



2010 Field Trial Results

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

Compiled by Paul W. Sylie, Ph.D., Director of Research
Vital Earth Resources, 706 East Broadway
Gladewater, Texas 75647, U.S.A.
(903)845-2163 www.vitalearth.com

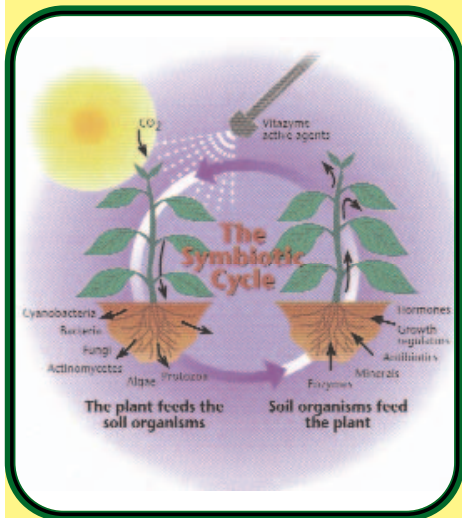
2010 Vitazyme Field Trial Results

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

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

Improved Symbiosis: The Secret of Vitazyme's Action

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



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

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

releases anionic elements. Organism types include mycorrhizae, cyanobacteria and various other bacteria, fungi, and actinomycetes.

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

existing program by enabling the plant to grow better, thus increasing productivity. Follow this easy-to-use five-point program.

- 1 Ideally, analyze the soil at a reputable laboratory and correct deficiencies and imbalances with expert consultation.
- 2 Reduce nitrogen fertilizer applications for non-legumes using this test: Reduce the application each time the fertilizer normally is applied. Legumes normally need no added nitrogen. Vitazyme will accelerate

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

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

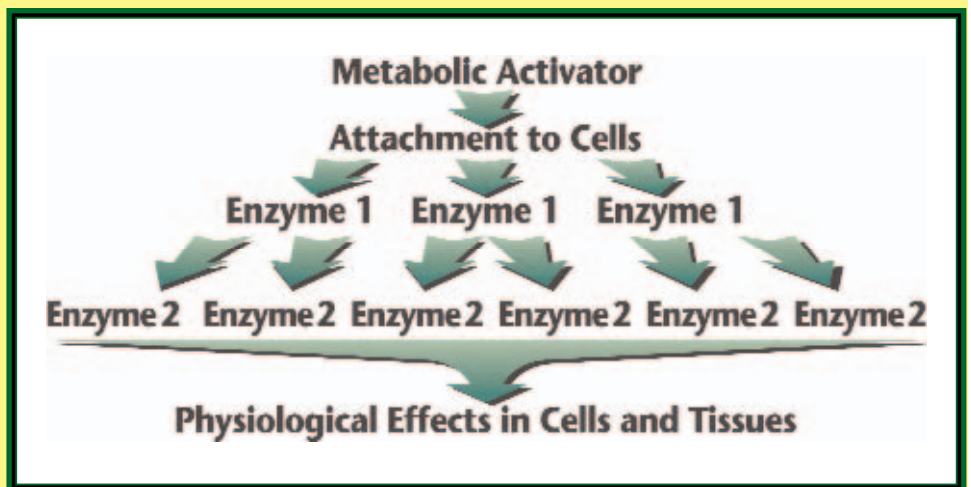
Very small amounts of these metabolic triggers in Vitazyme are needed to greatly improve plant and rhizosphere microbe response. This is because of the **enzyme cascade effect**. Successive tiers of enzymes are activated in plant and microbial tissues to give a large physiological response from very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

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

Vitazyme should be used within the context of a complete crop management system, never by itself. Vitazyme will optimize your

legume nitrogen fixation.

- 3 Treat the seeds or transplant roots, if possible at planting. Treat seeds with a dilute Vitazyme solution, such as 1 liter of a 5% solution for every 50 kg of seed. Mix the seeds thoroughly in a seed or cement mixer or on a tarp. **For excellent results apply the solution directly on the seed row with a planter attachment. Dip or spray transplant roots with a 1% or 2% solution.**
- 4 Apply Vitazyme to the soil and/or foliage. Follow instructions for each crop. In most cases from 10 to 20 oz/acre can be applied per application at one to three times during the cropping cycle. A fall application on stubble is effective to accelerate residue breakdown.
- 5 Integrate other sound, sustainable management practices into a total program. Use crop rotations, minimum tillage, soil conservation practices, and adapted plant varieties.



Vitazyme Highlights for 2010

The year 2010 continued a long succession of years with excellent responses to Vitazyme in many countries. Despite adverse weather conditions in some areas, performance of this highly consistent bios-timulant once again proved itself with a variety of soil types climatic zones. Note the trials in this booklet for details.

Some Highlights for 2010

1 Among the most notable results were those with grapes and wheat in Chile. Syngenta tested the product on a number of table grape vineyards and wheat fields, many of them replicated, and found improvements in fruit coloration, brix, yield, and time to maturity. With earlier maturity, picking could proceed earlier to fetch higher export prices. Wheat yields also responded impressively to Vitazyme.

2 In Viet Nam, plot trials and field use on rice, vegetables, and other crops contin-

ued to reveal outstanding responses to Vitazyme. A Chinese mustard trial produced a 19% yield increase, harvested two days earlier. An Giang will use the current excellent results as a springboard to expand the market into areas across the country during the next year as farmers have experienced the first taste of what this program can do to improve their yields, quality, and profits.

3 Registration in the Philippines has been completed, along with a lettuce trial that produced a massive 62% yield increase at the 100% nitrogen level, and a 46% increase at 50% nitrogen; with no fertilizer the increase was an amazing 128%. All increases were highly significant

4 Apples in New York continue to respond impressively to Vitazyme. Empires showed a 9% yield increase with four applications, while improving tree growth, fruit brix and pressure, and fruit

size. Applications to Honeycrisp apple trees increased the return bloom by 82% above the untreated control.

5 Ukraine trials on several crops revealed the continued, consistent improvements in yield and quality that have marked studies there for several years. A typical wheat trial gave increases in yield of from 16 to 24% over four fertilizer levels, along with reduced disease susceptibility and higher protein, test weight, and income. Trials with barley, buckwheat, potatoes, sugar beets, fodder beans, corn, soybeans, sunflowers, and pumpkins revealed similar excellent responses.

6 Aquatron treated water together with Vitazyme produced impressive greenhouse yield increases with corn.

7 Excellent results in Australia, Kenya, Egypt, Russia, Kazakhstan, and other countries reveal how Vitazyme can aid farmers in all soil and climatic zones.

Vitazyme Field Tests for 2010

Amaranth (Edible)

Researcher: unknown

Variety: Amaranth (*Amarantus mangosanus*)

Preseeding treatment: seeds mixed with dry soil

Experimental design: A small plot trial, using 30 m² plots and three replicates, was conducted on edible amaranth to determine the effect of Vitazyme on crop yield. Three plots were treated with Vitazyme, and three were left untreated.

1. Control (farmer normal practice)

2. Vitazyme

Fertilization: For 30 m², 48kg of chicken manure, 2 kg of "thermophosphate", and 2 kg of organic fertilizer mixed with N-P₂O₅-K₂O fertilizer.

Vitazyme application: (1) a seed treatment of 10% Vitazyme by wetting the seeds and drying, repeated three times; (2) soil and foliar treatment of 3 ml in 3 liters of water, 7 days after planting; (3) foliar treatment of 3 ml in 3 liters of water, 14 days after seeding.

Conclusion: This Viet Nam study with edible amaranth revealed that a seed treatment and two foliar treatments of Vitazyme increased yield by 9%, a very substantial gain.

Location: Hoc Mon District, Ho Chi Minh City, Viet Nam

Planting date: July 23, 2010

Amaranth Yield

Treatment	Yield/plot	Yield/ha	Change
	kg/30m ²	kg/ha	kg/ha
1. Control	120.0	40,000	---
2. Vitazyme, seeds	130.5	43,500	3,500 (+9%)

• Increase in yield with Vitazyme: 9%

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Researcher: unknown

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Conclusion: This Viet Nam study with edible amaranth revealed that a seed treatment and two foliar treatments of Vitazyme increased yield by 2%.

Location: Hoc Mon District, Ho Chi Minh City, Viet Nam

Planting date: July 5, 2010

Amaranth Yield

Treatment	Yield/plot	Yield/ha	Change
	kg/30m ²	kg/ha	kg/ha
1. Control	126	42,000	---
2. Vitazyme, seeds	129	43,000	1,000 (+2%)

• Increase in yield with Vitazyme: 9%

Apples

New Planting

Grower: Rick Kime
Location: Kime's Cider Mill, Bendersville, Pennsylvania
Variety: Gala, new trees
Soil type: unknown
Experimental design: A new orchard was planted with young trees, with three rows treated with Vitazyme twice on the soil around the trees. The control trees were about 10 rows away from the treated trees.



The untreated newly planted apple trees were growing well, but were greatly inferior in total branch length to the treated trees.

Vitazyme applied to these newly planted trees greatly stimulated leaf chlorophyll, and leaf and branch growth, as seen in these photos.

1. Control

2. Vitazyme

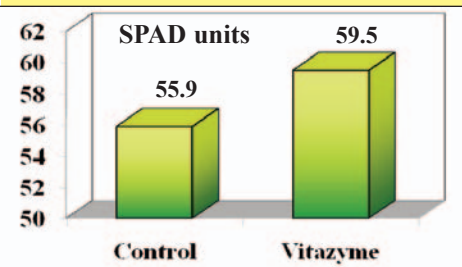
Fertilization: none

Vitazyme application: (1) 13/oz/acre (1 liter/ha) on the soil with a herbicide spray; (2) 13 oz/acre (1 liter/ha) on the soil later in the season

Chlorophyll determination: On August 17, 30 trees from each treatment were measured for chlorophyll using fully-opened, mature leaves, using a Minolta SPAD meter.

New growth determination: On August 17, 10 trees from the end of the middle row for each treatment were measured for branch numbers, as well as the new growth of each branch. These data were analyzed by a General Linear Model.

Leaf Chlorophyll



Total New Branch Length Per Tree

Treatment	Branch length ¹ inches	Length change inches
Control	111.9 b	---
Vitazyme	183.2 a	71.1 (+64%)
Main effects	0.0006***	
Model	0.0006***	
CV _{0.05}	26.1%	
LSD _{0.05}	36.2 inches	

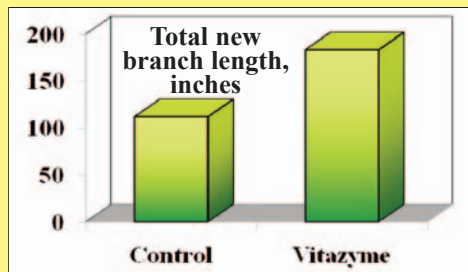
¹Means are significantly different according to the Student-Newman-Keuls Test at P=0.05.

Total Branches Per Tree

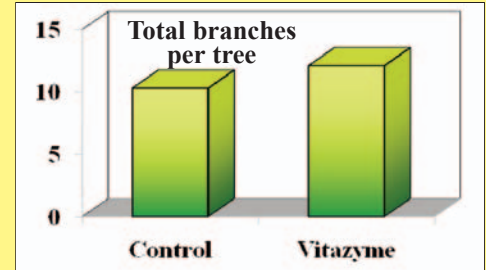
Treatment	Branches ¹ number	Change number
Control	10.3	---
Vitazyme	12.1	1.8 (+17%)
Main effects	0.1897 ^{ns}	
Model	0.1897 ^{ns}	
CV _{0.05}	26.4%	
LSD _{0.05}	2.8	

¹Means are significantly different according to the Student-Newman-Keuls Test at P=0.05.

Conclusion: In this southeastern Pennsylvania new apple planting study, Vitazyme greatly increased leaf chlorophyll levels, by 3.6 SPAD units. This enhanced photosynthetic advantage resulted in a significantly increased total new branch growth of 64%, while increasing the total branches per tree by 17%; the branch number increase was not significant, since most new growth was on already existing branches at planting. The results of this study show the great value of Vitazyme for improving first-year growth of apple trees.



• Increase in new growth with Vitazyme: 64%



• Increase in leaf chlorophyll with Vitazyme: 3.6 SPAD units

Apples

Researcher: Agr. Assistance

Location: Wayne County, New York

Variety: Empire

Soil pH: 6.6

Tree density: 450 trees/acre

Tree age: 25+ years

Rootstock: M26 y-trellis

Experimental design: An apple orchard was divided into an untreated control, a TrophoMax treatment, and a treatment receiving both TrophoMax and Vitazyme. The objective of the study was to evaluate the effect of these treatments on apple yield and quality.

1. Control

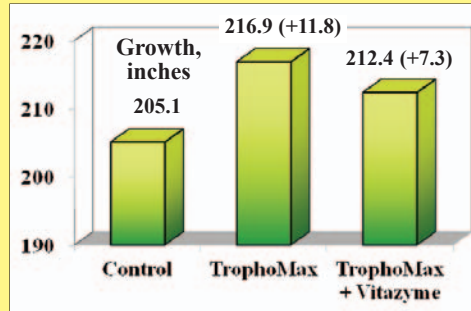
2. TrophoMax

3. TrophoMax + Vitazyme

Fertilization: 250 lb/acre Ca(NO₃)₂ (37 lb/acre N) pre-bloom to all treatments

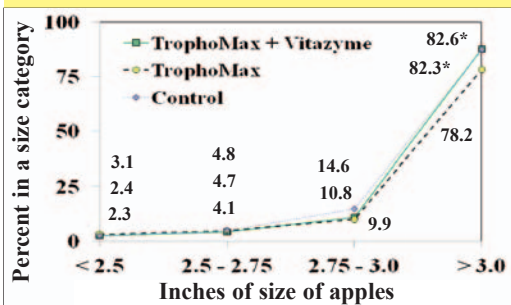
TrophoMax application: TrophoMax is an inoculant for seeds and leaves that contains patented beneficial bacteria called pink-pigmented facultative methylotrophs (PPFMs). These bacteria are naturally present on the leaves, roots, and leaves of all plant species, and they secrete nitrogen, and the growth regulators cytokinins and auxins. By applying these PPFM bacteria to exceed baseline levels, crop yields and biomass have been shown to increase, and resistance to heat, drought, insects, and microbial pathogens has been increased. Applications were 8 oz/acre at pink (April 23), petal fall (May 18), second cover (June 12), and fourth cover (July 19) using an airblast sprayer.

Tree Growth



Increase in tree growth
 TrophoMax +11.8
 TrophoMax + Vitazyme ... +7.3

Fruit Grade



*Significant increase over the control.

Increase in >3-inch apples
 TrophoMax +4.1%
 TrophoMax + Vitazyme ... +4.4%

Vitazyme application: 16 oz/acre at pink (April 23), petal fall (May 18), second cover (June 12), and fourth cover (July 19), along with TrophoMax using an airblast sprayer.

Weather for 2010: 2010 was unusually warm and wet, giving excellent growing conditions that resulted in good fruit size, high soluble solids, and high yields. There were also widespread losses due to frost at late bloom.

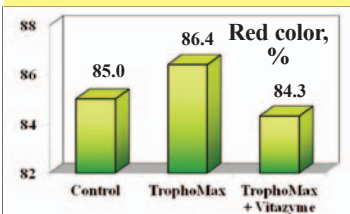
Tree growth: Seven trees from each treatment were evaluated.

Fruit quality results: Seven trees were evaluated from each treatment. Brix, pressure, and finish were measured on 10 fruit per tree; 100 fruit per tree were used to determine color.

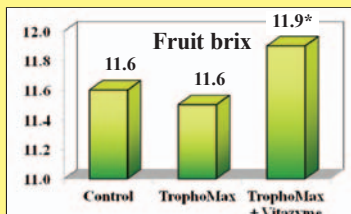
Mean fruit size:
 Control - 6.8 oz
 TrophoMax - 6.9 oz
 TrophoMax + Vitazyme - 6.8 oz

Increase in brix with TrophoMax + Vitazyme: 0.3 percentage point

Red Color

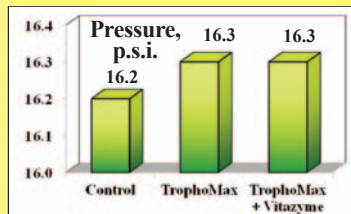


Fruit Brix

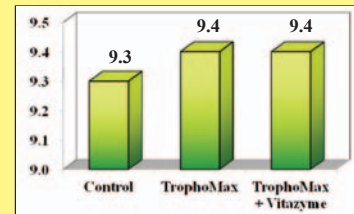


*Significant increase over the control

Fruit Pressure



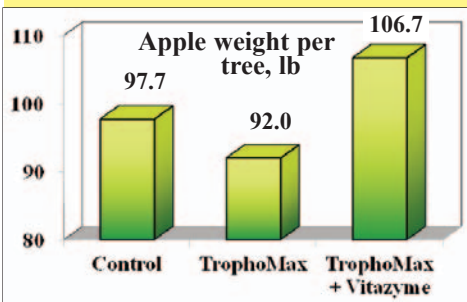
Fruit Finish*



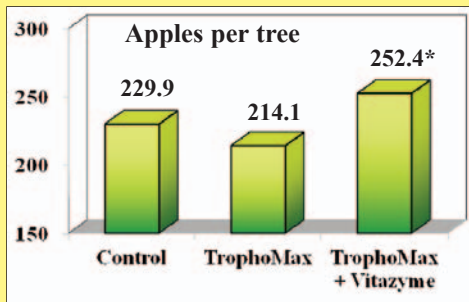
*10=perfect finish, 8-9=good commercial fruit finish, and 3-4=poor finish

Fruit yield results: The fruit was picked on representative trees of each treatment.

Apple Weight

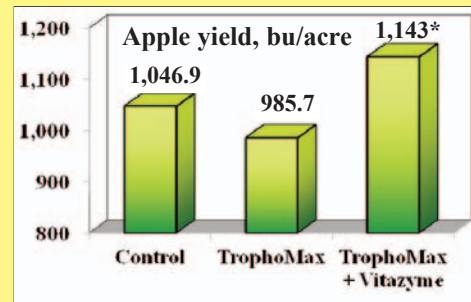


Apple Number



*Significant increase over the control.

Calculated Yield



*Significant increase over the control.

Conclusion: This New York apple trial revealed some positive response for TrophoMax alone with the >3.0-inch apple size (+4.1%), but with no other parameters measured. However, along with Vitazyme the fruit load (+9%) and fruit number (10%) were noticeably improved, as were >3.0-inch fruit (+4.4%) and the brix level (+0.3 percentage point). The calculated yield was also increased by 96.5 bu/acre (+9%) above the control with the combined products. There results lend credence to the possibility that the improvements noted in apple yield and quality in this study were due to Vitazyme and not TrophoMax bacteria, although there was no treatment with Vitazyme alone to verify this possibility.

According to the researcher,

- Total vegetative growth was somewhat increased in both the TrophoMax and TrophoMax plus Vitazyme treatments compared to the untreated control, although growth was adequate in all trees.
- Fruit set (apples/tree) and total yield were highest in the TrophoMax plus Vitazyme program.
- Fruit size was very large in all three treatments, mostly 3.0 inch diameter-plus fruit.

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- Percent red fruit color at harvest did not vary between treatments.
- Fruit firmness at harvest did not vary between the three treatments.
- The TrophoMax plus Vitazyme treatment showed an increase in soluble solid levels (Brix).
- No differences in fruit finish, or any signs of foliar or fruit phytotoxicity, were observed. TrophoMax applications did not result in any crop injury.

- **Increase in apple weight with TrophoMax + Vitazyme: 9%**
- **Increase in apple number with TrophoMax + Vitazyme: 10%**
- **Increase in apple yield with TrophoMax + Vitazyme: 9%**

Apples

A Study On Return Bloom



Without Vitazyme applied the previous year, return bloom for these Golden Delicious apples was rather weak compared to the treated trees.



Note how Vitazyme treatment the year before greatly enhanced the number of blossoms the following year, increasing them by 82%!

Researcher: Agr. Assistance

Variety: Golden Delicious

Tree age: 15+ years

Experimental design: On a commercial apple orchard, Vitazyme

was evaluated in a treated area for yield and quality parameters, as well as return bloom from 2009 applications, as compared to an untreated area alongside. Both the treated and control areas had the same management practices applied.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 2009 and 2010 applications were made with an airblast sprayer — applying 67 gallons/acre — at 13 oz/acre at pink, petal fall, and second cover.

Weather for 2010: 2010 was unusually warm and wet, giving excellent growing conditions that resulted in good fruit size, high soluble solids, and high yields. There were also widespread losses due to frost at late bloom.

Return bloom results: On April 29, 2010, flower clusters were counted on seven limbs (as replicates) for each treatment.

Fruit quality results: The fruit was picked and graded on two scaffold limbs per replicate (seven reps per treatment). Due to widespread frost injury losses, limbs fairly high in each tree were used.

Because the Vitazyme treatment allowed many more apples to set, this average size was less than for the untreated control.

Mean fruit size:
Control - 6.8 oz
Vitazyme - 6.6 oz

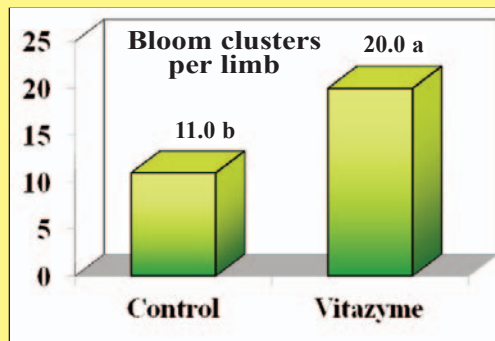
- **Increase in bloom cluster with Vitazyme: 9.0 per limb (+82%)**

Location: Wayne County, New York

Tree density: 400 trees/acre

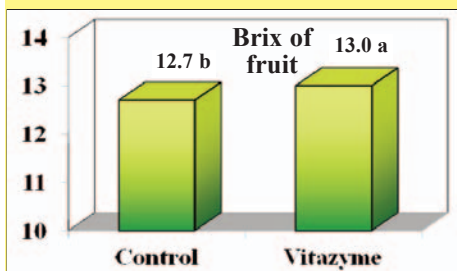
Rootstock: M26

Bloom Clusters Per Limb*



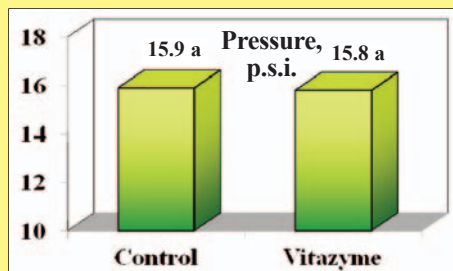
*Means followed by the same letter are not significantly different at P=0.05

Fruit brix*



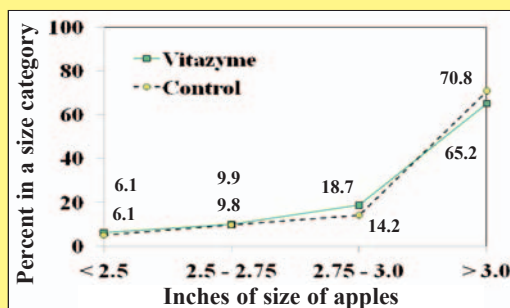
*Means followed by the same letter are not significantly different at P = 0.05. Measured on 10 fruit per rep (tree).

Fruit Pressure*



*Means followed by the same letter are not significantly different at P = 0.05. Measured on 10 fruit per rep (tree).

Fruit Grade



Fruit yield results: The fruit was picked on two scaffold limbs per replicate (seven reps per treatment). Due to widespread frost injury, limbs fairly high on each tree were used.

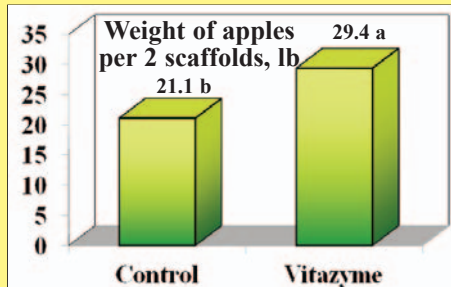
Quality improvements with Vitazyme

- 65.2% >3.0 inch fruit despite having a very heavy fruit load
- Fruit brix significantly greater than the control by 0.3 percentage point, despite a heavier fruit load

Conclusion: This New York apple study, begun in 2009 to evaluate the return bloom, yield, and quality of apples grown the subsequent year, proved that Vitazyme greatly improved all parameters except apple size. The failure to increase apple size was due to the much heavier load of fruit for the Vitazyme treatment. According to the author of the study,

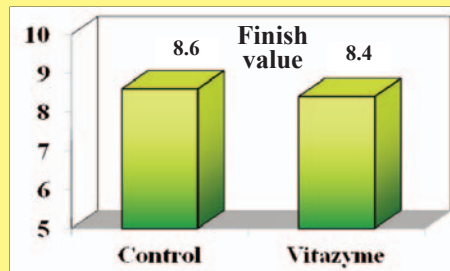
- **2010 return bloom.** 2010 return bloom (flower clusters/limb) was significantly improved in the Vitazyme program.
- **2010 fruit set, yields, and fruit size.** Fruit set (number of apples/limb) and yield were improved in the Vitazyme treatment compared to the untreated control, but not quite to the degree that return bloom had been increased. This was due to frost injury during bloom, and the Vitazyme treated rows were somewhat lower lying than the untreated control rows, and therefore suffered somewhat greater fruit losses. Fruit size was somewhat reduced in the Vitazyme treatment, as expected, since fruit size was very good in both treatments.
- **Fruit pressure and soluble solid levels at harvest.** Fruit firmness did not vary between the two treatments. The Vitazyme treatment showed an increase in soluble solid levels (Brix) despite the higher yields.
- **Fruit finish and foliar phytotoxicity.** Little difference in fruit finish was noted between the two treatments, and no foliar phytotoxicity was observed.
- **Return blooms in 2011** will be evaluated this coming May.

Pounds Per Two Scaffolds



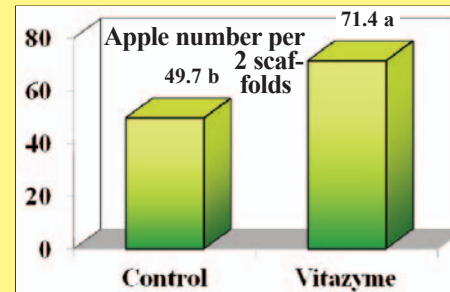
*Means followed by the same letter are not significantly different at P = 0.05.

Fruit Finish*



*Means followed by the same letter are not significantly different at P = 0.05. Fruit finish at harvest was rated as 10 = perfect finish, 8-9 = good commercial fruit finish, and 3-4 = poor finish.

Number Per Two Scaffolds*



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

Yield improvements with Vitazyme

- Increased weight per 2 scaffolds +8.3 lb (+39%)
- Increased apple number per 2 scaffolds +21.7 apples (+44%)

Barley, Spring

Researcher: V. V. Plotnikov
Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Location: National Academy of Agrarian Sciences, Vinnytsia State Agricultural

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Varieties: Skiff, Lofant, Nezabudka
Previous crop: corn
Planting date: April 7, 2010

Planting rate: 4 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, harrowing to 4 to 5 cm

Experimental design: A spring barley plot area, using a total area of about 1.0 ha, with four replicates, was established using two Vitazyme regimes to determine the product's effect on barley yield and grain quality.

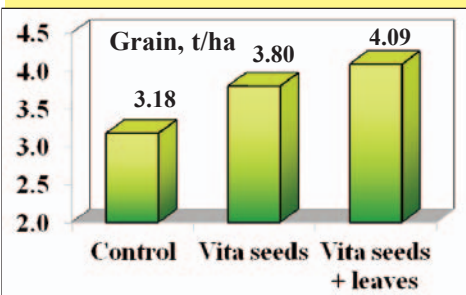
1. Control
2. Vitazyme on the seeds
3. Vitazyme on the seeds, and leaves and soil

Fertilization: 60 kg/ha N, 30 kg/ha P₂O₅, and 30 kg/ha K₂O incorporated before planting

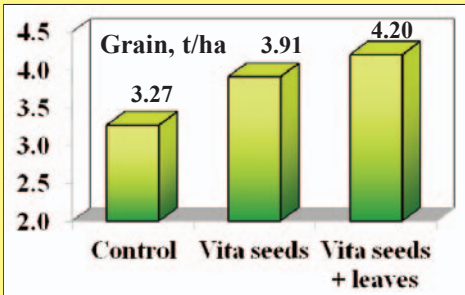
Vitazyme application: Treatments 2 and 3, a seed treatment at 1 liter/ha; Treatment 3, an additional foliar and soil treatment of 1 liter/ha on May 15, 2010

Yield results:

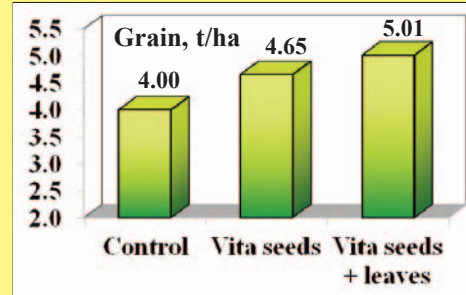
Skiff



Lofant



Nezabudka



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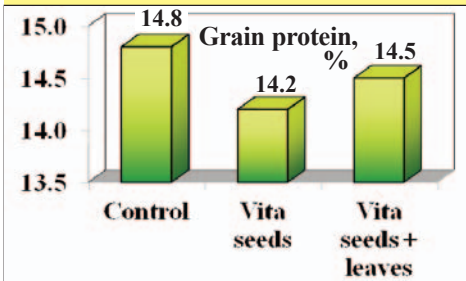
Profit results: All three varieties showed excellent profit increases with Vitazyme. For Skiff, the increases were 989 and 1,270 hrn/ha, for Lofant, 1,022 and 1,304 hrn/ha, and for Nezabudka, 1,022 and 1,436 hrn/ha for the seed treatment and seed treatment plus foliar treatment, respectively.

