



2014 Field Trial Results

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

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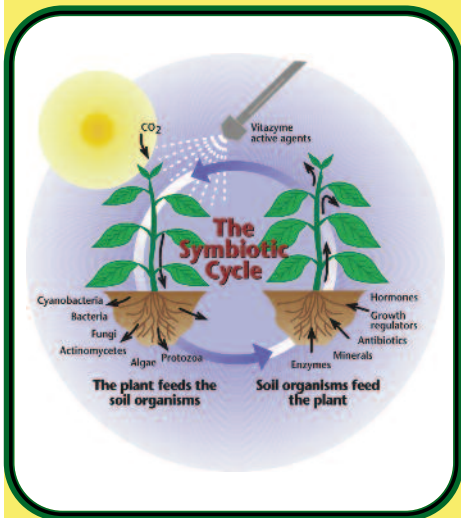
2014 Vitazyme Field Trial Results

This edition of Vitazyme crop reports represents the nineteenth 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

never by itself. Vitazyme will optimize your 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

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% →						

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

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

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

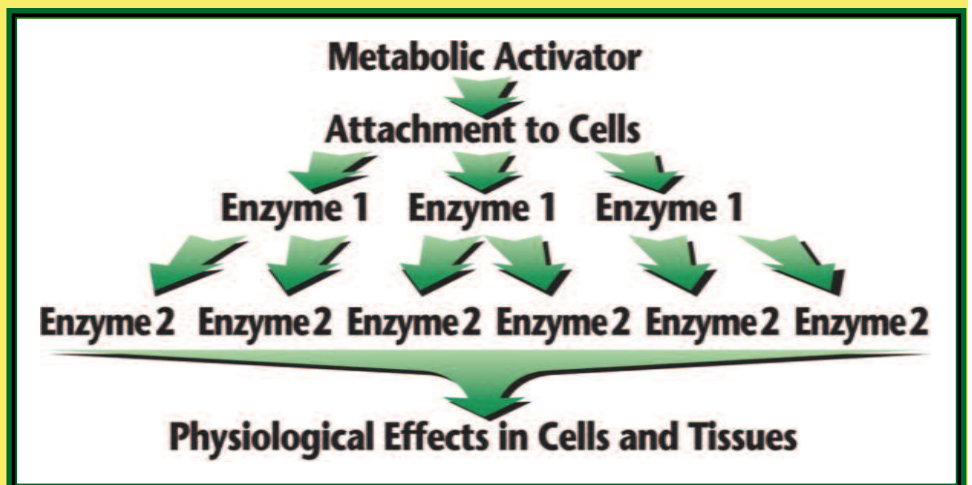
Vitazyme should be used within the context of a complete crop management system,

no added nitrogen. Vitazyme will accelerate 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 2014

Vitazyme crop results for 2014 were uniformly exceptional throughout the world. Especially notable are the seven points mentioned below.

Some Highlights for 2014

1 Seven cherry trials in central Washington produced increases in yield of 18 to 55%, with and without seaweed. Bing, Rainier, Sweetheart, and Skeena varieties produced larger, heavier, and higher pressure fruit that contained up to 4.28 percentage points more sugar. Fruit grades were in every case moved towards the larger sizes.

2 Apples in central Washington performed extremely well in both nurseries and producing orchards. Fuji and Red Delicious varieties produced heavier fruit weights having higher fruit pressure and larger grade ratings. Treated apple rootstock in nurseries were taller

with greater trunk circumference when treated with Vitazyme.

3 Corn and soybean trials in Iowa and Missouri continued the consistently positive results noted with Vitazyme over the years. In east-central Iowa, corn yielded 6% better (8.7 bu/acre) than the control, and soybeans 13% (7 bu/acre) more with Vitazyme, while in Missouri corn produced a 7% yield increase; ears were heavier, rows per ear were greater, kernel weight was increased, and tissue nutrients were higher.

4 Mexican trials showed excellent responses for corn (yield increases of 12 to 111%), avocados (increasing rates reduced days to flowering and improved fruit set, fruit weight, yield, and quality), rice (a yield increase of 21%), prickly pear (yield increase of 20%), wheat, and tomatoes.

