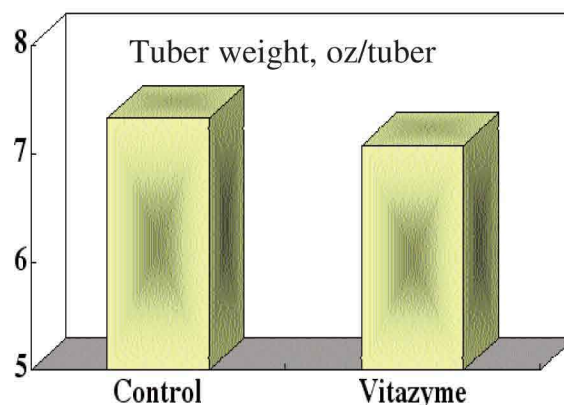
Treatment	≤4oz	4.1-8oz	8.1-9oz	9.1-10oz	10.1-11oz	11.1-12oz	12.1-18oz	18.1-20oz	≥20oz
<b>Control</b>	8.9%	33.9%	7.6%	4.4%	4.7%	7.9%	28.4%	4.2%	0
<b>Vitazyme</b>	10.9%	31.6%	9.3%	10.3%	5.7%	3.8%	16.4%	0	12.1%



## Average Tuber Weight

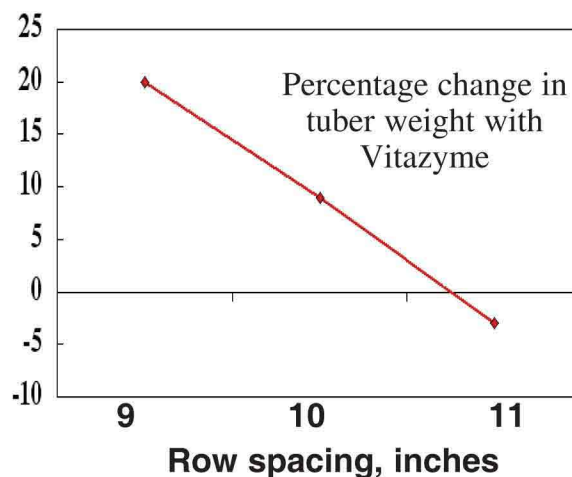
Treatment	Tuber weight oz/tuber	Change oz/tuber
<b>Control</b>	7.33	—
<b>Vitazyme</b>	7.08	(-) 0.25 (-3%)

**Increase in tuber weight: + 9%**



Vitazyme increased the average tuber weight by 20% at the 9-inch spacing, but by only 9% at the 10-inch spacing, while actually decreasing tuber weight slightly at the 11-inch spacing. The relationship between tuber weight change and in-row spacing is nearly straight-line, as shown in the graph. Vitazyme is shown to more effectively increase tuber weight at closer spacing intervals than at wider intervals.

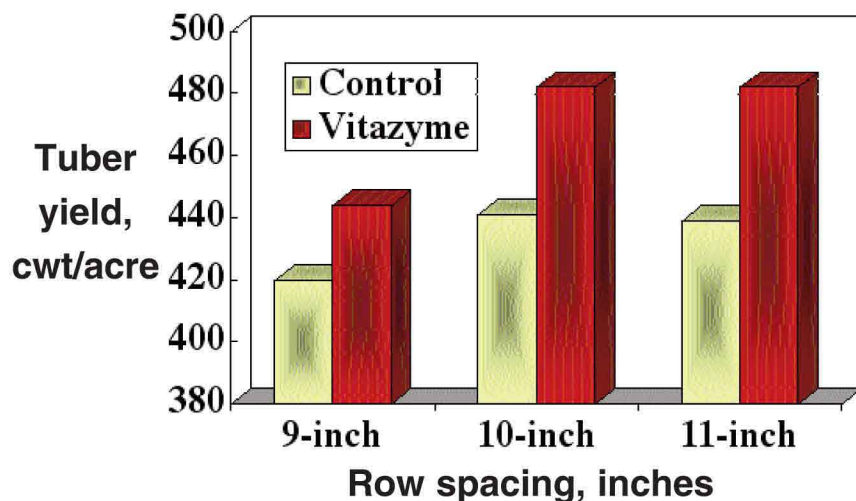
At 9 and 10-inch spacings the tuber size distribution was very similar, with Vitazyme producing more tubers in the 9 to 18 ounce range than the control. At the 11-inch spacing, Vitazyme caused the growth of more 9 to 11 ounce tubers, but reduced the number of tubers on either side of that range, except for the large tubers over 20 ounces.





**Yield results:** Samples for each treatment were weighed and calculated to determine per acre yields.

<b>Treatment</b>	<b>Tuber weight</b> cwt/acre	<b>Change</b> cwt/acre
<b>9-inch spacing</b>		
Control	420	—
Vitazyme	444	24 (+ 6%)
<b>10-inch spacing</b>		
Control	441	—
Vitazyme	482	41 (+9%)
<b>11-inch spacing</b>		
Control	439	—
Vitazyme	482	43 (+ 10%)



Yield increases at all three row spacings were consistent, ranging from 6 to 10%

**Income results:** Each tuber size category was weighted with the market price for that category on a percentage basis, and the size values were added to give a total value per cwt for each treatment.

#### **Tuber Weight Increase**

**9-inch spacing: + 6%**  
**10-inch spacing: + 9%**  
**11-inch spacing: +10%**

<b>Treatment</b>	<b>Tuber weight</b> cwt/acre	<b>Tuber price*</b> \$/cwt	<b>Total income</b> \$/acre	<b>Income increase</b> \$/acre
<b>9-inch spacing</b>				
Control	420	6.42	2,696.40	—
Vitazyme	444	7.73	3,432.12	735.72
<b>10-inch spacing</b>				
Control	441	6.82	3,007.62	—
Vitazyme	482	7.42	3,576.42	568.80
<b>11-inch spacing</b>				
Control	439	7.33	3,217.87	—
Vitazyme	482	7.08	3,412.56	194.69

\* Potato prices per cwt in the San Luis Valley of Colorado for November, 2004, are \$1.00 (<4oz), \$4.50 (4-8oz), \$5.51 (8-9oz), \$6.15 (9-10oz), \$6.82 (10-11oz), \$7.42 (11-12 oz), \$6.00 (12-18oz), \$2.00 (18-20oz), and \$1.00 (>20oz).

Vitazyme substantially increased potato income at all three row spacings, but especially at the 9 and 10-inch spacings. For the 9 and 10-inch spacings the tuber value was improved due to Vitazyme tuber size improvements, though such an effect was not noted for the 11-inch spacing.

#### **Increase in potato income with Vitazyme**

**9-inch spacing: \$735.72/acre**  
**10-inch spacing: \$568.80/acre**  
**11-inch spacing: \$194.69/acre**

**Conclusions:** In this Colorado potato trial using 9, 10, and 11-inch row spacings, Vitazyme boosted potato yields 6, 9, and 10%, respectively. These yield increases resulted in a higher value for the tubers, because of size improvements, for the 9 and 10-inch spacings, although this did not hold true for the 11-inch spacing. The increased total yield and better sizes contributed to good income increases for all three row spacings, but especially for the 9-inch spacing where an increase of \$735.72/acre was achieved.



## Vital Earth Resources

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# 2004 Crop Results

## Vitazyme on Potatoes

**Farmer:** Keith Doyen

**Location:** W.E. Doyen and Sons, Mapleton, Maine

**Variety:** Katahdin

**Market:** seed or table

**Row spacing:** 34 inches

**In-row spacing:** 7.5 inches

**Planting date:** May 22, 2004

**Soil type:** gravely loam

**Experimental design:** A potato field was divided into two parts, one part treated with Vitazyme, to evaluate the effects on yield and tuber size.

### 1. Control

### 2. Vitazyme

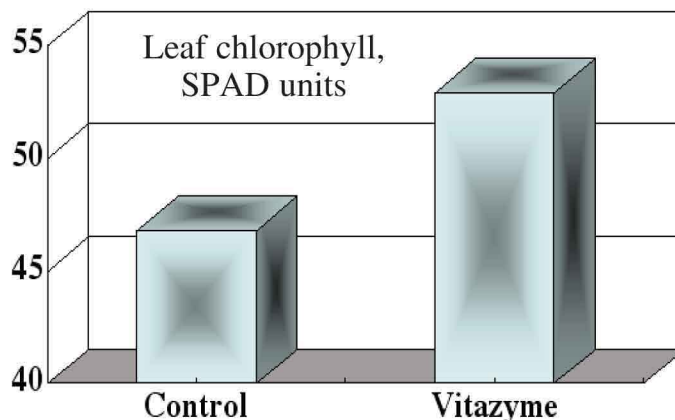
**Fertilization:** unknown

**Vitazyme application:** 13 oz/acre on July 2; 13oz/acre on July 29

**Chlorophyll effects:** On July 30, 30 plants from each treatment were evaluated for chlorophyll content using a Minolta SPAD meter.

Treatment	Leaf chlorophyll SPAD units	Change SPAD units
Control	46.8	—
Vitazyme	52.9	6.1 (+13%)

**Increase in leaf chlorophyll:  
+ 6.1 SPAD units**

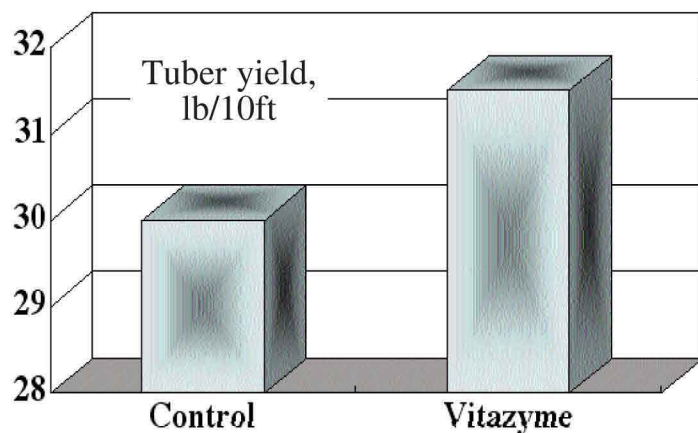


On this date the Vitazyme treated plants were visibly greener than the control treatment. Tubers from sample plants were noticeably larger for the treated plants.

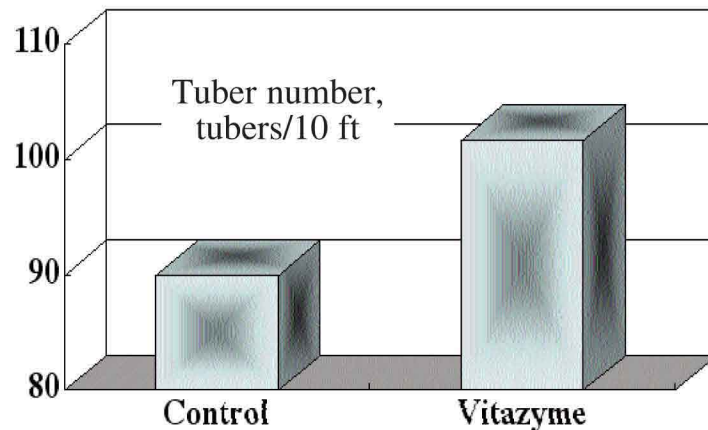
**Yield results:** Two 10-foot control row sections and three 10-foot Vitazyme treated sections were dug before harvest, and the tubers were weighed and sized. Values were averaged for the two treatments.

## Tuber Weight and Number

Treatment	Tuber weight lb/10 ft	Change lb/10 ft	Tuber number number/10 ft	Change number/10 ft
Control	30.0	—	90.0	—
Vitazyme	31.5	1.5 (+ 5%)	101.7	11.7 (+ 13%)

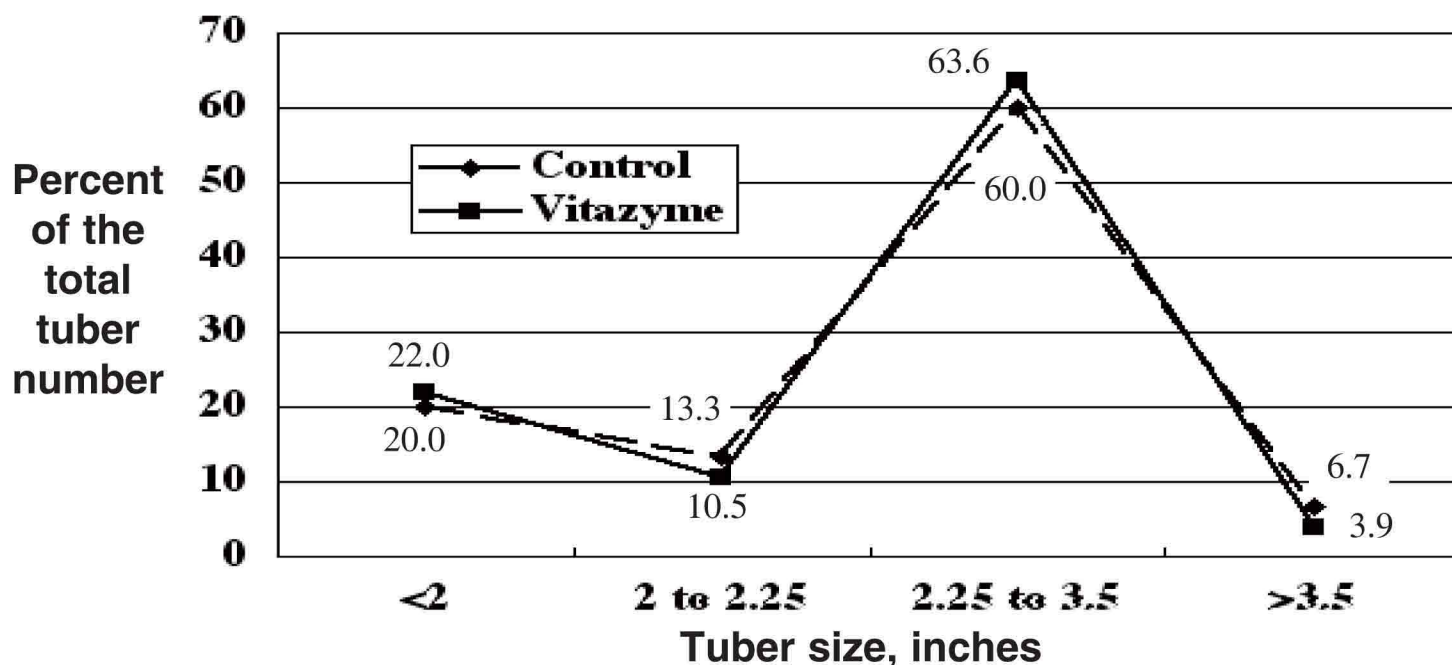


**Tuber yield increase: + 5%**



**Tuber number increase: + 13%**

### Tuber Size Distribution



**Conclusions:** Vitazyme in this on-farm Maine potato study increased the yield by 5% and tuber number by 13%. Tuber distribution with Vitazyme was moved in favor of the 2.25 to 3.5 inch size, where there were 3.6% more tubers than for the control. Other observations during harvest were the following:

- ✓ The Vitazyme treated tubers had a brighter appearance than the controls.
- ✓ Less soil adhered to the Vitazyme treated tubers than to the controls.
- ✓ Little if any rhizoctonia was evident with the Vitazyme treated potatoes, though some was evident for the control tubers.

## Vital Earth Resources

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# 2004 Crop Results

## Vitazyme on Potatoes

Farmer: Larry Ireland

Location: Presque Isle, Maine

Variety: Andover

Row spacing: 34 inches

In-row spacing: 7.5 inches

Soil type: gravely loam

Planting date: unknown

Market: seed

Experimental design: This split-field comparison evaluated ACA and Equity on the east side, and Vitazyme on the west side of the field. Both yield and tuber size were compared at harvest.