Grain quality results:

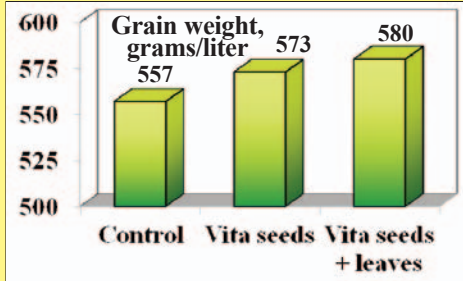
Treatment	Increase in grain yield with Vitazyme		
	Skiff	Lofant	Nezabudka
Vitazyme on seeds	0.62 (+19%)	0.64 (+20%)	0.65 (+16%)
Vitazyme on seeds + leaves	0.91 (+29%)	0.93 (+28%)	1.01 (+25%)

Skiff

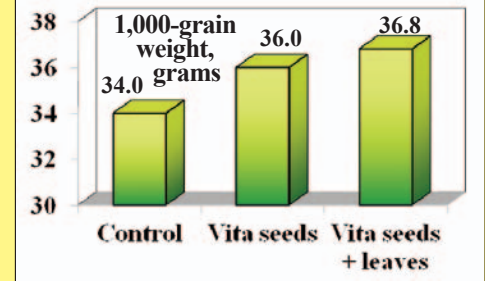
Crude Protein



Test Weight

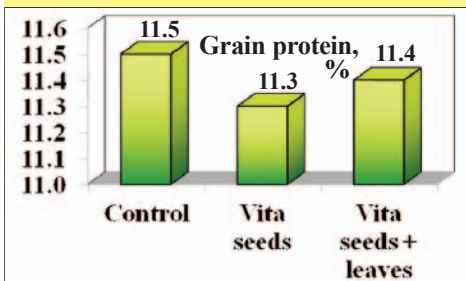


1,000-Grain Weight

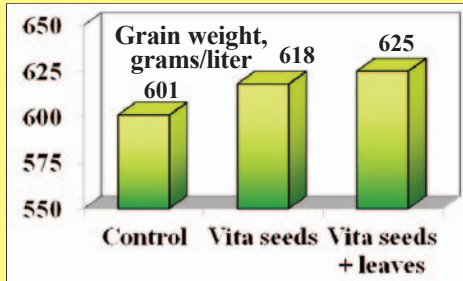


Lofant

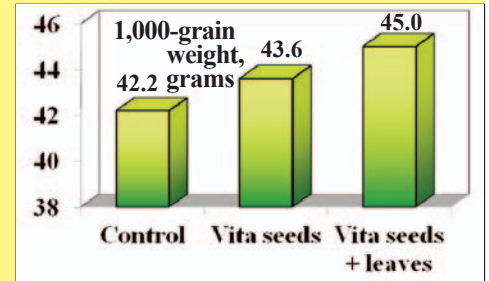
Crude Protein



Test Weight

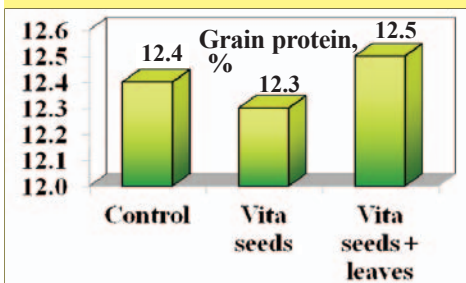


1,000-Grain Weight

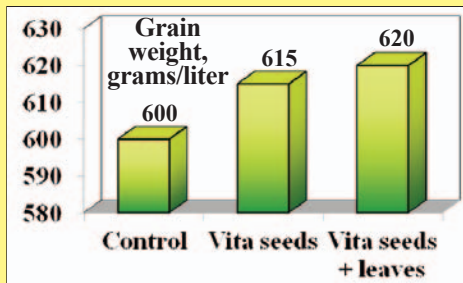


Nezabudka

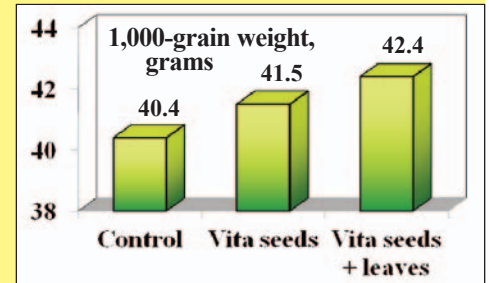
Crude Protein



Test Weight



1,000-Grain Weight



Conclusions: This replicated Ukrainian Vitazyme trial with spring barley, using three barley varieties, showed that the product in all cases benefitted the yield, profitability, and quality of the grain. These results are given in the following table.

Parameter	Vitazyme effects on spring barley		
	Skiff	Lofant	Nezabudka
Grain yield	+19 to 29%	+20 to 28%	+16 to 25%
Income	+989 to 1,270 hrn/ha	+1,022 to 1,304 hrn	+1,022 to 1,436 hrn/ha
Crude protein	-0.3 to 0.6%-pt	-0.1 to 0.2%-pt	-0.1 to +0.1%-pt
Test weight	+16 to 23 g/liter	+17 to 24 g/liter	+15 to 20 g/liter
1,000-grain weight	+2.0 to 2.8 grams	+1.4 to 2.8 grams	+1.1 to 2.0 grams

Yields were increased by from 16 to 20% with the seed treatment, and by 25 to 29% by the seed plus foliar treatment. Crude protein was generally decreased — a favorable result — by from 0.1 to 0.6 percentage point, except in one instance, by Vitazyme, while test weight was improved by 15 to 17 grams/liter by the seed treatment, and by 20 to 24 grams/liter by the seed plus foliar treatments. Weight for 1,000 grains likewise was raised by both treatments, by from 1.1 to 2.8 grams, more with the two treatments than with just one. These results reveal how valuable Vitazyme is for malting barley production in Ukraine.



Skiff barley in Ukraine produced much better early growth vigor and roots when treated with Vitazyme, as shown here.

Beans, Pinto

A Greenhouse Trial With Aquatron Water

Researcher: Paul W. Syltje, Ph.D

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Pinto beans

Soil type: sandy loam

Pot size: 1 gallon

Planting rate: 12 seeds per pot, thinned to three

Planting date: March 19, 2010

Growth temperature: 65° to 85°

Harvest date: April 22, 2010

Experimental design: This greenhouse experiment, using Vitazyme and Aquatron treated water, was arranged with three treatments and five replications to evaluate the effects of each product alone, and in combination, on plant growth.



Vitazyme improved plant size somewhat in this greenhouse trial, but especially the total dry weight accumulation.



Note how the Aquatron treated water improved root growth. Both this water and Vitazyme yielded more plant weight.

Treatment	Application
1	Control
2	Vitazyme at 100 ml/pot of a 0.02% solution
3	Aquatron water, applied at all waterings

Vitazyme application: 100 ml/pot of a 0.02% solution for Treatments 2, to approximate a 13 oz/acre (1 liters/ha) rate

Aquatron water application: An Aquatron device was obtained from Advanced AquaTronics International, Inc., Pompano Beach, Florida, and all water used to treat Treatments 3 and 4 was run through this device during watering. This water is imprinted with

electrons and frequencies that are designed to aid in crop production. Days of application: March 22, 23, 24, 25, 26, 29, 30, 31; April 1, 2, 6, 7, 8, 9, 12, 14, 15, 16 (twice), 21

Growth results: These beans were harvested by washing the soil from the corn roots. Leaf chlorophyll (eight measurements per pot) was measured, as was plant height and plant dry weight (125° F for 24 hours in a dryer). Weights were made to the nearest 0.01 gram.

Leaf Chlorophyll

Treatment	Chlorophyll*	Change
	SPAD units	SPAD units
3 (Aquatron)	38.2 a	1.7 (+5%)
2 (Vitazyme)	37.5 a	1.0 (+3%)
1 (Control)	36.5 a	---
Main effects	0.7506	
Model effects	0.7506	
CV _{0.05}	9.41%	
LSD _{0.05}	4.8 units	

*Means are not significantly different at P=0.05 according to the Student-Newman-Kuels Test.

Plant Height

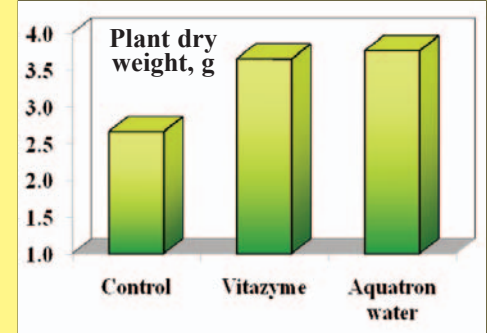
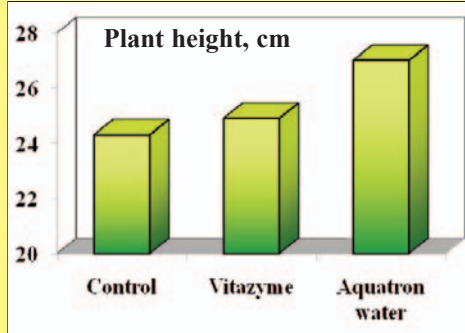
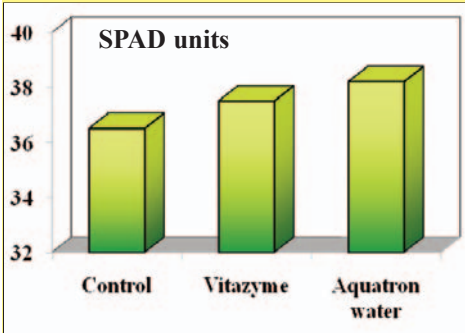
Treatment	Height*	Change
	cm	cm
4 (Aquatron)	27.0 a	2.7 (+11%)
2 (Vitazyme)	24.9 a	0.6 (+2%)
1 (Control)	24.3 a	---
Main effects	0.2604	
Model effects	0.2604	
CV _{0.10}	10.12%	
LSD _{0.10}	2.9 cm	

*Means are not significantly different at P=0.10 according to the Student-Newman-Kuels Test.

Plant Dry Weight

Treatment	Dry weight*	Change
	grams	grams
3 (Aquatron)	3.76 a	1.10 (+41%)
2 (Vitazyme)	3.65 a	0.99 (+37%)
1 (Control)	2.66 b	---
Main effects	0.0007	
Model effects	0.0007	
CV _{0.10}	10.65%	
LSD _{0.10}	0.40 gram	

*Means with different letters are significantly different at P=0.10 according to the Student-Newman-Kuels Test.



Conclusion: This greenhouse study with Vitazyme and Aquatron treated water applied to pinto beans revealed that both products dramatically increased dry weight yield above the control; 37 to 41%. Plant height and leaf chlorophyll were not significantly affected. A combined Vitazyme and Aquatron water treatment experienced poor bean germination, so could not be included in the analysis.

Increase in plant dry weight

Vitazyme	+37%
Aquatron water	+41%

Buckwheat

Researcher: V. V. Plotnikov

Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and steppe Region)

Variety: Ukrainian Super Elite

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: sugar beets

Planting date: May 7, 2010

Planting rate: 4.5 million seeds/ha

Soil preparation: tillage to 22 cm, harrowing to 3 to 4 cm

Experimental design: A buckwheat plot area was divided into four replicates with a control and two Vitazyme treatments, with the objective of determining the effects of the product on yield.

1. Control

2. Vitazyme on seeds

3. Vitazyme on seeds and leaves

Fertilization: 30 kg/ha of N, incorporated before planting

Vitazyme application: Treatments 2 and 3, 1 liter/ha on the seeds at planting on May 7; Treatment 3, 1 liter/ha on the leaves and soil at early bloom on June 7

Yield results:

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	1.70	---
2. Vitazyme, seeds	1.95	0.25 (+15%)
3. Vitazyme, seeds + leaves	2.12	0.42 (+25%)

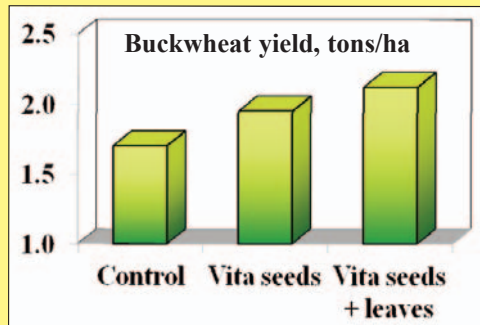
Income results: Income was increased by 630 hrn/ha for one treatment, and 835 hrn/ha for two treatments.

Conclusions: This Ukrainian trial with buckwheat

revealed that Vitazyme, applied either on the seeds or on the seeds plus the leaves, gave an excellent yield response: 15% for the seeds only, and 25% for the seeds plus the leaves. Income increases were from 630 to 855 hrn/ha. This program is an excellent management practice for buckwheat growers in Ukraine.

- **Increase in yield with Vitazyme: 15 to 25%**

Buckwheat Yield



Canola, Winter

Ukrainian Test on Three Varieties



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

Previous crop: tilled fallow

Planting date: August 25, 2009

Planting rate: 7 kg/ha

Soil type: gray podzolic (organic matter=2.2%, hydrolyzed N=8.4 mg/100 g soil, P=15.8 mg/100 g soil, exchangeable K=12.4 mg/100 g soil, pH=5.5)

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, and harrowing to 3 to 4 cm

Varieties: Black Giant, Antariya, Svitoch

Experimental design: An experimental area of 1 ha was divided into smaller plots to place three canola varieties into four replicates for each. Each variety received a control treatment and two Vitazyme treatments, with the objective of determining the effect of the product on canola yield.

1. Control

2. Vitazyme once

3. Vitazyme twice

Fertilization: 30-60-90 kg/ha of N-P₂O₅-K₂O tilled in; spring, 90 kg/ha N.

Vitazyme application: 1 liter/ha for Treatments 2 and 3 on November 24, 2009 (5 to 6 leaves); 1 liter/ha in addition for Treatment 3 on April

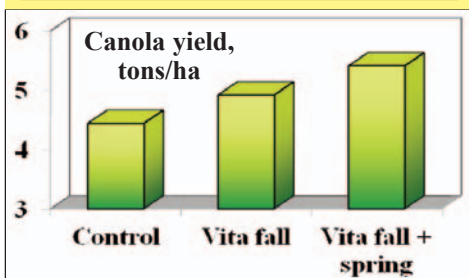
30, 2010 (budding). Sprayer output: 200 liters of water delivered per ha. Vitazyme was applied with the pesticide.

Pesticide application: Condor 12 AM

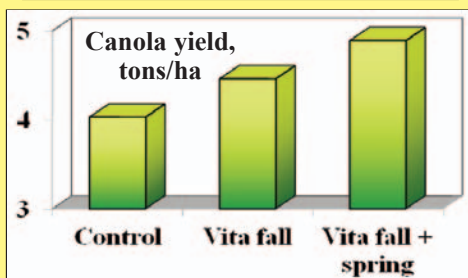
Weather conditions: Generally favorable, but somewhat warmer and dryer than normal

Yield results:

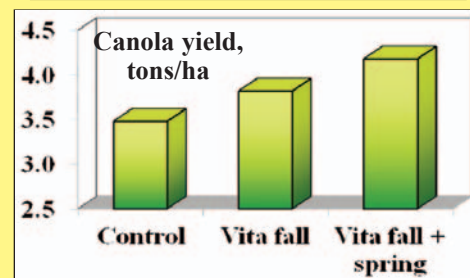
Black Giant



Antariya



Svitoch



Treatment	Yield t/ha	Yield change t/ha	Income increase hrn/ha
BLACK GIANT			
1. Control	4.44	---	---
2. Vita fall	4.92	0.48 (+11%)	1,720
3. Vita fall + spring	5.41	0.97 (+22%)	3,480
ANTARIYA			
1. Control	4.03	---	---
2. Vita fall	4.46	0.43 (+11%)	1,520
3. Vita fall + spring	4.89	0.86 (+21%)	3,040
SVITTOCH			
1. Control	3.48	---	---
2. Vita fall	3.82	0.34 (+10%)	1,160
3. Vita fall + spring	4.18	0.70 (+20%)	2,400

Conclusion: This Ukrainian replicated canola study proved that Vitazyme uniformly increased yields with a simple fall application of 1 liter/ha by 10 to 11%, while a fall plus a spring application about doubled that increase, to 20 to 22%. Income was also dramatically increased in all cases. These results show the great utility of the Vitazyme program to increase canola yields and profits in Ukraine.

Increase in Canola yield with Vitazyme

	<u>Fall only</u>	<u>Fall + Spring</u>
<i>Black Giant</i>	11%	22%
<i>Antariya</i>	11%	21%
<i>Svitoch</i>	10%	20%

Chinese Mustard

Researcher: unknown **Planting date:** July 25, 2010

Location: Hoc Mon District, Ho Chi Minh City, Viet Nam

Variety: Chinese mustard (*Brassica juncea*)

Preseeding treatment: seeds mixed with dry soil

Experimental design: A field of Chinese mustard was divided into the usual farmer practice and a Vitazyme treated area. The test had three replications, with 30m² per plot, in an effort to evaluate the effect of this product on crop growth..

1. Control (farmer normal practice)

2. Vitazyme

Fertilization: For 30 m², 48 kg of chicken manure, 2 kg of “thermophosphate”, and 2 kg of organic fertilizer mixed with N-P₂O₅-K₂O fertilizer.

Vitazyme application:

(1) Seeds were mixed with a 10% Vitazyme solution until wet, then dried, and repeated twice more; (2) soil and leaf spray of 3 ml of Vitazyme in 3 liters of water for 30 m², seven days after planting; (3) leaf spray of 3 ml of Vitazyme in 3 liters of water for 30 m², 14 days after planting.

Time to harvest results: The Vitazyme treated mustard was harvested two days earlier than the untreated plots.

• **Reduced time to harvest with Vitazyme: 2 days**

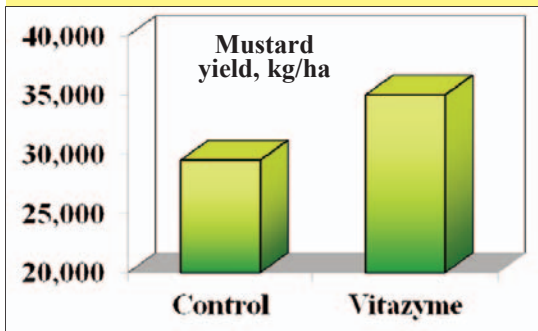
• **Increase in yield with Vitazyme: 19%**



Chinese mustard grown in Viet Nam was ready for harvest earlier than the control, and yielded substantially more leaves (+ 19%).

Chinese Mustard Yield

Treatment	Yield kg/30m ²	Yield kg/ha	Change kg/ha
1. Control	88.5	29,500	---
2. Vitazyme	105.0	35,000	5,500 (+19%)



Time To Harvest Results

Treatment	Harvest date	Days after planting
Control	August 22, 2010	28 days
Vitazyme	August 20, 2010	26 days

Conclusion: This Chinese mustard trial in Viet Nam proved that Vitazyme, applied on the seeds and two times later during growth, reduced the time to harvest by two days and increased mustard yield by 19%. This improvement in crop maturity and yield is highly attractive for increasing productivity and profits for Vietnamese farmers.

Chinese Mustard

Researcher: unknown

Variety: Chinese mustard (*Brassica juncea*)

Preseeding treatment: seeds mixed with dry soil

Experimental design: A field of Chinese mustard was divided into the usual farmer practice and a Vitazyme treated area. The test had three replications, with 30m² per plot, in an effort to evaluate the effect of this product on crop growth..

1. Control (farmer normal practice)

2. Vitazyme

Fertilization: For 30 m², 48 kg of chicken manure, 2 kg of “thermophosphate”, and 2 kg of organic fertilizer were mixed with N-P₂O₅-K₂O fertilizer.

Vitazyme application: (1) A spray of Vitazyme on the soil and leaves at 3 ml in 3 liters of

Continued on the next page

water, at 7 days after planting; (2) foliar spray of 3 ml in 3 liters of water, at 21 days after planting.

Time to harvest results: The Vitazyme treated mustard was harvested 1 to 3 days earlier than the untreated plots.

Yield results: The original plot data was lost, but the increase in yield was 7,000 kg/ha.

Conclusion: This Viet Nam test with Vitazyme, during the wet season, revealed that the product, when applied three times during the growth cycle, increased yield by 7,000 kg/ha. The farmers who observed this study also noted the following:

- Vitazyme treated plants had more chlorophyll in the leaves.
- Vitazyme treated plants were stronger.
- Treated plants matured 1 to 3 days before the control plants.
- The product may have been more effective during the wet season than the dry season, making fertilizer more effective while some of the fertilizer was lost due to leaching or denitrification.
- **Increase in yield with Vitazyme: 7,000 kg/ha**

• **Reduced time to harvest with Vitazyme: 1 to 3 days**



Not only were the leaves of these Chinese mustard plants much larger with Vitazyme, but the roots that supported them were more extensive.

Corn

A Long-Term Crop and Soil Study: Year 3

Researcher: Bert Schou, Ph.D

Research Organization: Agricultural Custom Research and Education Services (ACRES)

Location: Cedar Falls, Iowa

Variety: Pioneer PO916XR (GMO)

Soil type: Kenyon loam (34% sand, 46% silt, 20% clay, 4.5% organic matter, pH = 7.3, C.E.C = 17.8 meq/100 g, fertility level = excellent, drainage = excellent)

Planting depth: 2 inches

Row spacing: 30 inches

Planting rate: 32,000 seeds/acre

Seedbed at planting: fine

Planting date: April 22, 2010

Tillage: conventional

Previous crop: soybeans (with glyphosate)

Experimental design: The third year of research on the long-term effects of Vitazyme on crop yield and quality, and on soil conditions, was conducted on the same plots as the previous two years. Two treatments were utilized, as during previous years, with plots 15 x 50 feet, and with five replicates.

1. Control

2. Vitazyme

Fertilization: Nitrogen was applied to all areas at 120 lb N/acre pre-plant.

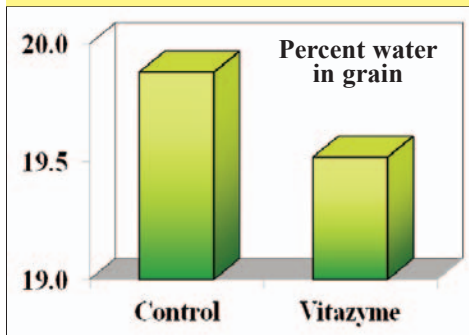
Weed control: glyphosate

Vitazyme application: (1) 13 oz/acre on the seeds at planting (April 22), and (2) 13 oz/acre sprayed on the leaves and soil at the V8 stage (20 inches tall) on June 16

Grain Moisture

Treatment	Grain moisture ¹	Change
	%	%
1. Control	19.88 a	---
2. Vitazyme	19.52 a	(-) 0.36
LSD (P=0.05)	1.19%	
Standard deviation	0.68%	
CV	3.44%	
Replicate F	0.385	
Treatment F	0.719	

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



Weather during the growing season:

The season was very wet, and temperatures were slightly above normal.

Harvest date: October 6, 2010. A Massey-Ferguson 8 plot combine harvested the middle two rows of each plot, and the corn was weighed with an electronic scale.

Grain moisture: There was a nonsignificant lower moisture content of the Vitazyme treated corn grain versus the control grain.

• **Reduced moisture in grain with Vitazyme: 0.36 percentage points**

Grain test weight: There was little difference between the treatments in grain test weight.

Plant population: The populations of both treatments were very close.

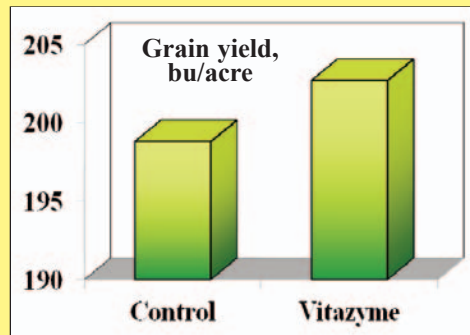
Yield results:

• **Increase in grain yield with Vitazyme: 2%**

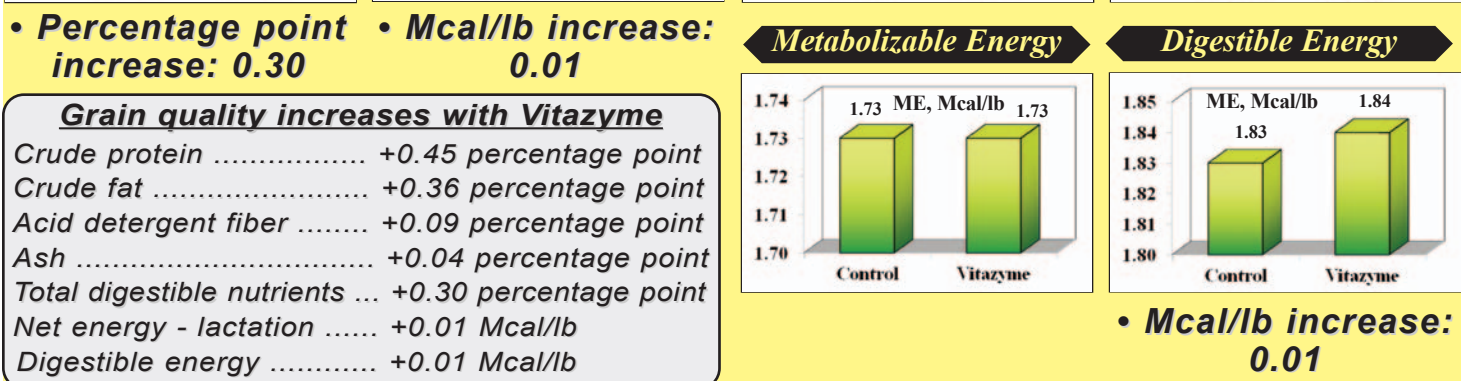
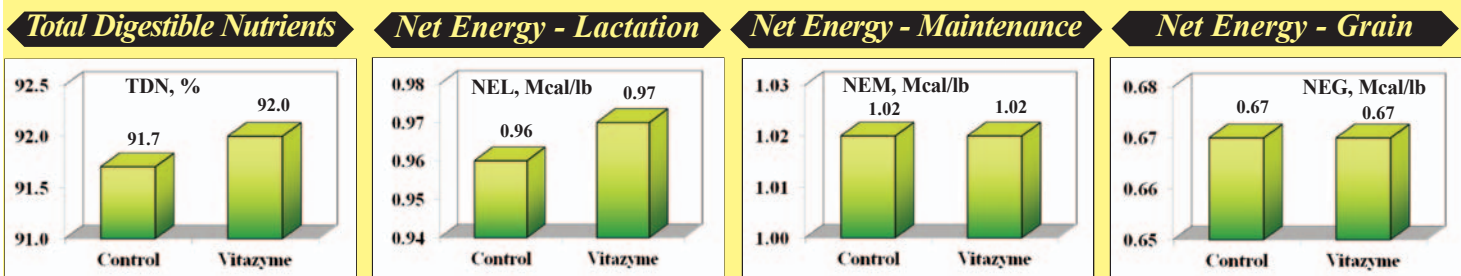
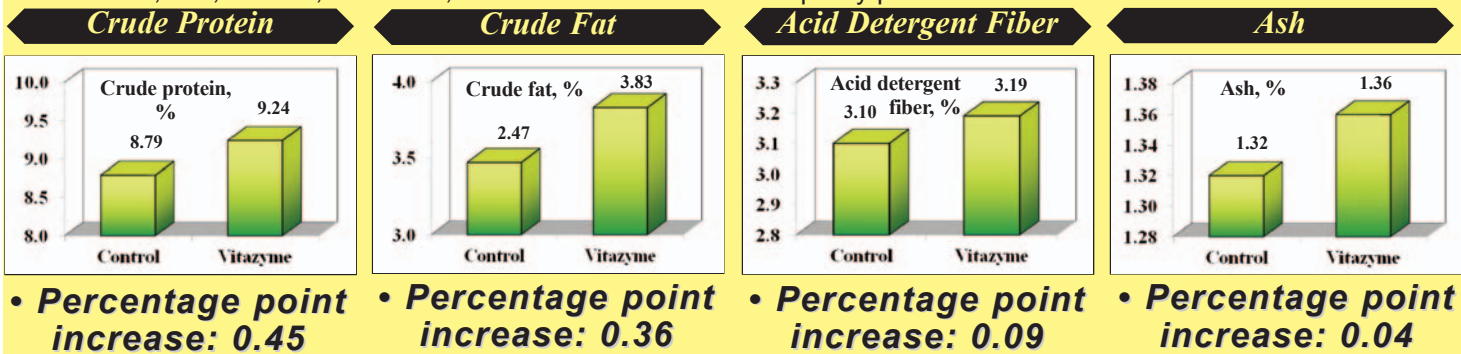
Grain Yield

Treatment	Grain yield ¹	Change
	%	%
1. Control	198.8 a	---
2. Vitazyme	202.7 a	(-) 0.36
LSD (P=0.05)	11.3 bu/acre	
Standard deviation	6.4 bu/acre	
CV	3.2%	
Replicate F	0.066	
Treatment F	0.895	

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



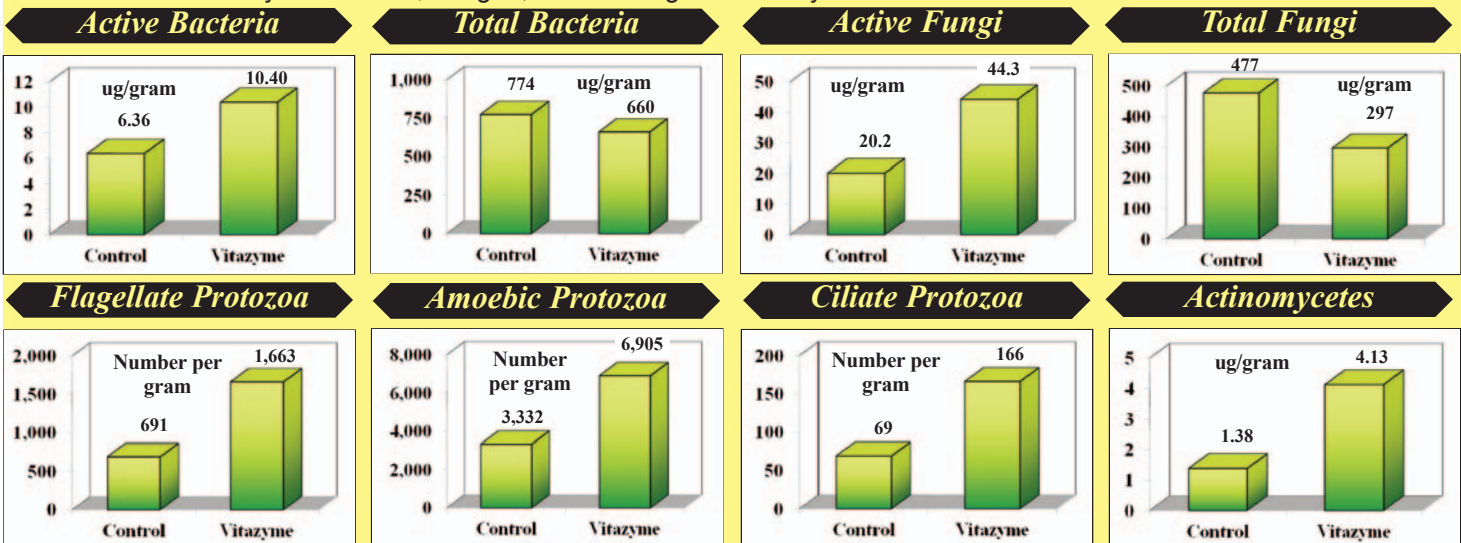
Grain quality results: Composite grain samples for each treatments (five treatments combined) were sent to Midwest Laboratories, Inc., Omaha, Nebraska, for an evaluation of several quality parameters.