5 Sugar beet results in Minnesota proved the potential of the program to improve sugar yield, with a large-scale field trial improving per acre sugar yield by up to 38%.

6 In Haiti, several crops were evaluated including dry beans, red beans, black beans, cabbage, leeks, tomatoes, okra, onions, peanuts, peppers, and rice. The inherently low inputs of fertilizer and other products allowed Vitazyme to substantially boost yields, by up to 108% for dry beans, 40% for cabbage, 62% for leeks, and 36% for okra.

7 Wheat and barley responded extremely well to the program in central Washington, usually with only one application. Data collected revealed more tillers and seeds per head, and greater grain weight with Vitazyme, giving up to 27% greater yield for winter wheat and 44% greater grain per head with barley.

Vitazyme Field Tests for 2014

Apples

Nursery Stock

Researchers: Jacob Hesseltine and Bruce Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: C&O Nursery

Location: Quincy, Washington

Variety: Bud 9 (apple rootstock)

Planting date: May 20, 2014

Plant density: 12 x 56 inches

Growing season weather: favorable

Experimental design: In a 17-acre field, rows 1 to 50 on the western side of the field were treated with Vitazyme as a root dip and a soil application, leaving the remaining rows as untreated controls.

1. Control

2. Vitazyme

Fertilization: unknown

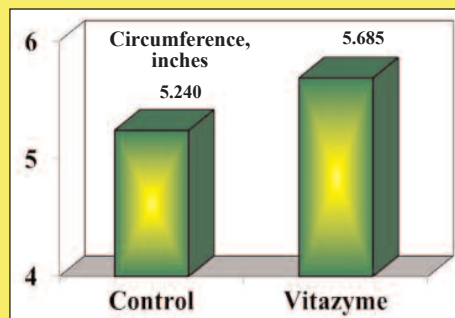
Vitazyme application: (1) 5% root dip at planting on May 20; (2) 16 oz/acre on the soil by rill irrigation on June 20; (3) 16 oz/acre by rill irrigation on July 20; (4) 16 oz/acre by rill irrigation on August 20.

Harvest date: Trees will be allowed to grow until the fall of 2015.

Growth results: On October 20, tree height and circumference were measured for every tenth tree for 100 trees, a few rows in from either side of the treatment dividing line.

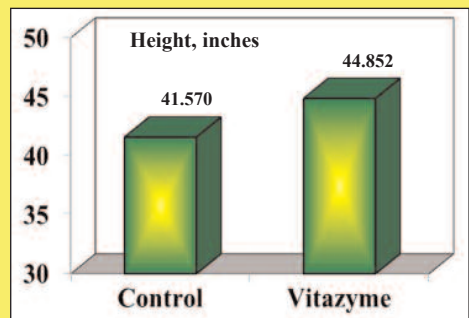
Conclusions: An apple nursery study, using Bud 9 rootstock and Vitazyme as a root dip and three subsequent monthly applications, resulted in an 8% increase in tree height over the growing season, as well as an 8.5% increase in trunk circumference. These improvements show the viability of this program to assist more rapid development of young fruit trees in Washington. The trees will continue on the program until the fall of 2015, when harvested trees will be sold by trunk caliper; greater caliper increases will mean improved sales revenue for the nursery.

Trunk Circumference



Increase in trunk circumference with Vitazyme: 8.5%

Tree Height



Increase in tree height with Vitazyme: 8%

Continued on the next page



Without Vitazyme this rootstock did not possess the vigor of the treated trees.

Note how Vitazyme gave superior height and leaf area for these young apple trees

Apples

Nursery Stock

Researchers: Jacob Hesseltine and Bruce Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: C&O Nursery

Location: George, Washington

Variety: M-9337 (apple rootstock)

Planting date: May 20, 2014

Plant density: 12 x 56 inches

Growing season weather: favorable

Experimental design: Fourteen acres of a nursery were divided in half, with Vitazyme used to treat one half, as a dip at planting and also later; half of the field served as a control. The purpose of the study was to discover the value of this product to accelerate tree growth.

1. Control 2. Vitazyme

Fertilization: unknown

Vitazyme application: (1) 5% root dip at planting on May 20; (2) 16 oz/acre on the soil by drip irrigation on June 20; (3) 16 oz/acre by drip irrigation on July 20; (4) 16 oz/acre by drip irrigation on August 20. Product was applied through an injector in the drip irrigation system.