### 1. Control (ACA + Equity)

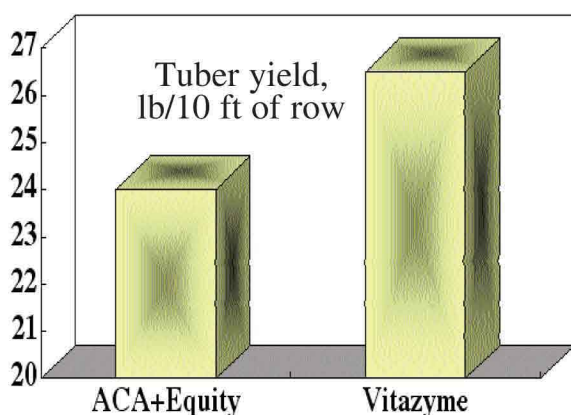
### 2. Vitazyme

Fertilization: unknown

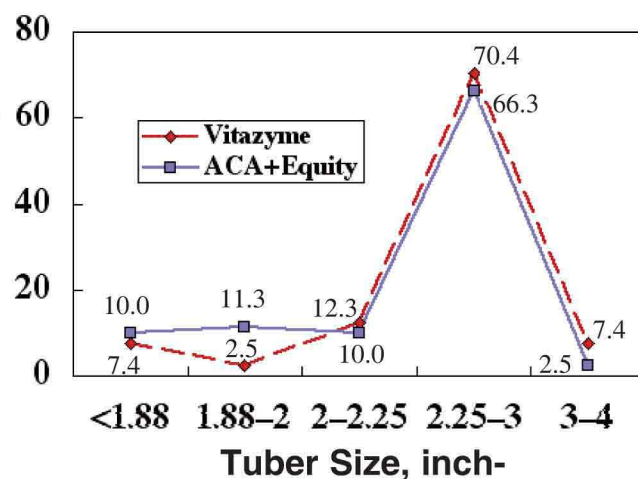
Vitazyme application: (1) 13 oz/acre on the seed pieces at planting; (2) 13 oz/acre on the leaves and soil at tuber initiation

Yield results: Ten-foot row sections were dug for each treatment on September 6, 2004, and the tubers were counted, weighed, and sized. Each 10-foot section had 11 plants.

Treatment	Tuber weight lb/10ft of row	Change lb/10ft of row	Tuber number number	Change number
ACA+Equity	24.0	—	80	—
Vitazyme	26.5	2.5 (+ 10%)	81	1 (+ 1%)



Percent of  
the total  
tuber  
number



**Increase in tuber yield: + 10%**

Vitazyme produced larger tubers, on average, than did the ACA + Equity treatment.

Conclusions: For this on-farm field comparison in northern Maine, Vitazyme produced a 10% greater yield of larger, more acceptable tubers than the other treatment. In addition, the soils treated with Vitazyme were “softer”, and the potatoes were deeper, than for the ACA+Equity treatment.

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# 2003 Crop Results

## Vitazyme on Potatoes

Researcher: Jon Gilley, Agro-Engineering, Alamosa, Colorado

Farm: Ford Farm, Field 8

Location: Saguache, Colorado

Variety: Norkotah TX 112

Soil type: sandy loam

Planting date: unknown

Population: 10-inch spacing

Row spacing: 34 inches

Experimental design: A portion of a center pivot irrigation circle was selected to apply Vitazyme, while the nearby areas of the circle served as the controls.

### 1. Control

### 2. Vitazyme

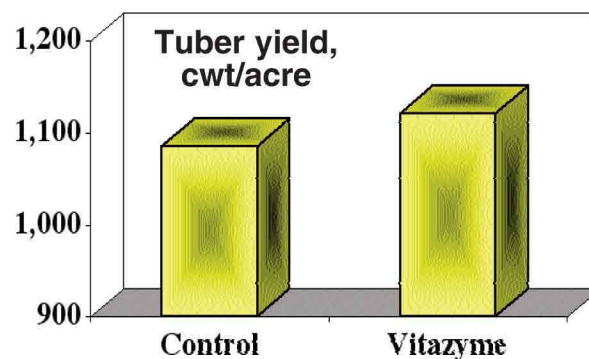
Fertilization: 130 lb/acre N, 100 lb/acre P<sub>2</sub>O<sub>5</sub>

Vitazyme application: (1) 13 oz/acre soon after planting, through the irrigation system; (2) 13 oz/acre at the early hook stage

Harvest date: unknown

Yield results: A 2 acre area of the treated potatoes was dug, weighed on a truck scale, and compared to a nearby untreated area.

Treatment	Yield	Change
	----- cwt/acre -----	
Control	542	—
Vitazyme	560	18 (+3%)



Income results: A price of \$10.00/cwt is used in these calculations.

Treatment	Tuber yield	Income	Increase
	cwt/acre	\$/acre	\$/acre
Control	542	5,420	—
Vitazyme	560	5,600	180

Conclusions: Vitazyme applied to potatoes in this southern Colorado test produced a modest 3% yield increase, that gave the grower \$180/acre more income. Not evaluated in this study was tuber size distribution, which very likely would have shown a higher percentage of medium-sized tubers. Such a size improvement, seen in several earlier potato trials in the same area, would further enhance this income figure.



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# **2003 Crop Results**

## **Vitazyme on Potatoes**

**Researcher:** Alan Perry, Bedrock Soil Balancing Services, Presque Isle, Maine

**Farmer:** Robert Shaw

**Location:** Ft. Fairfield, Aroostook County, Maine

**Variety:** Frito Lay 1879

**Soil type:** gravelly loam

**Row width:** 36 inches

**In-row spacing:** 8 inches

**Population:** unknown

**Previous crop:** cereal rye

**Planting date:** unknown

**Experimental design:** A potato field was divided into two parts, one receiving Vitazyme three times and the other receiving only the normal program.

### **1. Control**

### **2. Vitazyme**

**Fertilization:** standard for the farm

**Vitazyme applications:** three applications of 13 oz/acre each time: in the furrow at planting, at blossom, and a few weeks later

**Yield results:** While no yield figures are available for the control and treated areas, the yield improvement was easily noticed, and was estimated by the farmer to be 3,000 lb/acre, possibly more.

**Increase in yield: 3,000 lb/acre**

**Tuber size:** There were **fewer “B-sized” tubers** (2 inches or less in diameter) with Vitazyme, and **more uniformity in tuber size**.

**Conclusions:** Vitazyme, in this northern Maine trial produced a higher yield of more uniform sized tubers, with fewer in the small “B” range. With FL1879 potatoes it is difficult to get a yield increase, but this program proved that an increase is certainly possible.

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# 2003 Crop Results

## Vitazyme on Potatoes

**Researcher:** Jorge and Ignacio Gonzalez Duran, Vitazyme S.A. de C.V., Leon, Mexico; Alberto Cortes, Ag BioTech, Inc., Ensenada, B.C., Mexico

**Ranch manager:** Casimiro Gonzalez Perez

**Sabritas supervisor:** Andres Otero

**Location:** El Ranch "Cerro de agua", Saltillo, Coahuila, Mexico

**Variety:** Frito Lay variety

**Soil type:** high-calcium stony clay (desert soil); very compact

**Previous crop:** unknown

**Experimental design:** Two potato fields under separate center pivot irrigation were divided into sections having Vitazyme treatments and controls. Each field had a separate treatment regime. Vitazyme applications were made with a field sprayer.

### 1. Control

**Fertilization:** N-P-K plus certain micronutrients

**Vitazyme applications:** Field 9: three soil/foliar sprays at 1 l/ha, beginning 45 days after planting

Field 8: three soil/foliar sprays at 1 l/ha, beginning 30 days after planting

**Harvest date:** unknown

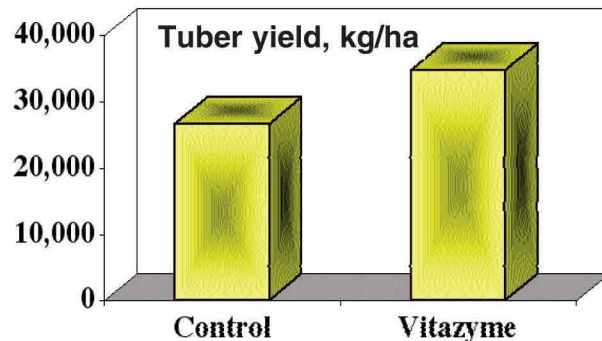
**Yield results:**

### Field 9

Treatment	Area	Yield	Area yield	Change
	ha	kg	kg/ha	kg/ha
Control	8.0	211,970	26,496	—
Vitazyme	10.0	345,890	34,589	8,093(+31%)

**Increase in yield: 31%**

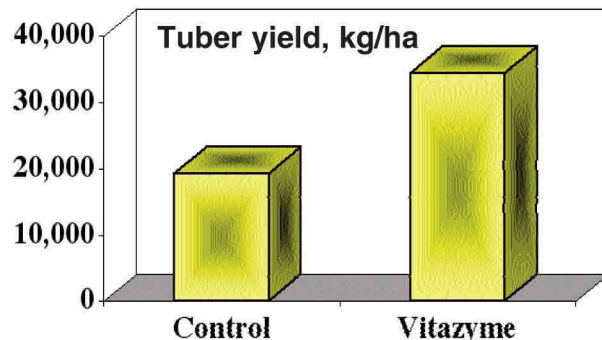
### 2. Vitazyme



### Field 8

Treatment	Area	Yield	Area yield	Change
	ha	kg	kg/ha	kg/ha
Control	4.5	86,754	19,279	—
Vitazyme	10.0	342,564	34,256	14,977 (+78%)

**Increase in yield: 78%**



**Income results:** The price of potatoes is 3.4 pesos/kg, and the

cost of Vitazyme is 231 pesos/liter.

27,516.2 pesos/ha increase

Field 9: 8,093 kg/ha increase x 3.4 pesos/kg =

50,921.8 pesos/ha increase

Field 8: 14,977 kg/ha increase x 3.4 pesos/kg =

Vitazyme cost: 3 applications x 231 pesos = 693 pesos/ha

Income – Cost ratio: 39.7 : 1

Field 9: 27,516.2 pesos/693 pesos = 73.5 : 1

Field 8: 50,921.8 pesos/693 pesos =

**Conclusions:** In this potato study near Saltillo, Mexico, Vitazyme applied three times produced remarkable increases in yield of 31% when applied fairly late in the growth cycle, and 78% when applied earlier. Increases may have been even greater if the product had been applied at or near planting as well. These very high yield increases translated into income increases of over 27,00 to nearly 57,000 pesos per hectare, with remarkable income:cost ratios of 39.7 to 73.5:1.

These two studies show the potential of Vitazyme to substantially increase the yields of potatoes grown in northern Mexico under the typically stressful conditions of high heat, compaction, low organic matter, and high calcium and mineral imbalances. This product enables plants to overcome many environmental stresses, as evidenced well in these tests.

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# 2003 Crop Results

## Vitazyme on Potatoes

Researcher: Jorge Alfonso Gonzalez Duran

Research organization: Agritec del Centro, S. de P.R. de RL., Leon, Guanajuato, Mexico

Test location: Zamora de Hidalgo, Michoacan, Mexico

Variety: Alpha

Planting date: August 10, 2002

Soil type: unknown

Row spacing: unknown

Previous crop: unknown

Experimental design: A 10-acre field of potatoes was split into two equal parts, one half treated with Vitazyme and the other half left untreated. All input parameters except for Vitazyme for both sides were equal.

### 1. Control

### 2. Vitazyme

Fertilization: At planting, 100 kg/ha 18-46-0 (%N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O), 100 kg/ha 16-16-16, 150 kg/ha 0-50-18, 100 kg/ha 22-22-4, and 100 kg/ha sulfur.

Vitazyme treatments: Two applications at 1 liter/ha, sprayed on each time, a few weeks after planting and at the hook stage

Harvest date: December 20, 2002

Yield results: At harvest time, two samples of 1 meter<sup>2</sup> each were collected from each of the two treatments. These two values for each treatments have been arranged for all of the yield figures below. The tubers were sorted according to size into five categories.

Yield and size distribution results:

### Yield and Tuber Size Data

The Vitazyme treatment produced tubers that were considerably larger than for the untreated plants. The weights

Treatment	Tuber size														
	1 A (large)			2 A (medium)			3 A (small)			4 A (very small)			5 A (extremely small)		
	number	kg/m <sup>2</sup>		number	kg/m <sup>2</sup>		number	kg/m <sup>2</sup>		number	kg/m <sup>2</sup>		number	kg/m <sup>2</sup>	
Control	6.5	0.91	—	7.5	0.75	—	16.5	0.83	—	8.5	0.17	—	2.5	0.07	—
Vitazyme	10.5	1.48	(+63%)	14.0	1.43	(+91%)	10.5	0.53	(-36%)	14.5	0.30	(+0.76)	11.5	0.12	(+71%)

for the large and medium sizes were 63 and 91% greater, respectively, with Vitazyme than without it. The Vitazyme treatment produced 2.91 kg/m<sup>2</sup> out of a total of 3.84 kg/m<sup>2</sup>,

or 76% of the total tuber weight, whereas the control produced 1.66 kg/m<sup>2</sup> out of a total of 2.72 kg/m<sup>2</sup>, which was 61% of the total tuber weight. Total tuber production was 71% higher with Vitazyme.

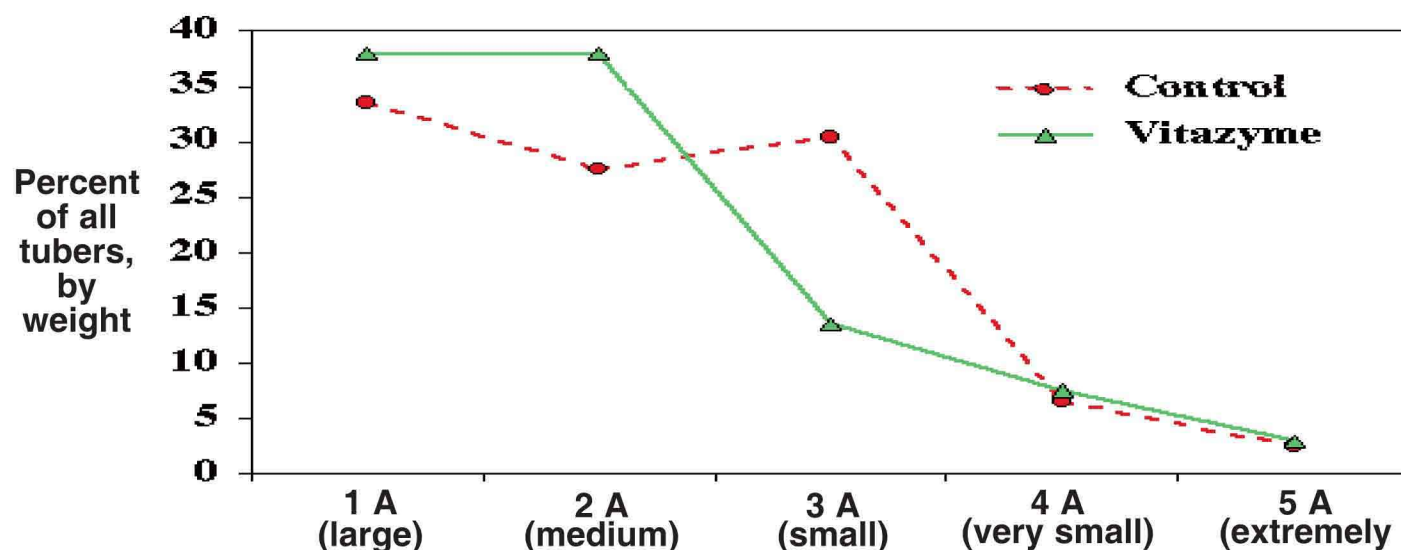
Treatment	Total Tubers		Total weight		Total yield	
	number		kg/m <sup>2</sup>		tons/ha	
Control	41.5	—	2.72	—	28.016	—
Vitazyme	61.0	(+47%)	3.84	(+41%)	39.552	(+41%)

**Tuber yield increase with Vitazyme: 41%**

**Increase in tuber size (large and medium) with Vitazyme: 15% above the control**



## Tuber Size Distribution, By Weight



**Income results:** Prices used in calculating these values are according to tuber size, using the following schedule.

9 pesos = 1 dollar.

Size 1 A — 8.0 pesos/kg

Size 4 A — 5.0 pesos/kg

Size 2 A — 7.0 pesos/kg

Size 5 A — 5.0 pesos/kg

Size 3 A — 6.5 pesos/kg

Treatment	Size 1 A			Size 2 A		
	Yield	Value		Yield	Value	
	kg/ha	Pesos/ha	\$/ha	kg/ha	Pesos/ha	\$/ha
Control	9,385.4 (33.5%)	75,083.2	8,342.58	7,704.4 (27.5%)	53,930.8	5,992.31
Vitazyme	15,029.8 (38.0%)	120,238.4	13,359.82	15,029.8 (38.0%)	105,208.3	11,689.81

Treatment	Size 3 A			Size 4 A		
	Yield	Value		Yield	Value	
	kg/ha	Pesos/ha	\$/ha	kg/ha	Pesos/ha	\$/ha
Control	8,544.9 (30.5%)	55,541.7	6,171.30	1,821.0 (6.5%)	9,105.2	1,011.69
Vitazyme	5,339.5 (13.5%)	34,706.9	3,856.32	2,966.4 (7.5%)	14,832.0	1,648.00

Treatment	Size 5 A		
	Yield	Value	
	kg/ha	Pesos/ha	\$/ha
Control	700.4 (2.5%)	3,502.0	389.11
Vitazyme	1,186 (3.0%)	5,933.0	659.22

	Total Value			
	Pesos/ha	\$/ha	change, Pesos/ha	change, \$/ha
Control	197,162.9	21,906.99	—	—
Vitazyme	280,918.6	31,213.17	+83,755.7	+9,306.19

**Increase in income: 83,755.7 pesos/ha  
9,306.19 \$/ha**

**Conclusions:** Vitazyme greatly improved the performance of this potato crop in Mexico, as determined by a split-field design. The tubers were larger on average with Vitazyme, the 1 A and 2A classes being increased by 15% above the controls in terms of percentage of the total weight. The total yield of tubers with Vitazyme was 41% greater than for the control, and total income was increased by 83,755.7 pesos/ha (\$9,306.19/ha) using this highly effective crop biostimulant.