Grain quality increases with Vitazyme

Crude protein +0.45 percentage point
 Crude fat +0.36 percentage point
 Acid detergent fiber +0.09 percentage point
 Ash +0.04 percentage point
 Total digestible nutrients ... +0.30 percentage point
 Net energy - lactation +0.01 Mcal/lb
 Digestible energy +0.01 Mcal/lb

Soil microorganism results: A composite soil sample from each rep of both treatments was collected and sent to the Soilfoodweb laboratory in Corvallis, Oregon, for microorganism analyses.



Nematode Populations

Treatment	Bacterial feeders*	Fungal feeders*	Root/Fungal feeders*	Predatory*	Root feeders*	Total
	number per gram					
Control	0.60 (5)	0.02 (1)	0.12 (3)	0	0.04 (1)	0.95
2. Vitazyme	0.39 (6)	0.04 (1)	1.99 (5)	0.06 (1)	0.12 (2)	3.14

*The number in parenthesis after the population number indicates the number of species detected.

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This ACRES long-term study for 2010 showed a clear advantage in growth for the Vitazyme treated plots.



Root mass was noticeably greater with Vitazyme at Cedar Falls, Iowa, a typical response with this powerful biostimulant.

There were more active bacteria and fungi with Vitazyme, but a bit fewer total bacteria and fungi. Much higher levels of flagellate, amoebic, and ciliate protozoa were found, as well as considerably more actinomycetes in the Vitazyme treated soil. There were more nematodes with Vitazyme, especially fungal and root-feeding species, plus some beneficial predaceous ones, and a greater total variety than in the control.

Bacteria and fungal ratios were as follows:

Treatment	Total fungi Total bacteria	Active fungi Total fungi	Active bacteria Total bacteria	Active fungi Active bacteria
Control	0.62	0.04	0.008	3.18
Vitazyme	0.45	0.15	0.02	4.24

Improvements in microbial populations with Vitazyme

Active bacteria	+64%
Active fungi	+119%
Flagellate protozoa	+141%
Amoebic protozoa	+107%
Ciliate protozoa	+141%
Actinomycetes	+199%

Conclusions: This Iowa long-term study revealed that Vitazyme, in the third year, increased the yield of corn by 3.9 bu/acre, while improving the quality of the corn considerably, especially the crude protein (0.45%-point), crude fat (0.36%-point), and ash (0.04%-point). Moreover, soil microbial populations were benefitted considerably with the product. These results continue to illustrate the positive effects of this product on both the yield and quality of corn grain, and on soil quality, in the U.S. Corn Belt.

Corn

A Yield and Quality Study



A six treatment replicated study in Iowa gave highly significant yield increases for corn, for both Vitazyme formulations.

Researcher: Bert Schou, Ph.D.

Research Organization: Agricultural Custom Research and Education Services (ACRES)

Location: Cedar Falls, Iowa

Variety: Pioneer 36W66 (non-GMO)

Soil type: Aredale loam (36% sand, 42% silt, 22% clay, 4.8% organic matter, pH = 6.4, C.E.C. = 1.7 meg/100 g, fertility level = fair, drainage = fair)

Planting depth: 1 inch

Row spacing: 30 inches

Planting rate: 34,000 seeds/acre

Seedbed at planting: fine

Planting date: April 29, 2010

Tillage: conventional

Previous crop: soybeans (with glyphosate)

Experimental design: A small plot study with corn, using plots 15 ft x 40 ft (six rows per plot), was set up with six treatments and six replicates in a Latin Square design. The purpose of the study was to evaluate two Vitazyme formulations and another seed treatment on the yield and quality of non-GMO corn.

Treatment	Nitrogen lb/acre	Vitazyme A ¹ oz/acre	Vitazyme B ² oz/acre	NERS ³ oz/acre
1	120	0	0	0
2	120	13 (2x)	0	0
3	120	0	13 (2x)	0
4	120	0	0	13 (1x)
5	120	13 (2x)	0	13 (1x)
6	60	13 (2x)	0	0

^{1,2,3}2x = two applications; 1x = one application.

³NERS = New Era Soil Treatment, applied at planting.

Fertilization: Nitrogen was applied to the appropriate plots pre-plant at 60 or 120 lb/acre of N.

Weed control: Harness Xtra at 1.2 quarts/acre, giving good weed control

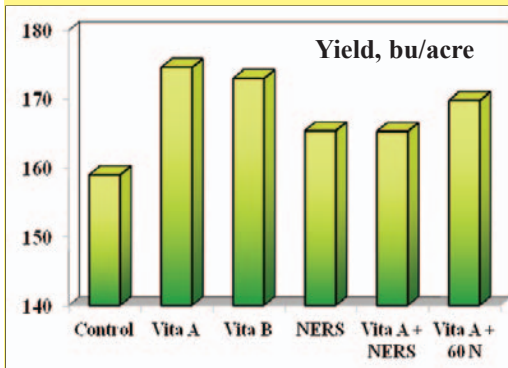
Vitazyme application: For Vitazyme A and B, 13 oz/acre on the seeds at planting on April 29, and as a foliar spray at 13 oz/acre on June 17, when the corn was at the V-8 stage (20 inches). The sprayer had a flat fan nozzle using 30 psi.

New Era Root Stimulator application: This liquid has a guaranteed analysis of 0.21% N, 0.01% P₂O₅, and other materials derived from compost, humic acids, seaweed extract, yucca, and bentonite. It is normally applied at 3 to 5 gallons/acre three to four times per growing season, but was applied at 13 oz/acre on the seeds at planting time for Treatments 4 and 5 of this experiment.

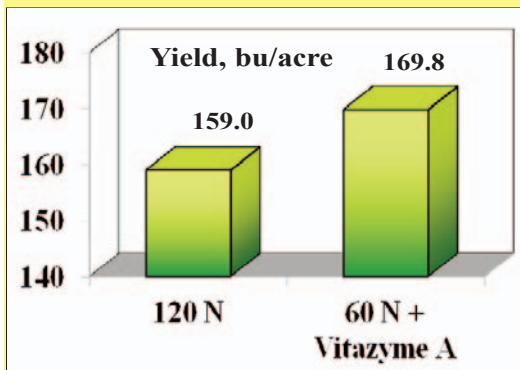
Corn Yield

Treatment	Yield ¹ bu/acre	Change bu/acre
1. Control	159.0 b	---
2. Vita A, 120 N	174.6 a	15.6 (+10%)
3. Vita B, 120 N	173.0 a	13.0 (+8%)
4. NERS, 120 N	165.4 b	6.4 (+4%)
5. Vita A + NERS, 120 N	165.3 b	6.3 (+4%)
6. Vita A, 60 N	169.8 b	10.8 (+7%)
LSD12.4 bu/acre		
Standard deviation	9.4 bu/acre	
Replicate F	13.11	
Treatment F	1.89	
CV	5.61%	

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



This non-GMO replicated corn trial from eastern Iowa proved that Vitazyme A and Vitazyme B formulations both substantially and statistically increased grain yield, by 15.6 bu/acre (10%) and 13.0 bu/acre (8%), respectively. Both of these treatments, applied at planting and at the V8 stage at 13 oz/acre, also increased the ash level of the grain. The increases were 0.56



Weather during the growing season: The season was very wet, and temperatures were slightly above normal.

Harvest date: October 7, 2010. A Massey-Ferguson 8 plot combine harvested the middle two rows of each plot, and the corn was weighed with an electronic scale.

Grain moisture: There were no significant differences among the six treatments in grain moisture at harvest. The range was 15.6 to 16.2%.
Grain test weight: No significant differences in grain test weight were found. They ranged from 54.7 to 55.0 lb/bu.

Plant population: All treatments had similar population, with no significant differences detected.

Grain quality results: Composite samples of corn from each treatment (all six replicates) were sent to Midwest Laboratories, Inc., in Omaha, Nebraska, for component analyses. The ash content was calculated on a dry weight basis.
Conclusion:

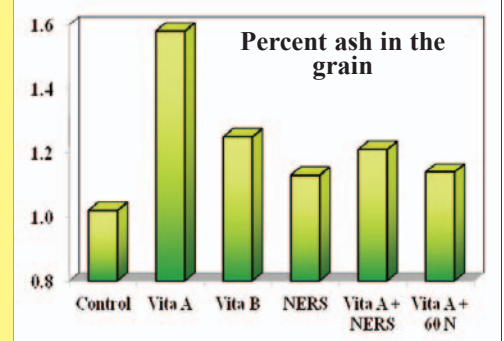
great increases in the minerals essential for plant growth. Thus, the growth and health-imparting values of these treatments should be apparent. All other treatments also increased crop yield by 4 to 7%, and grain ash in these treatments was raised by 0.11 to 0.19 percentage point.

Of special interest is the fact that a 50% nitrogen application, along with two Vitazyme A applications, improved yield by 10.8 bu/acre over the 100% nitrogen control without Vitazyme (see on the left). **This result shows the nitrogen utilization improvement usually noted with Vitazyme.**

Ash

Treatment	Ash %	Change ¹ %-pts
1. Control	1.02	---
2. Vita A, 120 N	1.58	+0.56
3. Vita B, 120 N	1.25	+0.23
4. NERS, 120 N	1.13	+0.11
5. Vita A + NERS, 120 N	1.21	+0.19
6. Vita A, 60 N	1.14	+0.12

¹Only the actual percentage point increase is shown



Increase in grain ash

Vitazyme A + 100% N	+0.56
Vitazyme B + 100% N	+0.23
Vitazyme A + 50% N	+0.19
New Era + 100% N	+0.12
Vitazyme A + New Era + 100% N	+0.11

Increase in corn yield

Vitazyme A + 100% N	+10%
Vitazyme B + 100% N	+8%
Vitazyme A + 50% N	+7%
New Era + 100% N	+4%
Vitazyme A + New Era + 100% N	+4%

Corn

Researcher: Bert Schou, Ph.D.

Research Organization: Agricultural Custom Research and Education Services (ACRES)

Location: Cedar Falls, Iowa

Variety: Pioneer PO916 (GMO)

Soil type: Aredale loam (36% sand, 42% silt, 22% clay, 4.8% organic matter, pH = 6.4, C.E.C. = 1.7 meq/100 g, fertility level = fair, drainage = fair)

Planting depth: 2 inches

Row spacing: 30 inches

Planting rate: 34,000 seeds/acre

Seedbed at planting: fine

Planting date: April 29, 2010

Tillage: conventional

Previous crop: soybeans (with glyphosate)

Experimental design: A small plot study with corn, using plots 15 ft x 40 ft (six rows per plot), was set up with six treatments and six replicates in a Latin Square design. The purpose of the study was to evaluate two Vitazyme formulations and another seed treatment on the yield and quality of GMO corn.

Continued on the next page

Treatment	Nitrogen lb/acre	Vitazyme A ¹ oz/acre	Vitazyme B ² oz/acre	NERS ³ oz/acre
1	120	0	0	0
2	120	13 (2x)	0	0
3	120	0	13 (2x)	0
4	120	0	0	13 (1x)
5	120	13 (2x)	0	13 (1x)
6	60	13 (2x)	0	0

^{1,2,3}2x = two applications; 1x = one application.
³NERS = New Era Soil Treatment, applied at planting.

Fertilization: Nitrogen was applied to the appropriate plots pre-plant at 60 or 120 lb/acre of N.

Weed control: glyphosate

Vitazyme application: For Vitazyme A and B, 13 oz/acre on the seeds at planting on April 29, and as a foliar spray at 13 oz/acre on June 17, when the corn was at the V-8 stage (20 inches). The sprayer had a flat fan nozzle, and a 30 psi delivery rate.

New Era Root Stimulator application: This liquid has a guaranteed analysis of 0.21% N, 0.01% P₂O₅, and other materials derived from compost, humic acids, seaweed

extract, yucca, and bentonite. It is normally applied at 3 to 5 gallons/acre three to four times per growing season, but was applied at 13 oz/acre on the seeds at planting only for Treatments 4 and 5 of this experiment.

Weather during the growing season: The season was very wet, and temperatures were slightly above normal.

Harvest date: October 8, 2010. A Massey-Ferguson 8 plot combine harvested the middle two rows of each plot, and the corn was weighed with an electronic scale.

Plant population: All treatments had similar populations, with no significant differences detected.

Yield results:

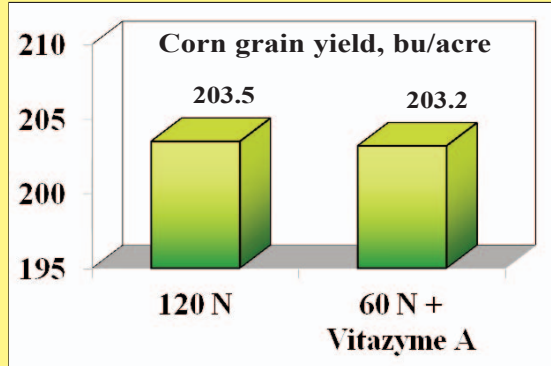
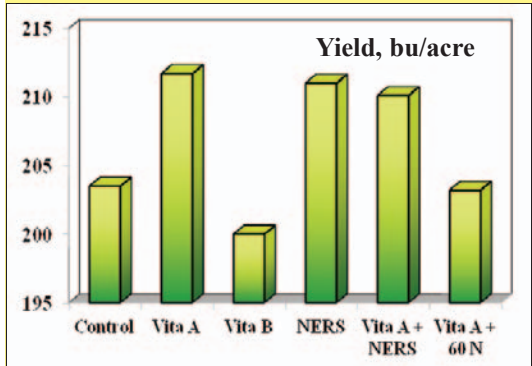
Corn Yield

Treatment	Yield ¹ bu/acre	Change bu/acre
1. Control	203.5 a	---
2. Vita A, 120 N	211.7 a	8.2 (+4%)
3. Vita B, 120 N	200.0 a	(-) 3.5 (-2%)
4. NERS, 120 N	211.0 a	7.5 (+4%)
5. Vita A + NERS, 120 N	210.1 a	6.6 (+3%)
6. Vita A, 60 N	203.2 a	(-) 0.3 (0%)
LSD 12.4 bu/acre	11.4 bu/acre	
Standard deviation	9.6 bu/acre	
Replicate F	0.505	
Treatment F	1.590	
CV	4.65%	

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

Increase in corn yield	
Vitazyme A + 100% N	+4%
New Era + 100% N	+4%
Vitazyme A + New Era + 100% N	+3%

Conclusion: This replicated corn study of a genetically modified variety in eastern Iowa revealed that Vitazyme A and New Era Root Stimulator increased grain yield by 4%. The two together increased yield by 3%. Vitazyme A alone, plus 50% of the optimum nitrogen (60 lb/acre), provided a yield equal to the control. However, it should be understood that none of these yield differences were significant at P=0.05.



Corn

A Nitrogen Rate Study

Researcher: Manjula V. Nathan, Ph.D., and Tim Reinbott
 University of Missouri, Columbia, Missouri

Plant population: 32,000 seeds/acre

Soil values: pH = 6.0; cation exchange capacity = 13.4 meq/100 g; available N = 2 meq/100 g; Bray P1 = 24 lb/acre; Ca = 3,870 lb/acre; Mg = 350 lb/acre; K = 190 lb/acre

Experimental design: A small plot study was conducted using plots that were 35 feet long and four rows wide, using three nitrogen rates, to determine if the product Vitazyme would have an effect on corn yield, leaf chlorophyll, and lodging. Six replications were used. Treatments were as follows:

- 0% nitrogen
- 50% nitrogen
- 100% nitrogen
- 0% nitrogen + Vitazyme
- 50% nitrogen + Vitazyme
- 100% nitrogen + Vitazyme

Fertilization: Pre-plant incorporated, 18-46-62 lb/acre N-P₂O₅-K₂O; after planting, 0, 80 (50% N), or 160 (100% N) lb/acre nitrogen as SuperU Urea

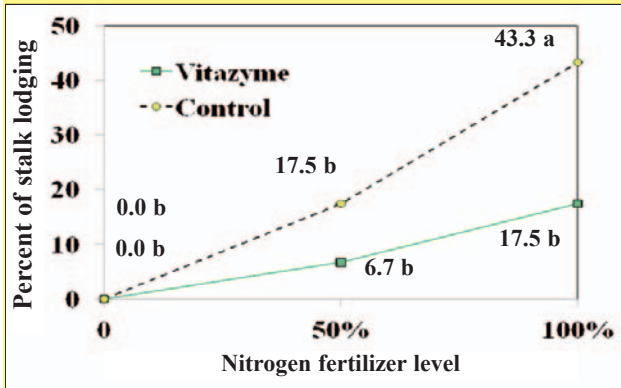
Vitazyme application: (1) Seeds were wetted with a 10% solution before planting, and dried; (2) 13 oz/acre (1 liter/ha) were sprayed on the plants and soil at the 10-leaf stage (June 25).

Chlorophyll results: A Minolta SPAD meter was used to measure leaf chlorophyll on July 21, but no significant differences were noted for the same nitrogen level among the six treatments. Ten plants from each

Continued on the next page

plot were measured, using the ear leaf.

Lodging



Means followed by the same letter are not significantly different at P=0.05. LSD_{0.05}=21.4%; Prob > F=0.007.

Reduction in lodging with Vitazyme

At 50% N -10.8%-points
 At 100% N -25.8%-points

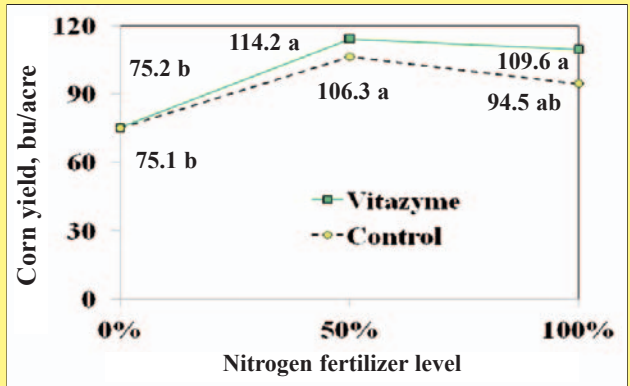
Conclusion: A replicated corn trial at the University of Missouri in 2010, using three nitrogen levels, revealed that Vitazyme significantly reduced plant lodging from high winds at the high (100%) nitrogen level; there was also a large reduction (about 26 percentage points) at the 50% nitrogen level, but the effect was not significant. Grain yield was increased by 7.9 bu/acre (7%) at the 50% nitrogen level, and by 15.1 bu/acre (16%) at the 100% nitrogen level, but these increases were not significant. It is likely that the late planting date, coupled with heavy rains that reduced nitrogen availability, reduced the ability of Vitazyme to improve yield response at all three nitrogen levels.

Lodging results: On July 20, at the tassel stage, a severe windstorm struck, which blew down many of the plants. Evaluations of lodging at harvest showed much greater susceptibility to stalk breakage with higher nitrogen levels and no Vitazyme. The corn treated with the lower nitrogen levels, as well as those receiving Vitazyme, had considerably less breakage from wind. This indicated stronger stalk structural tissues with these practices.

Weather conditions: Rainfall was very high during the growing season, leading to nitrogen loss from leaching and denitrification. The temperatures were somewhat above normal.

Yield results: The plots were harvested on October 21, 2010, using the two center rows of each plot. At every nitrogen level Vitazyme

Corn Yield



Means followed by the same letter are not significantly different at P=0.05. LSD_{0.05}=24.1 bu/acre; Prob > F=0.003.

Increase in yield with Vitazyme

At 50% N +7.9 bu/acre (+7%)
 At 100% N +15.1 bu/acre (+16%)

Corn

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

Variety: Pioneer 34R67 Liberty Link Triple-Stack

Soil type: sandy loam

Pot size: 1 gallon

Planting rate: 10 seeds per pot, thinned to three

Planting date: March 19, 2010

Growth temperature: 65° to 85°

Harvest date: April 22, 2010

Experimental design: A greenhouse study was devised using four treatments and five replications to evaluate the effects of Vitazyme and Aquatron water on corn growth.

Treatment	Application
1	Control
2	Vitazyme at 100 ml/pot of a 0.02% solution
3	Aquatron water, applied at all waterings
4	Vitazyme (as in Treatment 2) + Aquatron water (as in Treatment 3)



Aquatron treated water along with Vitazyme produced a dramatic growth response from corn in this greenhouse experiment. A 20% dry weight yield increase resulted.

Vitazyme application: 100 ml/pot of a 0.02% solution for Treatments 2 and 4, to approximate a 13 oz/acre (1 liter/ha) rate

Aquatron water application: An Aquatron device was obtained from Advanced AquaTronics International, Inc., Pompano Beach, Florida, and all water used to treat Treatments 3 and 4 was run through this device during watering. This water is imprinted with electrons and frequencies that are designed to aid in crop production. Days of application: March 22, 23, 24, 25, 26, 29, 30, 31; April 1, 2, 6, 7, 8, 9, 12, 14, 15, 16 (twice), 21

Growth results: The crop was harvested by washing the soil from the corn roots. Leaf chlorophyll (eight measurements per pot) and leaf length were measured, and drying the plants in a dryer at 125° F was continued for 24 hours. Weights were taken to the nearest 0.01 gram.

Continued on the next page

Leaf Chlorophyll

Treatment	Chlorophyll*	Change
	SPAD units	SPAD units
3 (Aquatron)	27.1 a	0.3
2 (Vitazyme)	27.1 a	0.3
1 (Control)	26.8 a	---
4 (Vita + Aqua)	25.6 a	(-) 1.2
Main effects	0.589	
Model effects	0.589	
CV _{0.10}	7.51%	
LSD _{0.10}	2.2 units	

*Means are not significantly different according to the Student-Newman-Keuls Test (P=0.10)

Plant Height

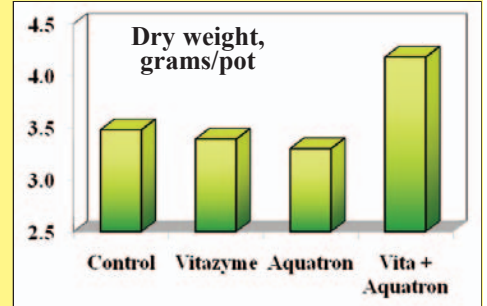
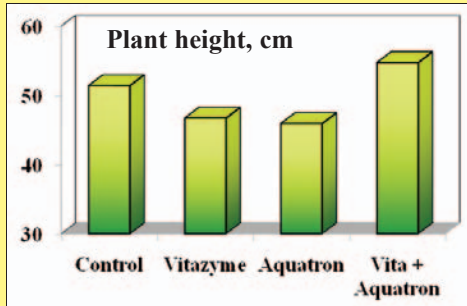
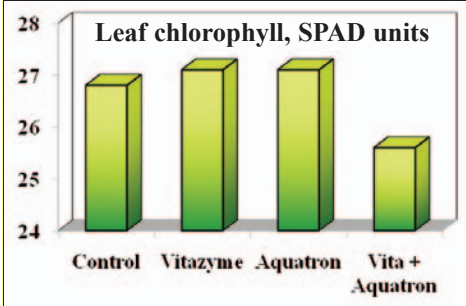
Treatment	Height*	Change
	cm	cm
4 (Vita + Aqua)	54.7 a	3.3 (+6%)
1 (Control)	51.4 a	---
2 (Vitazyme)	46.7 b	(-) 4.7 (9%)
3 (Aquatron)	45.9 b	(-) 5.5 (-11%)
Main effects	0.0009	
Model effects	0.0009	
CV _{0.10}	6.14%	
LSD _{0.10}	3.4 cm	

*Means with different letters are significantly different at P=0.10 according to the Student-Newman-Keuls Test.

Plant Dry Weight

Treatment	Dry weight*	Change
	grams	grams
4 (Vita + Aqua)	4.18 a	070 (+20%)
1 (Control)	3.48 b	---
2 (Vitazyme)	3.39 b	(-) 0.09 (-3%)
3 (Aquatron)	3.30 b	(-) 0.18 (-5%)
Main effects	0.0079	
Model effects	0.0079	
CV _{0.10}	10.51%	
LSD _{0.10}	0.42 gram	

*Means with different letters are significantly different at P=0.10 according to the Student-Newman-Keuls Test.



• **Increase in height with Vitazyme + Aquatron water: +6%**

• **Increase in plant dry weight with Vitazyme + Aquatron water: +20%**

Conclusion: This greenhouse study, using corn with Vitazyme, Aquatron water, and their combination, revealed that leaf chlorophyll did not significantly vary with the four treatments. However, the combined Vitazyme and Aquatron water produced the tallest plants (+6% above the control), and by far the greatest plant dry weight (+20%). The control, Vitazyme, and Aquatronics water treatments did not significantly vary from one another for plant height and dry weight. This study proves that the combination of Vitazyme and Aquatron treated water can greatly increase the growth of corn. The reason for neither Treatments 2 nor 3 not increasing yields by themselves in this study is not known.

Corn

A Greenhouse Trial

Researcher: Paul W. Syltje, Ph.D. **Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Pioneer 34R67 Liberty Link Triple-Stack

Soil type: Sandy loam **Pot size:** 1 gallon

Planting rate: 10 seeds per pot, thinned to three

Planting date: March 19, 2010 **Growth temperature:** 65° to 85° F

Experimental design: This greenhouse study utilized seven replicates and five treatments, to evaluate the effects of Vitazyme and another growth stimulant on corn growth.

Treatment	Vitazyme 1	Vitazyme 2	Root stimulator
1	O	O	O
2	X	O	O
3	O	X	O
4	O	O	X
5	X	O	X



The Vitazyme plus growth stimulator produced significantly more dry matter than the control in this study, though poor soil conditions reduced growth in some treatments.

Vitazyme application: Both Vitazyme 1 and Vitazyme 2 were applied at 100 ml per pot of a 0.02% solution for Treatments 2, 3, and 5. Vitazyme 1 was the regular product; Vitazyme 2 was produced without certain intermediate steps.

Root stimulator application: A 4 gallon/acre root stimulator treatment was applied in 100 ml of water for each pot of Treatments 4 and 5. The root stimulator dilution was 0.07 ml/100 ml of solution (for one pot).

Harvest date: April 22, 2010

Growth results: Roots were washed free of soil, heights were measured, and the plants were dried in a drying oven at 125° F for 24 hours.

Conclusion: This greenhouse study with corn revealed that Vitazyme 1 plus a root stimulator greatly increased both plant height (+11%) and dry weight (66%) above the control. The root stimulator alone increased height by 9%, and dry weight by 46%. Vitazyme 1 and Vitazyme 2 did not differ significantly in their effects on plant height and dry weight, but they exceeded the control dry weight by from 6 to 10%.

Plant Height

Treatment	Height*	Change
	cm	cm
5 (Vita 1 + Growth Stim)	55.1 a	5.5 (+11%)
4 (Growth Stim)	54.2 a	4.6 (+9%)
1 (Control)	49.6 b	—
2 (Vita 1)	49.3 b	(-) 0.3 (-1%)
3 (Vita 2)	48.3 b	(-) 1.3 (-3%)
Main effects	0.0193*	
Model effects	0.0193*	
CV _{0.10}	8.61%	
LSD _{0.10}	4.0 cm	

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

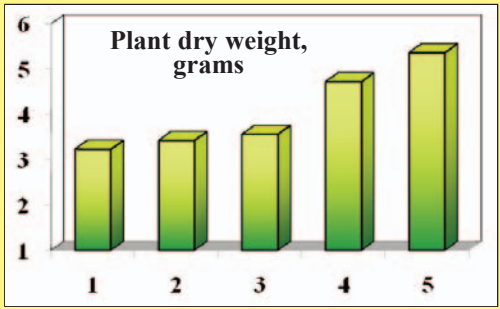
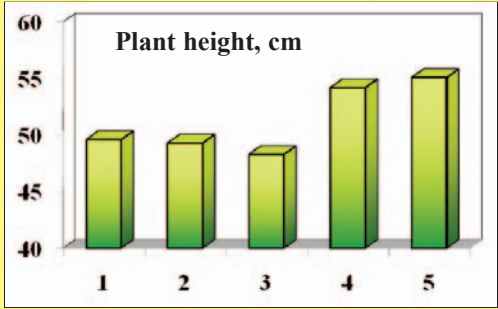
Plant Dry Weight

Treatment	Dry weight ¹	Change
	grams	grams
5 (Vita 1 + Growth Stim)	5.36 a	2.13 (+66%)
4 (Growth Stim)	4.72 b	1.49 (+46%)
3 (Vita 2)	3.56 c	0.33 (+10%)
2 (Vita 1)	3.42 c	0.19 (+6%)
1 (Control)	3.23 c	—
Main effects	0.0000***	
Model effects	0.0000***	
CV _{0.10}	26.47%	
LSD _{0.10}	0.61 gram	

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

Increase in plant height
Vitazyme + Growth stimulator +11%
Growth Stimulator ... +9%

Increase in dry weight
Vitazyme 1 + Growth stimulator +66%
Growth Stimulator ... +46%
Vitazyme 2 +10%



Corn

Researcher: V. V. Plotnikov
Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)
Variety: Saari, FAO 280

Research organization: National Academy of Agrarian Sciences

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)
Previous crop: corn
Planting date: May 20, 2010
Planting rate: 22 kg/ha
Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 5 to 6 cm



Corn treated with Vitazyme on the right grew larger plants that yielded 12% more grain than the untreated control.