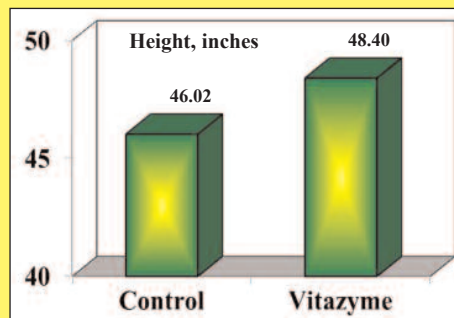
Harvest date: Trees will be grown until sale the fall of 2015.

Growth results: On October 20, tree height and circumference were measured for every tenth tree for 100 trees, a few rows in from either side of the treatment dividing line.

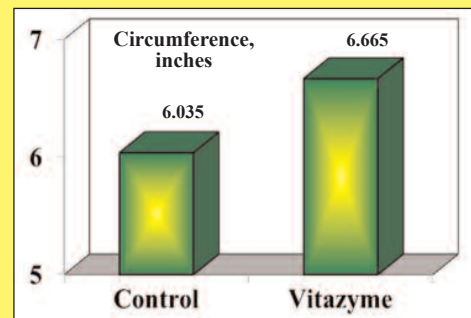
Conclusions: This apple nursery trial in central Washington, wherein Vitazyme was

applied as a root dip and three times later through drip irrigation, revealed that tree height was increased by 5%, and trunk circumference by 10%. The excellent improvements in tree growth obtained in this trial show the ability of the program to aid nursery growers in accelerating tree caliber to improve sales income. The program will continue through the fall of 2015 when the stock will be harvested and sold.

Tree Height



Trunk Circumference



Increase in tree height with Vitazyme: 5%

Increase in trunk circumference with Vitazyme: 10%



These trees display typical good growth for rootstock in Washington.



With Vitazyme, notice the extra height, deeper green color, and leaf area compared to the untreated control trees of the other photo.

Apples

Researchers: Casimir Lorentz, Quincy Farm Chemicals, Paul W. Syltie, Ph.D., and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Weber Orchards

Variety: Red Delicious

Location: Quincy, Washington

Rootstock: M111

Soil type: sandy loam

Tree age: 26 years (grafted to M111 in 2004)

Tree density: 18 feet between rows, 11 feet in-row (0.004545 acre/tree), or 220 trees/acre

Experimental design: Three blocks of Red Delicious apples, 12.5 acres each, were selected to evaluate the effects of Vitazyme on apple yield and quality. Five rows through the middle of each block were treated, and the remaining untreated rows served as controls. Four Vitazyme applications were made.

1. Control

2. Vitazyme

Fertilization: standard nutrient program

Vitazyme application: (1) 16 oz/acre at pink; (2) 16 oz/acre at petal fall; (3) 16 oz/acre at first cover; (4) 16 oz/acre on September 15 (three weeks before harvest). An air-blast sprayer delivering 80 gal/acre, driven at 3.5 mph, was used to apply the product.

Growing season weather: favorable, except for some mid-summer heat that slowed growth.

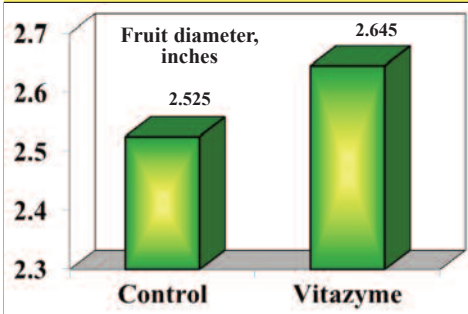
Harvest date: October 6 to 9, 2014

Harvest dates for sampling: (1) August 12; (2) October 6 (at harvest time)

Apple yield and quality results: Twelve random apples were selected from each treatment on August 12th and 48 random apples were selected for each treatment on October 6. Values were averaged from each sampling.