**Control**



**Vitazyme**



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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Jon Gilley

Farm: Sun Valley Farm

Planting date: June 5, 2002

Population: 10-inch spacing

Experimental design: A center pivot irrigated field was divided into Vitazyme treated and untreated areas.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

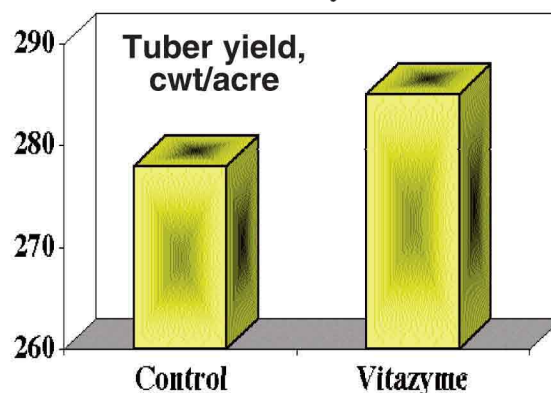
Vitazyme treatments: (1) 13 oz/acre soon after planting, through the irrigation system; (2) 13 oz/acre at the early hook stage

Harvest date: September 1, 2002

Yield results: A yield monitor evaluated 20 to 30 acres of both the control and Vitazyme treatments.

Treatment	Tuber yield	Change
	----- cwt/acre -----	
Control	278	—
Vitazyme	285	7 (+3%)

**Tuber yield increase: 3%**



Income results: Based on an estimated price of \$10.00/cwt, the following potato values are calculated. No size determinations were made on these tubers.

Treatment	Tuber yield	Income	Increase
	cwt/acre	\$/acre	\$/acre
Control	278	2,780	—
Vitazyme	285	2,850	70

**Income increase: \$70.00/acre**  
(not including size distribution improvements)

Conclusions: Vitazyme applied to these Yukon Gold potatoes increased the yield by 3%, with a \$70/acre increase in gross income, but these figures do not take into account a likely improvement in the uniformity of the tubers which would increase income further. Such a size distribution was not determined in this study, but other tests in the San Luis Valley have shown that Vitazyme improves the uniformity, and therefore the marketability and price, of the tubers.

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Jon Gilley

Farm: Ford Farm

Planting date: June 10, 2002

Population: 10-inch spacing

Experimental design: A section of an irrigated (center pivot) potato field was treated with Vitazyme, and the remainder of the field served as a control.

Research organization: Agro-Engineering, Alamosa, Colorado

Location: Saguache, Colorado

Soil type: sandy loam

Harvest date: September 20, 2002

Variety: Yukon Gold

Row spacing: 34 inches

### 1. Control

Fertilization: 130 lb/acre N, 100 lb/acre P<sub>2</sub>O<sub>5</sub>

Vitazyme treatments: (1) 13 oz/acre soon after planting, through the irrigation system; (2) 13 oz/acre at the early hook stage

Chlorophyll levels: On July 24 chlorophyll determinations were made using a Minolta SPAD meter, on 30 leaves for both the control and treated areas of the field.

### 2. Vitazyme

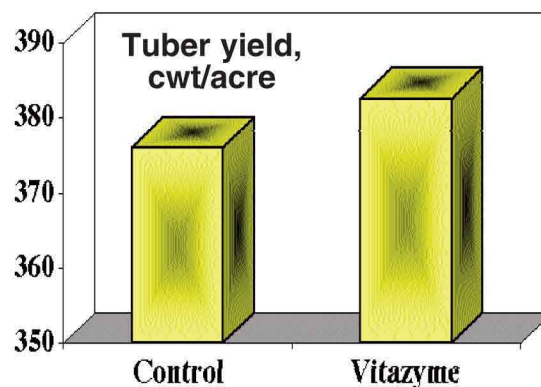
Treatment	SPAD value	Change
----- SPAD units -----		
Control	40.8	—
Vitazyme	41.8	1.0

**Increase in leaf chlorophyll:  
1.0 SPAD unit**

Yield results: Four-acre samples of the Vitazyme treated and the control areas of the test area were harvested and weighed on a truck scale.

Treatment	Tuber yield	Change
----- cwt/acre -----		
Control	376.0	—
Vitazyme	382.6	6.6 (+2%)

**Tuber yield increase: 2%**

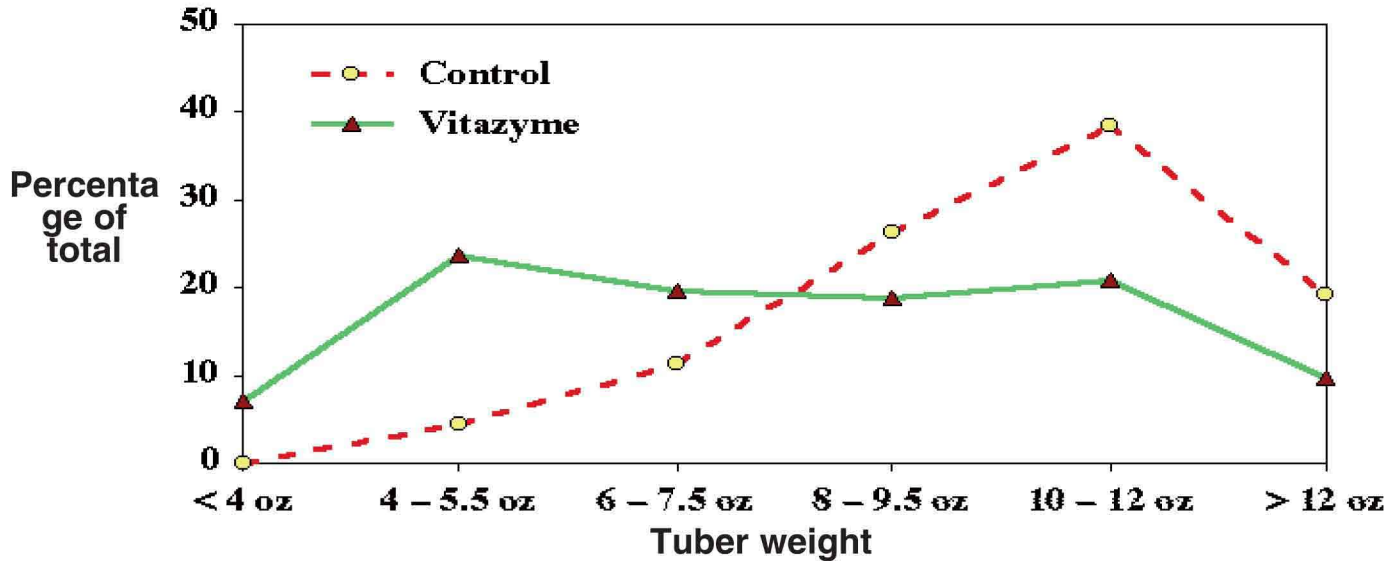


Tuber size results: Samples of potatoes were collected from each treatment, and individual tubers were weighed to determine the percentages of tubers in each size range.

	< 4 oz		4 – 5.5 oz		6 – 7.5 oz		8 – 10 oz		10 – 12 oz		> 12 oz	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
		lb		lb		lb		lb		lb		lb
Control	0	0	4	1.2 (4.5%)	7	3.0 (11.3%)	13	7.0 (26.4%)	15	10.2 (38.5%)	6	5.1 (19.2%)
Vitazyme	14	1.8 (7.1%)	22	6.0 (23.6%)	12	5.0 (19.7%)	9	4.8 (18.9%)	8	5.3 (20.9%)	3	2.5 (9.8%)



## Tuber Weight Distribution



**Income results:** A price of \$10.00/cwt is used in these calculations, although because of a more favorable size distribution with Vitazyme the prices actually received for the tubers with Vitazyme would be higher.

Treatment	Tuber yield	Income	Increase
	cwt/acre	\$/acre	\$/acre
Control	376.0	3,760	—
Vitazyme	382.6	3,826	66

**Income increase: \$66.00/acre**  
(not including size distribution improvements)

**Conclusions:** Vitazyme increased the total yield by 2% in this field of Yukon Gold potatoes, but the size distribution of the tubers was markedly increased in the 4 to 10 oz size versus the untreated control. This change in size distribution would lead to higher prices for the producer, which prices were not easy to calculate in this study. The increase in chlorophyll content of the leaves measured in July indicated an increased fixation of energy to generate the yield increase.

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Allen Perry

Farmer: Mike Fitzpatrick

Location: Watson Farm, Houlton, Maine

Variety: Superior

Soil type: gravelly loam

Row width: 36 inches

Planting date: unknown

Experimental design: A field was divided into two parts, one part (the west side) treated with conventional fertility methods and the other (the east side) with the Albrecht system along with Vitazyme.

### 1. Control – conventional

### 2. Vitazyme – Albrecht system

Fertilization: unknown

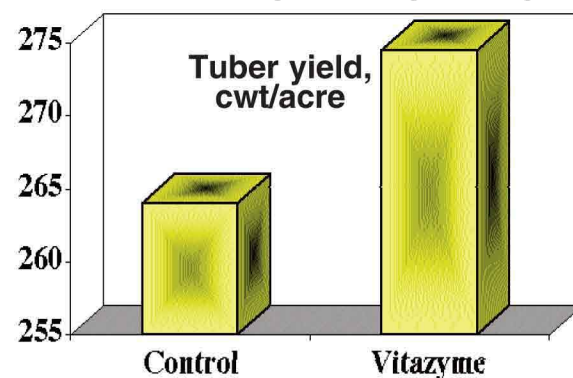
Vitazyme treatments: 13 oz/acre on the seeds at planting; 13 oz/acre on the leaves and soil at blossom time

Harvest date: unknown

Yield results: Near harvest time, two 10-foot row sections from each treatment were dug and weighed to give an estimate of yield.

Treatment	Tuber number	Sample weight	Tuber < 2 in	Yield	Yield change
	no./20 ft	lb/20 ft	no./20 ft	cwt/acre	cwt/acre
Control	156	40.0	15	264.0	—
Vitazyme	175	41.5	16	274.5	+10.5 (+4%)

**Increase in tuber yield: 4%**



Income results: At \$7.00/cwt, the added 10.5 cwt/acre with the Vitazyme/Albrecht program would give \$73.50/acre added income.

**Income increase: \$73.50/acre**

Conclusions: In this potato trial in Maine, Vitazyme plus the Albrecht mineral balancing program increased yield by 4%, a very profitable increase as income was boosted by \$73.50/acre. In addition, there was **greater uniformity** of the tubers and, generally speaking, **more large tubers** with the Vitazyme/Albrecht treatment.

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Jon Gilley

Farm: Lyle Nissen Farm East

Planting date: June 10, 2002

Population: 11-inch spacing

Experimental design: A section of an irrigated (center pivot) potato field was treated with Vitazyme, while the remainder of the field served as a control.

Research Organization: Agro-Engineering, Alamosa, Colorado

Location: Mosca, Colorado

Soil type: sandy loam

Variety: Norkota 296

Row spacing: 34 inches

### 1. Control

### 2. Vitazyme

Fertilization: 200 lb/acre N (one-third applied pre-plant), 150 lb/acre P<sub>2</sub>O<sub>5</sub> (pre-plant), 0.25 lb/acre Zn

Vitazyme treatments: (1) 13 oz/acre soon after planting, through the irrigation system; (2) 13 oz/acre at the early hook stage

Harvest date: September 25, 2002

Leaf chlorophyll: On July 24, 2002, the leaf chlorophyll of about 30 leaves for both treatments was measured and averaged using a Minolta SPAD chlorophyll meter.

Treatment	SPAD value	Change
	----- SPAD units -----	
Control	46.0	—
Vitazyme	47.5	1.5

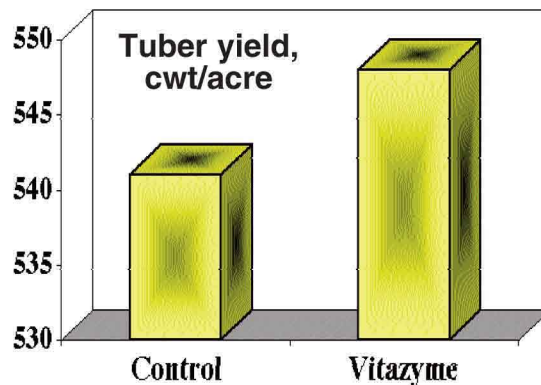
**Increase in leaf chlorophyll:  
1.5 SPAD units**

Yield results: A 0.5-acre sample was harvested and weighed for each treatment.

Treatment	Tuber yield	Change
	----- cwt/acre -----	
Control	541	—
Vitazyme	548	7 (+1.3%)

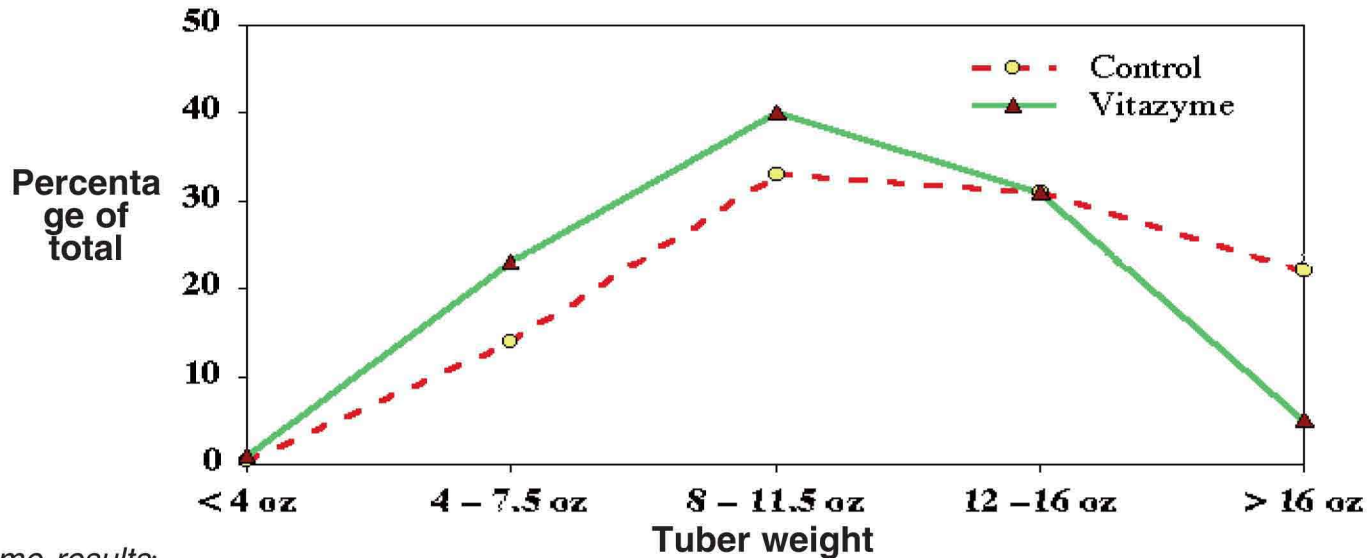
**Tuber yield increase: 1.3%**

Tuber weight results:



	< 4 oz		4 – 7.5 oz		8 – 11.5 oz		12 – 16 oz		> 16 oz	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
		lb		lb		lb		lb		lb
Control	1	0.2 (0.4%)	20	7.0 (14%)	27	16.9 (33%)	19	16.2 (31%)	12	11.4 (22%)
Vitazyme	2	0.4 (1%)	33	11.5 (23%)	35	20.2 (40%)	18	15.5 (31%)	2	2.7 (5%)

## Tuber Weight Distribution



### Income results:

A price of \$6.50/cwt is used in these calculations, although because of a more favorable size distribution with Vitazyme the prices actually received for the tubers with Vitazyme would be higher.