Note the larger ears from the treated plots: the ears are not only longer, but they possess more rows of grains that are fuller.

Experimental design: A corn plot area was divided into four replicates with a control and one Vitazyme treatment, with the objective of determining the effects of the product on corn yield.

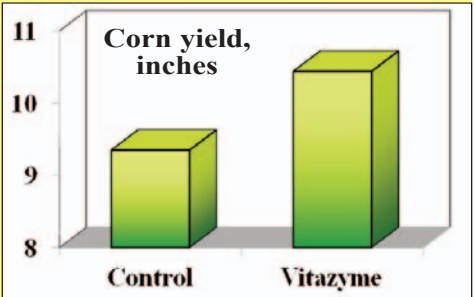
Corn Yield

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	9.35	---
Vitazyme	10.44	1.09 (+12%)

- 1. Control
- 2. Vitazyme on the leaves and soil

Fertilization: 100-60-60 kg/ha N-P₂O₅-K₂O, incorporated before planting
Vitazyme application: 1 liter/ha to the leaves and soil at the 7 to 8-leaf stage on June 17

Yield results: See the table and graph on the right.
Income results: A single Vitazyme application at the 7 to 8-leaf stage increased corn grain income by 1,489 hrn/ha.
Conclusion: Corn raised with Vitazyme, applied at 1 liter/ha to the leaves and soil at the 7 to 8-leaf stage, increased yield by 1.09 tons/ha (12%), and income by 1,489 hrn/ha, in this Ukraine replicated research trial, showing the product's excellent effects upon this crop in Ukraine.



• Increase in grain yield with Vitazyme: 12%

Corn

Researcher: unknown

Location: Krasnodar Region, Russia

Planting date: May 5, 2010

Soil type: Chernozem (2.6 to 3.2% organic matter, pH = 5.1, available P₂O₅ = 45.0 to 48.4, available K₂O = 341 to 385 mg/kg, exchangeable bases = 28.9 to 31.8 mg/100 g of soil, saturation with Ca and Mg = 85.0 to 88.6%, texture = 66% clay and 34% silt), highly fertile

Experimental design: A corn field was divided into untreated and Vitazyme treated plots, 40 m², using four replicates, with the objective of evaluating its effects on corn growth and yield.

1. Control

Fertilization: a fall application of 16-60-40 kg/ha N-P₂O₅-K₂O as NH₄H₂PO₄ and KCl, plus 50 kg/ha of NH₃ in April; 50 kg/ha more NH₃ before planting

Weed control: Harness KE, 2 liters/ha in April, 2010

Vitazyme application: (1) 1 liter/ha on the leaves and soil sprayed at the 3 to 4-leaf stage on May 18, 2010, and (2) 1 liter/ha foliar sprayed at the 6 to 8-leaf stage on June 1, 2010

Weather conditions: The climate is moderate continental, warm temperature, and humid. Hot and dry weather during early growth in May prolonged the early grand period of growth, but rain (7.39 cm) in later June helped crop development. July was hot and dry, which reduced crop productivity.

Yield results:

Research organization: Krasnodar Lukyanenko NIICX

Variety: Krasnodar 385MB

Tillage: disking

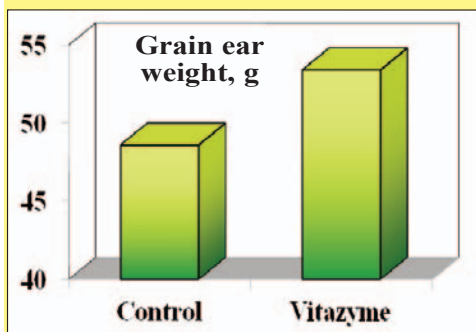
Seeding rate: 18 kg/ha

Previous crop: winter barley

2. Vitazyme

Corn Yield

Grain Per Ear**



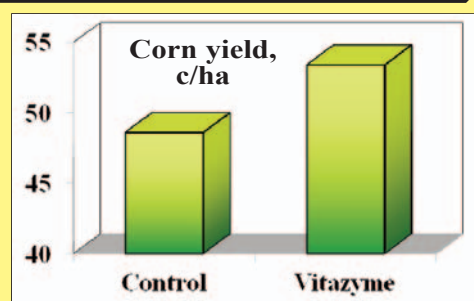
*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 11.8 g

- **Increase in grain per ear with Vitazyme: 13 g (+10%)**

Treatment	Yield* (c/ha)	Change (c/ha)
Control	48.6 b	---
Vitazyme	53.4 a	4.8 (+10%)

*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 3.8 c/ha.

- **Increase in grain yield with Vitazyme: 10%**



Grain quality results: The protein content of the two treatments was nearly identical, the control being 9.53% and the Vitazyme treatment being 9.56%.

Conclusion: This Russian corn trial from the Krasnodar Region revealed that Vitazyme improved ear size (10% more corn per ear), and increased the yield significantly (P = 0.05) over the control, also by 10% (4.8 c/ha). This increase was a result of using only two 1 liter/ha applications, at the 3 to 4-leaf stage. Even with the yield increase the protein content of the grain was not diminished, but was slightly improved. These results show the great utility of using Vitazyme as a yield and profit enhancer for corn in Russia.

Corn

A Greenhouse Trial

Researcher: Paul W. Syltie, Ph.D.

Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Variety: Pioneer 34R67 Liberty Link

Soil type: Sandy loam, mixed with 10% compost

Pot size: 1 gallon

Planting rate: 10 seeds per pot, thinned to three

Planting date: December 16, 2009

Growth temperature: 50° to 80° F

Experimental design: Three treatments and seven replications were employed in a greenhouse study to evaluate the effect of two Vitazyme formulations on the growth of corn.

1. Control

2. Vitazyme 1

3. Vitazyme 2

Vitazyme application: Vitazyme 1 and Vitazyme 2 were applied at 100 ml per pot of a 0.01% solution.

Harvest date: February 1, 2010.

Growth results: Roots were washed free of soil, leaf lengths were measured, and the plants were dried in a drying oven at 125° F for 24 hours.

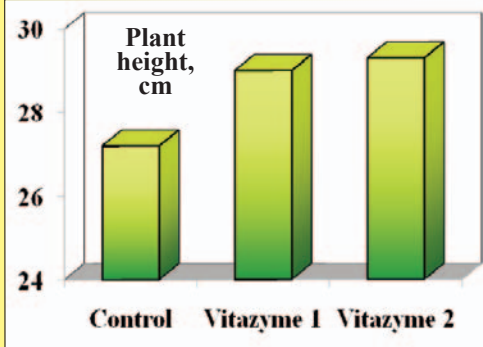


Note the considerably greater growth of the Vitazyme treated corn plants, despite a soil very low in available nitrogen; dry weight increased by 18% in one formulation, and by 16% in the second.

Plant Height

Treatment	Height ¹ cm	Change cm
3 (Vita 2)	29.3 a	2.1 (+8%)
2 (Vita 1)	29.0 a	1.9 (+7%)
1 (Control)	27.2 b	---
Blocks	0.1652 ns	
Main effects	0.0406*	
Model	0.0765 ns	
CV _{0.10}	5.09%	
LSD _{0.10}	1.4 cm	

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



Increase in plant height

Vitazyme 1 +8%
Vitazyme 2 +7%

Increase in plant height

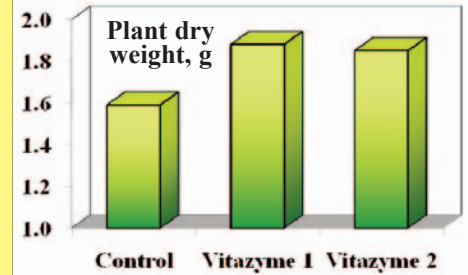
Vitazyme 1 +18%
Vitazyme 2 +16%

Conclusion: This greenhouse study revealed that Vitazyme 1 and Vitazyme 2 did not differ significantly in their effect on corn height and dry weight, both producing significantly greater values than the untreated control: height increases were 7 to 8%, and dry weight increases were 16 to 18%.

Plant Dry Weight

Treatment	Dry weight ¹ grams	Change grams
3 (Vita 1)	1.88 a	0.29 (+18%)
2 (Vita 2)	1.85 a	0.26 (+16%)
1 (Control)	1.59 b	---
Blocks	0.6091 ns	
Main effects	0.0997*	
Model	0.338 ns	
CV _{0.10}	14.4%	
LSD _{0.10}	0.24 g	

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



Corn

A Greenhouse Study

Researcher: Paul W. Syltie, Ph.D.

Variety: Pioneer 34R67 Liberty Link

Pot size: 1 gallon

Planting rate: 10 seeds per pot, thinned to three

Planting date: December 16, 2009

Growth temperature: 50° to 80° F

Experimental design: In this greenhouse corn study, using eight replicates, three treatments were used to evaluate the effect of Vitazyme, with or without formic acid, on corn growth.

1. Control 2. Vitazyme 3. Vitazyme + Formic acid

Vitazyme application: 100 ml/pot of a 0.02% solution

Formic acid application: Vitazyme at 100 ml/pot of a 0.02% solution having 0.5% formic acid

Harvest date: February 2, 2010

Growth results: The plants in each pot were washed free of soil, and the plant heights were measured. Then the plants were dried in a drying oven at 125° F for 24 hours.

Conclusion: This greenhouse study with corn revealed that both Vitazyme alone, and Vitazyme plus formic acid, significantly increased plant height (12 to 16%) and plant dry weight (17 to 19%) above the control. These data indicate that, in spite of sterilization of the product, Vitazyme alone or with formic acid equally stimulated plant growth in this corn study.

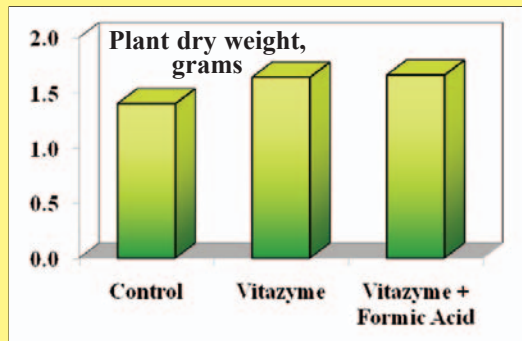
Location: Vital Earth Resources Research Greenhouse, Gladewater, Texas

Soil type: sandy loam

Plant Dry Weight

Treatment	Dry weight ¹ grams	Change grams
3 (Vita + Formic Acid)	1.66 a	0.26 (+19%)
2 (Vitazyme)	1.64 a	0.24 (+17%)
1 (Control)	1.40 b	---
Blocks	0.0590 ns	
Main effects	0.0021**	
Model	0.0081**	
CV _{0.10}	8.37%	
LSD _{0.10}	0.12 gram	

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



Plant Height

Treatment	Height ¹ cm	Change cm
3 (Vita + Formic acid)	30.7 a	4.2 (+16%)
2 (Vitazyme)	29.8 a	3.3 (+12%)
1 (Control)	26.5 b	---
Blocks	0.3505 ns	
Main effects	0.0054**	
Model	0.0480*	
CV _{0.10}	7.76%	
LSD _{0.10}	2.0 cm	

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

Increase in plant height

Vitazyme +16%
Vitazyme + Formic Acid +12%

Increase in plant dry weight

Vitazyme +19%
Vitazyme + Formic Acid +12%

Cotton

Farmer: Richard Schweers

Variety: unknown

Experimental design: A cotton field had two 6-acre areas separated for a test to compare Vitazyme treatment with an untreated control. The purpose of the test was to evaluate the effects of the product on cotton growth parameters.

1. Control

Fertilization: unknown

Vitazyme application: 13 oz/acre at mid-bloom

Harvest date: unknown

Growth parameters: Near harvest, the county agricultural extension agent assisted in evaluating the number of bolls per plant. After harvest, the roots from 19 plants of each treatment were dug and cut off at the soil level, then dried and weighed.

Conclusion: This cotton trial in south central Texas revealed that Vitazyme substantially improved the boll number per plant (34%), a direct reflection of a much greater root system (44%) as evidenced by dry root weight. The yield of the cotton could not be evaluated due to harvesting limitations. Vitazyme is shown by this study to have great potential in improving cotton yields for Texas farmers.

Test cooperater: Clyde Muennink

Planting date: unknown

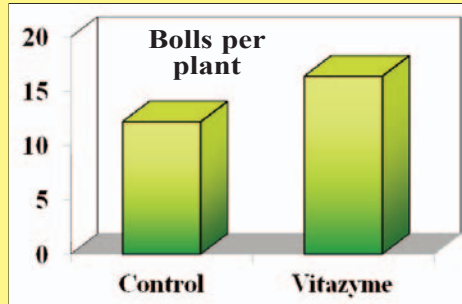
Location: Hondo, Texas

Dry Root Weight

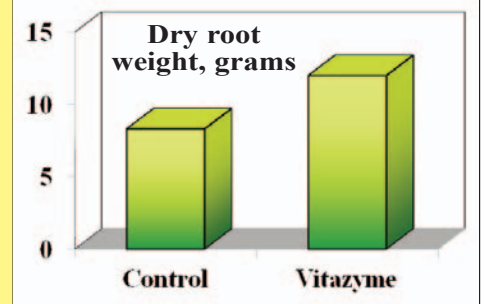
Treatment	Weight	Change
	grams	grams
Control	8.31	---
Vitazyme	12.00	3.69 (+44%)
Main effects P	0.0223*	
Model P	0.0223*	
CV	46.9%	
LSD _{0.05}	3.13g	

Bolls Per Plant

Treatment	Bolls	Change
	bolts/plant	bolts/plant
Control	12.2	---
Vitazyme soak	16.4	4.2 (+34%)



• **Increased bolls with Vitazyme: 34%**



• **Increase in root weight with Vitazyme: 44%**

Fodder Beans

Researcher: V. V. Plotnikov

Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Vizyr Super Elite

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: spring rape

Planting date: April 17, 2010

Planting rate: 1 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 5 to 6 cm

Experimental design: A fodder bean plot area was divided into four replicates with a control and two Vitazyme treatments, with the objective of determining the effects of the product on bean yield.

1. Control

2. Vitazyme on seeds

3. Vitazyme on seeds and leaves

Fertilization: 45-45-45 kg/ha of N-P₂O₅-K₂O, incorporated before planting

Vitazyme application: Treatments 2 and 3, 1 liter/ha on the seeds at planting on April 17; Treatment 3, 1 liter/ha on the leaves and soil at early bloom on June 9

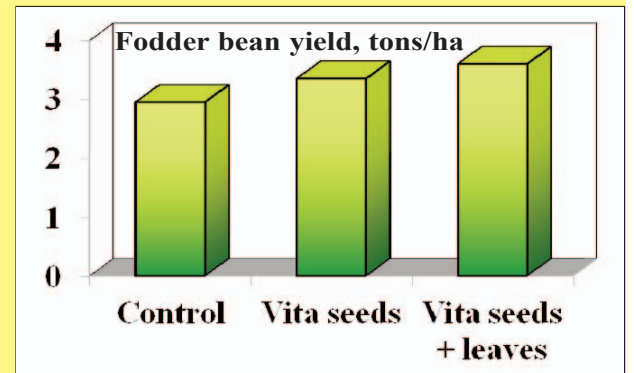
Yield results: See table and graph on the right.

Income results: A single at-planting seed application of Vitazyme produced a 630 hrn/ha income increase; with two applications, at planting and at bloom, that increase was 855 hrn/ha.

Conclusion: A replicated fodder bean trial in Ukraine revealed that Vitazyme, at 1 liter/ha applied to the seeds at planting, produced a yield increase of 0.40 tons/ha (14%), that gave 630 hrn/ha more income. An additional 1 liter/ha at bloom produced a large 0.65 ton/ha (22%) yield increase, with 855 hrn/ha of added income. These results prove the great value of using Vitazyme for fodder bean production in Ukraine.

Fodder Bean Yield

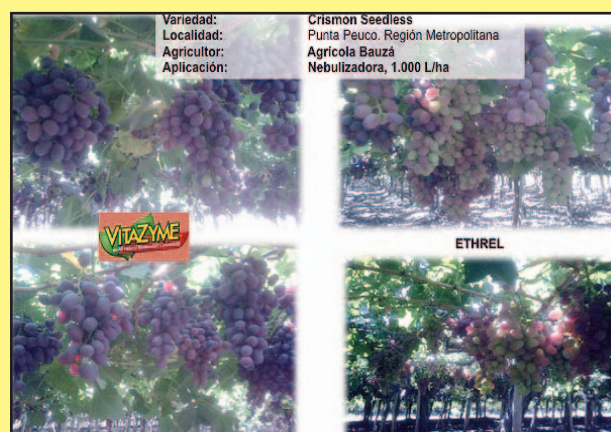
Treatment	Yield	Yield change
	tons/ha	tons/ha
1. Control	2.95	---
2. Vitazyme, seeds	3.35	0.40 (+14%)
3. Vitazyme, seeds + leaves	3.60	0.65 (+22%)



• **Increase in yield with Vitazyme: 14 to 22%**

Grapes, Table

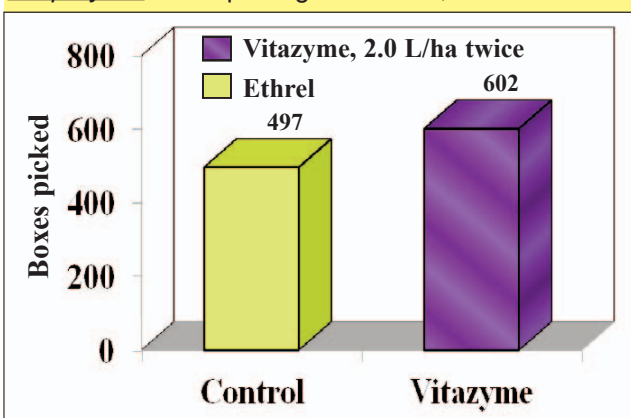
Grower: Agricola Bauza **Researcher:** Syngenta
Location: Parcel 26 of Agricola Bauza, Punta Peuco, Metropolitan Region, Chile
Variety: Crimson Seedless
Sprayer rate: 1,000 liters/ha (nebulizer sprayer)
Experimental design: A vineyard of Crimson Seedless grapes was divided into a Vitazyme treated area as well as an Ethrel treated control. The purpose of the study was to evaluate the effects of the product on grape yield, maturity, and advancement of coloration of the crop, and grape quality parameters versus the control.



This Syngenta series reveals the fine results obtained at Agricola Bauza in terms of advanced coloration: early color means a market advantage.

1. **Vitazyme, 2.0 liters/ha twice** 2. **Ethrel**

Fertilization: as recommended
Ethrel application: as recommended
Vitazyme application: 2.0 liters/ha applied 15 days before veraison, and 2.0 liters/ha applied at veraison
Grape sugar: Both treatments produced a Brix value about the same: Vitazyme, 19.9; Control, 20.1.
Grape yield: One picking was made, on March 3 and 4, 2010.



Conclusion: The researchers concluded the following:

- The Vitazyme treatment produced 21% more boxes than did the Ethrel treated control.
- The color of the Vitazyme treated berries was much more homogenous within the clusters than for the control, which facilitated the harvest. There were also few green berries in the treated area.
- There were real differences between the two treatments in terms of brix, despite the increased yield of the Vitazyme treatment.
- The differences between the treatments were marked 15 days before harvest, but near the end of harvest these differences were diminishing.

Vitazyme is shown by this trial to produce superior yields, more than Ethrel, without diminishing quality parameters.

- **Increase in grape yield with Vitazyme: 105 boxes (21%)**

Grapes, Table

Grower: Agricola La Cabana **Researcher:** Syngenta **Location:** Coltauco, Region VI, Chile
Variety: Thompson Seedless **Spacing:** 4.0 x 2.0 meters **Sprayer rate:** 70 liters/ha (EES sprayer)

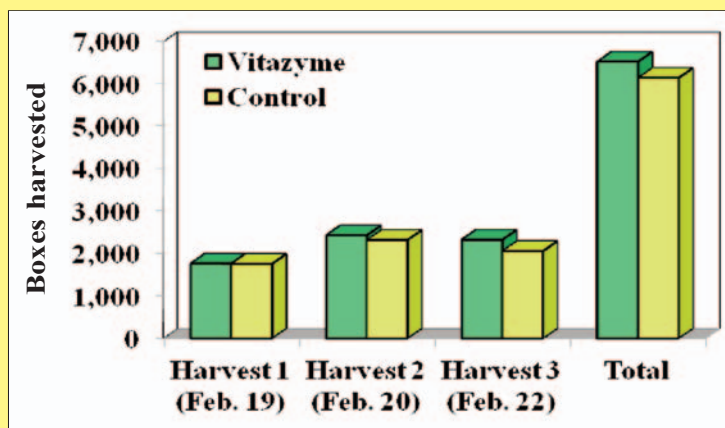
Experimental design: A vineyard of Thompson Seedless grapes was divided into a Vitazyme treated parcel, along with an untreated area alongside to evaluate the effects of the product on grape yield and maturity.

Grape Yield

Treatment	Harvests							
	Feb. 19	%	Feb. 20	%	Feb. 22	%	Total	Change
1. Vitazyme, 2 L/ha twice	1,765	0%	2,433	+5	2,329	+13	6,527	381 (+6%)
2. Control	1,758	---	2,324	---	2,064	---	6,146	---

1. **Vitazyme, 2.0 liters/ha twice** 2. **Control**

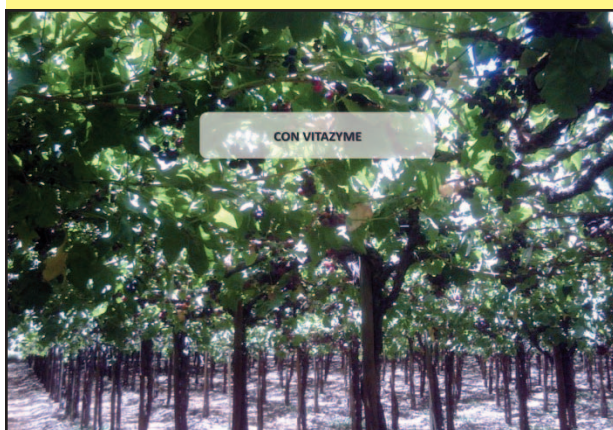
Fertilization: as recommended
Vitazyme application: 2.0 liters/ha applied 15 days before veraison (December 7, 2009), and 2.0 liters/ha applied at veraison (December 12, 2009)
Grape yield: Three harvests were made, on February 19, 20, and 22, 2010.



Conclusion: This Chilean table grape study revealed that Vitazyme, applied at 2.0 liters/ha twice, resulted in a 6% yield increase across three harvests. A 1.5 liters/ha rate would likely have given a greater yield response.

- **Increase in grape harvest with Vitazyme: 6%**

Grapes, Table



Grower: Fundo Santa Marta **Researcher:** Syngenta
Location: Santa Marta, Metropolitan Region, Chile
Variety: Flame Seedless
Experimental design: A vineyard was divided into two Vitazyme treatments, plus an untreated control, to evaluate the effects of the product on grape maturity and coloration, yield, and sugar content.
Fertilization: as recommended

Treatment	Rates and timing	
	15 days before veraison	At veraison
	----- liters/ha -----	
1. Vitazyme	1.5	1.5
2. Vitazyme	2.0	2.0
3. Control	0	0

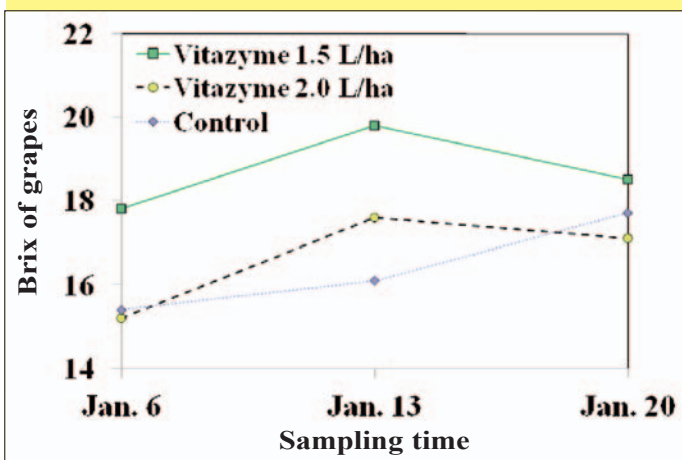
Vitazyme application: 1.5 liters/ha both times for Treatment 1; 2.0 liters/ha both times for Treatment 2

Grape sugar results: Sugar was measured at three times, before and during harvest.

This Syngenta trial at Fundo Santa Marta revealed the ability of Vitazyme to increase grape yield and brix, and speed the maturity significantly.

Grape Brix

Treatment	Brix values				Change
	1-6	1-13	1-20	Ave	
1. Vitazyme, 1.5 L/ha	17.8	19.8	18.5	18.7	2.3 (+14%)
2. Vitazyme, 2.0 L/ha	15.2	17.6	17.1	16.6	0.2 (+1%)
3. Control	15.4	16.1	17.7	16.4	---



Increase in Brix with Vitazyme

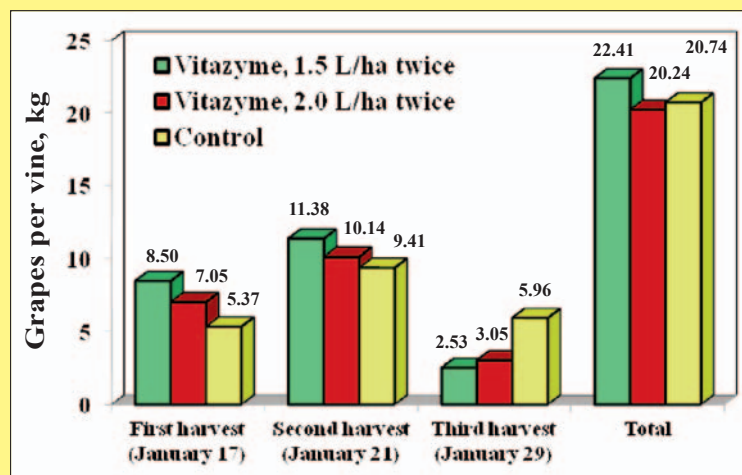
1.5 L/ha twice +2.3 Brix
 2.0 L/ha twice +0.2 Brix

Yield results: Three pickings were made.

Conclusion: This fresh grape trial in Chile, using Vitazyme twice at either 1.5 or 2.0 liters/ha, revealed that the product improves early coloration and maturity of Thompson Seedless grapes. Not only was the time to harvest improved (by 58% for 1.5 liters/ha, and 31% for 2.0 liters/ha for the first, more profitable harvest), but the total yield was increased by the 1.5 liters/ha treatment (+8%). In addition, grape sugar was improved with Vitazyme, by an average of 2.3 Brix for the 1.5 liters/ha rate, and by 0.2 Brix for the 2.0 liters/ha rate. According to Syngenta, "The T1 [1.5 liters/ha] treatment represents a real breakthrough and increased crop yield compared with the control and T2 [2.0 liters/ha]".

Grape Yield

Treatment	Grape pickings				
	Jan. 17	Jan. 21	Jan. 29	Total	Change
	kg/vine				
1. Vitazyme, 1.5 L/ha	8.50	11.38	2.53	22.41	1.67 (+8%)
2. Vitazyme, 2.0 L/ha	7.05	10.14	3.05	20.24	(-) 0.50 (-2%)
3. Control	5.37	9.41	5.96	20.74	---



Increased yield with Vitazyme

First Picking

1.5 L/ha +3.13 kg/vine (+58%)
 2.0 L/ha +1.68 kg/vine (+31%)

Second picking

1.5 L/ha +1.97 kg/vine (+21%)
 2.0 L/ha +0.73 kg/vine (+8%)

Total pickings

1.5 L/ha +1.67/vine (+8%)

Grapes, Table

Grower: Fundo Santa Marta

Researcher: Syngenta

Location: Santa Marta, Metropolitan Region, Chile

Variety: Thompson Seedless

Experimental design: This trial utilized a vineyard that was divided into two Vitazyme treatments besides a control. The purpose of the trial was to evaluate the product's ability to enhance the coloration and maturity of grapes, while increasing yield and quality.

Treatment	Rates and timing	
	15 days before veraison	At veraison
	----- liters/ha -----	
1. Vitazyme	1.5	1.5
2. Vitazyme	2.0	2.0
3. Control	0	0

Fertilization: as recommended

Vitazyme application: 1.5 liters/ha for Treatment 2 at both times, and 2.0 liters/ha for Treatment 2 at both times

Grape sugar results: Sugar was measured at four times during February. The Brix values varied little for the three treatments from February 10 to March 4, and on the last sampling day the values all converged at 15.7 Brix.

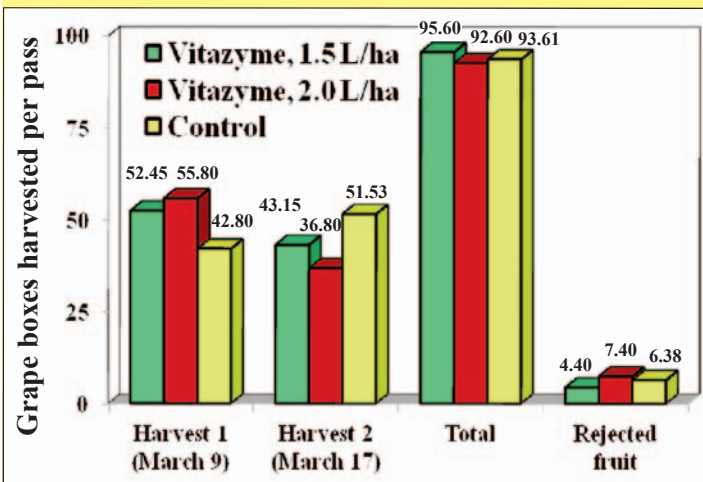
Grape yield results: Two pickings were made.