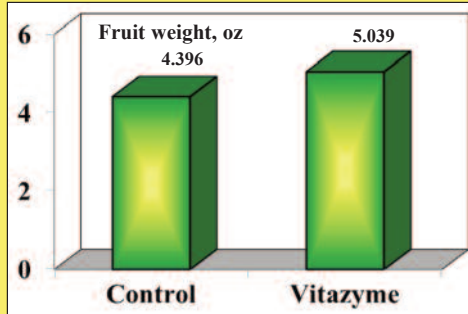
August 12, 2014, Sampling

Fruit Size¹



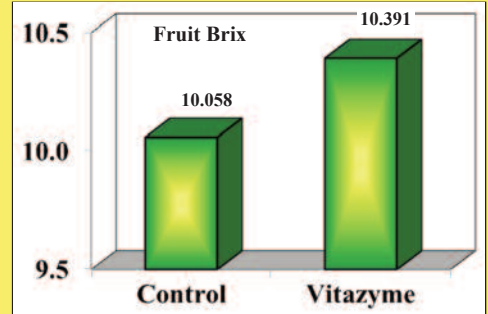
¹Determined using a Cranston fruit sizer.

Fruit Weight¹



¹Determined using a Matrix-500 digital scale.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

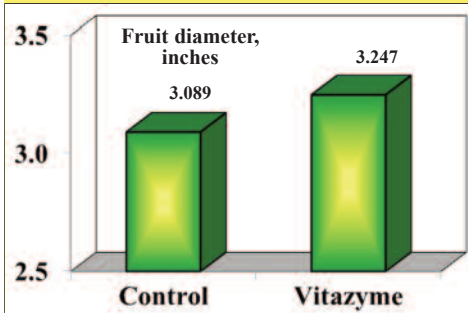
Increase in fruit size with Vitazyme: 5%

Increase in fruit weight with Vitazyme: 15%

Increase in fruit Brix with Vitazyme: 0.333 %-point

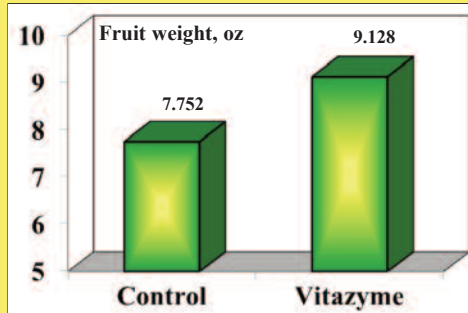
October 6, 2014, Sampling

Fruit Size¹



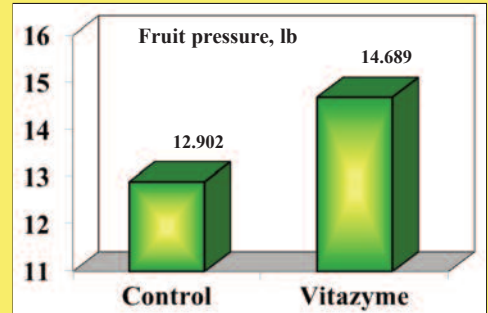
¹Determined using a Cranston fruit sizer.

Fruit Weight¹



¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined using a QA Supplies penetrometer.

Increase in fruit size with Vitazyme: 5%

Increase in fruit weight with Vitazyme: 18%

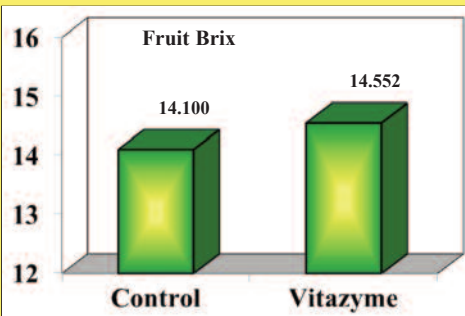
Increase in fruit pressure with Vitazyme: 14%

The size, weight, pressure, and Brix were in all cases for both dates, increased substantially with Vitazyme. Fruit grade was moved greatly towards the higher grade as well, especially as evidenced by the percentage in the "premium" grade (33% vs. 15%).