Treatment	Tuber yield	Income	Increase
	cwt/acre	\$/acre	\$/acre
Control	541	3,516.50	—
Vitazyme	548	3,562.00	45.50

**Income increase: \$45.50/acre**  
(not including size distribution improvements)

Conclusions: Vitazyme increased the yield of these Norkota potatoes by only 1.3% in this Colorado potato study, but the improvement in size distribution – drastically increasing the number of tubers in the 4 to 16 oz range – reveals how Vitazyme can increase the farmer's income in qualitative as well as quantitative means. Many growers are interested in producing a larger number of medium-sized tubers, which Vitazyme assists in accomplishing in a significant way. An increase in leaf chlorophyll content and enhanced rhizosphere activity during the season helped the plants produce more tubers of a more uniform size.



## Vital Earth Resources

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Jerel Lindgren

Location: Tri-Campbell Farms, Grafton, North Dakota

Variety: Frito Lay 1533

Soil type: sandy clay loam

Row spacing: 36 inches

In-row spacing: 8 to 9 inches

Planting date: unknown

Experimental design: A potato field ("Ron's West") was divided into two parts, the north side left untreated and the south side treated with Vitazyme. Fertilization and other cultural practices were the same over the entire field.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

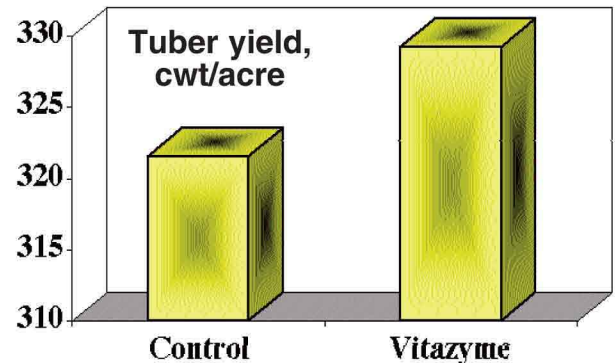
Fungicides: sprayed every 7 days

Vitazyme treatments: 13 oz/acre on the seed pieces at planting; 13 oz/acre on the leaves and soil at flowering

Yield results: At harvest the tuber weights for specific areas were determined by weighing loaded trucks.

Treatment	Yield cwt/acre	Yield change cwt/acre
Control	321.5	—
Vitazyme	329.2	+7.7 (+2.4%)

**Tuber yield increase: 2.4%**



Income results: At \$7.00/cwt, the increase of 7.7 cwt/acre gave \$53.90/acre more income.

**Income increase: \$53.90/acre**

Conclusions: In this North Dakota potato study, Vitazyme increased the tuber yield by 2.4% and increased income by \$53.90/acre. No changes in size distribution of the tubers were determined.

## Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

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# 2002 Crop Results

## Vitazyme on Potatoes

Farmer: Richard Porter

Planting date: May 29, 2002

Previous crop: barley

Location: King Farm, Mars Hill, Maine

Row spacing: 36 inches

Variety: FL 1833

Soil type: gravelly loam

Experimental design: A field was divided into three parts to test Vitazyme at one, two, or three applications.

1. One application of Vitazyme (at planting)	2. Two applications of Vitazyme (at planting and July)	3. Three applications of Vitazyme (at planting and July and August)
--	--	---

Fertilizer treatments: 1,400 lb/acre of a 14-14-17% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O applied at planting (banded)

Vitazyme treatments: (1) 13 oz/acre at planting on May 29; (2) 13 oz/acre at blossoming on the leaves and soil on July 31, 2002; (3) 13 oz/acre on the leaves and soil on August 13, 2002

Insecticide applications: Admire in the furrow at planting

Kill date: September 3

Second kill date: September 10

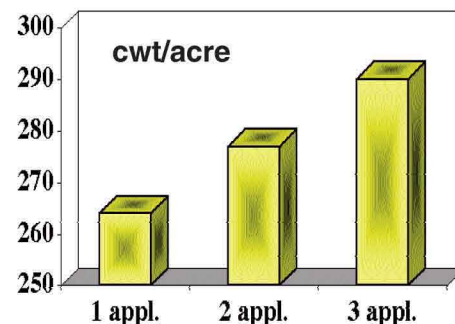
Yield results: Twelve rows from each plot were harvested and weighed on a truck scale; actual field acreage was not determined. Before harvest, 10-foot row sections were also harvested for yield estimates of all three sections.

	Truck weights		10-foot row samples		
	Load weight	Change	Weight	Yield**	Change
	lb		lb	cwt/acre	
1. One application	30,640	—	20	264	—
2. Two applications	32,190*	1,550 (+5%)	21	277	13 (+5%)
3. Three applications	33,820	3,180 (+10%)	22	290	27 (+10%)

\* This load was adjusted slightly for rocks and soil in the potatoes.

\*\* Yield = 10-foot row weight x 8 = barrels/acre x 1.65 = cwt/acre.

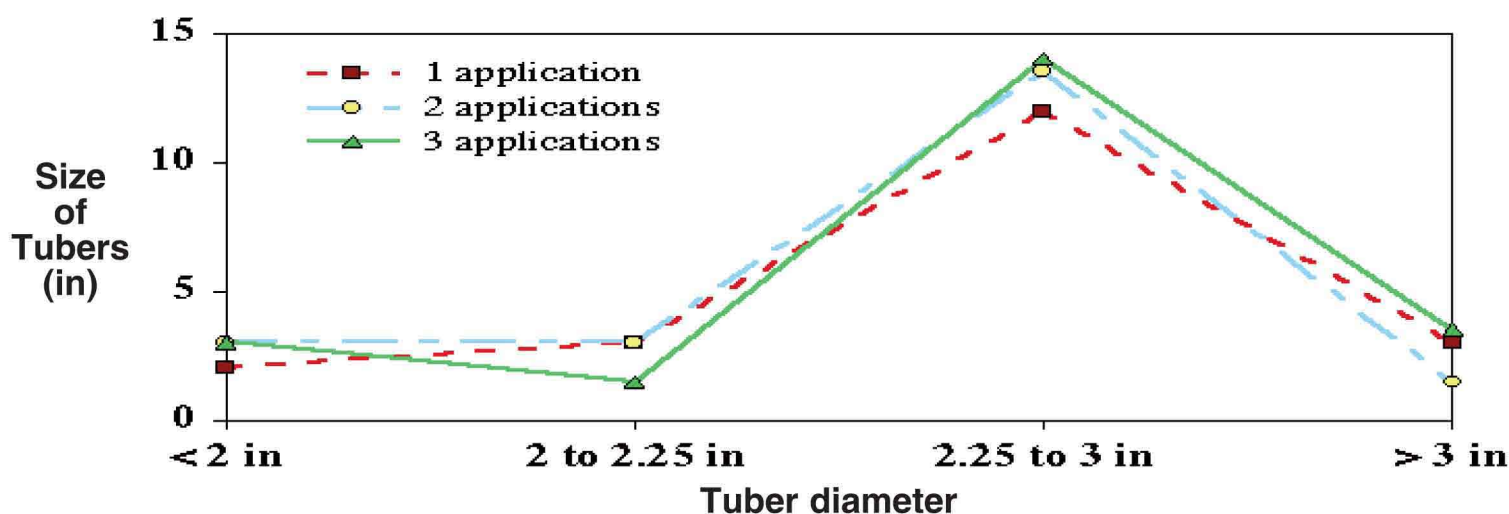
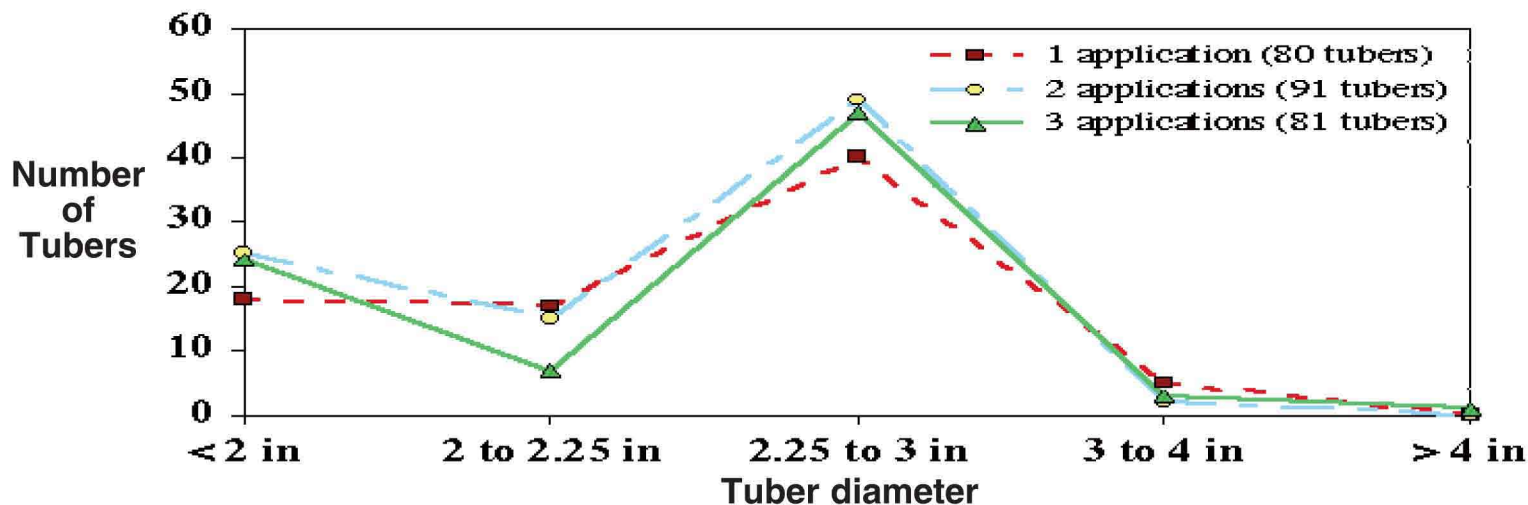
**Tuber yield**



**Yield increase with Vitazyme: 5% with two applications  
10% with three applications**

Both the weighed truck samples and the hand-dry samples were remarkably consistent, revealing 5 and 10% increases in yield with both sampling methods.

Tuber sizes: The 10-foot row samples were sized according to diameter, and the weights of these sized samples were determined.



Extra applications of Vitazyme tended to produce larger tubers having more weight, as noted especially in the 2.25 to 3 inch diameter range. The largest single tuber was for three applications.

**Income results:** A value of \$6.00 per cut of potatoes is estimated

Treatment	Tuber yield	Total income	Income above a single application	Approximate cost:benefit ratio
	cwt/acre	\$/acre	\$/acre	
1. One application	264	1,584	—	—
2. Two applications	277	1,662	78	9.8

**Conclusions:** Vitazyme applied twice increased the yield 13 cwt/acre over the single application, and when applied three times increased the yield by 26 cwt/acre over the single application. These applications tended to increase tuber size, and resulted in increased incomes of from \$78 to \$156/acre, giving cost:benefit ratios of 10 to 13.

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Allen Perry

Variety: Dark Red Norlin

In-row spacing: 8 inches

Farmer: Mike Fitzpatrick

Soil type: gravelly loam

Population: 17,500 plants/acre

Location: Watson Farm, Houlton, Maine

Row width: 36 inches

Experimental design: The field was divided into two parts, one treated twice with Vitazyme and the other left untreated. The fertility program was the same for both treatments.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

Vitazyme treatments: 13 oz/acre on the seed pieces at transplanting; 13 oz/acre on the leaves and soil in July

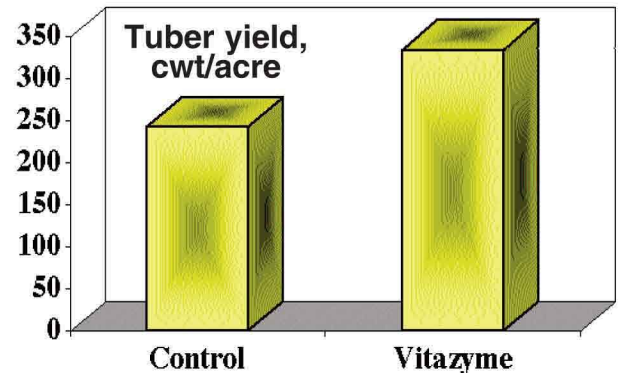
Yield results: On August 8, 2002, two plants were sampled from each area, each plant having the same number of stems and vitality.

	Control	Vitazyme	Change
	----- tuber wt (lb)/2 plants -----		
Tuber yield	2.77	3.81	+1.04 (+38%)

No weights were determined at harvest, but by converting the dug weights above, the yields are estimated in the following table and graph.

	Control	Vitazyme	Increase
	----- cwt/acre -----		
Tuber yield	242.4	333.4	91.0

**Increase in tuber yield: 38%**



Income results: The potato price is estimated at \$0.07/lb (\$7.00/cwt), meaning that yield increases of 91.0 cwt/acre would bring \$637/acre more income.

**Income increase: \$637/acre**

Conclusions: The grower in this study noticed a visual improvement in yield at harvest. Despite the fact that weighed yield values were not collected, the sampling in August indicated a marked improvement in yield with Vitazyme as well as a marked increase in income.



## Vital Earth Resources

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# 2002 Crop Results

## Vitazyme on Potatoes

Researcher: Allen Perry

Farmer: Mike Fitzpatrick

Location: Watson Farm, Houlton, Maine

Variety: Dark Red Norlin

Soil type: gravelly loam

Row width: 36 inches

In-row spacing: 8 inches

Population: 17,500 plants/acre

Experimental design: The field was divided into two parts, one treated twice with Vitazyme and the other left untreated. The fertility program was the same for both treatments.

### 1. Control

### 2. Vitazyme

Fertilization: unknown

Vitazyme treatments: 13 oz/acre on the seed pieces at transplanting; 13 oz/acre on the leaves and soil in July

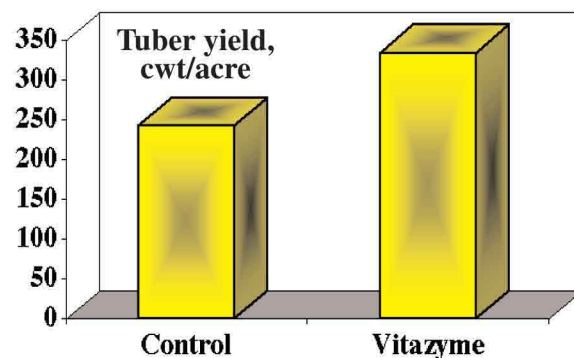
Yield results: On August 8, 2002, two plants were sampled from each area, each plant having the same number of stems and vitality.

	Control	Vitazyme	Change
	-----	tuber wt (lb)/2 plants	-----
Tuber yield	2.77	3.81	+1.04 (+38%)

No weights were determined at harvest, but by converting the dug weights above, the yields are estimated in the following table and graph.

	Control	Vitazyme	Increase
	-----	cwt/acre	-----
Tuber yield	242.4	333.4	91.0

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**Income increase: \$637/acre**

Conclusions: The grower in this study noticed a visual improvement in yield at harvest. Despite the fact that weighed yield values were not collected, the sampling in August indicated a marked improvement in yield with Vitazyme as well as a marked increase in income.

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# 2002 Crop Results

## Vitazyme on Potatoes, for Seed

Researcher: C.K. Kim

Research organization: Dae Yu Company, Ltd.

Location: Bongsung-Ri, Aeyoul-Eup, Jeju-City, Korea

Variety: Daeji

Soil fertility: unknown

Soil type: unknown

Planting date: Autumn of 1999, spring of 2001, fall of 2001

Experimental design: A field area of 100 m<sup>2</sup> (10 “are”) was used for this study. Vitazyme and three other products were compared to a control treatment for all three plantings. The five treatments were randomized and replicated three times, with five plants for each plot.

1. Control

4. Product A-2

2. Vitazyme

5. Product B

3. Product A-1

Fertilizer treatments: unknown

Vitazyme treatments : (1) 2 liters/hectare (26 oz/acre) as a 1:3,000 dilution, sprayed on the leaves and soil at 25 cm plant height; (2) the same application at early bloom

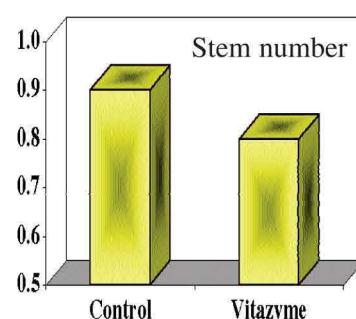
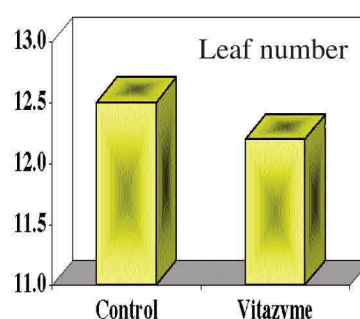
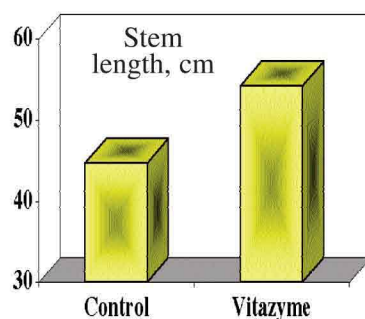
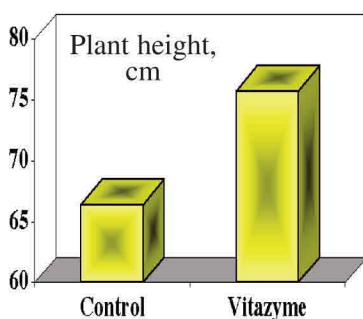
Other biostimulant treatments: The same applications as for Vitazyme, but for Product A-1 a 1:500 dilution was used; for Product A-2 a 1:1,000 dilution was used; for Product B a 1:1,000 dilution was used.