Treatment	Brix values			
	2-10	2-19	2-25	3-4
1. Vitazyme, 1.5 L/ha	12.8	14.1	15.1	15.7
2. Vitazyme, 2.0 L/ha	13.3	14.1	15.1	15.7
3. Control	13.1	14.3	15.4	15.7

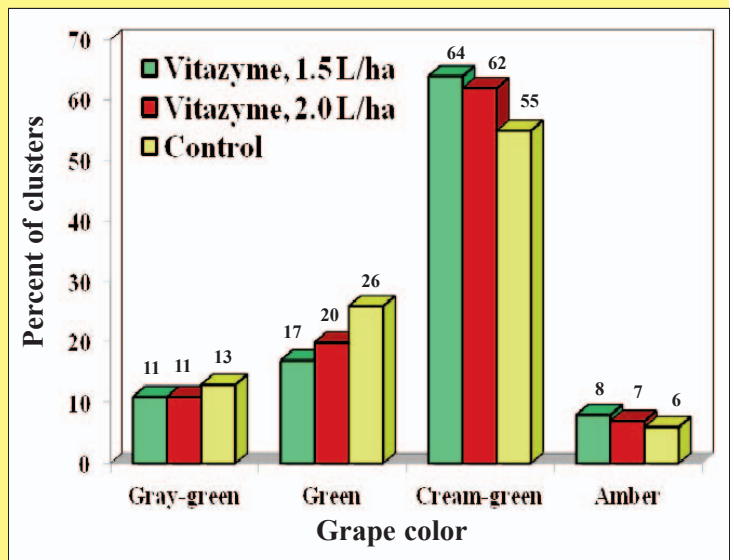
Grape Yield

Treatment	Picking yields				Total	Change	Rejected fruit
	March 9	%	March 17	%			
	----- boxes/pick -----				----- total boxes -----		boxes
1. Vitazyme, 1.5 L/ha	52.45	(+25%)	43.15	(-16%)	95.60	1.99 (+2%)	4.40
2. Vitazyme, 2.0 L/ha	55.80	(+33%)	36.80	(-29%)	92.60	(-) 1.01 (-1%)	7.40
3. Control	42.08	---	51.53	---	93.61	---	6.38

• **Refused fruit reduced at 1.5 liters/ha: -31%**



Distribution of Fruit Color



Increased yield with Vitazyme

First Picking

1.5 L/ha	+25%
2.0 L/ha	+33%

Total pickings

1.5 L/ha	+2%
----------------	-----

Grape color results: For the grapes harvested, a color evaluation was made.

Vitazyme increased the percentage of grapes in the cream-green category, which fetches a much greater price than does the green category, often twice as much.

Conclusion: This Chilean fresh grape trial, using 1.5 and 2.0 liters/ha of Vitazyme applied twice, revealed that the yield of first-picked grapes was increased by 25% and 33% by the 1.5 and 2.0 liters/ha rates, respectively, compared to the control. This allowed the farmer to sell more of his grapes at a higher price. Besides, the amount of refused fruit at the 1.5 liters/ha rate was reduced by 31%. According to Syngenta, "Vitazyme in doses of 1.5 and 2.0 L/ha were harvested earlier. This advance [in maturity] allowed a harvest of about 20% more fruit 10 days earlier." The color of the fruit was also positively influenced by Vitazyme: both rates increased the percentage of the cream-green clusters, which sell for a much higher price than the gray-green, green, or amber fruit. Fruit sugar was not affected by any treatments in this study. These results confirm the great utility of Vitazyme to enhance grape yield, quality, and color in Chile.

Grapes, Table

Grower: Fundo El Retiro, DDC

Location: Pudahuel, Metropolitan Region, Chile

Spacing: 3.75 x 2.5 meters

Experimental design: A vineyard of Thompson Seedless table grapes was divided into four treatments, three of them Vitazyme and the fourth the control. The purpose of the trial was to evaluate the product's effects on grape yield and maturity at specific dates.

Researcher: Syngenta

Variety: Thompson Seedless

Sprayer: vineyard micron sprayer delivering 1,000 liters/ha

Treatment	Applications	
	Initial	Final
	----- liters/ha -----	
1. Vitazyme	1.5	0
2. Vitazyme	0	1.5
3. Vitazyme	1.5	1.5
4. Control	0	0

*The "Initial" and "Final" application times were not specified in the research document, but probably were "15 days before veraison" for "Initial", and "At veraison" for "Final."

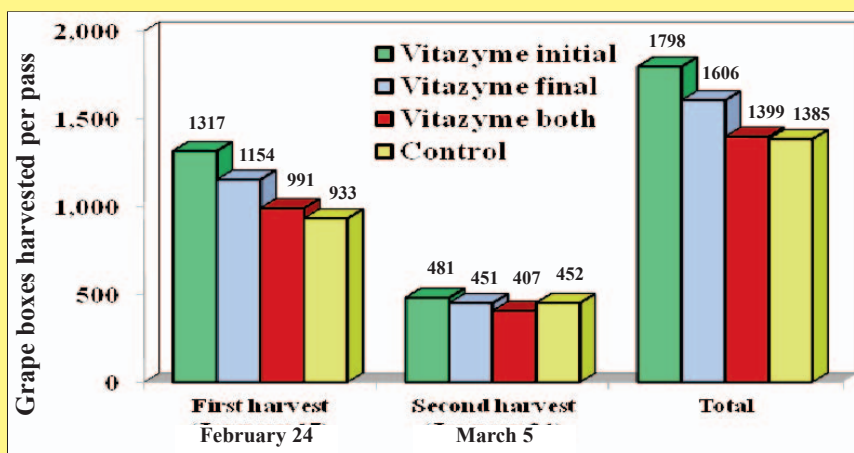
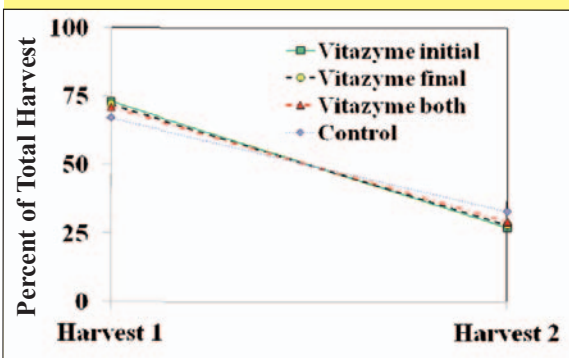
Fertilization: as recommended

Vitazyme application: 1.5 liters/ha at the specified times in Treatments 1, 2, and 3

Grape yield results:

Treatment	Harvest 1	Percent	Harvest 2	Percent	Total
	boxes	%	boxes	%	boxes
1. Vitazyme (initial)	1,317	73	481	27	1,798 (+30%)
2. Vitazyme (final)	1,154	72	451	28	1,606 (+16%)
3. Vitazyme (both)	991	71	407	29	1,399 (+1%)
4. Control	933	67	452	33	1,385 ---

Percent of Grapes Per Picking



Percent of first harvest grapes

Vitazyme initial	73
Vitazyme final	72
Vitazyme both	71
Control	67

Yield increase with Vitazyme

Vitazyme initial	+30%
Vitazyme final	+16%
Vitazyme both	+1%

Conclusion: In this Thompson Seedless grape trial in Chile, Vitazyme applied at the "initial" time caused a remarkable 30% yield increase, while marginally improving the maturity and coloration of the grapes, by 6% more than the control (73% vs. 67%) on February 24. The "final" Vitazyme treatment gave an excellent 16% yield increase on February 24, advancing fruit color development, while also improving the percentage of the initial picking by 5 percentage points more than the control. The Vitazyme applications did not improve the maturity and yield of the grapes by much, showing that, in this situation, only one application was required to achieve excellent early coloration and high final yield.

Grapes, Table

Grower: Prohens

Location: Apacheta, Copiapo, Chile

Experimental design: A grape vineyard was separated into two Vitazyme treatments with Ethrel, and Ethrel alone, to evaluate the effect of the products and combinations on sugar content, berry size, yield, and maturity of the crop.

Researcher: Syngenta

Variety: Flame Seedless

Treatment	Vitazyme applications		
	15 days before veraison	At veraison	Ethrel*
	----- liters/ha -----		
1. Vitazyme + Ethrel	1.5	1.5	0.7
2. Vitazyme + Ethrel	2.0	2.0	0.7
3. Ethrel only	0	0	0.7

*Applied 15 days before coloration.

Fertilization: as recommended

Vitazyme application: 1.5 liters/ha twice for Treatment 1, and 2.0 liters/ha twice for Treatment 2

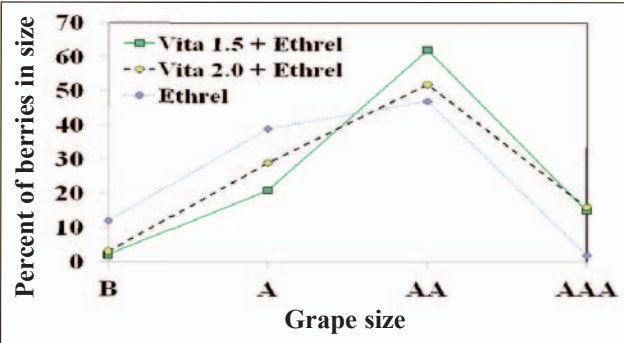
Grape sugar results: Five dates were selected to determine grape sugar: November 19 and 26, and December 3, 10, and 17, 2009. There were no major differences in Brix for the three treatments during the one-month period, as the sugar for all three increased from about 13.5 to 14.0, 15.0, 16.1, and 17.1 brix.

Grape size results: The size of the grapes was measured near harvest.

Grape Size

Treatment	Grape size*			
	B	A	AA	AAA
	----- % of berries -----			
1. Vita (1.5 L/ha) + Ethrel	2	21	62	15
2. Vita (2.0 L/ha) + Ethrel	3	29	52	16
3. Ethrel	12	39	47	2

*B=16.0 to 17.5 mm; A=17.5 to 19.0 mm; AA=19 to 21 mm; AAA>21 mm.



Grape size

Size AA

Vita 1.5 + Ethrel ... +62%

Vita 2.0 + Ethrel ... +52%

Size AAA

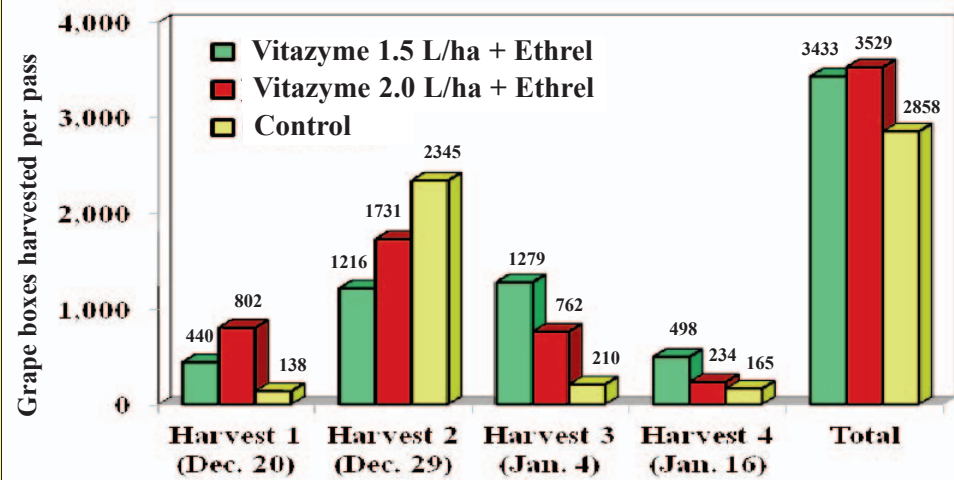
Vita 1.5 + Ethrel ... +15%

Vita 2.0 + Ethrel ... +16%

Yield results: Four harvests were made, on December 20 and 29, 2009, and on January 4 and 16, 2010.

Treatment	Picking yields									
	Dec. 20 %	Dec. 29 %	Jan. 4 %	Jan. 16 %	Total	Change				
	----- boxes/picking -----				total boxes					
1. Vita (1.5 L/ha)+Ethrel	440	+219	1,216	-48	1,279	+509	498	+202	3,433	575 (+20%)
2. Vita (2.0 L/ha)+Ethrel	802	+481	1,731	-26	762	+263	234	+42	3,529	671 (+23%)
3. Ethrel	138	---	2,345	---	210	---	165	---	2,858	---

Conclusion: This table grape study in Chile in 2009 and 2010 revealed that Vitazyme plus Ethrel proved to be superior to Ethrel treatment alone. Although grape sugar was not improved by Vitazyme, the AA size of the fruit was increased substantially by either the 1.5 liters/ha treatment twice (+62%), or by the 2.0 liters/ha treatment twice (+52%). Size AAA grapes were increased as well by both treatments, by 15% to 16%. Harvested yield was dramatically improved with Vitazyme, by 20% with the 1.5 liters/ha rate and by 23% with the 2.0 liters/ha rate. The early harvest percentage when Vitazyme was added with Ethrel was increased greatly as well by 440 to 802%. According to the researchers, "Vitazyme improved harvest of grapes 9 days earlier, and increased the boxes harvested per hectare. This was due to an early harvest of many boxes, and the treatment helped reduce the number of clusters that were not harvested."



Grapes, Table

Grower: Felipe Guerra, Del Monte Fresh Produce

Researcher: Syngenta

Location: Region V, Chile (Metropolitana)

Variety: Flame Seedless **Spacing:** 3.5 x 1.75 meters

Sprayer: ESS, 75 liters/ha

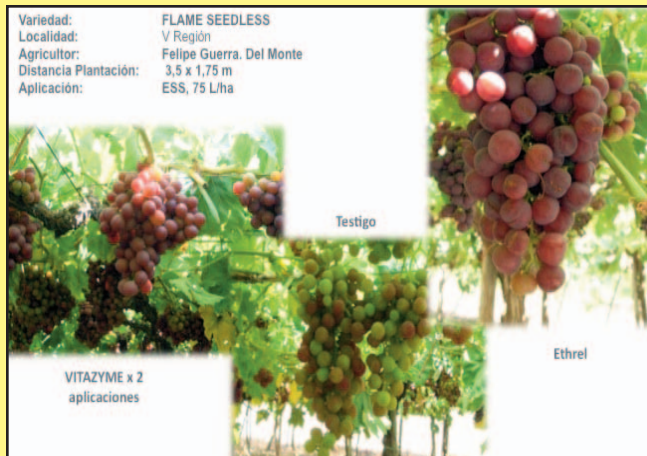
Experimental design: A vineyard of Flame Seedless grapes for fresh market was treated with Vitazyme in two areas; the other areas received conventional programs. The purpose of the trial was to evaluate the effect of the treatments on color and quality parameters of the grapes, as well as the time to maturity of the harvested fruit relative to exportation requirements.

Treatment	Application rate	Application time	
	liters/ha	15 days before veriason	At veriason
1. Ethrel	0.5	0	X
2. Vitazyme	2.0	X	X
3. Control	2.0	0	0

Fertilization: as recommended

Vitazyme application: 2.0 liters/ha each time for Treatment 2

Ethrel application: 0.5 liters/ha for Treatment 1



In this Syngenta presentation, the better early coloration of grapes is displayed at the Felipe Guerra Ranch, allowing for a much better market price.

Continued on the next page

Grape quality results: Brix results are at harvest.

Treatment	Brix values
Ethrel and Control	15.5 to 16.5 (x=16.00)
Vitazyme	16.5 to 18.0 (x=17.25)

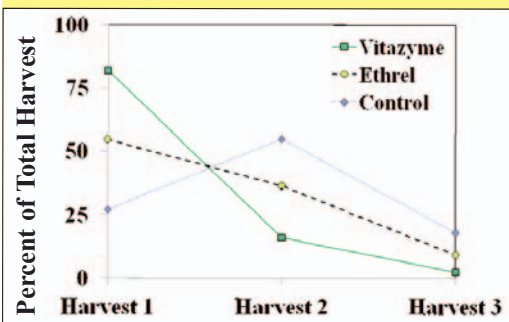
Increase in Brix with Vitazyme

Average of 1.25 Brix

Splitting of the grapes was less with the Vitazyme treatment than with the other two.

Grape harvest results: Grapes were harvested when the color was acceptable for table use, meaning they had achieved a red color. Three harvests were recorded.

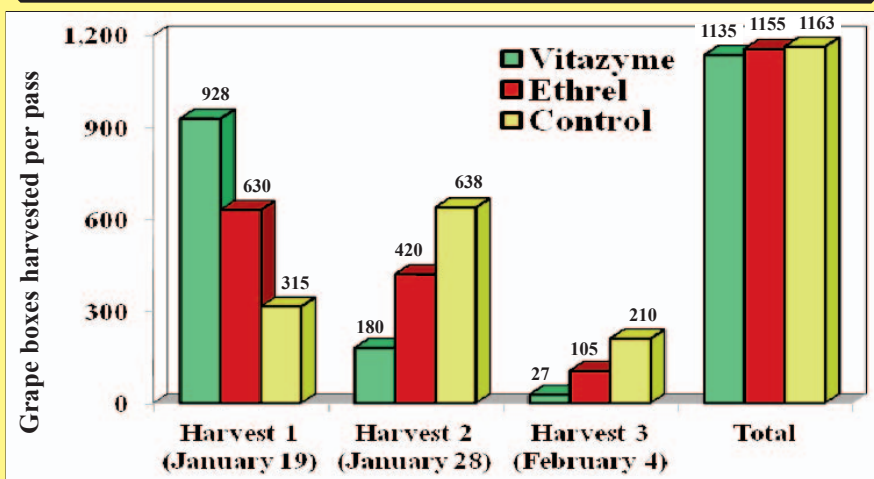
Percent of Grapes Per Picking



Percent of first harvest grapes

Vitazyme	81.8
Ethrel	54.5
Control	27.1

Grape Yield



Treatment	Harvest 1 boxes	Percent %	Harvest 2 boxes	Percent %	Harvest 3 boxes	Percent %	Total boxes
2. Vitazyme	928	81.8	180	15.9	27	2.3	1135
1. Ethrel	630	54.5	420	36.4	105	9.1	1155
3. Control	315	27.1	638	54.9	210	18.0	1163

Conclusion: This Flame Seedless table grape study in Chile revealed that Vitazyme greatly increased the percentage of grapes harvested on the January, 2010, first harvest; the percentages of Ethrel and untreated grapes harvested on the first harvest were 54.5 and 27.1%, respectively, while the Vitazyme treatment produced 81.8% of the yield for the first harvest. The product greatly advanced coloration of the skins. This early maturity with Vitazyme markedly improved the income of the farmer by allowing him to market more grapes earlier, to reach the more lucrative early market. Besides, the Vitazyme treated grapes had more sugar — thus tasted better — and there were fewer split grapes with the treatment. Ethrel was the second best treatment in terms of earlier maturity, followed by the control. The total harvest was about the same for all three treatments.

Lettuce

Researcher: Adoracion Torres-Guy
College of Agriculture, U.P. Los Banos

Planting rate: one seedling per hill

Seedling growth: seeds planted in seed boxes, and transplanted at 15 days

Spacing: 132 plants per plot, at 15 cm between hills and 20 cm between rows

Experimental design: A small plot replicated study (three reps) was set up to determine the effect of Vitazyme as a foliar treatment for lettuce, and to generate field data to register the product with the Fertilizer and Pesticide Authority in The Philippines. The plots were arranged in a randomized complete block design.

Institution: Soils and Agro-Ecosystem Division, Agricultural Systems Cluster,

Location: Los Banos, Lagune, The Philippines

Variety: Grand Rapids

Growth period: wet season

Plot size: 5 m²

Fertilization: 100% fertilizer: basal application per plot of 25 g of KCl (0-0-60% N-P₂O₅-K₂O), 50 g of 16-20-0, and 60.6 g of 46-0-0, plus 85 g of 46-0-0 side-dressed 10 days after transplanting. 50% fertilizer: half of the foregoing applications

Vitazyme application: 1 liter/ha (13 oz/acre) sprayed on the leaves to the dripping point at 5, 10, and 15 days after transplanting

Treatment	Fertilizer	Vitazyme
1	0	0
2	100%	0
3	50%	0
4	0	Yes
5	50%	Yes
6	100%	Yes

Yield and growth results: The lettuce was harvested 26 days after transplanting, at which time marketable yield, plant height, leaf number, and leaf width were determined. Ten representative plants from each plot were used for determining height, leaf number, and leaf width.

Leaf Number

Treatment	Leaves* number	Change number
1. Control	5.3 d	---
2. 100% N	8.0 b	2.7 (+51%)
3. 50% N	7.0 c	1.7 (+32%)
4. Vitazyme only	7.0 c	1.7 (+32%)
5. Vitazyme + 50% N	8.0 b	2.7 (+51%)
6. Vitazyme at 100% N	9.0 a	3.7 (+70%)

*Means followed by the same letter are not significantly different at P=0.05. Fully expanded leaves were measured for 10 plants.

Increase in leaf number

No Vitazyme

100% Nitrogen +51%
50% Nitrogen +32%

With Vitazyme

0% Nitrogen +32%
50% Nitrogen +51%
100% Nitrogen +70%

Leaf Width

Treatment	Leaf width*	
	cm	Change
1. Control	3.9 e	---
2. 100% N	6.8 c	2.9 (+74%)
3. 50% N	5.8 d	1.9 (+49%)
4. Vitazyme only	5.8 d	1.9 (+49%)
5. Vitazyme + 50% N	7.6 b	3.7 (+95%)
6. Vitazyme at 100% N	8.4 a	4.5 (+115%)

*Means followed by the same letter are not significantly different at P=0.05. The width of 10 fully expanded leaves per plot were measured.

Plant Height

Treatment	Height*	
	cm	Change
1. Control	7.93 c	---
2. 100% N	14.43 c	6.50 (+82%)
3. 50% N	10.70 d	2.77 (+35%)
4. Vitazyme only	10.93 d	3.00 (+38%)
5. Vitazyme + 50% N	16.87 b	8.94 (+113%)
6. Vitazyme at 100% N	19.67 a	11.74 (+148%)

*Means followed by the same letter are not significantly different at P=0.05. The longest leaf was measured from the base to the leaf tip of 10 randomly selected plants of each plot.

Increase in plant height

No Vitazyme
 100% Nitrogen +82%
 50% Nitrogen +35%

With Vitazyme
 0% Nitrogen +38%
 50% Nitrogen +113%
 100% Nitrogen +148%

Increase in leaf width

No Vitazyme
 100% Nitrogen +74%
 50% Nitrogen +49%

With Vitazyme
 0% Nitrogen +49%
 50% Nitrogen +95%
 100% Nitrogen ... +115%

Crop Yield

Treatment	Plot weight*		Yield*		Change
	grams/plot	tons/ha	grams/plot	tons/ha	
1. Control	150.0 e	3.07 e	---	---	---
2. 100% N	369.3 c	8.16 c	5.09	(+166%)	
3. 50% N	340.0 d	6.68 d	3.61	(+118%)	
4. Vitazyme only	343.3 d	7.00 d	3.93	(+128%)	
5. Vitazyme + 50% N	443.3 b	10.80 b	7.73	(+252%)	
6. Vitazyme at 100% N	550.0 a	11.95 a	8.88	(+289%)	

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

Increase in crop yield

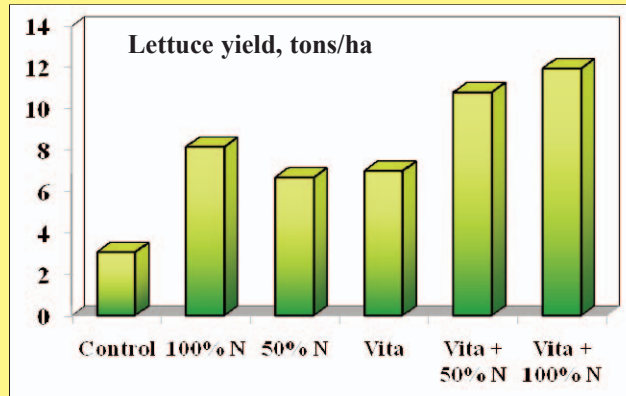
No Vitazyme
 100% Nitrogen ... +166%
 50% Nitrogen +118%

With Vitazyme
 0% Nitrogen +128%
 50% Nitrogen +252%
 100% Nitrogen ... +289%

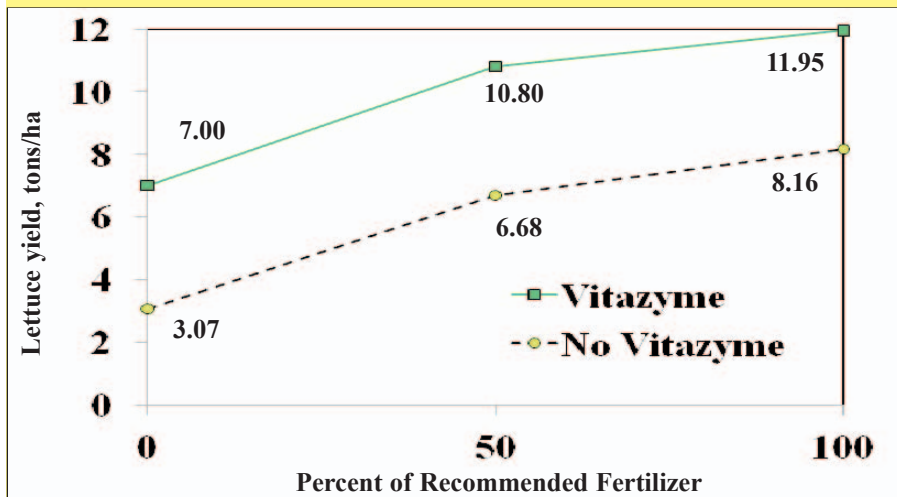
Conclusion: According to the official report on the Philippine lettuce study,

“The different treatments influenced significantly the plant height, number and width of leaves, weight of plant, and yield of lettuce at harvest. The recommended rate of Vitazyme increased significantly the number of leaves, but the increment was higher with the conventional fertilizer. All treatments increased all parameters significantly over the control. The performance of Vitazyme in combination with 50% of the recommended rate of conventional fertilizer was significantly better than the performance of either Vitazyme alone or 50% of the recommended rate of conventional fertilizer, indicating a positive interaction between Vitazyme and 50% of the recommended rate of conventional fertilizer.

A much better positive interaction was noted between Vitazyme alone and the recommended rate of conventional fertilizer. However, for economic reasons it would be better to recommend to the farmers a combination of the recommended rate of Vitazyme with 50% the recommended rate of conventional fertilizer. This approach will definitely result in much higher cost savings. The new product, Vitazyme, may qualify for provisional registration by the Fertilizer and Pesticide Authority as long as it is applied together with conventional fertilizer at 50% of the recommended rate.”



Note the improvement in nitrogen utilization with Vitazyme.



- **No added fertilizer** plus Vitazyme yielded 3.93 tons/ha (28%) more than no fertilizer alone.
- **With 50% added fertilizer**, Vitazyme increased the yield by 4.12 tons/ha (62%) more than 50% fertilizer alone.
- **With 100% added fertilizer**, Vitazyme increased lettuce yield by 3.79 tons/ha (46%) more than 100% fertilizer alone.

Note also that Vitazyme with no fertilizer added exceeded the 50% fertilizer rate without Vitazyme by 0.32 tons/ha (5%), while the 50% fertilizer rate plus Vitazyme exceeded the 100% fertilizer rate without Vitazyme by 2.64 tons/ha (32%), showing a great nitrogen efficiency improvement with this product.

Peanuts

Researcher: unknown

Variety: local variety

Experimental design: A trial was set up with peanuts using three treatments in separate areas of a field. The purpose of the study was to evaluate the effect of Vitazyme and Rhizobium bacteria on peanut growth and yield.

Location: Phu Cat, Binh Dinh Province, Viet Nam

Planting date: December 20, 2009

1. Control

2. Rhizobium

3 Rhizobium + Vitazyme

Vitazyme application: 5% seed treatment before planting

Vitazyme + Rhizobium applications: 5% Vitazyme plus 1 kg/liter of water, on the seeds

Rhizobium application: 1 kg/ha of inoculant in 1 liter of water, on the seeds

Germination results: Vitazyme accelerated germination by 1 to 2 days.

Yield results: See the table and graph on the right.

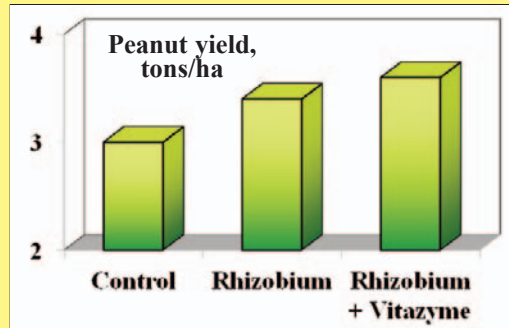
Conclusion: This peanut trial in Viet Nam, using Rhizobium bacterial inoculant with and without Vitazyme as a seed treatment, proved that Vitazyme + Rhizobium alone boosted yield by 13% above the control, while Vitazyme plus the Rhizobium increased yield by 20%, another 7% above the Rhizobium alone. These results prove not only the efficacy of Rhizobium bacteria to improve peanut yields, but of Vitazyme to further enhance Rhizobium activity. No treatment with Vitazyme alone was used in this study.

• **Improvement in time to germination with Vitazyme: 1 to 2 days**

• **Increase in yield with Vitazyme + Rhizobium bacteria: 20%**

Peanut Yield

Treatment	Yield tons/ha	Yield change tons/ha
Control	3.0	---
Rhizobium	3.4	0.4 (+13%)
Rhizobium + Vitazyme	3.6	0.6 (+20%)



Potatoes



White potatoes grown in Ukraine responded very well to Vitazyme, producing a tuber yield 9 to 14% better than the untreated control. Note also more chlorophyll in the treated plants.

Vitazyme application: Treatments 2 and 3, 1 liter/ha on the young plants and soil on June 17; Treatment 3, 1 liter/ha on the leaves and soil at flowering on July 5

Yield results: See the table and graph on the right.

Income results: The result of an early application was a 7,550 hrn/ha income increase, whereas two applications increased income by 11,600 hrn/ha.

Conclusion: The yield and income for potatoes in this Ukrainian replicated potato trial increased substantially. For a single 1 liter/ha Vitazyme application not long after emergence, yield increased by 3.1 tons/ha (9%), and income by 7,550 hrn/ha, while with an additional 1 liter/ha application at bloom the yield jumped by 4.8 tons/ha (14%) above the control. Income increased by 11,600 hrn/ha for two applications. The Vitazyme program works very well for potatoes in Ukraine.

• **Increase in yield with Vitazyme: 9 to 14%**

Researcher: V. V. Plotnikov
Academy of Agrarian Sciences

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Planting date: May 12, 2010

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 10 to 12 cm

Experimental design: A potato plot area was divided into four replicates with a control and two Vitazyme treatments, with the objectives of determining the effects of the product on potato tuber yield.