Continued on the next page

Conclusions: This Red Delicious apple study in Washington revealed that Vitazyme, applied three times early and once late during fruit development, improved fruit size (5%), fruit weight (15 to 18%), fruit Brix (up to 0.452 percentage-point), and fruit pressure (14%), while moving fruit grade toward the more valuable premium grade. Storability and transport would be enhanced due to greater fruit pressure. Yield of apples likely was increased by about 18%, though no actual measurements were made, since apple weight was improved by that amount and fruit numbers per acre were similar. These results show great efficacy of Vitazyme for apple production in central Washington.

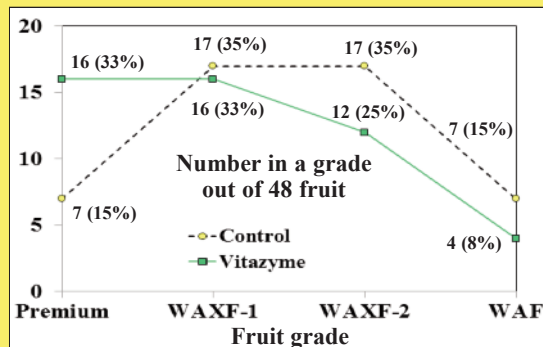
Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit Brix with Vitazyme: 0.452 %-point

Apple Grade Out of 48 Fruit¹



¹Premium is the highest grade, followed by WAXF-1 (WA Extra Fancy-1), WAXF-2 (WA Extra Fancy-2), and WAF (WA Fancy). Grading was assisted by Sherry Hesselstine, a fruit grader with 15 years of experience.



A remarkable improvement in size of Red Delicious apples was achieved with Vitazyme in this trial



Note the excellent fruit set when Vitazyme was applied four times at 16 oz/acre during the season.

Apples

Researchers: Casimir Lorentz, Quincy Farm Chemicals, Paul W. Syltje, Ph.D., and Jacob Hesselstine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Weber Orchards

Location: Quincy, Washington

Variety: Fuji

Tree age: 26 years (grafted to M111 in 2004)

Rootstock: M111

Tree density: 18 feet between rows, 11 feet in-row (0.004545 acre/tree), or 220 trees/acre

Soil type: sandy loam

Experimental design: A 3-acre block of Fuji apples was selected to evaluate the effect of four applications of Vitazyme on apple yield and quality. Five rows in the middle of the



A beautiful fruit set resulted from four Vitazyme applications to this Fuji apple orchard.



As with the Red Delicious apples, these Fuji apples responded to Vitazyme by producing larger, sweeter, better-colored fruit.

block were treated, leaving the remainder of the trees as untreated controls.

1. Control

2. Vitazyme

Fertilization: standard nutrient program

Vitazyme application: (1) 16 oz/acre at pink; (2) 16 oz/acre at petal fall; (3) 16 oz/acre at first cover; (4) 16 oz/acre on September 15 (one month before harvest). An air-blast sprayer delivering 80 gal/acre, driven at 3.5 mph, was used to apply the product.

Growing season weather: favorable, except for some mid-summer heat that slowed growth.

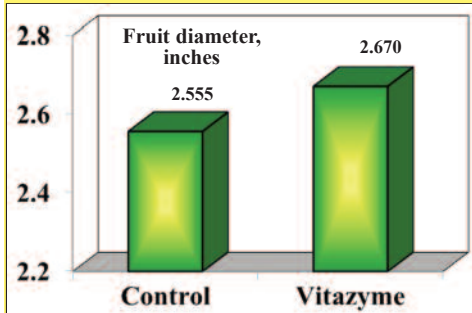
Harvest date: October 16, 2014

Harvest dates for sampling: (1) August 12; (2) October 6, 7 to 10 days before harvest

Apple yield and quality results: Twelve random apples were selected from each treatment on August 12th and 48 random apples were selected from each treatment on October 6. Values were averaged from each sampling.