Results: No individual plot data could be obtained for this study, so only treatment means are shown.

### Fall Planting–Plant Response Study

Measurements were made 45 days after planting.

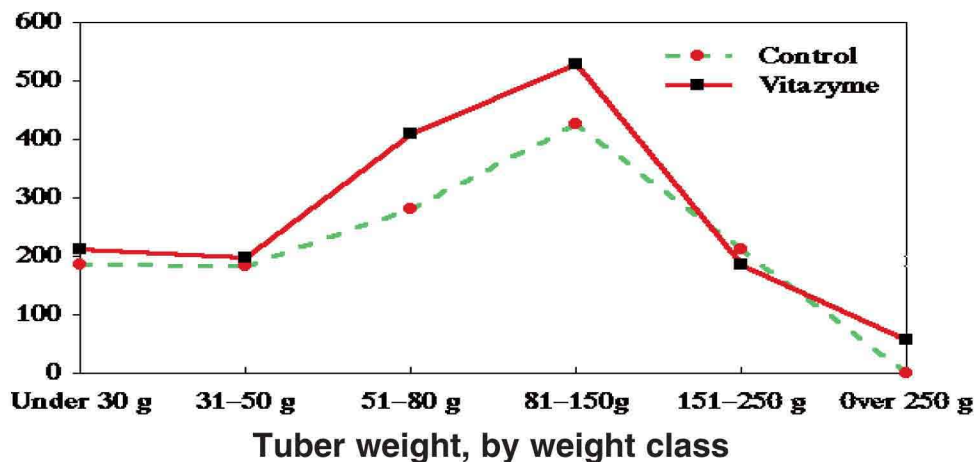
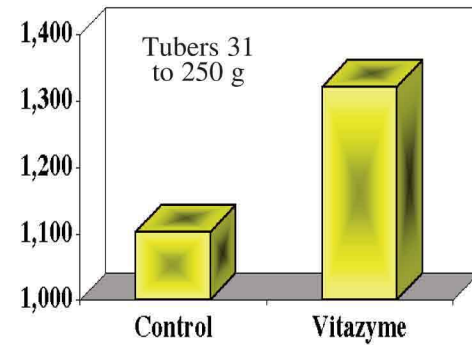
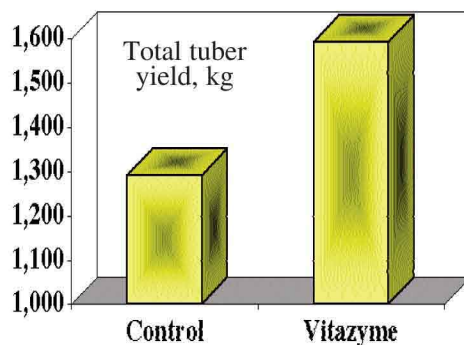
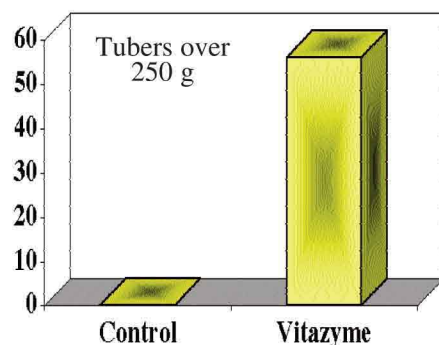
Treatment	Plant height	Change	Stem length	Change	Leaf number	Change	Stem number	Change
	cm		cm					
Control	66.4	—	44.7	—	12.5	—	0.9	—
Vitazyme	75.7	9.3 (+14%)	54.1	9.4 (+21%)	12.2	(-) 0.3 (-2%)	0.8	(-) 0.1 (-11%)
Product A-1	74.9	8.5 (+13%)	51.0	6.3 (+14%)	13.6	1.1 (+9%)	0.5	(-) 0.4 (-44%)
Product A-2	71.9	5.5 (+8%)	48.5	3.8 (+9%)	11.6	(-) 0.9 (-7%)	0.9	0 0
Product B	80.6	14.2 (+21%)	56.3	11.6 (+26%)	13.2	0.7 (6%)	0.7	(-) 0.2 (-22%)



# Spring Planting

Measurements were made 90 days after planting

Treatment	Under 30g	31 to 50 g	51 to 80 g	81 to 150 g	151 to 250 g	Over 250g	Total	Change	31 to 250 g
----- kg of tubers/100 square meters -----									
Control	185	183	282	426	213	0	1,290	—	1,103
Vitazyme	213	197	410	528	186	56	1,590	300(+23%)	1,321 (+20%)
Product A-1	156	145	296	408	283	0	1,288	-2 (0%)	1,132 (+2%)
Product A-2	172	170	293	529	186	31	1,380	90 (+7%)	1,177 (+7%)
Product B	183	207	308	369	203	0	1,270	(-)20 (-2%)	1,087 (-2%)

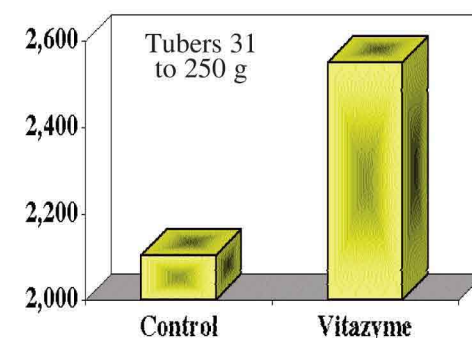
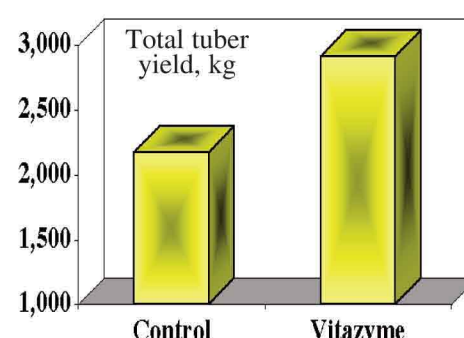
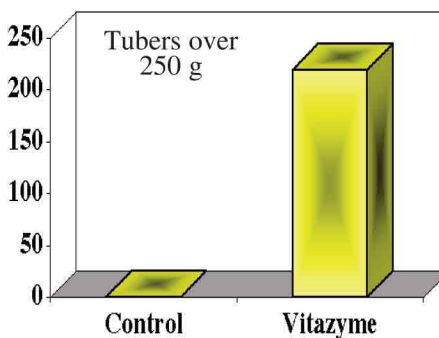


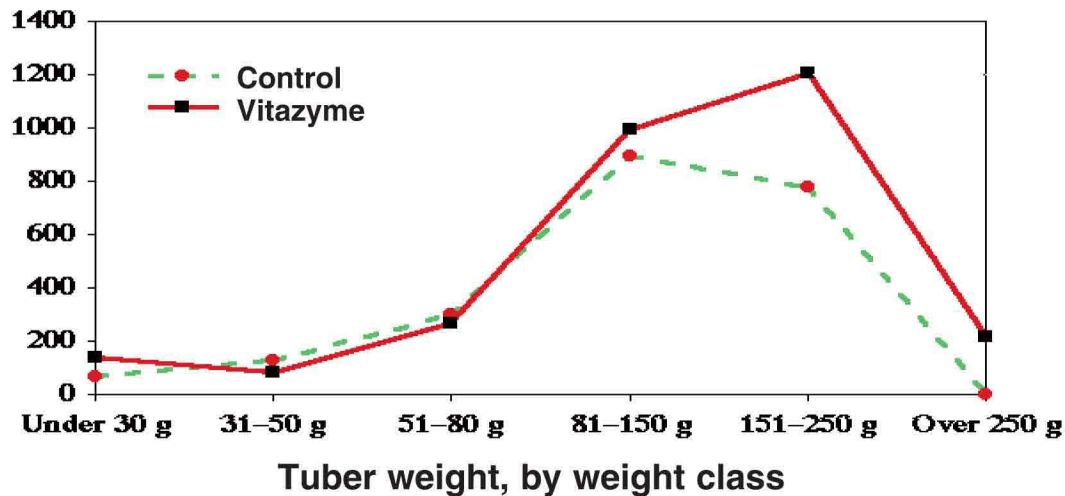
**Increase in tuber yield: 23%**

# Fall Planting

Measurements were made 90 days after planting.

Treatment	Under 30g	31 to 50 g	51 to 80 g	81 to 150 g	151 to 250 g	Over 250g	Total	Change	31 to 250 g
----- kg of tubers/100 square meters -----									
Control	69	130	299	897	778	0	2,172	—	2,103
Vitazyme	141	83	265	995	1,205	219	2,908	736 (+34%)	2,548 (+21%)
Product A-1	99	24	379	935	687	337	2,461	289 (+13%)	2,025 (-4%)
Product A-2	87	125	333	693	1,437	0	2,675	503 (+23%)	2,588 (+23%)
Product B	118	86	160	1,296	1,111	148	2,920	748 (+34%)	2,654 (+26%)





**Increase in tuber  
yield: 34%**

**Conclusions:** Vitazyme enhanced early potato growth in this Korean study by 14% in plant height and 21% in stem length. Yields of potatoes were increased by 23 to 34% above the controls, and tuber weight was increased by Vitazyme toward the larger sizes.



## Vital Earth Resources

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# 2001 Crop Results

## Vitazyme on Potatoes

Farmer: Judd and Greg Hemphill

Location: Presque Isle, Maine

Variety: Atlantic

Row spacing: 36 inches

Soil type: gravely loam

Experimental design: A strip of a production field was treated with Vitazyme twice, and an adjoining strip was treated with ACA (a 15-0-0%N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O formulation with Zn-NH<sub>4</sub>-acetate).

**1. Control**

**2. ACA**

**3. Vitazyme**

Fertilization: All field areas were treated the same.

Vitazyme treatments: (1) 13 oz/acre at 4 to 6 inches height on the leaves and soil; (2) 13 oz/acre at blossom on the leaves and soil

Growth responses on August 17: Vitazyme application resulted in a much greater response of roots, tops, and tubers than for the control or ACA treatments. ACA resulted in a yellowing of some of the top leaves.

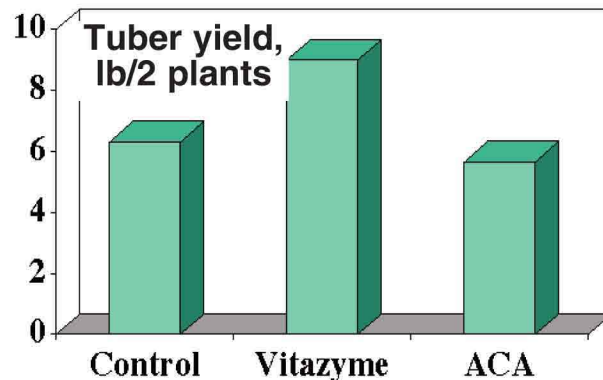
Yield results: **Judd: "Vitazyme was about 25 cwt/acre better [than the untreated control]."**

**Alan Perry: "The potato yield difference was probably better than 25 cwt/acre, since the difference was obvious, and that usually means from 35 to 50 cwt/acre more yield."**

	Control	Vitazyme	ACA
	----- tuber wt (lb)/2 plants -----		
<b>Tuber yield*</b>	6.31	8.98 (+42%)	5.66 (-10%)

\* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

**Yield increase with Vitazyme: 42%**



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# 2001 Crop Results

## Vitazyme on Potatoes

Farmer: Paul Lagerstrom

Location: Presque Isle, Maine

Variety: Russet Burbank

Row spacing: 36 inches

Soil type: gravelly loam

Experimental design: A large potato field was divided into strips of treated and untreated potatoes.

**1. Control**

**2. Vitazyme, 13 oz/acre**

**3. Vitazyme, 26 oz/acre**

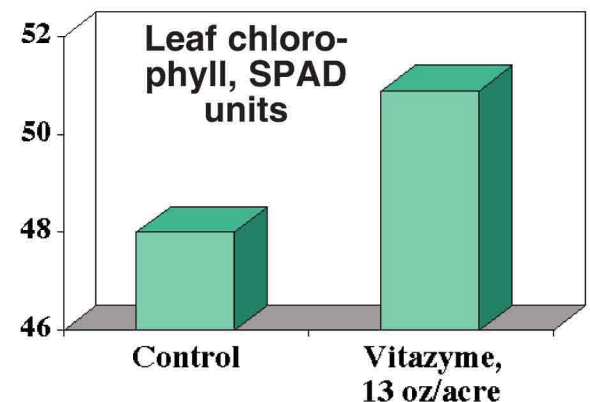
Fertilization: equal over all areas

Vitazyme treatments: one foliar/soil application at 13 oz/acre, or 26 oz/acre at early bloom (at row fill)

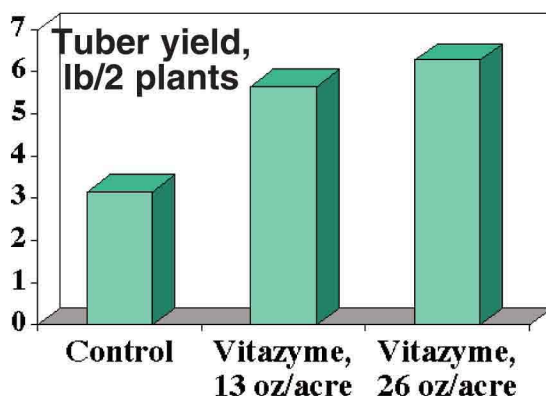
Leaf chlorophyll: On August 20, chlorophyll determinations were made on 30 randomly selected leaves for each treatment.

	Control	Vitazyme 13 oz per acre
	----- SPAD units -----	
<b>Leaf chlorophyll</b>	48.0	50.9

\* Average of 30 representative leaves per treatment.



Yield results: On August 20, two average plants from each treatment were selected for tuber yield evaluations.



	Control	Vitazyme 13 oz/acre	Vitazyme 26 oz/acre
	----- tuber wt (lb)/2 plants -----		
<b>Tuber yield*</b>	3.16	5.66 (+79%)	6.28 (+99%)

\* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

Alan Perry: "The Vitazyme treatment was obviously better, my guess by more than 50 cwt/acre. The uniformity and type [with Vitazyme] were striking."

**Yield increase with Vitazyme: > 50 cwt/acre**

## Vital Earth Resources

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# 2001 Crop Results

## Vitazyme on Potatoes

Farmer: Mike and Clinton Adams

Location: Easton, Maine

Variety: Shepody, Russet Burbank

Row spacing: 36 inches

Soil type: gravelly loam

Experimental design: A large potato field was divided into strips of treated and untreated potatoes.

### 1. Control

### 2. Vitazyme (one or two treatments)

Fertilization: the same fertility program over all areas of the fields

Vitazyme treatments:

Shepody: Strip 1, 20 oz/acre on July 2 on the leaves and soil

Strip 2, 13 oz/acre on July 27, and 13 oz/acre on August 7 on the leaves and soil

Russet Burbank: 13 oz/acre on June 20, and 13 oz/acre on August 7

Yield results: On August 19 the following yield differences were noted. There was much better growth of roots, tops, and tubers for Vitazyme at this time than for the control treatments.