1. Control

2. Vitazyme after emergence

3. Vitazyme after emergence and at flowering

Fertilization: 120-60-60 kg/ha of N-P₂O₅-K₂O, incorporated before planting

Research organization: National

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

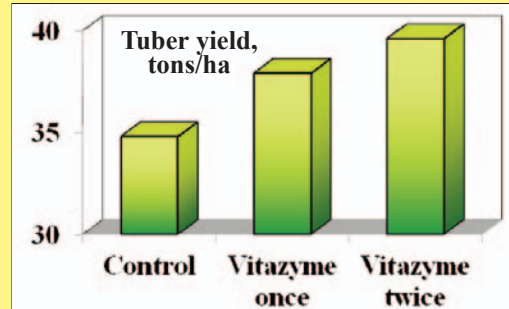
Variety: Fantaziya Elite

Previous crop: spring barley

Planting rate: 2.8 tons/ha

Potato Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	34.8	---
2. Vitazyme, once	37.9	3.1 (+9%)
3. Vitazyme, twice	39.6	4.8 (+14%)



Pumpkins

Researcher: V. V. Plotnikov

Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: unknown

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: spring barley

Planting date: May 15, 2010

Planting rate: 5 kg/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 5 to 6 cm

Experimental design: Pumpkins were planted in a plot area that was divided into four replicates, with a control and one Vitazyme treatment, with the objective of determining the effects of the product on yield.

1. Control

2. Vitazyme at early flowering

Fertilization: 45-45-45 kg/ha N-P₂O₅-K₂O, incorporated before planting

Vitazyme application: 1 liter/ha to the leaves and soil at early flowering, on July 9

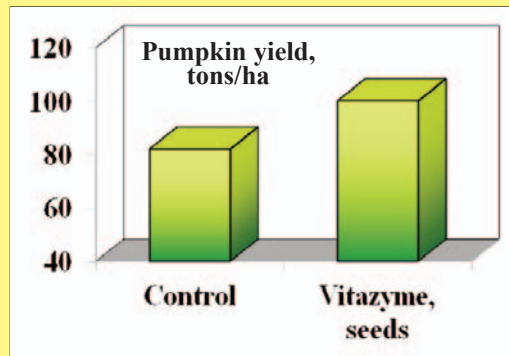
Yield results: See the table and graph on the right.

Conclusion: A pumpkin trial in Ukraine showed that Vitazyme, applied once at early bloom, increased the tonnage of pumpkins by 18 tons/ha (22%) above the untreated control. This was a great increase in yield, and it shows the great utility of this product for pumpkin producers.

• **Increase in yield with Vitazyme: 22%**

Pumpkin yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	82	---
2. Vitazyme, seeds	100	18 (+22%)



Soybeans



The 16 and 23% yield increases with Vitazyme in this Ukraine study are typical responses with soybeans, using seed or leaf treatments.

1. Control

2. Vitazyme on seeds

3. Vitazyme on seeds and leaves

Fertilization: 45-30-30 kg/ha of N-P₂O₅-K₂O, incorporated before planting

Vitazyme application: Treatments 2 and 3, 1 liter/ha on the seeds at planting on April 30; Treatment 3, 1 liter/ha on the leaves and soil at early bloom on June 9

Yield results: See the table and graph on the right.

Income results: A single treatment on the soybean seeds produced 1,346 hrn/ha more income, while a seed plus foliar and soil treatment increased income by 1,700 hrn/ha.

Conclusion: A Ukrainian soybean study revealed that Vitazyme, applied on the seeds at 1 liter/ha at planting, increased yield by 16% (0.43 ton/ha). A seed plus foliar treatment at 1 liter/ha at early bloom increased yield by 23% (0.60 ton/ha). Both treatments were highly profitable, increasing income by 1,356 to 1,700 hrn/ha, showing the great utility of this agricultural program for soybeans in Ukraine.

• **Increase in yield with Vitazyme: 16 to 23%**

Researcher: V. V. Plotnikov

Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Vinnychanka

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: winter wheat

Planting date: April 30, 2010

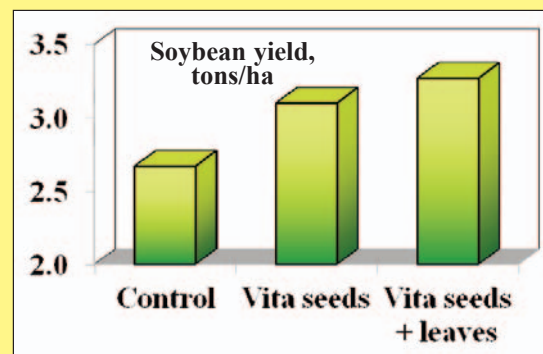
Planting rate: 0.8 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 5 to 6 cm

Experimental design: A soybean plot area was divided into four replicates with a control and two Vitazyme treatments, with the objective of determining the effects of the product on soybean yield.

Soybean Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	2.67	---
2. Vitazyme, seeds	3.10	0.43 (+16%)
3. Vitazyme, seeds + leaves	3.27	0.60 (+23%)



Sugar Beets

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

Varieties: Olexandria, Lenora, Merak **Soil type:** gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: spring vetch **Planting date:** April 24, 2010

Planting rate: 100,000 seeds/ha **Soil preparation:** disking to 6 to 8 cm, tillage to 25 to 27 cm, cultivation twice to 3 to 4 cm

Experimental design: A plot area of sugar beets was sown to three varieties, using four replications, and two Vitazyme treatments for each variety. Each variety also had its own untreated control. The purpose of the study was to determine the effect of the product on beet yield, sugar content, and sugar yield.

1. Control

2. Vitazyme

Fertilization: 45 kg/ha P₂O₅, and 45 kg/ha K₂O applied in the fall, and 80 kg/ha of N applied and incorporated in the spring before planting

Vitazyme application: (1) 1 liter/ha on the leaves and soil on June 17, 2010; (2) 1 liter/ha on the leaves and soil on July 9, 2010

Yield and sugar results:

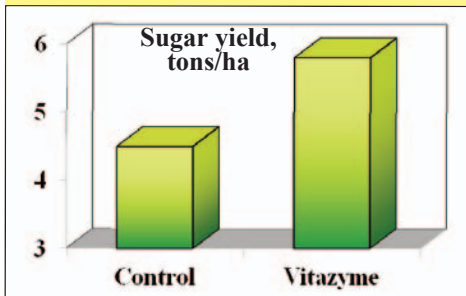


Note the excellent size of the beets dug from the Vitazyme treated area, as well as their higher chlorophyll levels. Besides, the sugar content was improved by from 0.6 to 1.0 percentage point despite the higher yields.

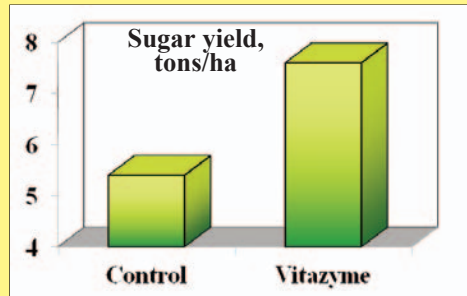
Treatment	Beet yield tons/ha	Yield change tons/ha	Sugar content %	Content change %-points	Sugar yield tons/ha	Yield change tons/ha
Olexandria						
1. Control	31.2	---	14.4	---	4.5	---
2. Vitazyme	38.8	7.6 (+24%)	15.0	+0.6	5.8	1.3 (+29%)
Lenora						
1. Control	38.9	---	14.0	---	5.4	---
2. Vitazyme	52.7	13.8 (+36%)	14.5	+0.5	7.6	2.2 (+41%)
Merak						
1. Control	39.3	---	14.2	---	5.6	---
2. Vitazyme	48.5	9.2 (+23%)	15.2	+1.0	7.4	1.8 (+32%)

Sugar Yield

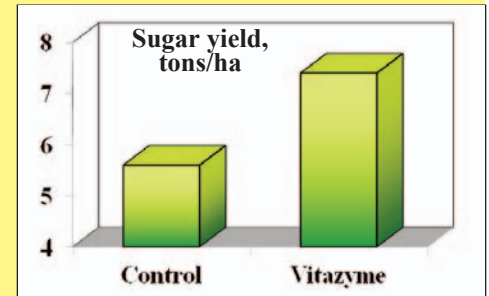
Olexandria



Lenora



Merak



Income increase: The added income from Vitazyme application was significant for all three varieties: 2,093 hrn/ha for Olexandria, 4,388 hrn/ha for Lenora, and 3,054 hrn/ha for Merak.

Conclusion: This sugar beet study in Ukraine revealed that Vitazyme,

applied twice at 1 liter/ha during the growing period, dramatically increased the beet yield and sugar yield for all three beet varieties. Increases in beet yield ranged from 23 to 36%, and increases in sugar yield were from 29 to 41%. The sugar content of the beets was also increased, from 0.5 to 1.0 percentage point. Income increases were improved by from 2,093 to 4,388 hrn/ha. These truly excellent yield and income results show the great value of Vitazyme for sugar beet production in Ukraine.

Increases with Vitazyme

	Beet yield	Sugar content	Sugar yield
Olexandria	24%	0.6 %-point	29%
Lemora	36%	0.5 %-point	41%
Merak	23%	1.0 %-point	32%

Sugar Beets

Researcher: V. V. Plotnikov

Location: National Academy of Agrarian Sciences, Vinnytsia State Agricultural

Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Karmelita

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil,

P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: winter wheat

Planting date: April 24, 2010

Planting rate: 100,000 seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, harrowing to 4 to 5 cm

Experimental design: A plot area of about 1 ha was planted to sugar beets, and a trial with four replicates using one Vitazyme treatment and four levels of fertilization was placed upon it. The objective of the test was to evaluate the effect of Vitazyme and fertilizer level on the yield of sugar for the beets.

1. No fertilizer, no Vitazyme

2. No fertilizer, plus Vitazyme

3. Low fertilizer, no Vitazyme

4. Low fertilizer, plus Vitazyme

5. Medium fertilizer, no Vitazyme

6. Medium fertilizer, plus Vitazyme

7. High fertilizer, no Vitazyme

8. High fertilizer, plus Vitazyme

Fertilization: Phosphorus and potassium were applied in the fall during the main tillage operation, and nitrogen was spring applied, and incorporated before planting.

Treatments 3 and 4: 80-60-80 kg/ha N-P₂O₅-K₂O

Treatments 5 and 6: 120-90-120 kg/ha N-P₂O₅-K₂O

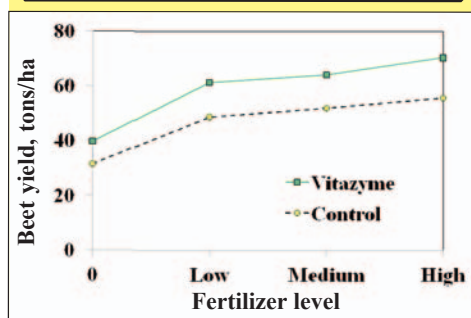
Treatments 7 and 8: 160-120-160 kg/ha N-P₂O₅-K₂O

Vitazyme application: 1 liter/ha sprayed on the leaves and soil (1) June 17, 2010, and (2) July 9, 2010

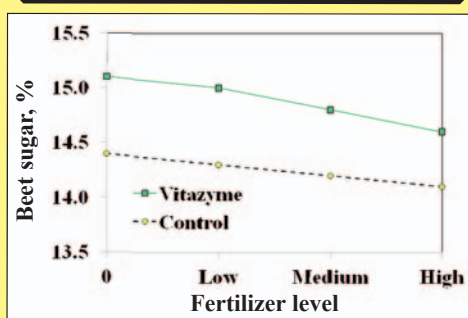
Sugar and beet yield results:

Treatment	Beet yield	Change	Sugar content	Change	Sugar yield	Change
	tons/ha	tons/ha	%	%-points	tons/ha	tons/ha
1. No fert, no Vita	31.5	---	14.4	---	4.5	---
2. No fert, + Vita	39.7	8,2 (+26%)	15.1	+0.7	6.0	1.5 (+33%)
3. Low fert, no Vita	48.7	---	14.3	---	7.0	---
4. Low fert, + Vita	61.2	12.5 (+26%)	15.0	+0.7	9.2	2.2 (+31%)
5. Medium fert, no Vita	51.9	---	14.2	---	7.4	---
6. Medium fert, + Vita	64.1	12.2 (+24%)	14.8	+0.6	9.5	2.1 (+28%)
7. High fert, no Vita	55.6	---	14.1	---	7.8	---
8. High fert, + Vita	70.3	14.7 (+25%)	14.6	+0.5	10.2	2.4 (+31%)

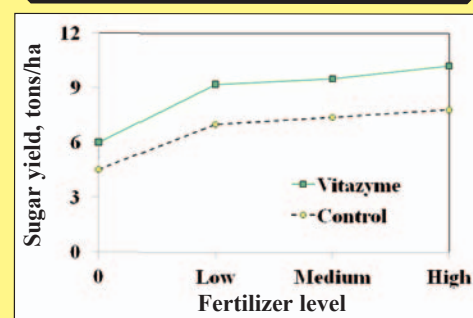
Sugar Beet Yield



Beet Sugar Content



Sugar Yield



Vitazyme gave uniform increases in yield (24 to 26%) at all four fertility levels, and also increased sugar content of the beets (by 0.5 to 0.7 percentage points) despite higher yields, though sugar content increased a bit less as the fertilizer levels and yields increased. Final sugar yield for all four fertilizer levels was markedly improved by Vitazyme (28 to 33%).

Income results: Profits with Vitazyme were improved markedly at all four fertilizer levels, from 2,306 hrn/ha for none added, to 3,700 hrn/ha at the low level, to 3,553 hrn/ha for the medium level, and to 4,289 hrn/ha for the high fertilizer level.

Conclusion: This sugar study in Ukraine, using four fertilizer levels and one Vitazyme regime (1 liter/ha applied twice to the leaves and soil), showed that beet and sugar yields were markedly and uniformly improved at all fertilizer levels. Besides, the sugar content of the beets was increased by 0.5 percentage point or more, the increase decreasing slightly as the fertilizer rate increased.

These results are summarized to the right. The Vitazyme program is shown to be an excellent practice to incorporate into sugar beet production in Ukraine.

Increases with Vitazyme

	No fert	Low fert	Medium fert	High fert
Beet Yield	26%	26%	24%	25%
Sugar content	0.7 %-pt	0.7 %-pt	0.6 %-pt	0.5 %-pt
Sugar yield	33%	31%	28%	31%
Profit	2,306 hrn/ha	3,700 hrn/ha	3,553 hrn/ha	4,289 hrn/ha

Sugar Beets

Researcher: Unknown
Company testing: Astarta
Location: Khmilnyk raion, Vinnytsia oblast, Zhdanivka, Ukraine
Variety: Ukrainian ChS-70
Planting date: April 20, 2010
Planting rate: 150,000 seeds/ha



There is a clear difference in the leaf area and vigor of the sugar beets grown with Vitazyme for Astarta in Ukraine.



Beets harvested from the two areas of this trial, a few rows from one another, reveal a pronounced difference in yield (13%).

Seedbed preparation: disking 6 to 8 cm deep and tilling 25 to 27 cm deep in the fall, and harrowing twice at 3 to 4 cm deep in the spring

Previous crop: winter wheat

Experimental design: A sugar beet field was divided into three treatments, two of which were Vitazyme treatments, in an effort to evaluate the product's effects on beet yield and sugar yield.

1. Control

2. Vitazyme once

3. Vitazyme twice

Fertilization: 45 kg/ha P₂O₅ and 45 kg/ha K₂O in the fall, and 100 kg/ha N in the spring

Vitazyme applications: Treatments 2 and 3 both received 1 liter/ha sprayed on the leaves and soil on June 20, and Treatment 3 received an additional 2 liter/ha on July 10, 2010.

Yield results:

Treatment	Beet yield tons/ha	Change tons/ha	Sugar content %	Sugar yield tons/ha	Change tons/ha
1. Control	38.6	---	16.6	6.43	---
2. Vitazyme once	42.9	4.3 (+11%)	16.5	7.07	0.64 (+10%)
3. Vitazyme twice	43.7	5.1 (+13%)	16.6	7.26	0.83 (+13%)

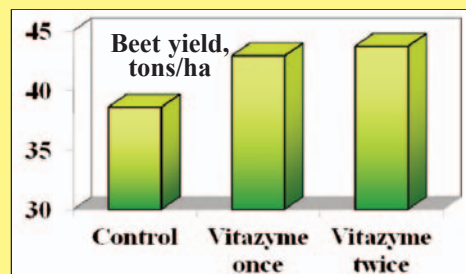
Sugar content results: All three treatments produced nearly the same sugar content.

Income results: The single Vitazyme application increased income by 1,305 hrn/ha, while two applications improved income by 1,385 hrn/ha.

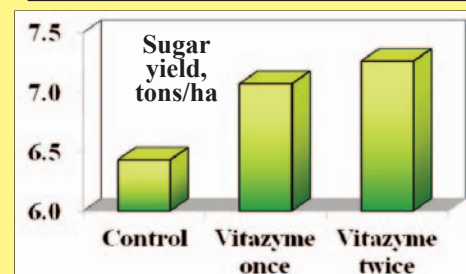
Conclusion: This sugar trial, conducted by Astarta in Ukraine, showed excellent beet and sugar yield increases with Vitazyme: 11 to 13% for beet yield, and 10 to 13% for sugar yield. The sugar content of the beets did not drop below the control for both Vitazyme treatments, despite big yield increases, and the income increased noticeably. These results show the great value of using Vitazyme for sugar beet production in Ukraine.

- Increase in beet yield with Vitazyme: 11 to 13%
- Increase in sugar yield with Vitazyme: 10 to 13%

Beet Yield



Sugar Yield



Sugar Beets

Researcher: N. M. Domanov, Ph.D.

Location: Plant Protection Laboratory, Russian Academy of Agricultural Sciences, Belgorod Agricultural Research Institute, Belgorod, Russia

Planting date: April 26, 2010

Disease resistance: moderate

Variety: Lgovska one-seeded 52

Previous crop: winter wheat

Soil type: Chernozem (4.4% organic matter, CEC = 36.8 meq/100 g, hydrolytic soil acidity = 1.6 - 2.0 mg/100 g, pH = 5.8, exchangeable P₂O₅ = 26 mg/100 g, exchangeable K₂O = 126 mg/100 g)

Experimental design: A replicated field trial with sugar beets was conducted with four replicates and five treatments to determine the effect of Vitazyme on sugar beet growth and sugar yield. Plots were 100 m².

Treatment	Procedures
1	Control: no treatment
2	Standard: Epin-Extra preplant seed treatment (4 ml/ton in 10 liters of water/ton) Foliar spray at 2 to 3 full leaves (40 ml/ha in 250 liters of water/ha)
3	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (0.1 liter/ha in 250 liters of water/ha)
4	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (0.5 liter/ha in 250 liters of water/ha)
5	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (1.0 liter/ha in 250 liters of water/ha)

Fertilization: 16-16-16% N-P₂O₅-K₂O (rate unknown)

Vitazyme application: 0.1, 0.5, or 1.0 liter/ha applications to the leaves at 2 to 3 leaves, and at 6 to 8 leaves

Growing conditions: Growth of the beets was affected by very warm temperatures throughout the main growing season — from 5 to 7° C above normal from April through July — and by well-below-normal precipitation. The March through July rainfall was only 116 mm, or 45.5% of normal; these rains were also irregular.

Growth stages:

Planting	April 26
Germination	May 23 - 25
First pair of the true leaves ...	June 1 - 3
Third pair of true leaves	June 7 - 10
Closing in rows	July 14 - 16
Closing between rows	July 28 - 30
Harvest	September 20

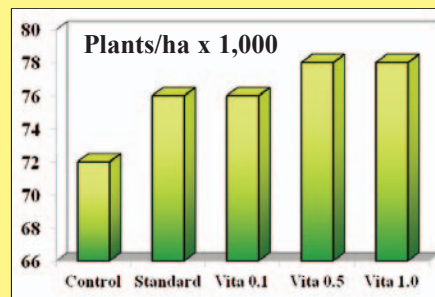
Plant density: Just before harvest, a population count was made.

Treatment	Plant density 1,000/ha	Change 1,000/ha
1. Control	72	---
2. Standard	76	4 (+6%)
3. Vita 0.1 L/ha	76	4 (+6%)
4. Vita 0.5 L/ha	78	6 (+8%)
5. Vita 1.0 L/ha	78	6 (+8%)

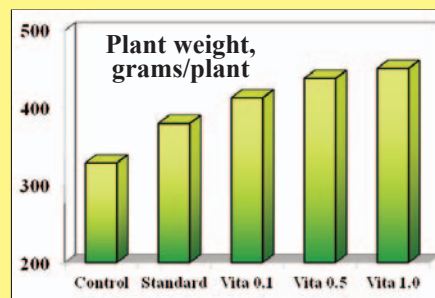
The highly abnormal weather — dry and warm — caused great stress on the beets, resulting in considerably fewer plants for the untreated control. **Vitazyme reduced the stress of Treatments 3, 4, and 5, which was evident 5 to 6 days after treatment. The treated plants were noted to have improved foliar development and less wilting from the hot, dry conditions.** Some days reached 35 to 38° C.

Plant weight: An average weight of roots, leaves, and total plants was determined for each plot.

Treatment	Root wt	Change	Leaf wt	Change	Total wt	Change	Leaves + Root ratio
	grams						
1. Control	242	---	97	---	339	---	0.4
2. Standard	253	11 (+5%)	127	30 (+31%)	380	41 (+12%)	0.5
3. Vita 0.1 L/ha	258	16 (+7%)	155	58 (+60%)	413	74 (+22%)	0.6
4. Vita 0.5 L/ha	274	32 (+13%)	164	67 (+69%)	438	99 (+29%)	0.6
5. Vita 1.0 L/ha	282	40 (+17%)	169	72 (+74%)	451	112 (+33%)	0.6



• Increase in plant density with Vitazyme: 6 to 8%



Increase in plant weight with Vitazyme

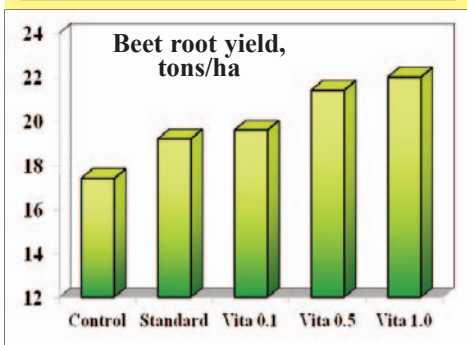
	<u>Roots</u>	<u>Leaves</u>	<u>Total</u>
0.1 liter/ha	7%	60%	22%
0.5 liter/ha	13%	69%	29%
1.0 liter/ha	17%	74%	33%

Yield results:

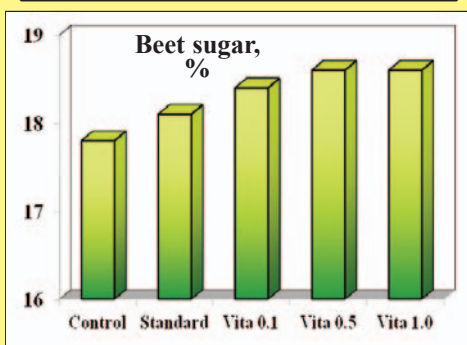
Treatment	Root yield*	Change	Sugar content	Change	Sugar yield*	Change
	tons/ha	tons/ha	%	%-points	tons/ha	tons/ha
1. Control	17.4 c	---	17.8	---	3.1 c	---
2. Standard	19.2 b	1.8 (+10%)	18.1	0.3	3.5 b	0.4 (+13%)
3. Vita 0.1 L/ha	19.6 b	2.2 (+13%)	18.4	0.6	3.6 b	0.5 (+16%)
4. Vita 0.5 L/ha	21.4 a	4.0 (+23%)	18.6	0.8	4.0 a	0.9 (+29%)
5. Vita 1.0 L/ha	22.0 a	4.6 (+26%)	18.6	0.8	4.1 a	1.0 (+32%)

*Means followed by the same letter are not significantly different at P=0.05. LSD_{0.05}=1.4 tons/ha.

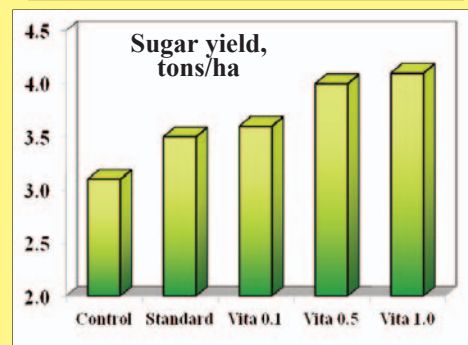
Beet Yield



Sugar Content



Sugar Yield



Continued on the next page

Increase in beet yield with Vitazyme

0.1 liter/ha +13%
 0.5 liter/ha +23%
 1.0 liter/ha +26%

Increase in sugar content with Vitazyme

0.1 liter/ha +0.6%-pt
 0.5 liter/ha +0.8%-pt
 1.0 liter/ha +0.8%-pt

Increase in sugar yield with Vitazyme

0.1 liter/ha +16%
 0.5 liter/ha +29%
 1.0 liter/ha +32%

Conclusion: This sugar beet study in Russia, conducted during a very stressful year with high temperatures and low rainfall, revealed that under such stress Vitazyme treatments, applied twice (at 2 to 3 leaves and at 6 to 8 leaves), far exceeded the control for all parameters measured, and also exceeded the standard treatment using Epin-Extra. Vitazyme increased plant survival through stressful weather by 4,000 to 6,000 plants/ha (6 to 8%), while increasing plant weight by 22 to 33%; the leaf plus root ratios were also increased by 0.2 over the control treatment. Yield from Vitazyme application showed a significant increase of from 13 to 26%, the size of increase following the Vitazyme application rate increase. The standard Epin-Extra yield was 10% greater than the control. Sugar content of the beets was boosted by 0.6 to 0.8 percentage points with Vitazyme, with a final sugar yield increase of from 16 to 32%. Only the 0.1% Vitazyme rate was significantly equal to the Epin-Extra treatment in terms of final sugar yield. These results prove the great utility of using Vitazyme for sugar beet production in Russia.

Sunflowers

Researcher: N. M. Domanov, Ph.D.

Location: Plant Protection Laboratory, Russian Academy of Agricultural Sciences, Belgorod Agricultural Research Institute, Belgorod, Russia

Variety: unknown

Planting date: May 10, 2010

Previous crop: winter wheat

Soil type: Chernozem (4.4% organic matter, CEC = 36.8 meq/100 g, hydrolytic soil acidity = 1.6 - 2.0 mg/100 g, pH = 5.8, exchangeable P₂O₅ = 26 mg/100 g, exchangeable K₂O = 126 mg/100 g)

Experimental design: A replicated field trial with sunflowers was conducted with four replicates and five treatments to determine the effect of Vitazyme on sunflower growth and production. Plots were 100 m².

Treatment	Procedures
1	Control: no treatment
2	Standard: Epin-Extra preplant seed treatment (4 ml/ton in 10 liters of water/ton) Foliar spray at 2 to 3 full leaves (40 ml/ha in 250 liters of water/ha)
3	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (0.1 L/ha in 250 L/ha of water)
4	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (0.5 L/ha in 250 L/ha of water)
5	Vitazyme on leaves at 2 to 3 leaves, and at 6 to 8 leaves (1.0 L/ha in 250 L/ha of water)

Fertilization: 16-16-16% N-P₂O₅-K₂O (rate unknown)

Vitazyme application: 0.1, 0.5. or 1.0 liter/ha application to the leaves at 2 to 3 leaves, and at head formation

Growing conditions: Growth of the sunflowers was affected by very warm temperatures throughout the main growing season — from 5 to 7° C above normal from April through July — and by well-below-normal precipitation. The March through July rainfall was only 116 mm, or 45.5% of normal; these rains were also irregular.

Growth stages:

Planting May 10
Germination May 25
2 -3 leaves June 14
Head formation July 9
Harvest September 10

Plant density: Just before harvest, a population count was made. There was no difference in population for the five treatments, all of them being about 48,000/ha.

Increase in yield with Vitazyme

0.1 liter/ha +12%
 0.5 liter/ha +22%
 1.0 liter/ha +25%

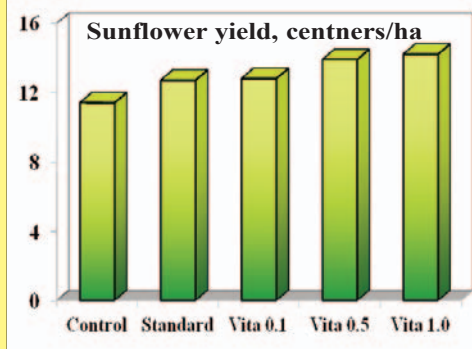
Yield results: See the table and graph to the right.

Conclusion: This sunflower study in Russia revealed that Vitazyme, applied twice at 2 to 3 leaves and at heading, increased the yield significantly above the control for all three application levels: 0.1, 0.5, and 1.0 liter/ha. The 1.0 liter/ha standard Vitazyme rate significantly increased the yield above the standard Epin-Extra treatment as well, 25% versus 11%. These results show the utility of Vitazyme to boost sunflower performance in Russia, especially during an unusually hot and dry year.

Sunflower Yield

Treatment	Yield*	Change
	----- centners/ha -----	
1. Control	11.4 c	---
2. Standard	12.7 b	1.3 (+11%)
3. Vita 0.1 L/ha	12.8 b	1.4 (+12%)
4. Vita 0.5 L/ha	13.9 ab	2.5 (+22%)
5. Vita 1.0 L/ha	14.2 a	2.8 (+25%)

*Means followed by the same letter are not significantly different at P=0.05. LSD_{0.05}=1.2 centners/ha.



Sunflowers

Researcher: V. V. Plotnikov
Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: PF-10

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: corn

Planting date: May 20, 2010

Planting rate: 5 kg/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 5 to 6 cm

Experimental design: A sunflower area of a research farm was divided into four replicates with a control and one Vitazyme treatment, the objective being to determine the effects of the product on sunflower yield.

1. Control

2. Vitazyme at early head formation

Fertilization: 45-30-30 kg/ha N-P₂O₅-K₂O, incorporated before planting

Vitazyme application: 1 liter/ha to the leaves at early head formation, on July 4

Yield results: See table and graph to the right.