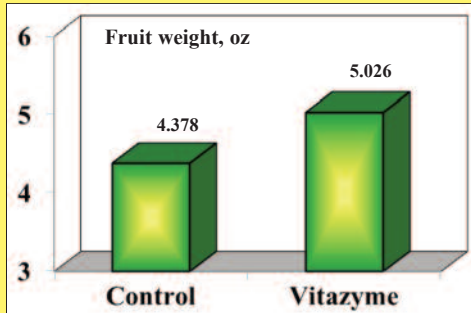
August 12, 2014, Sampling

Fruit Size¹



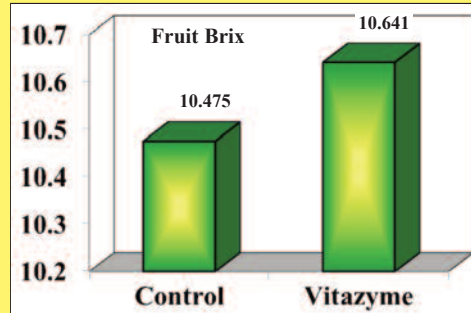
¹Determined using a Cranston fruit sizer.

Fruit Weight¹



¹Determined using a Matrix-500 digital scale.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

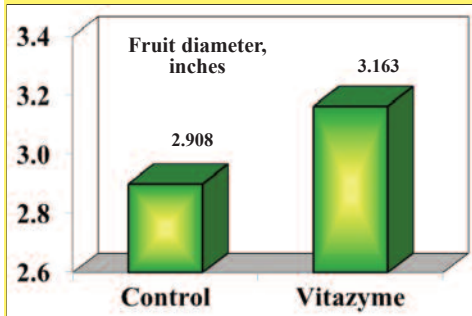
Increase in fruit size with Vitazyme: 5%

Increase in fruit weight with Vitazyme: 15%

Increase in fruit Brix with Vitazyme: 0.166 %-point

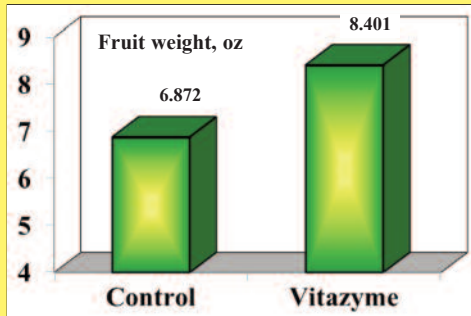
October 6, 2014, Sampling

Fruit Size¹



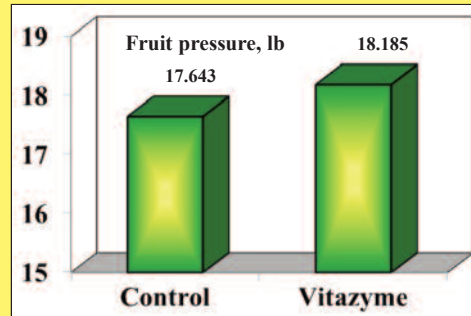
¹Determined using a Cranston fruit sizer.

Fruit Weight¹



¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined using a QA Supplies penetrometer.

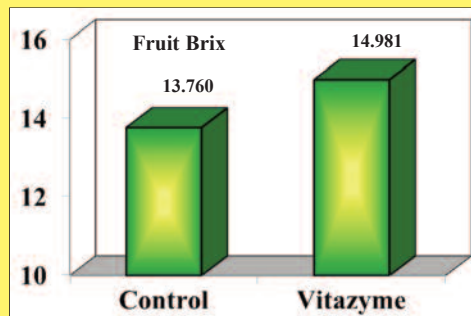
Increase in fruit size with Vitazyme: 9%

Increase in fruit weight with Vitazyme: 22%

Increase in fruit pressure with Vitazyme: 3%

Increase in fruit Brix with Vitazyme: 1.221 %-points

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Conclusions: A Fuji apple in-orchard study in central Washington, using Vitazyme four times, proved that apple size, weight, pressure, and Brix all increased for both sampling dates: August 12 and October 6. Final size increase was 9%, weight was 22%, pressure was 3%, and Brix was 1.221 percentage-points. Assuming that fruit set was similar for both treatments, then total yield of apples would have been improved by about 22%, proportional to the increase in fruit weight. This program is shown to be highly effective for increasing apple yield, income, quality, and storability for apple growers in Washington.

Avocados

Researcher: Hermilo Sanchez Sanchez, Ph.D.