### Shepody

#### Control

#### Vitazyme 13 oz/acre

#### Vitazyme 26 oz/acre

Tuber yield\*

2.59

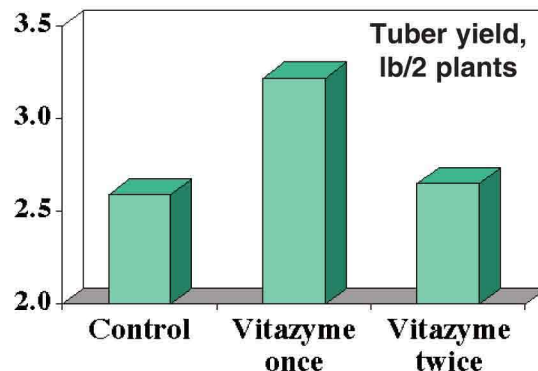
----- tuber wt (lb)/2 plants -----

3.22 (+24%)

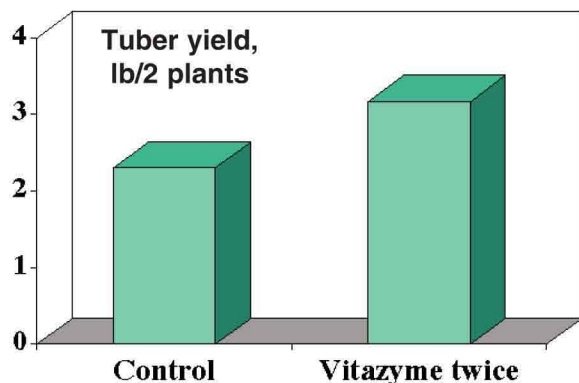
2.65 (+2%)

\* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

**Yield increase with Vitazyme: 24%**



### Russet Burbank



#### Control

#### Vitazyme

Tuber yield\*

2.30

----- tuber wt (lb)/2 plants -----

3.17 (+38%)

\* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

**Yield increase with Vitazyme: 38%**

Mike Adams: "The Shepody's were at least 50 cwt/acre better than the non-treated. There was better size and more uniformity in size."

Clinton Adams: "The Vitazyme treated tubers had better, more uniform size."

## Vital Earth Resources

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# 2001 Crop Results

## Vitazyme on Potatoes

Farmer: Dennis and Tim Kingsberry

Location: Blaine, Maine

Variety: Russet Burbank

Row spacing: 36 inches

Soil type: gravelly loam

Experimental design: A potato field was divided into two parts:

### 1. Control

### 2. Vitazyme

Fertilization: the same throughout the field using the base saturation (Albrecht) soil balancing system

Vitazyme treatments: two 13 oz/acre applications on the leaves and soil

Yield results: **No large-scale harvest results were determined, but Dennis Kingsberry stated, "The Vitazyme yields were definitely better than the nontreated yields."**

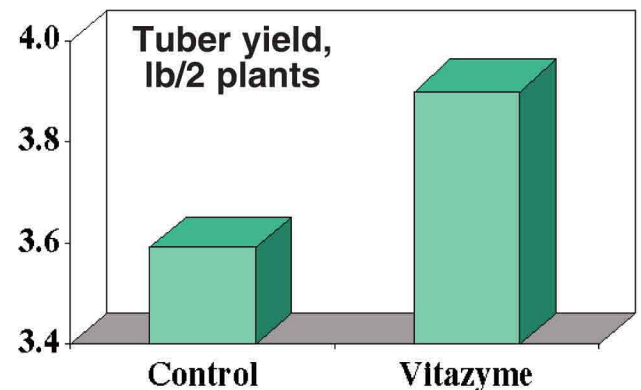
Alan Perry: "The Kinsberry's are very pleased with the results they have had with the Albrecht system and Vitazyme so far. Dennis was very aware of finding more roots in and on the harvest-ing equipment. He kidded me about the trouble all these roots were causing him. We had two fields this year which yielded over 300 cwt/acre, a very good yield for Aroostook County, an improvement over last year and a big improvement for them. A relative said that one field was the best Russet Burbank field he had seen this year in Maine.

On August 19 samples were taken from one Russet Burbank field, and the potatoes were weighed.

	Control	Vitazyme
	----- tuber wt (lb)/2 plants -----	
<b>Tuber yield*</b>	3.59	3.90 (+9%)

\* Samples were taken from plants with the same stem number and average vitality, at two locations per treatment.

**Yield increase with Vitazyme: 9%**





## Vital Earth Resources

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# 2001 Crop Results

## Vitazyme on Potatoes

Farmer: John Auckland

Location: Arkport, New York

Variety: Redsen

Soil type: muck (organic)

Row spacing: 34 inches

Planting date: unknown

Harvest date: unknown

Experimental design: A muck field of 8 acres was split into three equal sections, and Vitazyme treatments were applied to two of them.

### 1. Control

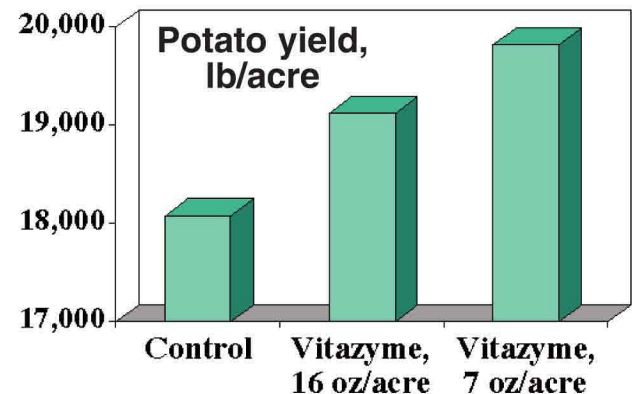
### 2. Vitazyme (16 oz/acre)

### 3. Vitazyme (7 oz/acre)

Fertility treatments: 1,100 lb/acre of an 8-8-8% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O liquid fertilizer (88 lb/acre of each nutrient), placed 2 inches below and 2 inches beside the furrow. Midseason the entire field was sidedressed with 250 lb/acre of urea (115 lb/acre N).

Yield results: At harvest, a field length of 6 rows representative of each treatment was harvested and weighed in a truck. Some soil still clung to the tubers, so may have affected weights a bit.

Treatment	Tuber yield	Yield increase
	----- lb/acre -----	
1. Control	18,080	—
2. Vitazyme, 16 oz	19,120	1,040 (+6%)
3. Vitazyme, 7 oz	19,820	1,740 (+10%)



**Yield increase with Vitazyme: 10%**

Income results: The potato price is estimated at \$0.12/lb.

**Vitazyme, 16 oz/acre ..... +\$124.80/acre**

**Vitazyme, 7 oz/acre ..... +\$208.80/acre**

Conclusions: In this New York potato trial on muck soils, Vitazyme at both 7 and 16 oz/acre substantially increased tuber yield and income, especially at the 7 oz/acre rate. This rate increased yield by 10% and income by \$208.80/acre.

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# **2001 Crop Results**

## **Vitazyme on Potatoes** ***A Testimonial***

**Farmers:** Wayne and Ryan Bradstreet

**Location:** Bridgewater, Maine

**Variety:** Kennebec, for seed

**Row spacing:** 36 inches

**Soil type:** gravelly loam

**Experimental design:** A field was divided into a treated and untreated portion.

### **1. Control**

### **2. Vitazyme**

**Fertilization:** The base saturation balancing (Albrecht) method was used throughout the field, this being the first year on the system.

**Vitazyme treatment:** (1) 13 oz/acre pre-bloom about June 10, after weed kill on the leaves and soil; (2) 13 oz/acre about July 15, at bloom, on the leaves and soil

### **Observations:**

**Wayne:** "It was a very good crop, one of the best Kennebec crops we have had!"

**Ryan:** "The Vitazyme treated tubers had good uniformity of size, had a very good tuber set, and the tuber numbers were much better than usual."

There were some "common scab" defects on tubers from two parts of the field, but as one moved from the control to the treated portion of the field the scab problem disappeared.

## ***Vital Earth Resources***

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# **2000 Crop Results**

## **Vitazyme on Potatoes a Testimonial**

Farmer: Neil Grass

Location: Mars Hill, Maine

Variety: Kanona

Planting date: June 9, 2000

Row spacing: 36 inches

Previous crop: fallow

Soil type: gravely loam

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

### **1. Control**

### **2. Vitazyme**

Fertilization amount: 1,100 lb/acre of 14-14-14-1.2% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-Mg, with N applied as 50% NH<sub>4</sub>NO<sub>3</sub> and 50% (NH<sub>4</sub>)<sub>2</sub> SO<sub>4</sub>

Vitazyme application: 13 oz/acre twice, the last half of the season after tuber initiation

Top kill date: September 12, 2000

Yield and quality comments:

Neil: "The Vitazyme treated Kanonas definitely had a more uniform size, had more roots, and were definitely better. At harvest the Vitazyme treated area had at least 2,500 cwt more per acre, probably more like 3,500 cwt."

Alan Perry: "This field had the best yield on the farm. Tuber size was extremely uniform, which allowed them to be killed when more than 50% of them (as high as 70%) were chef size (3 to 4 inches in diameter). This helped increase total yield.

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# 1999 Crop Results

## Vitazyme on Potatoes

Farmers: Bruce Ankeny

Location: Nampa, Idaho

Variety: Yukon Gold

Soil type: silt loam

Irrigation: sprinkler irrigated periodically

Planting date: May 29, 1999

Experimental design: A garden area of about 12 x 40 feet was prepared and planted in raised rows. Each treatment covered half of the prepared area.

### 1. Control

### 2. Vitazyme

Fertilization: compost at a liberal rate

Vitazyme application: Seed pieces for the Vitazyme treatment were soaked overnight in a 5% Vitazyme solution. Vitazyme was also sprayed using a 2% solution on the leaves at about 5 inches height.

Harvest date: September 15, 1999

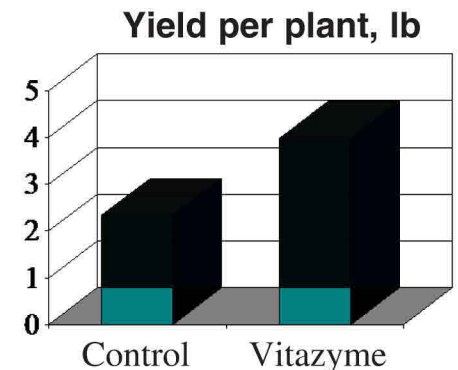
Growth observations: The Vitazyme treated plants grew faster from the beginning.

Observation	Control	Vitazyme
Time to first leaves	16 days	7 days
Leaf area	—	30 to 40% more
Leaf color	Light green	Deep green

Yield results: At maturity 13 hills from each treatment were harvested and weighed.

	Control*	Vitazyme	Increase
		lb	
Yield, 13 hills	30.3	51.8	(+) 21.5 (+71%)
Yield per plant	2.33	3.98	(+) 1.65 (+71%)

**Yield increase: 71%**



Conclusions: In this garden trial the Vitazyme treated potato plants performed much better than the untreated plants in terms of germination and early growth, total leaf area and plant size, leaf color, and tuber yield per plant (1.65 lb/plant more). In addition, after digging the Vitazyme treated plants stayed green for a much longer time than did the control plants. This slower drydown was likely due to thicker cell walls and stronger vascular tissues from greater cellulose, hemicellulose, and lignin deposition.



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# 2000 Crop Results

## Vitazyme on Potatoes

Farmer: Dave Votypka

Location: Wayland, New York

Variety: Snowden

Planting date: May 27, 2000

In-row spacing: 11.5 inches

Row spacing: 36 inches

Soil type: Bath gravely loam

Previous crop: peas underseeded with clover

Experimental design: One portion of a potato field was treated with Vitazyme, on the seeds at planting, while the remainder was left untreated.

### 1. Control

### 2. Vitazyme

Fertilizer treatments: 1,000 lb/acre of 12-15-20% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O with zinc

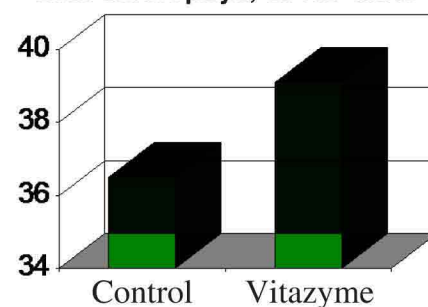
Insecticide treatment: Admire insecticide in the row with Vitazyme

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

Chlorophyll results: On August 14, 20 representative leaves from each treatment were analyzed for chlorophyll with a Minolta SPAD meter, and the results were averaged.

Treatment	Chlorophyll Change	
	SPAD units	
Control	36.5	--
Vitazyme	39.1	(+) 2.6

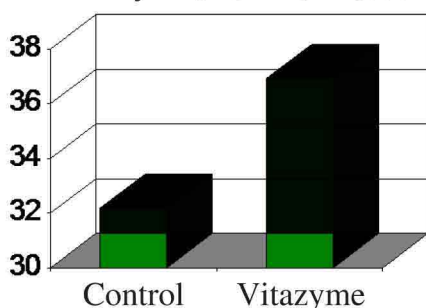
Leaf chlorophyll, SPAD units



**Chlorophyll increase: 2.6 SPAD units**

Yield results: At harvest, four rows were harvested from each treatment and weighed.

Tuber yield, lb/acre, x 1,000



Treatment	Tuber yield		Increase per acre
	Per 4 rows	Per acre*	
	lb	lb/acre	lb/acre
Control	12,960	32,175	4,738 (+15%)
Vitazyme	15,020	36,913	--

\* Area harvested: control—0.4028 acre; Vitazyme—0.4069 acre.

**Tuber yield increase: 15%**

Income results: The value of potatoes is about \$6.50/cwt.

**Income increase: \$307.97/acre**

Conclusions: Vitazyme applied at 13 oz/acre only one time — at planting — to these Snowden potatoes produced more intensive growth throughout the season, as evidenced by greater chlorophyll and plant size at midseason compared to the control plants. Final tuber yields reflected this earlier growth response, with Vitazyme increasing the yield by 15% and upping the income by about \$308/acre.

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# 2000 Crop Results

## Vitazyme on Potatoes

Farmers: Tim and Dennis Kingsbury

Location: Blaine, Maine

Planting date: May 29, 2000

Variety: Russet Burbank, for french fries

Row spacing: 36 inches

Soil type: gravelly loam

Previous crop: oats

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

### 1. Control

### 2. Vitazyme

Fertilization: The soil cation balancing system was utilized. Based on a soil test, the following fertilizers were applied:  $(\text{NH}_4)_2\text{SO}_4$  – 250 lb/acre;  $\text{NH}_4\text{NO}_3$  – 410 lb/acre; sulfur – 20 lb/acre;  $\text{K}_2\text{SO}_4$  – 400 lb/acre; borax(14% B) – 15 lb/acre;  $\text{ZnSO}_4(36\%\text{Zn})$  – 35 lb/acre.

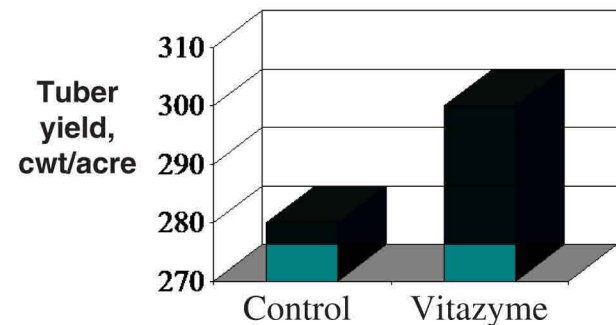
Vitazyme application: two 13 oz/acre applications

Top killing date: September 26, 2000

Yield results:

	Control*	Vitazyme	Increase
	cwt/acre		
<b>Tuber yield</b>	280	300	20(+7%)

\* Average per all of the Russet Burbank average.



**Tuber yield increase: 7%**

Conclusions: Vitazyme produced a sizable yield increase in this Russet Burbank potato trial.

Tim: “The Vitazyme treated tubers look very good. I would like to use it on a larger test. It is hard to see difference on a small test.

The potatoes on the Vitazyme had fewer small tubers, which made the crop look much bigger going into storage.”

Dennis: “This was the best field on the farm. It had the best size and the best yield.”

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# 2000 Crop Results

## Vitazyme on Potatoes

**Grower:** Semtec: Mark Innes and Amy Kunugi

**Location:** Center, Colorado

**Variety:** Nugget

**Planting date:** May 5, 2000

**Data collection:** Agro Engineering, Alamosa, Colorado

**Soil type:** loamy sand

**Row spacing:** alternate 32 in-36 in (average of 34 in)

**Experimental design:** A center pivot area of 120 acres, having similar soils throughout, was divided into four equal test areas of 30 acres each. These areas were all treated the same except three areas received an application of a different biostimulant product; one area served as a control.