Income results: A single Vitazyme application increased income by 1,379 hrn/ha above the untreated control.

Conclusion: In this Ukrainian replicated sunflower trial, Vitazyme increased the yield by 0.39 ton/ha (19%) above the control, and increased income by 1,379 hrn/ha. This crop and soil amendment is shown to be an excellent addition for sunflower production programs in Ukraine.

• **Increase in yield with Vitazyme: 19%**



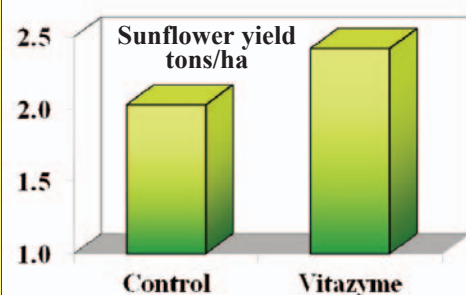
Vitazyme treated roots on the right show much greater size and root mass than roots from the untreated control on the left.



Note the impressive size of the treated heads from this same study. Bird damage was a problem for some of the plot area.

Sunflower Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	2.03	---
2. Vitazyme	2.42	0.39 (+19%)



Vetch, Spring

Researcher: V. V. Plotnikov

Research organization: National Academy of Agrarian Sciences

Location: Vinnytsia State Agricultural Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Liliana

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: spring barley

Planting date: April 17, 2010

Planting rate: 1.8 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, cultivation to 4 to 5 cm

Experimental design: A spring vetch plot area was divided into four replicates with a control and two Vitazyme treatments, with the objective of determining the effects of the product on vetch yield.

1. Control

2. Vitazyme on seeds

3. Vitazyme on seeds and leaves

Fertilization: 15-15-15 kg/ha of N-P₂O₅-K₂O, incorporated before planting

Vitazyme application: Treatments 2 and 3, 1 liter/ha on the seeds at planting on April 17; Treatment 3, 1 liter/ha on the leaves and soil at early bloom on June 9

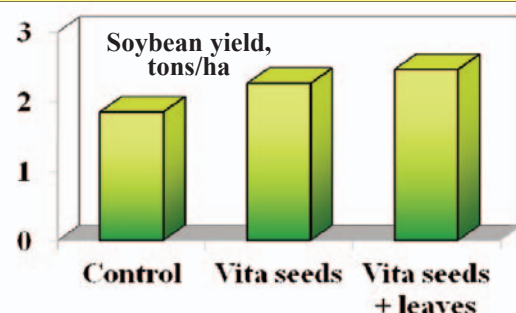
Yield results: See the table and graph on the right.

Income results: The single seed treatment produced 1,005 hrn/ha more increase, whereas the seed plus foliar treatment increased yield by 1,305 hrn/ha.

Conclusion: Vitazyme in this replicated Ukrainian spring vetch trial produced excellent yield increases using both a seed treatment (22%), and a seed plus foliar treatment (33%). Income increases were commensurate with yield increases: 1,005 and 1,305 hrn/ha, respectively. These results illustrate how effective this biostimulant is to improve the yields and income for vetch in Ukraine.

Vetch Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	1.85	---
2. Vitazyme, seeds	2.26	0.41 (+22%)
3. Vitazyme, seeds + leaves	2.46	0.61 (+33%)



• **Increase in yield with Vitazyme: 22 to 33%**

Wheat, Spring

Researcher: V. V. Plotnikov

Location: National Academy of Agrarian Sciences, Vinnytsia State Agricultural

Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Pecherianka, Super Elite

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: soybeans

Planting date: April 16, 2010

Planting rate: 6 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, harrowing to 4 to 5 cm

Experimental design: A wheat plot area, using a total area of about 1.0 ha, with four replicates, was established using two Vitazyme regimes to determine the product's effect on crop yield, grain quality, and plant growth characteristics.

1. Control

2. Vitazyme on the seeds

3. Vitazyme on the seeds, and leaves and soil

Fertilization: 30 kg/ha N, 30 kg/ha P₂O₅, and 30 kg/ha K₂O incorporated before planting

Vitazyme application: Treatments 2 and 3, a seed treatment at 1 liter/ha; Treatment 3, an additional foliar and soil treatment of 1 liter/ha on May 21, 2010

Yield results: See table and graph on the right.

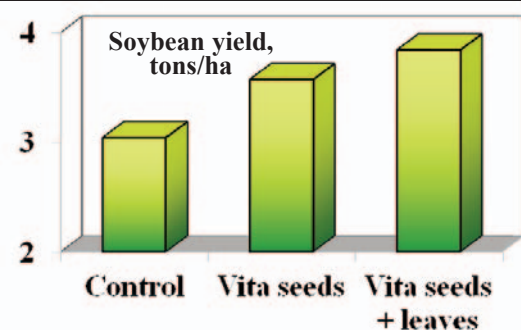
Income results: Vitazyme improved crop income by 843 hrn/ha for the seed treatment alone, and by 1,098 hrn/ha for both the seed and foliar treatments.

Increase in grain yield with Vitazyme

Vitazyme on the seeds +17%
 Vitazyme on seeds + leaves ... +26%

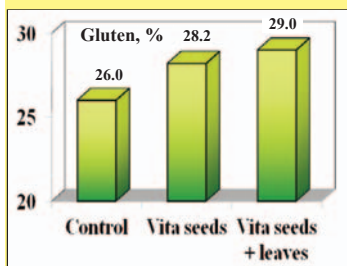
Vetch Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	3.04	---
2. Vitazyme, seeds	3.57	0.53 (+17%)
3. Vitazyme, seeds + leaves	3.84	0.80 (+26%)



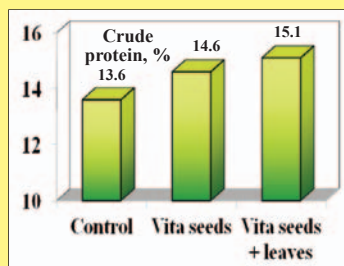
Grain quality results:

Grain Gluten



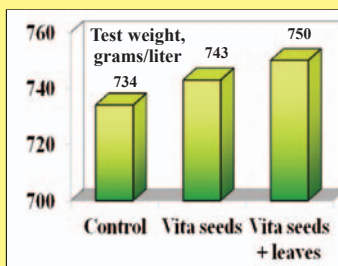
Vitazyme on the seeds enhanced grain gluten by 2.2%-points, while an additional foliar treatment raised gluten by 3.0%-points.

Crude Protein



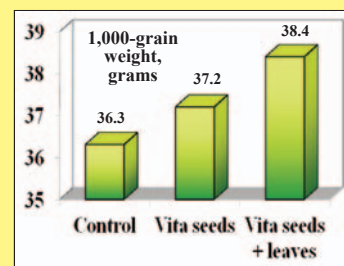
A seed treatment alone raised crude protein by 1.0%-point, while an additional foliar treatment boosted protein by 1.5%-points.

Test Weight



A single seed treatment increased grain density by 9 grams/liter, while an additional foliar treatment boosted it by 16 grams/liter.

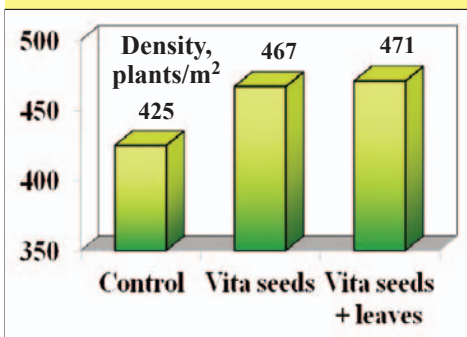
1,000-Grain Weight



Vitazyme on the seeds boosted 1,000-grain weight by 0.9 grams, and an added foliar spray further boosted this weight by 2.1 grams.

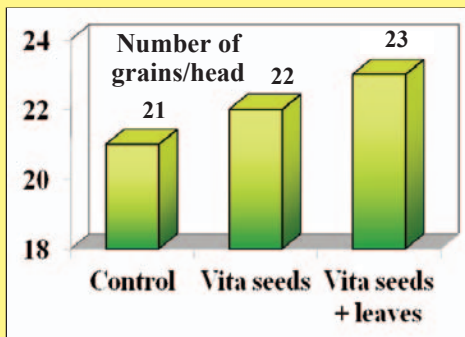
Plant structure results:

Plant Density



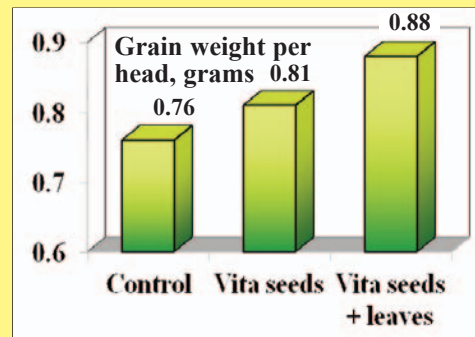
The seed treatment alone increased plant survival and density by 42 plants/m², while an additional foliar spray increased density by 46 plants/m².

Grains Per Head



There was an increase in seeds per head of 1 grain going from the control, to the single seed treatment, to the seed treatment plus foliar spray.

Grain Weight Per Head



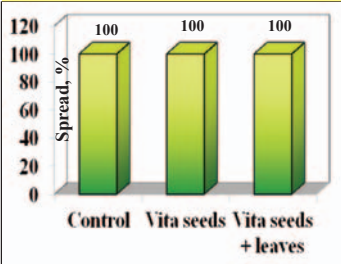
Grain weight per head was improved by a Vitazyme seed treatment alone by 0.05 gram, whereas an additional foliar spray raised that grain weight by 0.12 gram/head.

Disease results: Both oidium and septoriosis fungal diseases were evaluated.

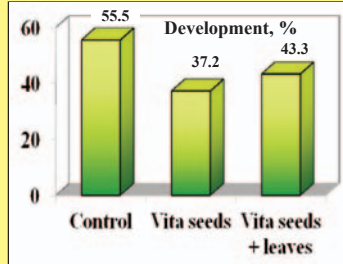
Oidium Disease

Septoriosis Disease

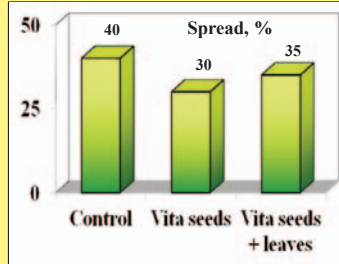
Oidium Spread



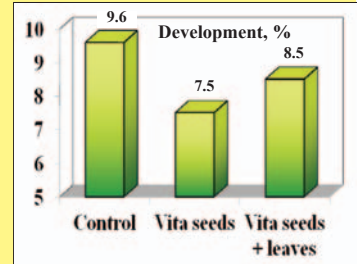
Oidium Development



Septoriosis Spread



Septoriosis Development



All plants for all three treatments were infected with oidium disease.

The development of Oidium was somewhat less with both Vitazyme treatments, by 18.3% less for the seed treatment and by 12.2% less for the two treatments.

Septoriosis spread a bit less among the Vitazyme treated plants, being 10% fewer affected plants for the seed treatment alone, and 5% fewer for the two treatments.

As for Oidium, septoriosis spread a bit less in the infected plant sites with Vitazyme, being 2.1% less for the seed treatment and 1.1% less for the seed plus foliar treatment.

Conclusion: A replicated spring wheat study at Vinnytsia, Ukraine, revealed that Vitazyme, whether applied at 1 liter/ha on the seeds, or with this treatment plus a 1 liter/ha foliar treatment in addition, greatly improved most parameters measured. These results are summarized below.

These results are summarized below.

<u>Parameter</u>	<u>Vitazyme effect</u>	<u>Parameter</u>	<u>Vitazyme effect</u>
Grain yield	+17 to 26%	Grains per head	+1 to 2 grains/head
Income	+843 to 1,098 hrn/ha	Grain weight per head	+0.05 to 0.12 g/head
Grain Gluten	+2.2 to 3.0 %-points	Oidium spread	none
Crude protein	+1.0 to 1.5 %-points	Oidium development	-12.2 to 18.3%
Test weight	+9 to 16 grams/liter	Septoriosis spread	-5 to 10%
1,000-grain weight	+0.9 to 2.1 grams	Septoriosis development	-1.1 to 2.1%
Plant density	+42 to 46 plants/m ²		

Vitazyme is shown by this study to be a highly effective product for improving spring wheat yield, quality, and growth traits, and reducing disease susceptibility in Ukraine.

Wheat, Winter

A Ukrainian Fertilizer Rate Trial

Researcher: V. V. Plotnikov

Location: National Academy of Agrarian Sciences, Vinnytsia State Agricultural

Research Station, Vinnytsia, Ukraine (Central Forest and Steppe Region)

Variety: Liona, Super Elite

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5)

Previous crop: summer vetch

Planting date: October 9, 2009

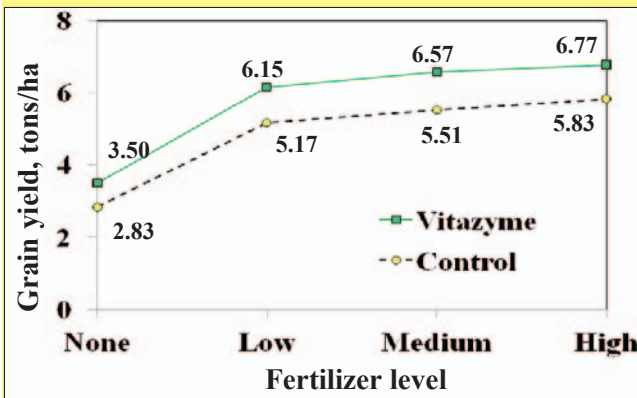
Planting rate: 6 million seeds/ha

Soil preparation: disking to 6 to 8 cm, tillage to 22 cm, harrowing to 3 to 4 cm

Treatment	Fertilizer kg/ha	Vitazyme	Treatment	Fertilizer kg/ha N-P ₂ O ₅ -K ₂ O	Vitazyme
1	0	no	5	0	yes
2	65-30-45	no	6	65-30-45	yes
3	100-45-70	no	7	100-45-70	yes
4	130-60-90	no	8	130-60-90	yes

Experimental design: A replicated field trial with Liona winter wheat was established using four rates of fertilizer and one Vitazyme treatment, to determine the yield, grain quality, and disease susceptibility of the crop in response to these treatments.

Grain Yield



Fertilization: fall, 30-30-30 kg/ha N-P₂O₅-K₂O tilled in; spring, 60 kg/ha N

Vitazyme application: (1) 1 liter/ha on the seeds at planting; (2) 1 liter/ha on the leaves in the spring

Yield results:

Increase in grain yield with Vitazyme with fertilizers*

No fertilizer.....	+0.67 ton/ha (+24%)
65-30-45	+0.98 ton/ha (+19%)
100-45-70	+1.01 tons/ha (+18%)
130-60-90	+0.94 ton/ha (+16%)

*Comparisons are made at the same fertility level.

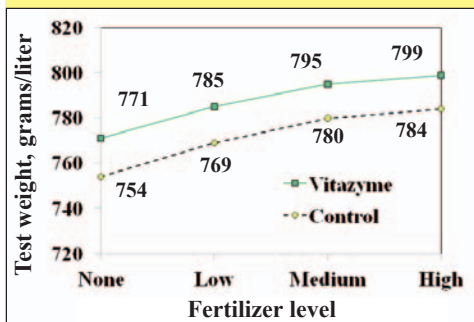
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Note that at all fertilizer levels the Vitazyme addition markedly increased grain yield, especially at the zero rate, where a 24% yield increase resulted. The increase dropped a bit to a 16% yield increase at the highest fertilization rate. In all cases, fertilizer efficiency was improved with Vitazyme.

Income results: Using yields given above, the income was increased with Vitazyme by 817, 1,352, 1,401, and 1,286 hrn/ha from the lowest to the highest fertilizer rates, respectively, at the same fertilizer level.

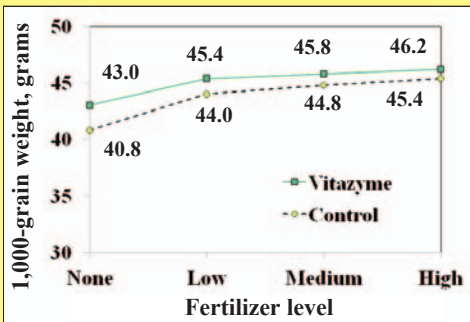
Quality results:

Test Weight



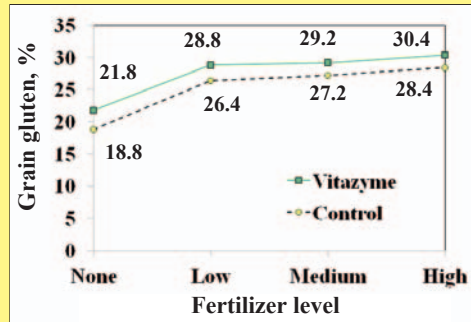
Vitazyme increased the grain density (grams/liter) successively above the untreated controls, at each fertilizer level, from 17 grams/liter at no fertilizer to 15 grams/liter at high fertilizer.

1,000-Grain Weight



At each fertilizer level, Vitazyme improved the 1,000-grain weight, by from 2.2 grams at zero fertilizer to 0.8 gram at high fertilizer.

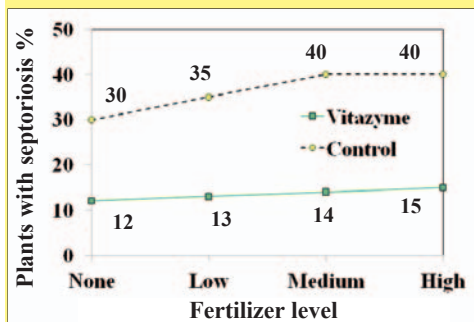
Gluten



The gluten content of the grain increased by 3.0 percentage points at zero fertilizer, and by 2.0 percentage points at the high fertilizer level in response to Vitazyme.

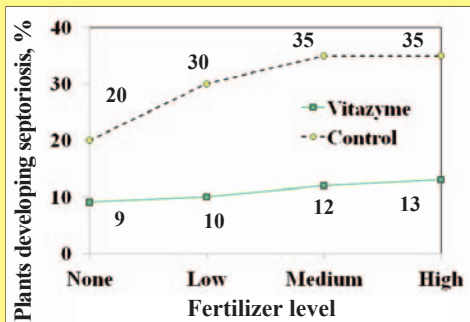
Disease results: Only septoriosi fungal disease was evaluated.

Spike Septoriosi Spread



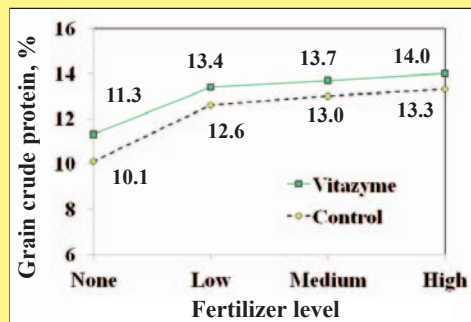
The spread of spike septoriosi was much higher with untreated wheat plants; Vitazyme had 18% fewer plants affected at zero fertilizer, but 25% fewer affected plants at high fertilizer levels.

Spike Septoriosi Development



Vitazyme greatly reduced the development of spike septoriosi at all fertilizer levels, by 11% less with no fertilizer to 23% less with the most fertilizer applied.

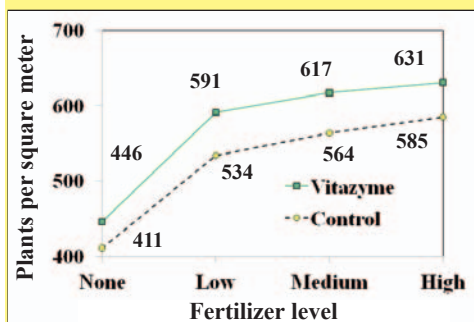
Crude Protein



Vitazyme increased crude protein of the grain at each fertilizer level, by 1.2 percentage points at zero fertilizer to 0.7 percentage point at the highest fertilizer level.

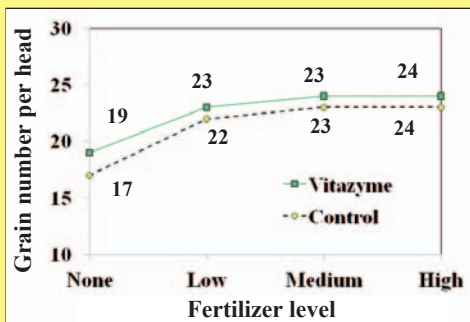
Wheat structure results:

Plant Density



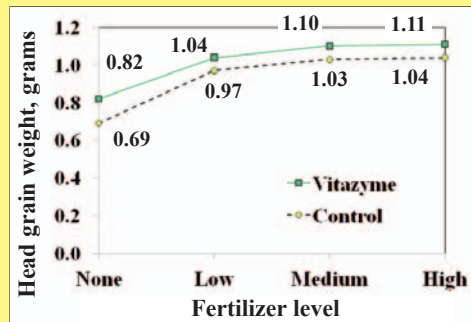
The seed and foliar treatments with Vitazyme increased the plant population at all fertilizer levels, by 35 plants/m² at no fertilizer and by 46 plants/m² at high fertilizer.

Grains Per Head



The number of grains per head was slightly favored by Vitazyme at each fertilizer level, by about one grain per head.

Grain Weight Per Head



Vitazyme consistently increased the weight of grain per head at each fertilizer level, from 0.13 gram/head at zero fertilizer to 0.07 gram/head at high fertilizer. This result came from more grains/head plus a higher grain weight with Vitazyme.

Conclusion: Vitazyme in this Ukrainian winter wheat trial significantly improved the yield, profitably, quality, fungal infection, and growth characteristics at four fertilizer levels. The improvements were consistent for all parameters, and are summarized on the next page.

<u>Parameter</u>	<u>Vitazyme effect</u>	<u>Parameter</u>	<u>Vitazyme effect</u>
Grain yield	+16 to 24%	Septoriosis spread	-18 to 25%
Income	+817 to 1,401 hrn/ha	Septoriosis development	-11 to 23%
Grain test weight	+15 to 17 g/liter	Plant density	+35 to 46 plants/m ²
1,000-grain weight	+0.8 to 2.2 g	Grains per head	+1 to 2 grains/head
Grain gluten	+2.0 to 3.0 %-points	Grain weight per head	+0.07 to 0.13 g/head
Crude protein	+0.7 to 1.2 %-points		

The data for this test show clearly that Vitazyme tends to improve crop yield, quality, and structural characteristics the most at the lower fertility levels (zero and 65-30-45 kg/ha N-P₂O₅-K₂O), while reducing the development and spread of the head fungal disease septoriosis the most at higher fertilizer levels (100-45-70 and 130-60-90 kg/ha N-P₂O₅-K₂O). These results display the great value of Vitazyme as a highly profitable crop amendment for Ukrainian winter wheat production.

Wheat, Winter

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

Variety: Liona Super Elite **Planting date:** October 7, 2009

Planting rate: 6 million seeds/ha **Previous crop:** winter canola

Soil type: gray podzolic (organic matter = 2.2%, hydrolyzed N = 8.4 mg/100 g soil, P = 15.8 mg/100 g soil, exchangeable K = 12.4 mg/100 g soil, pH = 5.5) **Soil preparation:** disking 6 to 8 cm, tillage to 22 cm, and harrowing to 3 to 4 cm

Experimental design: An experimental area was divided into smaller plots, with four replicates for the Liona wheat variety. Three Vitazyme treatments were utilized to determine the effect of this product on winter wheat yield and quality.

1. Control
2. Vitazyme (unknown treatment)
3. Vitazyme on seeds
4. Vitazyme on seeds, and foliar in spring

Fertilization: fall, 30-30-30 kg/ha N-P₂O₅-K₂O tilled in: in the spring, 60 kg/ha N.

Vitazyme application: Treatment 2, an unknown Vitazyme treatment; Treatment 3, a Vitazyme seed treatment to give 1 liter/ha; Treatment 4, a Vitazyme seed treatment to give 1 liter/ha plus a foliar spray at 1 liter/ha on April 30, 2010.

Yield results:

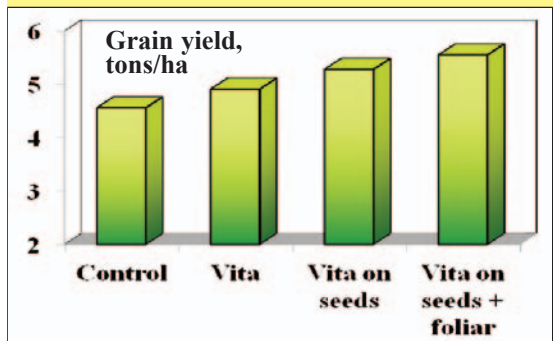
Quality results:



This winter wheat trial in Ukraine reveals a strong growth of well-filled heads with Vitazyme treatment, at 1 liter/ha.

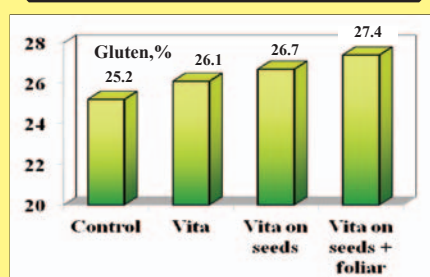
Grain Yield

Treatment	Grain yield	Change
	tons/ha	tons/ha
1. Control	4.56	---
2. Vita (unknown)	4.91	0.35 (+8%)
3. Vita on seeds	5.28	0.72 (+16%)
4. Vita on seeds + leaves	5.55	0.99 (+22%)

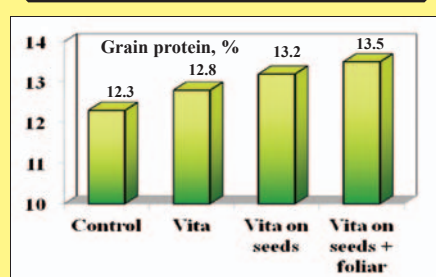


• Increase in grain with Vitazyme: 8 to 22%

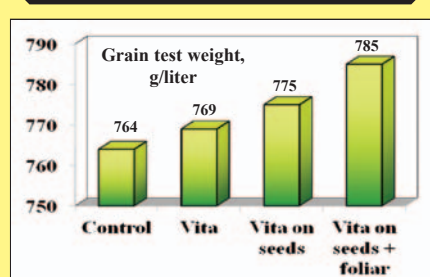
Gluten Content



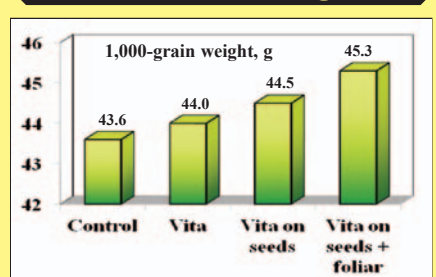
Crude Protein



Test Weight



1,000-Grain Weight



Income results: Profits were increased for the three Vitazyme treatments by 577 hrn/ha (Treatment 1), 1,123 hrn/ha (Treatment 2), and 1,368 hrn/ha (Treatment 3).

Continued on the next page

Conclusion: A winter wheat trial in Ukraine, using a replicated plot design, revealed that Vitazyme increased grain yield by 8 to 22%, gluten content by 0.9 to 2.2 percentage points, crude protein by 0.5 to 1.2 percentage points, test weight by 5 to 21 grams/liter, and 1,000-grain weight by 0.4 to 1.7 grams. In all cases the smallest increase for each parameter was with an undefined Vitazyme treatment, the next highest increase was for a seed treatment, and the highest values were in all cases for Vitazyme applied as a seed treatment and again in the spring as a foliar treatment. This management regime is shown to be a great benefit for Ukrainian wheat farmers.

• **Increase in gluten with Vitazyme: 0.9 to 2.2%-points**

• **Increase in crude protein with Vitazyme: 0.5 to 1.2%-points**

• **Increase in test weight with Vitazyme: 5 to 21 grams/liter**

• **Increase in 1,000-grain weight with Vitazyme: 0.4 to 1.7 grams**

Wheat, Winter

Researcher: unknown

Company testing: Ukrzernoprom AGRO

Location: Tulchin raion, Vinnytsia oblast, Kleban, Ukraine

Planting date: October 7, 2009

Variety: Zolotokolosa

Planting rate: 6 million seeds/ha

Previous crop: winter rape

Seedbed preparation: disking 6 to 8 cm deep, tillage 20 to 22 cm deep, and harrowing 4 to 5 cm deep (twice)

Experimental design: A winter wheat field was divided into an untreated control plus two Vitazyme treatments to evaluate the product's effects on wheat yield, quality, and profitability.

1. Control 2. Vitazyme, fall only 3. Vitazyme, fall and spring

Fertilization: in the spring, 20-60-80 kg/ha of N-P₂O₅-K₂O

Vitazyme application: Treatments 2 and 3 received 1 liter/ha in the fall on September 9, 2009, and Treatment 3 received an additional 1 liter/ha on the leaves and soil on June 5, 2010.

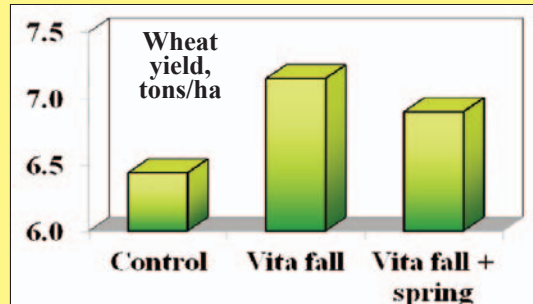
Yield results: See the table and graph on the right.