University location: Academic Unit of Agro-Hydraulic Engineering, Autonomous University of Puebla, San Juan Acateno, Teziutlan, Puebla, Mexico

Location of study: commercial orchard at Tlalnepantla, Morelos, Mexico

Variety: Hass

Soil type: clayey

Trial initiation: August 13, 2013

Tree spacing: 6m x 6m

Tree age: 8+ years

Experimental design: An avocado orchard was selected to evaluate the effect of Vitazyme on the yield and quality of the fruit. The experiment was laid out in a Latin Square design with one tree per plot (36 m²), replicated four times.

Fertilization: none

Vitazyme application: 2.5, 5.0, and 7.5 ml/tree applied by sprayer to the leaves of appropriate trees every 60 days, four times, following harvest (see the table)

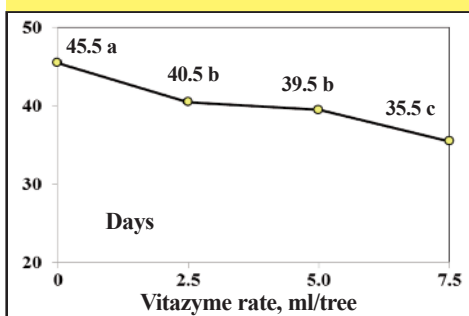
Statistical evaluation: The Statistical Analysis System (SAS) was used, employing Tukey's Test to evaluate differences among treatment means, at P = 0.05.

Growth and yield results: For all means, values followed by the same letter are not significantly different at P = 0.05 according to Tukey's Test.

Treatment	Days after harvest ¹				Total dosage
	60	120	180	240	
	----- ml/liter of spray -----				liters/ha
Control	0	0	0	0	0
Vitazyme 1	2.5	2.5	2.5	2.5	0.7
Vitazyme 2	5.0	5.0	5.0	5.0	1.4
Vitazyme 3	7.5	7.5	7.5	7.5	2.1

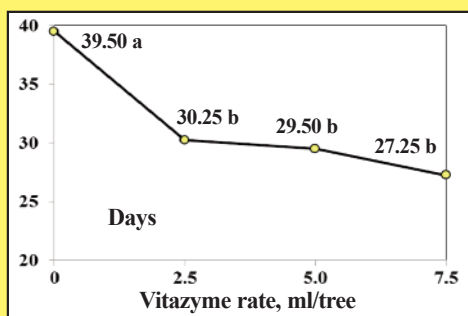
¹All applications received the indicated dosage of Vitazyme in 5 liters per tree of water, applied to the leaves.

Days to Bud Break¹



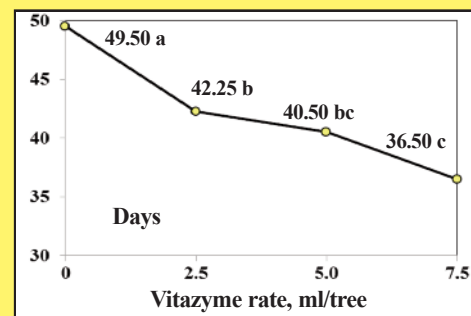
¹Number of days to bud break after pruning.

Days to Flowering¹



¹Number of days to 50% bud break.

Days to Fruit Set¹



¹Number of days to 20% of the small fruit formed, starting from 50% bud break.

Reduction in Days to Bud Break

Vitazyme 1 5 days
Vitazyme 2 6 days
Vitazyme 3 10 days

As the Vitazyme rate increased, the time to bud break was reduced linearly by 5 to 10 days.

Reduction in Days to Flowering

Vitazyme 1 9.25 days
Vitazyme 2 10.00 days
Vitazyme 3 12.25 days

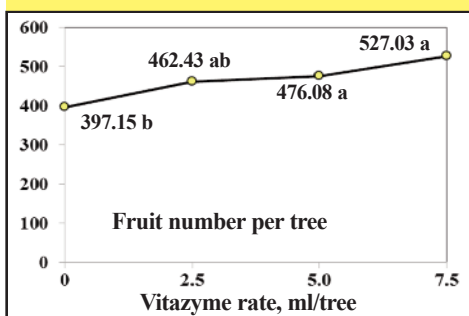
Days to flowering were reduced by a remarkable 9.25 to 12.25 days, consistent with brassino-steroid effects on fruit trees.