### 1. Control

### 2. Vitazyme

### 3. GroZyme

### 4. E-2001

**Irrigation:** total of about 18 inches, every third day at 0.7 inch per irrigation beginning at emergence near the end of May

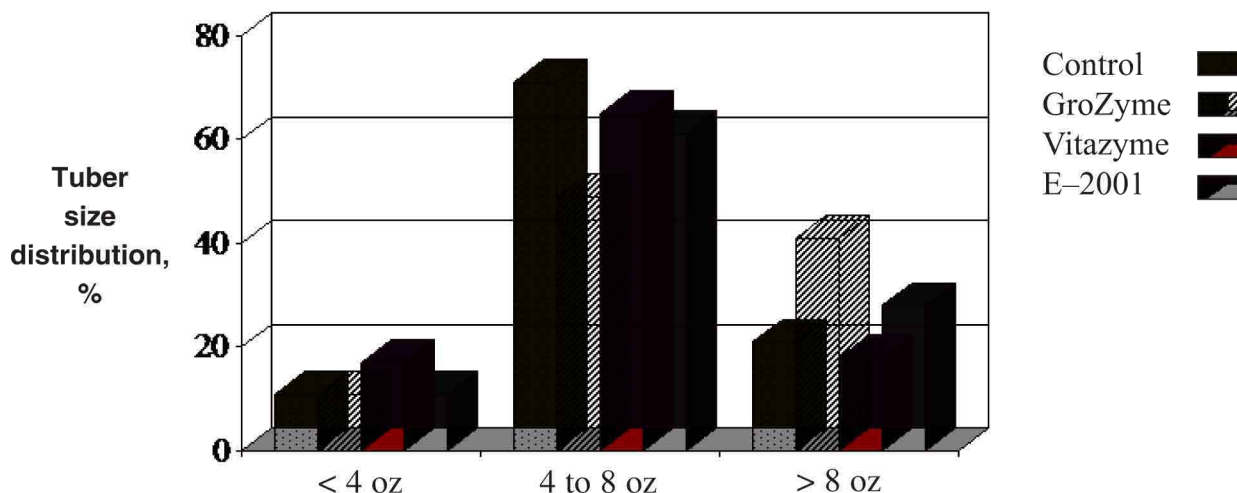
**Fertilization:** 140 lb/acre N, no P or K plus some S applied through the irrigation system; 400 lb/acre  $\text{FeSO}_4$ , 200 lb/acre  $\text{MnSO}_4$ , 35 lb/acre  $\text{ZnSO}_4$ , 20 lb/acre  $\text{CuSO}_4$ , 0.5 ton/acre compost, plus 1 ton/acre gypsum, all mixed and applied before planting and incorporated into the soil

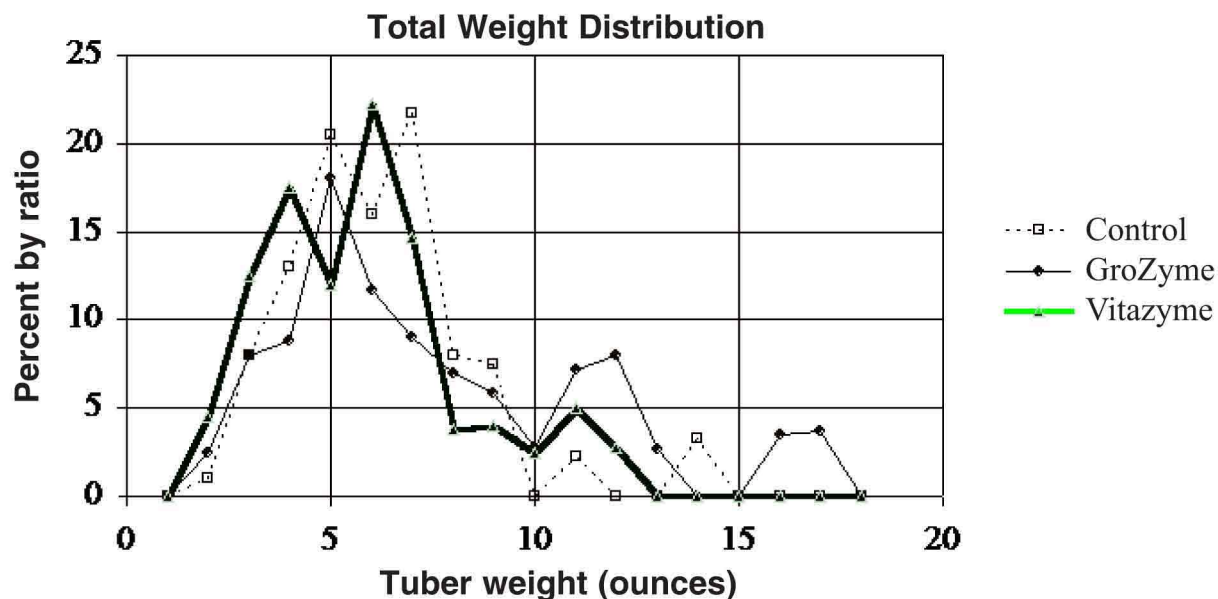
**Vitazyme treatment:** 13 oz/acre through the irrigation system at planting, with about 0.7 inches of water

**Harvest date:** October 12 to 14, 2000

**Tuber size evaluation:** On October 13, Agro Engineering performed a potato size evaluation of each treatment. The tubers were classified according to the ranges listed.

Treatment	Potato tuber weight				Average tuber size
	< 4 oz	> 6 oz	4 to 8 oz	> 8 oz	
	% of total mass				oz/tuber
Control	11	58	71	21	5.5
GroZyme	11	62	49	41	5.9
Vitazyme	17	54	65	18	4.9
E-2001	11	49	61	28	5.3





The Vitazyme treated tubers tended to skin a bit more than the other treatments at harvest, a result of possibly a soil difference or, more likely, the fact that the plants were still actively growing at harvest time. Had their growth been allowed to continue there would have been more yield and larger tubers.

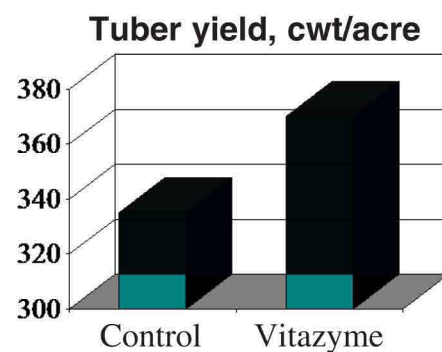
Based on field notes of the harvesters, the Vitazyme treated potatoes had **medium-sized tubers**, compared to smaller tubers for GroZyme and generally larger tubers for E-2001. However, the size evaluation indicated the largest number of large (> 8 oz) tubers for GroZyme.

**Tuber yield:** On October 13, Agro-Engineering evaluated the yield of each treatment using a yield monitor, which determined 2,610 data points for the control and 1,093 data points for the Vitazyme area. No data was supplied for the GroZyme and E-2000 areas, but Agro-Engineering stated that **Vitazyme yields were the highest of all three products tested.**

Treatment	Tuber yield, average	Change
	cwt/acre	
Control	335	-----
Vitazyme	370*	(+) 35 (+10%)

\* Significantly greater than the control at P=0.01.

**Tuber yield increase: 10%**



**Income change:** A price of \$3.00/cwt is estimated, considering 1999 prices of about \$4.00/cwt and 2000 prices of near \$2.00/cwt.

Treatment	Income	Change
	\$/acre	
Control	1,005.00	-----
Vitazyme	1,110.00	(+) 105.00

**Income increase: \$105.00/acre**

**Conclusions:** This large-scale potato trial in southern Colorado proved the effectiveness of Vitazyme in increasing total tuber yield, and in producing a medium sized tuber. At harvest the plants were still growing to some extent. Vitazyme outperformed the other two biostimulants in the study, and increased income by about \$105/acre for a single application applied through the irrigation system.



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# 2000 Crop Results

## Vitazyme on Potatoes a Testimonial

Farmers: Frank Kearney

Location: Mars Hill, Maine

Variety: Monona

Planting date: May 23, 2000

Row spacing: 36 inches

Soil type: gravelly loam

Previous crop: oats underseeded with clover

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

### 1. Control

### 2. Vitazyme

Fertilization: The cation balancing system was used on this field. Fertilizers added were as follows:  $P_2O_5$  – 75 lb/acre;  $NH_4NO_3$  – 300 lb/acre;  $(NH_4)_2 SO_4$  – 250 lb/acre;  $K_2SO_4$  – 400 lb/acre; borax – 15 lb/acre;  $ZnSO_4$  – 35 lb/acre; sulfur – 25 lb/acre.

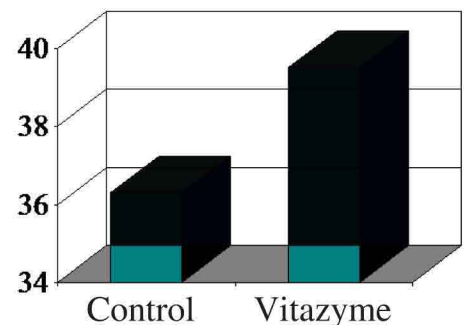
Vitazyme treatment: 13 oz/acre on July 6, with the fungicide (Manzate 75 DF)

Top killing date: August 23, 2000

Chlorophyll content: On August 18, 2000, chlorophyll readings were made with a Minolta SPAD meter using 20 randomly selected leaves from each treatment.

	Control	Vitazyme	Change
	SPAD units		
Leaf chlorophyll	36.3	39.5	3.2

Leaf chlorophyll, SPAD units



**Leaf chlorophyll increase: 3.2 SPAD units**

### Yield and quality comments:

Frank: "Very interesting results. Vitazyme gave definitely better roots. The plants looked better all summer, with more even tuber size. I would like a larger test next year."

The leaf chlorophyll level of the Vitazyme treatment was definitely superior during the growing season, showing that the carbon – fixing potential of the treated plants was greater than the control. This apparent advantage translated into a greater yield and the uniformity of the treated tubers.

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# 2000 Crop Results

## Vitazyme on Potatoes

Farmer: Dick Porter

Location: Mars Hill, Maine

Variety: Frito Lay 1625

Planting date: Vitazyme area: May 28; control area: May 22.

Row spacing: 36 inches

Soil type: gravely loam

Previous crop: oats

Experimental design: A field was treated with Vitazyme, while an adjoining field with equivalent soil types and crop history were left untreated.

### 1. Control

### 2. Vitazyme

Fertilizer treatments: 1,250 lb/acre of a 10-14-17% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O fertilizer

Vitazyme treatment: 13 oz/acre on the seed pieces at planting with Admire insecticide; 13 oz/acre on the leaves and soil at blossom time.

Insecticide application: Admire in the furrow at planting

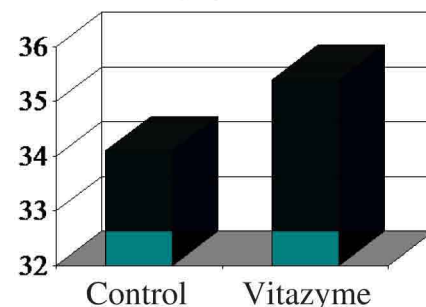
Chlorophyll levels: On August 18, 20 representative leaves from each treatment were evaluated for chlorophyll using a Minolta SPAD meter.

### Leaf Chlorophyll

	Control	Vitazyme	Change
	SPAD units		
Leaf chlorophyll	34.1	35.4	1.3

**Chlorophyll increase: 1.3 SPAD units**

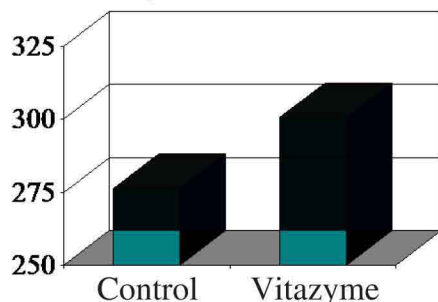
### Leaf chlorophyll, SPAD units



### Tuber Yield\*\*

Yield results: Three 10-foot row lengths were dug from each field area. The plant number, total weight, and tuber numbers were recorded. Each plot for both treatments averaged 11 plants.

### Tuber yield, lb/acre, x 1,000



	Control*	Vitazyme*	Change
Tuber yield	lb/plot		
	20.93 b	22.77 a	1.84(+9%)
	cwt/acre		
	276.3 b	300.6a	24.3(+9%)

\* Means followed by the same letter are not significantly different at P=0.20 according to Tukey's Honestly Significance Difference Test. LSD<sub>0.10</sub>=2.88.

\*\* Yield calculations in cwt/acre are determined by harvesting a 10-foot row length, and multiplying this weight (in lb.) by 8. This gives barrels (165 lb each). Such a calculation has proven to be fairly accurate in determining actually marketed yield, which takes into account shrinkage in storage, and rocks and debris amongst the tubers.

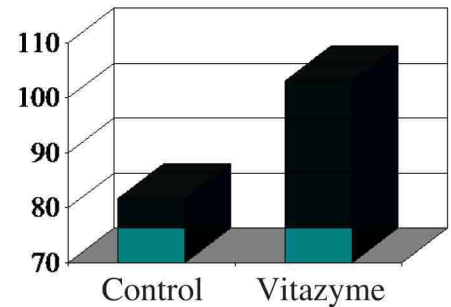
**Tuber yield increase: 9%**  
**[in spite of six days less growth]**

### Total Tubers

	Control*	Vitazyme*	Change
		number/plot	
<b>Tuber yield</b>	56.3 b	71.0 a	14.7(+26%)
		number/acre	
	81,748 b	103,092 a	21,344(+26%)

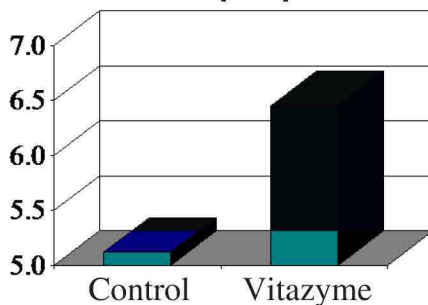
\* Means followed by the same letter are not significantly different at  $P=0.09$ , according to Tukey's Honestly Significance Difference Test.  $LSD_{0.10}=14$ . The harvested average is 0.0006887 for a 10-foot-sample.

### Total tubers per acre, x1,000



**Tuber number increase: 26%**  
[in spite of six days less growth]

### Tubers per plant



### Tubers Per Plant

	Control	Vitazyme	Change
		number/plant	
<b>Tubers/plant</b>	5.12	6.45	1.33(+30%)

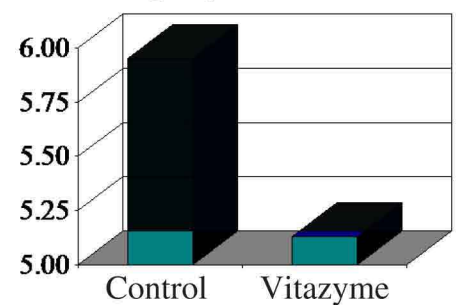
**Tuber/plant increase: 30%**  
[in spite of six days less growth]

### Weight Per Tuber

	Control	Vitazyme	Change
		lb/tuber	
<b>Weight/tuber</b>	0.3716	0.3207	(-)0.0509(-14%)
		oz/tuber	
	5.95	5.13	(-)0.82(-14%)

**Weight per tuber decrease: (-)14%**

### Weight per tuber, oz



Income increase: The value of these chipping potatoes is estimated at \$11/cwt if sold in the late winter or early spring.

	Control	Vitazyme	Change
		\$/acre	
<b>Total income</b>	3,039.301	3,306.60	267.30

**Income increase:**  
**\$267.30/acre**

Conclusions: Vitazyme applied to these FL 1625 potatoes increased the leaf chlorophyll content, and thus photosynthesis, during the growing season. This increase was translated into more total tuber yield and a 30% greater number of tubers for the same number of plants, though the tuber size on average was less (by 14%). The 9% greater yield means a \$267.30/acre yield increase from the two applications, which is a very significant income improvement from the sound investment in Vitazyme. These improvements in growth, yield, and income occurred in spite of the fact that the Vitazyme treated potatoes were planted six days later than the control potatoes.



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# 1999 Crop Results

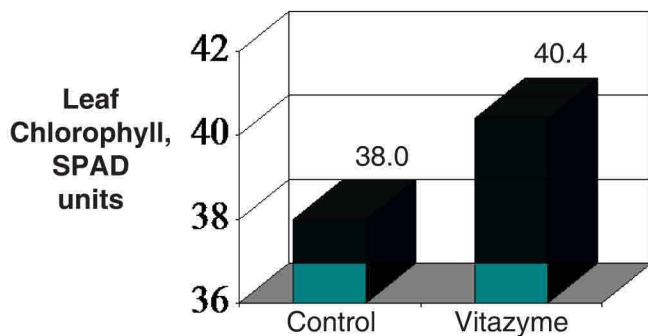
## Vitazyme on Potatoes

### Testimonials

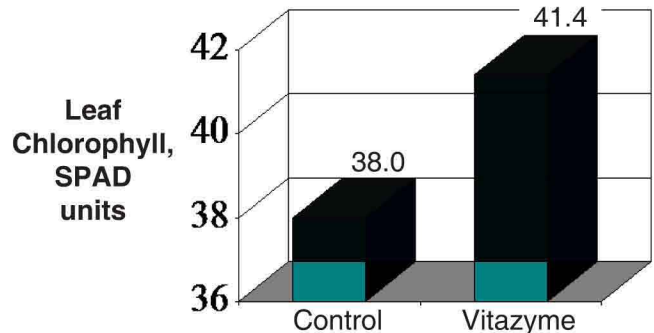
Several potato growers used Vitazyme on all of their acreage in the Presque Isle, Maine, area, so no test comparison with untreated controls could be made. Those having control areas without a Vitazyme application had positive remarks to give about the product.