• **Increase in yield with Vitazyme: 7 to 11%**

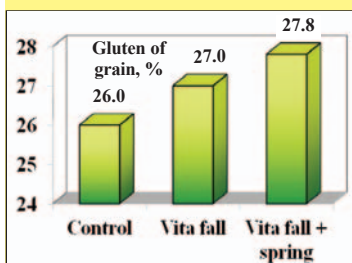
Grain quality results:

Wheat Yield

Treatment	Yield tons/ha	Yield change tons/ha
1. Control	6.44	---
2. Vitazyme, fall	7.15	0.71 (+11%)
3. Vitazyme, fall + spring	6.90	0.46 (+7%)

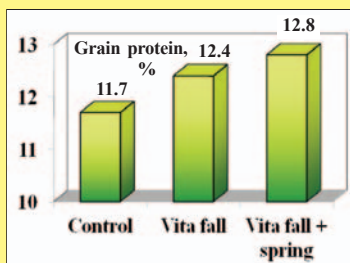


Gluten Content



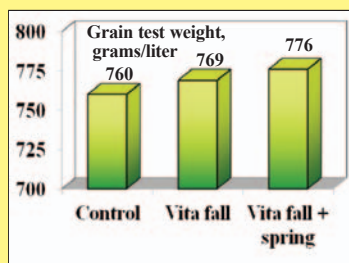
Increase with Vitazyme
 Vitazyme once 1.0%-point
 Vitazyme twice 1.8%-point

Crude Protein



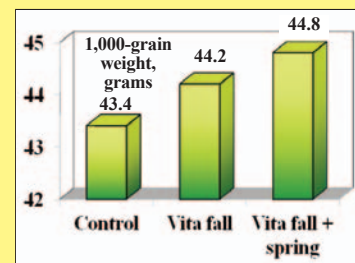
Increase with Vitazyme
 Vitazyme once 0.7%-point
 Vitazyme twice 1.1%-point

Test Weight



Increase with Vitazyme
 Vitazyme once 9 grams/L
 Vitazyme twice ... 16 grams/L

1,000-Grain Weight



Increase with Vitazyme
 Vitazyme once 0.8 gram
 Vitazyme twice 1.4 grams

Income results: A single Vitazyme application increased income by 1,106 hrn/ha, while two applications increased income by 494 hrn/ha.

Conclusion: A winter wheat trial in Ukraine, using Vitazyme at 1 liter/ha in the fall or 1 liter/ha in the fall as well as in the spring, proved that the yield was increased by 11% with one application, but 7% with two. The income was increased by 1,106 hrn/ha, and 494 hrn/ha with the two treatments. Grain quality was improved the most with two Vitazyme applications, up to 1.8%-points for gluten, 1.1%-points for protein, 16 grams/liter for test weight, and 1.4 grams for 1,000-grain weight; a single application provided consistent increases in quality parameters, only slightly less than those from two applications.

Wheat, Winter

Researcher: unknown

Research organization: Krasnodar Lukyanenko NIICX

Location: Krasnodar Region, Russia

Variety: Moskvich

Seeding rate: 5 million seeds/ha

Planting date: October 12, 2009

Tillage: disking

Previous crop: sunflowers

Soil type: Chernozem (2.6 to 3.2% organic matter, pH = 5.1, available P₂O₅ = 45.0 to 48.4, available K₂O = 341 to 385 mg/kg, exchangeable bases = 28.9 to 31.8 mg/100 g od foil, saturation with Ca and Mg = 85.0 to 88.6%, texture = 66% clay and 34% silt), highly fertile

Experimental design: A wheat field was divided into untreated and Vitazyme treated plots, 40 m², using four replicates, with the objective of evaluating the product's effects on winter wheat growth and yield.

1. Control

2. Vitazyme

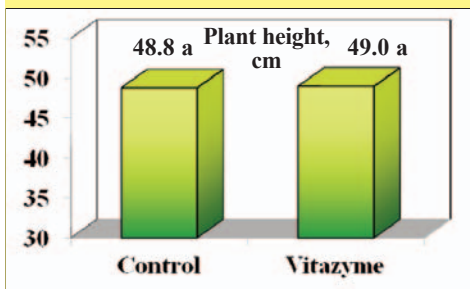
Fertilization: a fall application of 16-60-40 kg/ha N-P₂O₅-K₂O as NH₄H₂PO₄ and KCl; a spring application of 2 c/ha

Vitazyme application: (1) 1 liter/ha foliar sprayed at early heading and flowering on May 18, 2010, and (2) 1 liter/ha foliar sprayed at early ripening on May 28, 2010

Weather conditions: The climate is moderate continental, warm temperate, and humid. At planting and thereafter, conditions were warm and dry, but by freezeup rainfall and temperatures favored excellent hardening of the newly emerged plants. Springtime growth was hampered by dry and hot weather, which persisted into flowering and ripening of the grain. During harvest, excessive rain fell to negatively influence grain quality.

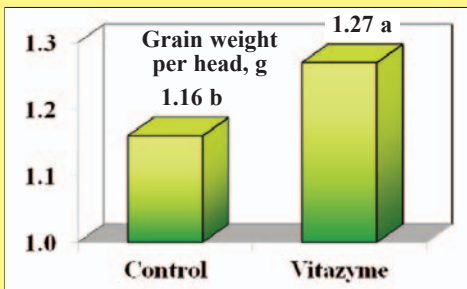
Yield results:

Stalk Height*



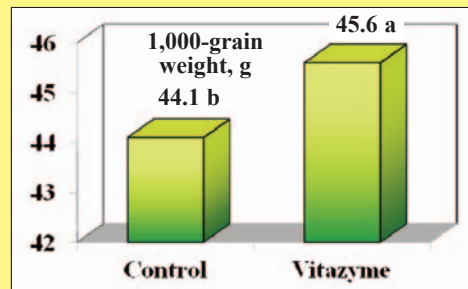
*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 1.2 cm.

Grain Weight Per Head*



*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 0.06 g.

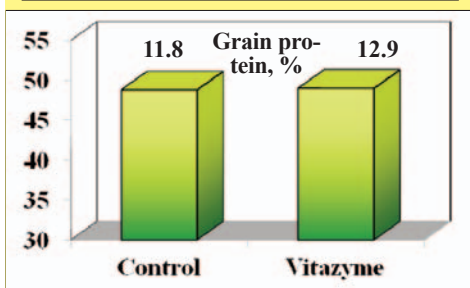
1,000-Grain Weight*



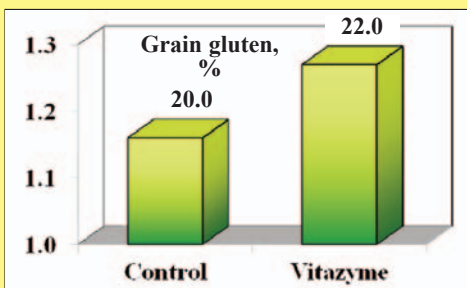
*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 0.5 g.

Grain quality results:

Protein



Gluten

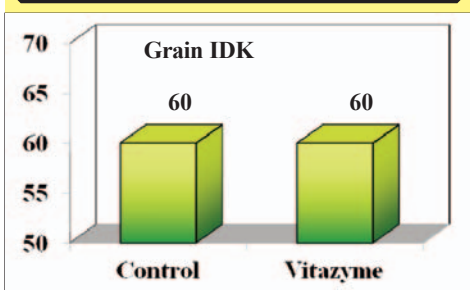


Grain Yield

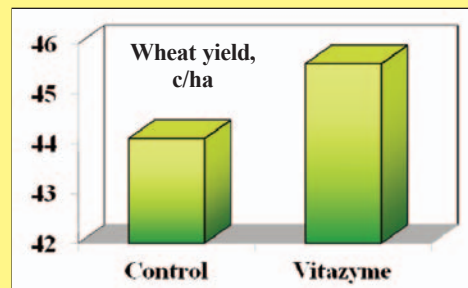
Treatment	Income c/ha	Change c/ha
Control	56.0 b	—
Vitazyme	62.2 a	6.2 (+11%)

*Means followed by the same letter are not significantly different at P = 0.05. LSD_{0.05} = 2.8 c/ha.

IDK



Conclusions: A winter wheat study, conducted in 40 m² plots in Russia, revealed that Vitazyme improved wheat growth and yield, as well as wheat grain quality, in nearly every case. These improvements are summarized below.



Parameter	Increase with Vitazyme
Grain weight per head	0.11 gram (9%)
1,000-grain weight	1.5 gram (3%)
Grain yield	6.2 c/ha (11%)
Protein of grain	1.1 %-points
Gluten of grain	2.0 %-points

Vitazyme for this study in Russia improved both winter wheat yield and quality. It is an excellent amendment for wheat growers.

- Increase in wheat yield with Vitazyme: 11%
- Increase in gluten with Vitazyme: 2.0%-points

- Increase in grain per head with Vitazyme: 0.11 gram (+9%)
- Increase in 1,000-grain weight with Vitazyme: 1.5 gram (+3%)
- Increase in protein with Vitazyme: 1.1%-points

Wheat

Farmer: Enrique Babyleck
Location: Pitrufquen, Chile
Previous crop: oats

Research organization: Syngenta
Variety: Kumpa
Planting date: May 2, 2009

Experimental design: Plots in a wheat field were marked with stakes, and seven treatments of Vitazyme, applied early and/or late, and with or without reduced N fertilizer, were added to determine the effects of these treatments on wheat growth parameters and grain yield.



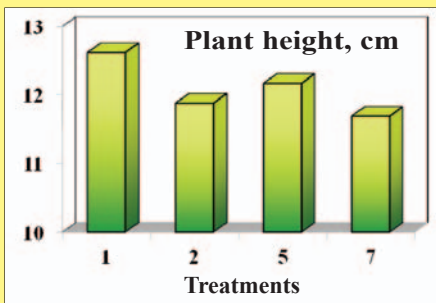
A Syngenta wheat trial at the Babyleck farm, using several rates and combinations of Vitazyme and fertilizer, proved that yields could be increased by up to 8% with the program.

Treatment	Vitazyme rate*		Nitrogen % of optimum
	Preemergence	BBCH32	
	liters/ha	liters/ha	
1	1.0	0	100
2	1.5	0	100
3	1.0	1.0	100
4	1.5	1.5	100
5	1.5	0	50
6	1.5	1.5	50
7	0	0	100

*Triaccontanol concentration: 0.0022 g/liter; brassinosteroid concentration: 0.013 g/liter.

Plant Height At 54 Days After Planting

Treatment					
No.	Vita early	Vita late	N	Height	Change
	liters/ha		%	cm	
1	1.0	0	100	12.62	0.93 (+8%)
2	1.5	0	100	11.88	0.19 (+2%)
5	1.5	0	50	12.17	0.48 (+4%)
7	0	0	100	11.69	---



Fertilization: according to recommendations

Vitazyme application: (1) 1.0 or 1.5 liters/ha on the leaves and soil at BBCH14, on June 26, 2009; (2) 1.0 or 1.5 liters/ha on the leaves and soil at stage BBCH 31, on October 5, 2009.

Growth results: see the following tables and graphs

Increase in plant height with Vitazyme

1.0 L/ha at BBCH14, 100% N +8%
 1.5 L/ha at BBCH14, 100% N +2%
 1.5 L/ha at BBCH14, 50% N +4%

Yield results:

Wheat Grain Yield

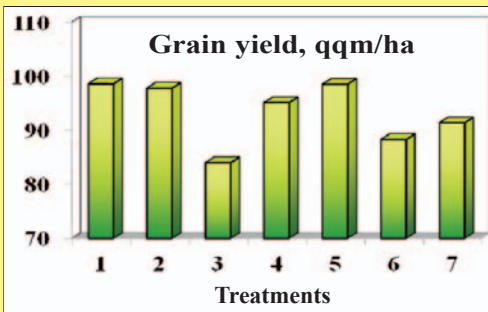
Treatment					
No.	Vita early	Vita late	N	Yield	Change
	liters/ha		%	number	
1	1.0	0	100	98.6	7.2 (+8%)
2	1.5	0	100	97.8	6.4 (+7%)
3	1.0	1.0	100	84.0	(-) 7.4 (-8%)
4	1.5	1.5	100	95.1	3.7 (+4%)
5	1.5	0	50	98.5	7.1 (+8%)
6	1.5	1.5	50	88.3	(-) 3.1 (13%)
7	0	0	100	91.4	---

Yield increase with Vitazyme

1.0 L/ha at BBCH14 +8%
 1.5 L/ha at BBCH14 +7%
 1.5 L/ha twice +4%
 1.5 L/ha at BBCH14 + 50% N +8%

Tillers Per Plant At 54 Days After Planting

Treatment					
No.	Vita early	Vita late	N	Tillers	Change
	liters/ha		%	number	
1	1.0	0	100	1.70	(-) 0.35 (-17%)
2	1.5	0	100	1.50	(-) 0.55 (-27%)
3	1.0	1.0	100	1.85	(-) 0.20 (-10%)
4	1.5	1.5	100	1.75	(-) 0.30 (-15%)
5	1.5	0	50	1.95	(-) 0.10 (-5%)
6	1.5	1.5	50	1.85	(-) 0.20 (-10%)
7	0	0	100	2.05	---



All Vitazyme treatments reduced the number of tillers per plant.

Conclusion: In this Vitazyme study in Chile, evaluating the effects of the product on wheat treated with 1.0 and/or 1.5 liters/ha applied once or twice

— with either 50% or 100% of the recommended N, the 1.0 and 1.5 liter/ha rates applied at the BBCH14 stage produced 7 to 8% yield increases. The 1.5 liters/ha rate applied twice (100% N) produced

a 4% yield improvement, while a 50% fertilizer N reduction increased the yield by 8%; this was the most profitable treatment of all seven. Interestingly, these yield responses were not a reflection of tillers per plant, since all Vitazyme treatments reduced tillering. The yield improvement must have been due to larger heads and greater grain weight from Vitazyme application. This study proves the effectiveness of Vitazyme use on wheat in Chile.

Wheat

Farmer: Felipe Schmidt **Location:** Pailahueque, Chile
Research organization: Syngenta **Variety:** Caluga
Planting date: June 5, 2009 **Previous crop:** oats
Experimental design: A wheat field was divided into plots having Vitazyme treatment and no treatment for the purpose of evaluating the product's effects on wheat growth and yield, at both 100% and 50% nitrogen fertilization.

Treatment	Vitazyme rate*		Nitrogen % of optimum
	Preemergence	BBCH32	
	liters/ha	liters/ha	
1	1.0	0	100
2	1.5	0	100
3	1.0	1.0	100
4	1.5	1.5	100
5	1.5	0	50
6	1.5	1.5	50
7	0	0	100

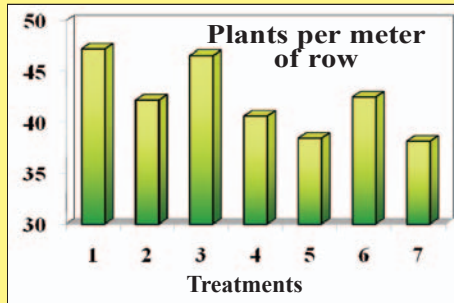
*Triaccontanol concentration: 0.0022 g/liter; brassinosteroid concentration: 0.013 g/liter.



A Vitazyme trial at the Schmidt farm in Chile revealed that the plant population, crop height, and yield of wheat were in most cases improved with the product.

Plant Population At 35 Days After Planting

No.	Treatment		N	Population Change	
	Vita early	Vita late		Population	Change
	liters/ha	liters/ha	%	plants per meter	Change
1	1.0	0	100	47.19	9.06 (+24%)
2	1.5	0	100	42.19	4.06 (+11%)
3	1.0	1.0	100	46.56	8.43 (+22%)
4	1.5	1.5	100	40.63	2.50 (+7%)
5	1.5	0	50	38.44	0.31 (+1%)
6	1.5	1.5	50	42.50	4.37 (+11%)
7	0	0	100	38.13	---



Fertilization: according to recommendations

Vitazyme application: (1) 1.0 or 1.5 liters/ha on the soil before emergence, on June 9, 2009; (2) 1.0 or 1.5 liters/ha on the leaves and soil at stage BBCH32, on October 5, 2009

Growth results: See the following tables and graphs.

Increase in plant population with Vitazyme

100% N

1.0 liter/ha early +24%
 1.5 liter/ha early +11%
 1.0 liter/ha twice +22%
 1.5 liter/ha twice +7%

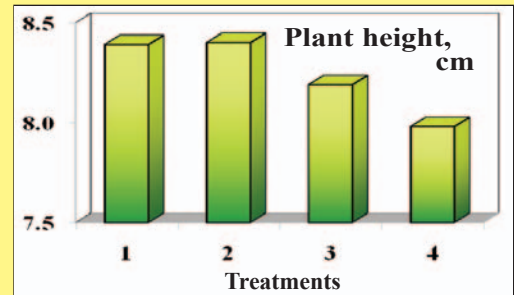
50% N

1.5 liter/ha twice +11%

Plant Height At 59 Days After Planting

No.	Treatment		N	Height	Change
	Vita early	Vita late			
	liters/ha	liters/ha	%	cm	Change
1	1.0	0	100	8.39	0.41 (+5%)
2	1.5	0	100	8.40	0.42 (+5%)
5	1.5	0	50	8.19	0.21 (+3%)
7	0	0	100	7.98	---

• Increase in plant height with Vitazyme: 3 to 5%

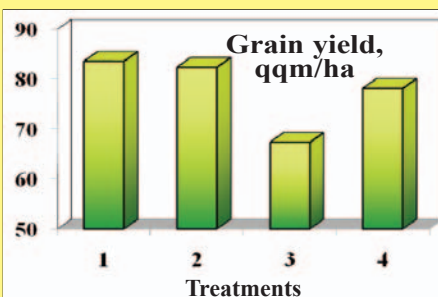


Grain Yield

No.	Treatment		N	Yield	Change
	Vita early	Vita late			
	liters/ha	liters/ha	%	qqm/ha	Change
1	1.0	0	100	83.58	5.41 (+7%)
4	1.5	1.5	100	82.38	4.21 (+5%)
5	1.5	0	50	67.33	(-) 10.84 (-14%)
7	0	0	100	78.17	---

Increase in wheat yield with Vitazyme

1.0 liter/ha early +7%
 1.5 liter/ha twice +5%



Yield results: See left.

Conclusion: In this wheat study with Vitazyme in Chile, using various 1.0 and 1.5 liter/ha applications, with a 50% fertilizer N application rate in some cases, all treatments improved

Continued on the next page

plant population, by up to 24% with the 1 liter/ha spray before emergence. At 59 days after planting, the height of the plants was improved by 3 to 5% above the control, while the harvested yield increased by 7% (5.41 qqm/ha) for the 1 liter/ha application preemergent; the 1.5 liter/ha rate before emergence gave a similar yield increase. A fertilizer N reduction of 50%, with a 1.5 liters/ha application before emergence, produced a yield below the control; apparently the available N in the soil was not sufficient for a yield increase despite Vitazyme's ability to improve N efficiency. These results show the great utility of using this product to improve wheat production in Chile.

Wheat

Farmer: Syngenta

Variety: Orvantis

Planting date: May 28, 2009

Experimental design: In this trial, a series of wheat plots was laid out in a field using seven treatments. The purpose of the study was to evaluate the effect of Vitazyme, with and without reduced fertilizer N, on wheat growth and yield.

Location: Pua, Chile

Previous crop: barley



This wheat trial at Pua, Chile, revealed excellent tillering increases with Vitazyme, and 4 to 8% yield increases with Vitazyme applied at from 1.0 to 1.5 liters/ha before emergence.

Treatment	Vitazyme rate*		Nitrogen % of optimum
	Preemergence	BBCH32	
	liters/ha	liters/ha	
1	1.0	0	100
2	1.5	0	100
3	1.0	1.0	100
4	1.5	1.5	100
5	1.5	0	50
6	1.5	1.5	50
7	0	0	100

*Triaccontanol concentration: 0.0022 g/liter; brassinosteroid concentration: 0.013 g/liter.

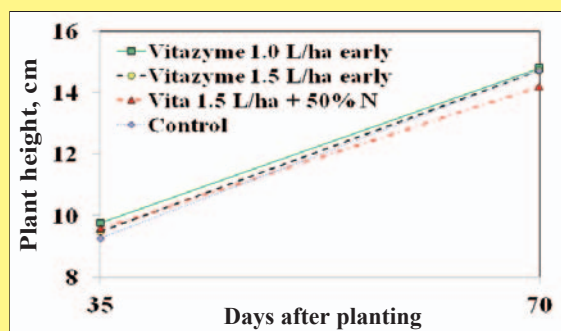
Fertilization: according to recommendations

Vitazyme application: (1) 1.0 or 1.5 liters/ha on the leaves and soil shortly after emergence, on June 9, 2009; (2) 1.0 or 1.5 liters/ha on the leaves and soil at stage BBCH31, on October 9, 2009.

Growth results:

Plant Height At 35 and 70 Days After Planting

Treatment		N	Height	Change	Height	Change
No.	Vita early					
	liters/ha	%	cm	cm	cm	cm
1	1.0	0	9.77	0.51 (+6%)	14.79	0.09 (+1%)
2	1.5	0	9.48	0.22 (+2%)	14.72	0.02 (0%)
5	1.5	0	9.58	0.32 (+3%)	14.19	(-) 0.51 (-3%)
7	0	0	9.26	---	14.70	---



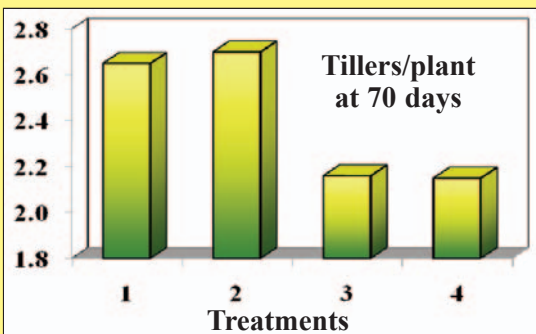
Tillers At 70 Days After Planting

Treatment		N	Tillers	Change
No.	Vita early			
	liters/ha	%	number	number
1	1.0	0	2.65	0.50 (+23%)
2	1.5	0	2.70	0.55 (+26%)
5	1.5	0	2.16	0.01 (0%)
7	0	0	2.15	---

Yield results:

Grain Yield

Treatment		N	Yield	Change
No.	Vita early			
	liters/ha	%	qqm/ha	qqm/ha
1	1.0	0	111.6	4.4 (+4%)
2	1.5	0	116.3	9.1 (+8%)
3	1.0	1.0	101.6	(-) 5.6 (-5%)
4	1.5	1.5	104.4	(-) 2.8 (-3%)
5	1.5	0	103.8	(-) 3.4 (-3%)
6	1.5	1.5	95.3	(-) 11.9 (-11)
7	0	0	107.2	---



Increase in tillers with Vitazyme

1.0 liter/ha early +23%
 1.5 liter/ha twice +26%

Conclusion: In this wheat study in Chile, using Vitazyme at 1.0 or 1.5 liters/ha shortly after emergence and/or about 18 weeks later, and with or

without nitrogen fertilizer, Vitazyme at 1.0 or 1.5 liters/ha, applied shortly after emergence, stimulated tillering by 23 to 26%, and increased yield of the grain by 4 to 8%. Other treatments did not cause increases in growth parameters or yield, especially Treatment 6 which received two 1.5 liter/ha Vitazyme applications. It appears that N fertilizer applications need to be maintained at optimum levels under Chilean conditions for Vitazyme to work best, and a second application later in the season does not add to yield responses. A single Vitazyme application early in the growth period gives the best results, and shows the product's excellent utility for Chile's agriculture.

Increase in wheat yield with Vitazyme
 1.0 liter/ha early +4%
 1.5 liter/ha twice +8%

Wheat

Farmer: Marcel Jakob **Location:** Curacautin, Chile
Research organization: Syngenta **Variety:** Otto
Planting date: August 5, 2009 **Previous crop:** wheat
Experimental design: A wheat field was divided into several strips to place Vitazyme treatments having one or two applications, plus some with reduced N applications. The objective of the study was to evaluate the product's effects on plant growth and crop yield.
Fertilization: according to recommendations



A Syngenta wheat trial at the Marcel Jakob farm produced 9 to 15% increases in plant population. Unfortunately there was no yield data collected, but it may be presumed that yield would follow this population.

Treatment	Vitazyme rate*		Nitrogen % of optimum
	Preemergence	BBCH32	
	liters/ha	liters/ha	
1	1.0	0	100
2	1.5	0	100
3	1.0	1.0	100
4	1.5	1.5	100
5	1.5	0	50
6	1.5	1.5	50
7	0	0	100

*Triaccontanol concentration: 0.0022 g/liter; brassinosteroid concentration: 0.013 g/liter.

Plant Population At 19 Days After Planting

No.	Treatment			N	Population Change	
	Vita early	Vita late				
	liters/ha		%		plants per meter	
1	1.0	0	100	53.75	4.37	(+9%)
2	1.5	0	100	55.94	6.56	(+13%)
3	1.0	1.0	100	56.56	7.18	(+15%)
4	1.5	1.5	100	55.63	6.25	(+13%)
5	1.5	0	50	55.00	5.62	(+11%)
6	1.5	1.5	50	56.56	7.18	(+15%)
7	0	0	100	49.38	---	

Increase in plants/meter of row with Vitazyme

100% N

1.0 liter/ha early +9%
 1.5 liters/ha early +13%
 1.0 liter/ha twice +15%
 1.5 liters/ha twice +13%

50% N

1.5 liters/ha early +11%
 1.5 liters/ha twice +15%

Vitazyme application: (1) 1.0 or 1.5 liters/ha on the leaves and soil at BBCH14, on September 9, 2009; (2) 1.0 or 1.5 liters/ha on the leaves and soil at stage BBCH 32, on November 11, 2009.

Growth results: See the table above.
Yield results: No yield results are available from this study.

Conclusion: In this wheat study in Chile to evaluate Vitazyme effects on wheat growth, for all treatments, at both 50% and 100% N levels, the population of plants per meter of row was increased, from 9 to 15%. Unfortunately, no yield results are available for the study.

Wheat

Test farm: CIA **Research organization:** Syngenta **Location:** Pua, Chile
Variety: Otto **Previous crop:** barley **Planting date:** July 14, 2009
Experimental design: A series of four strips in a uniform field were planted to wheat, the strips separated by spaces about one meter wide. The purpose of the study was to evaluate the effect of Vitazyme applications, with and without a "Take-All Pack" fertilizer mix, on wheat yield.
Fertilizer: according to recommendations, plus a Take-All Pack for Treatments 2, 3, and 4

Treatment	Vitazyme		Take-All Pack (TAP)
	Early	Late	
	liters/ha	liters/ha	
1	0	0	0
2	0	0	X
3	1.5	0	X
4	1.5	1.5	X

Vitazyme application: (1) For Treatments 3 and 4, 1.5 liters/ha at the BBCH 14-21 stage on September 14; for Treatments 4, 1.5 liters/ha at the BBCH 31 stage on October 30.

Yield results:



A vivid demonstration of Vitazyme's effect on enhancing a micronutrient fertilizer is displayed in this photo from Syngenta.

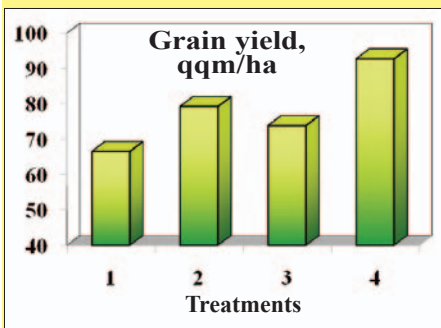
Conclusions: In this Chilean wheat demonstration at Pua, the Take-All Pack increased grain yield above the control by 19%. By adding Vitazyme to the crop in a single early

Wheat Grain Yield

No.	Treatment			Yield (qgm/ha)	Change ¹ (control=Trt. 1) (qgm/ha)	Change ² (control=Trt. 2) (qgm/ha)
	Vita early	Vita late	TAP			
	liters/ha	liters/ha				
1	0	0	0	66.56	---	---
2	0	0	X	79.25	12.69 (+19%)	---
3	1.5	0	X	73.88	7.32 (+11%)	(-) 5.37 (+7%)
4	1.5	1.5	X	92.75	26.19 (+39%)	13.50 (+17%)

¹Yields are compared to the control (Treatment 1).

²Yields of Treatments 3 and 4 are compared to Treatment 2.



application, the yield dropped slightly by 7%. However, when two applications were made, one early plus one later, the grain yield improved by a remarkable 17% (13.50 qgm/ha) compared to the TAP treatment only. It is possible that, in this study situation, a

later application alone would have given the full increase noted, since an early application gave a decrease for some unknown reason. The demonstration lends support to the fact that Vitazyme, in the combination with a nutrient package designed to combat Take-All of wheat, is able, when applied at the proper time, to greatly increase wheat yield.

Change in wheat yield with Vitazyme

Using the untreated treatment as control

TAP only +19%

TAP + Vitazyme early +11%

TAP + Vitazyme twice +39%

Using the TAP only treatment as control

TAP + Vitazyme early -7%

TAP + Vitazyme twice +17%

Wheat

A Summary of Four Trials

Research organization: Syngenta, Santiago, Chile

Experimental design: Four wheat field trials were set up in various locations across Chile, and are reported elsewhere. The purpose of the studies was to evaluate the effect of Vitazyme, applied at 1.0 or 1.5 liters/ha once or twice, with 50% or 100% fertilizer, on wheat yield.

Fertilization: according to recommendations

Vitazyme application: (1) 1.0 or 1.5 liters/ha on the soil before emergence, on June 9, 2009; (2) 1.0 or 1.5 liters/ha on the leaves and soil at stage BBCH 32, on October 5, 2009.

Yield results: See the following summary of the four trials.

Treatment	Vitazyme rate*		Nitrogen % of optimum
	Preemergence	BBCH32	
	liters/ha	liters/ha	
1	1.0	0	100
2	1.5	0	100
3	1.0	1.0	100
4	1.5	1.5	100
5	1.5	0	50
6	1.5	1.5	50
7	0	0	100

*Triaccontanol concentration: 0.0022 g/liter; brassinosteroid concentration: 0.013 g/liter.

Wheat Grain Yield

No.	Treatment			Yield	Change
	Vita early	Vita late	N		
	cm	cm			
1	1.0	0	100	79.8	4.2 (+6%)
2	1.5	0	100	79.7	4.1 (+5%)
3	1.0	1.0	100	70.6	(-) 5.0 (-7%)
4	1.5	1.5	100	77.5	1.9 (+3%)
5	1.5	0	50	72.0	(-) 3.6 (-5%)
6	1.5	1.5	50	68.5	(-) 7.1 (-9%)
7	0	0	100	75.6	---

Conclusion: These four Chilean wheat trials proved that only one Vitazyme application, at either 1.0 or 1.5 liters/ha, applied early in the growing season, was necessary to provoke yield increases (5 to 6%). Two 1.5 liter/ha applications also increased the yield (3%). On average, reducing fertilizer N brought a yield reduction, showing the need to further investigate this unexpected result.

Increase in wheat grain yield with Vitazyme

1.0 liter/ha early +6%

1.5 liters/ha early +5%

1.5 liters/ha twice +3%