**Jay and David McCrum.** On August 8, 1999, the chlorophyll levels of leaves for treated and untreated areas of test fields revealed significant differences. Values were determined by averaging 20 leaves for each treatment, using a Minolta SPAD meter.

**Snowden**



**Russet Burbank**

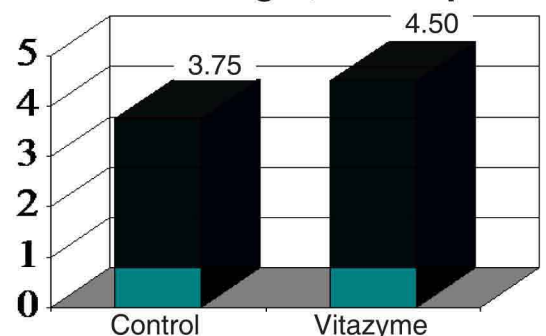


Two Vitazyme applications were put on 1,700 acres of their potatoes, at 13 oz/acre each time: (1) at planting on the seed pieces, and (2) one week before flowering. Samples of plants from treated and nearby untreated areas revealed significant yield improvements with Vitazyme, up to a 33% increase.

**Alan Irving.** Treated potatoes in the test area had greater uniformity of size and better color. No yields were determined for treated and untreated areas.

**Terry McPherson.** On August 9, 1999, a significant difference in yield was detected between Vitazyme treated and untreated areas of a Russet Burbank field. Samples of two plants from each treatment gave the weights shown on the right. It was impossible to separate yields for the two areas due to wet conditions at harvest. Terry estimated that the treated area yielded at least 20 cwt/area more than the adjacent control area.

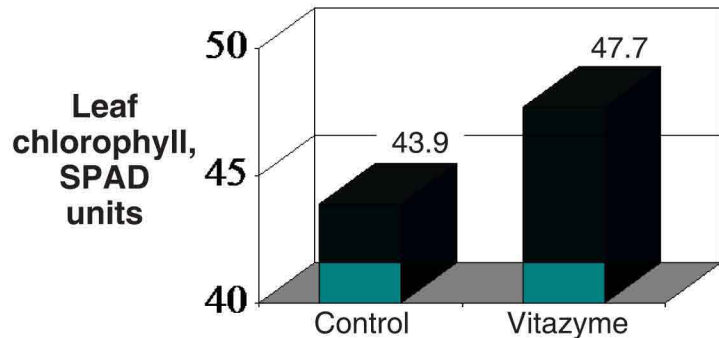
**Potato weight, lb/two plants**





**Jay Boyd.** On August 10, 1999, the Vitazyme treated areas of a field revealed higher leaf chlorophyll levels than nearby untreated areas. Note the graph on the right. The yields of treated field areas, while not documented, were higher than for untreated field areas.

**Mike Adams.** “[Vitazyme treated] plants looked fuller with more leaves all summer. Tubers had more even size and very nice type.”



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# 1999 Crop Results

## Vitazyme on Potatoes

Grower: Bob Johnson

Location: Naples, Florida

Variety: Red Lasota

Planting date: December 29, 1999

Soil Type: gravelly (limestone)

Harvest date: April 17, 1999

Experimental design: A field contained 16-row strips of potatoes divided by drainage ditches. Three strips were treated with Vitazyme and eight strips were left untreated.

### 1. Control (no Vitazyme)

### 2. Vitazyme

Fertility treatments: 1,300 lb/acre of 7-10-10% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O, broadcast preplant and incorporated; 1,200 lb/acre of 12-4-18 dropped in rows four inches apart and scratched into the shoulders of the hills, at the four-inch stage

Fungicide treatments: 14 during the growing season, on January 20, 26, February 1, 3, 8, 11, 15, 19, 23, 26, and March 9, 15, 20, 2.

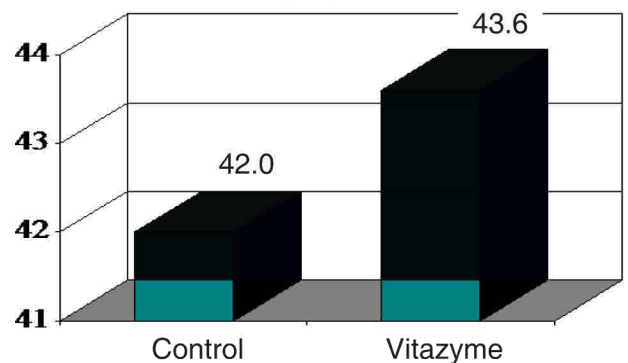
Vitazyme application: 13 oz/acre sprayed over the foliage and soil at tuber initiation, and 13 oz/acre about 12 days later

Chlorophyll content: On March 5, 1999, evaluations on chlorophyll were taken with a Minolta SPAD meter, using 20 leaves randomly selected across each plot, and averaged. The control areas had 160 values, and the treated areas 100 values.

Treatment	SPAD value
Control	42.0
Vitazyme	43.6 (+4%)

**Chlorophyll increase:  
4%**

Leaf chlorophyll, SPAD units

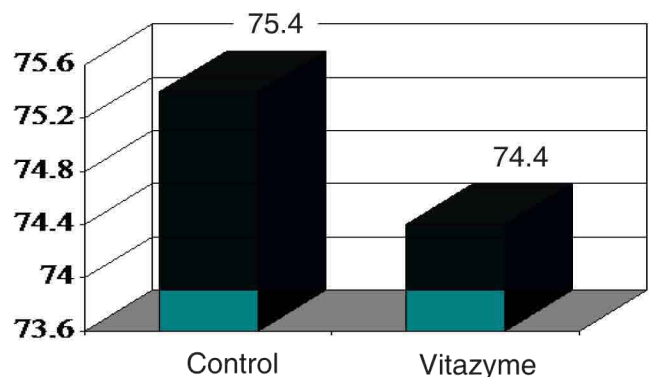


Leaf canopy temperature: On March 5, 1999, canopy temperatures were taken of each plot using a Raytek infrared thermometer. Plot values were averaged.

Treatment	Canopy temperature, °F
Control	75.4
Vitazyme	74.4 (-1.0)

**Leaf canopy temperature reduction:  
1.0 °F**

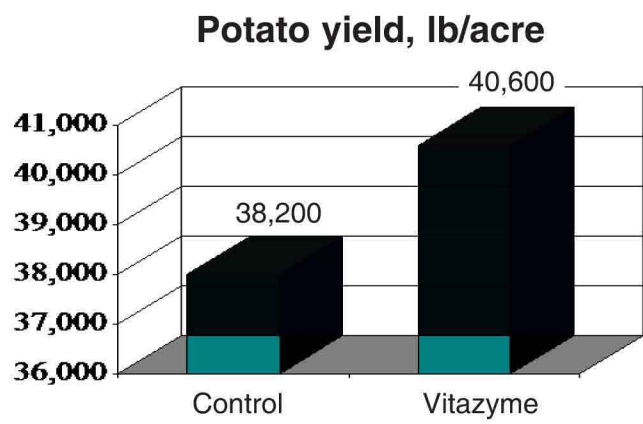
Canopy temperature, °F



Yield results:

Treatment	Yield, lb/acre
Control	38,200
Vitazyme	40,600 (+2,400)

**Yield increase: 6%**



Income results: Potato price = \$0.16/lb x 2,400 lb/acre = \$384.00/acre

**Income increase: \$384.00/acre**

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# 1999 Crop Results

## Vitazyme on Potatoes

Farmer: John Aukland

Location: Arkport, New York

Variety: Reba

Soil type: muck (organic)

Row spacing: 34 inches

Planting date: May 5, 1999

Harvest date: October 5, 1999

Experimental design: A field of 5 acres was split in half, one half receiving Vitazyme and the other half another foliar treatment called "ACA" (an anhydrous ammonia + zinc formulation).

### 1. Control (ACA)

### 2. Vitazyme

Fertility treatments: 1000 lb/acre of 8-8-8 preplant, and 250 lb/acre of urea sidedressed (193 lb/acre of N total)

Vitazyme and ACA treatments: 13 oz/acre of Vitazyme with Admire insecticide on seed pieces at planting; 1pt/acre of ACA in fertilizer band at planting

Chlorophyll determinations: On August 11, chlorophyll readings were made using a Minolta SPAD meter, and 20 leaves per treatment for an average.

Treatment	SPAD units	Increase
Control (ASA)	39.4	---
Vitazyme	43.6	4.2 (+11%)

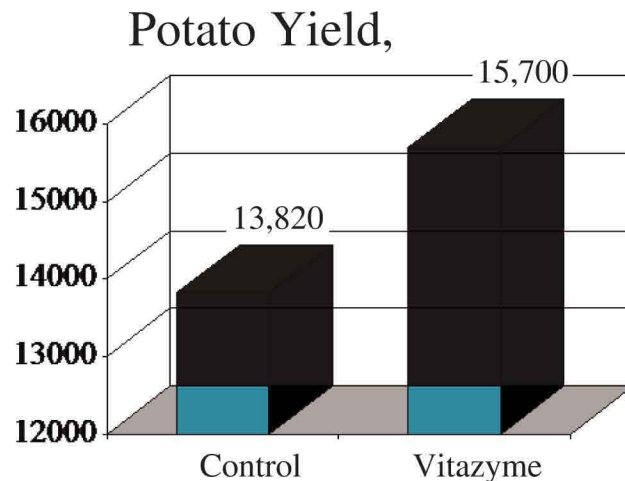
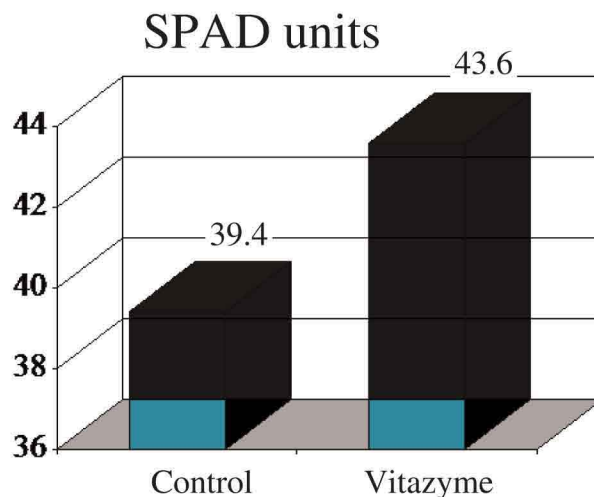
**Chlorophyll increase:  
4.2 SPAD units**

Yield results: Four field-length rows of each treatment were harvested and weighed.

Treatment	Yield lb/acre	Increase lb/acre
Control (ASA)	13,820	---
Vitazyme	15,700	1,880 (+14%)

**Tuber weight increase:  
+ 14%**

Income results: At \$0.16/lb, the increased yield produced **\$300.80/acre more income.**





## Vital Earth Resources

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# 1999 Crop Results

## Vitazyme on Potatoes

Farmer: James Harrison

Variety: Cara (seed potatoes)

Harvest date: September 1, 1999

Experimental design: A potato field was divided into two parts: two-thirds with standard fertilizer practices and one-third with the "Eco-Ag" System, using Vitazyme, humic acids, and beneficial rhizosphere bacteria.

Location: North Yorkshire, England

Planting date: first weekend of May, 1999

Soil type: sandy clay loam

### 1. Control

### 2. Vitazyme + Eco-Ag products

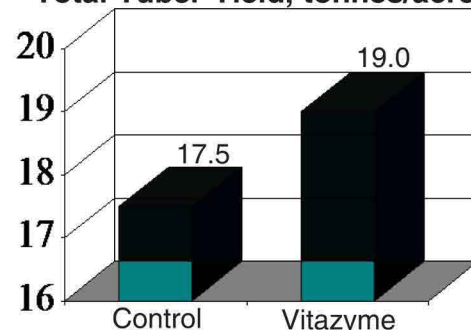
Fertility treatments: recommended applications of mono-ammonium phosphate,  $K_2SO_4$ ,  $(NH_4)_2SO_4$ , and other minerals

Vitazyme applications: 0.5 liter/ha (6 oz/acre) + humic acids + rhizospore bacteria at planting; 0.5 liter/ha and humic acids at tuber initiation and again at tuber bulking

Yield results:

	<u>Control</u> tonnes/acre	<u>Vitazyme</u> tonnes/acre	<u>Change</u> tonnes/acre
Yield, net	17.50	19.00	1.50 (+9%)
Yield, seed quality	5.93	7.75	1.82 (+31%)
Yield, food quality	11.57	11.25	-0.32 (-3%)

Total Tuber Yield, tonnes/acre



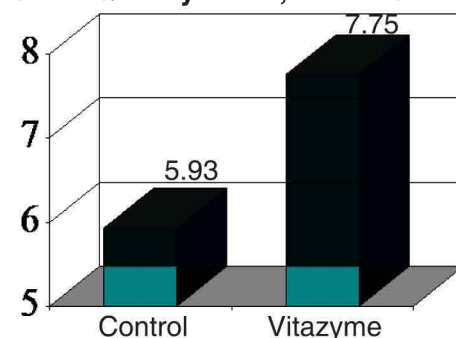
**Seed yield increase: 31%**

Income results: Seed potato price = \$286.20/tonne

Food potato price = \$95.40/tonne

	<u>Control</u>	<u>Vitazyme</u>
Total income	\$1,761.40/acre	\$3,291.30/acre

Seed Quality Yield, tonnes/acre



**Income increase: \$1,529.90/acre**

Comments: The extra profit achieved by the Eco-Ag System in this potato study was \$491.31, after accounting for the extra costs of this system compared to the conventional program. "Mr. Harrison was delighted by the result which he monitored throughout the year. He intends to use Vitazyme on all crops in 2000."

**Vitazyme and the Eco-Ag System produced a sizeable (31%) increase in high quality seed potatoes versus the conventional system.**

## ***Vital Earth Resources***

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# **1997 Crop Results**

## **Vitazyme on Potatoes A Testimonial**

Farmer: Mike Conlogue

Location: Littleton, Maine

Variety: Superior

Experimental design: A small field had Vitazyme applied to about half of the field, with an untreated control left for comparison on the other half.

Vitazyme treatment: 13 oz/acre applied to the soil soon after planting

Fertility treatment: base saturation balancing of nutrients

Comments:

- The Vitazyme treated plants had **superior tuber set, appearance, and size (greater uniformity)** than the untreated control.
- In spite of droughty conditions, **the yield of these Superiors was greater** than similar fields for some of his neighbors.
- **Chlorophyll** in leaves on July 17, using a SPAD meter (average of 20 leaves):

Control - 47.0

Vitazyme - 48.2

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# **1997 Crop Results**

## **Vitazyme on Potatoes A Testimonial**

*Farmer:* Steve Clockadile

*Location:* Westfield, Maine

*Variety:* Katahdin

*Experimental design:* Vitazyme over the entire field

*Vitazyme treatment:* 13 oz/acre on the foliage about July 17

*Fertility treatment:* base saturation balancing of nutrients

*Comments:*

- **“I think Vitazyme is the best thing I put on my farm this year!”**
- At least a **20% yield increase** was achieved over other fields, and over what was expected on this field.
- Part of the field had a poor stand, but rather than yielding misshapen and uneven tubers the Vitazyme caused **very even sizing and few misshapen tubers**. The **yield** for this part of the field was as good as for the part having a good stand.
- Some hills had **up to 26 tubers per plant!**
- **Sizing** was equal in areas of a poor stand and a good stand.

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# **1997 Crop Results**

## **Vitazyme on Potatoes A Testimonial**

Farmer: Merlon Cronkite

Location: Presque Isle, Maine

Variety: Atlantic

Experimental design: Much of the field received Vitazyme, with a control strip left untreated.

Vitazyme treatment: 13 oz/acre on the foliage applied July 15

Fertility treatment: base saturation balancing of nutrients

Comments:

- The Maine State Inspection Service said that **the Vitazyme treated Atlantics were the best of that variety they had seen in 1997.**
- Merlon stated that this field produced the **best yield** on Atlantics he has ever seen.
- Compared to the control strip, the Vitazyme treatment did the following:
  - a) **Substantially improved the yield**
  - b) **Produced very even sizing**
  - c) **Greatly increased the tuber set per plant**
- The control potatoes had much less set and therefore grew too large, having **poorer shape and size uniformity than did the Vitazyme treated plants.**
- **Chlorophyll** in leaves on July 17, using a SPAD meter (average of 20 leaves):
  - Control - 43.3
  - Vitazyme - 44.4