Reduction in Days to Fruit Set

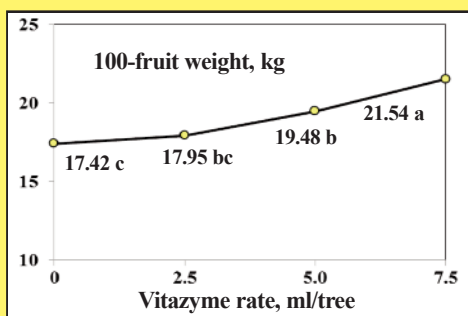
Vitazyme 1 7.25 days
Vitazyme 2 9.00 days
Vitazyme 3 13.00 days

Days to fruit set were greatly reduced, by up to 13 days at the highest Vitazyme application.

Fruits Per Tree

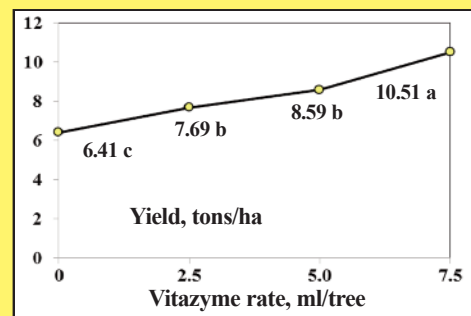


Fruit Weight¹



¹100 fruit were weighed.

Fruit Yield¹



¹Estimate based on fruit weight.

Increase in Fruits Per Tree

Vitazyme 1	16%
Vitazyme 2	20%
Vitazyme 3	33%

A linear increase in fruit number resulted with higher rates of application, up to a 33% increase.

Increase in Fruit Weight

Vitazyme 1	3%
Vitazyme 2	12%
Vitazyme 3	24%

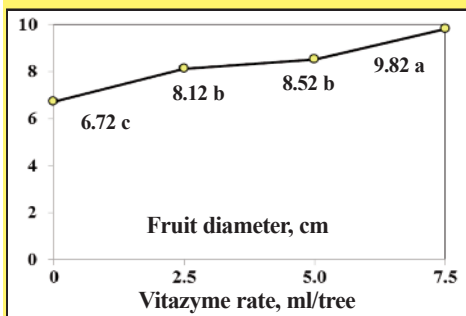
Significant fruit weight increases occurred at the 5.0 and 7.5 ml/tree rates, with up to 24% greater weight.

Increase in Fruit Yield

Vitazyme 1	20%
Vitazyme 2	34%
Vitazyme 3	64%

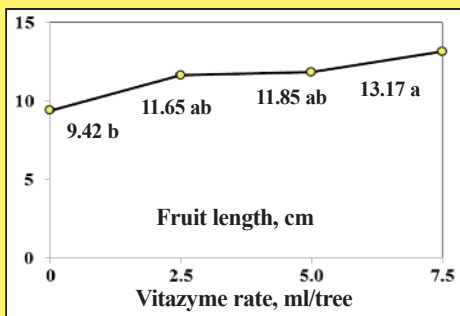
A nearly straight-line increase in yield resulted from added increments of Vitazyme.

Fruit Diameter¹



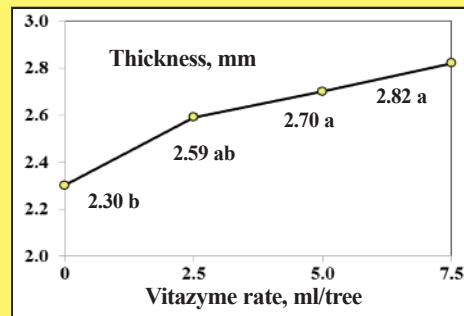
¹10 fruits were measured with a vernier caliper, and averaged.

Fruit Length¹



¹10 fruits were measured with a vernier caliper, and averaged.

Skin Thickness¹



¹A cross section of skin from five fruit was measured by microscope, and averaged.

Increase in Fruit Diameter

Vitazyme 1	21%
Vitazyme 2	27%
Vitazyme 3	46%

All rates of Vitazyme increased fruit diameter significantly, up to 46% at the highest rate.

Increase in Fruit Length

Vitazyme 1	24%
Vitazyme 2	26%
Vitazyme 3	40%

All three Vitazyme treatments were statistically the same, and the 7.5 ml/tree rate produced a 40% increase in fruit length.

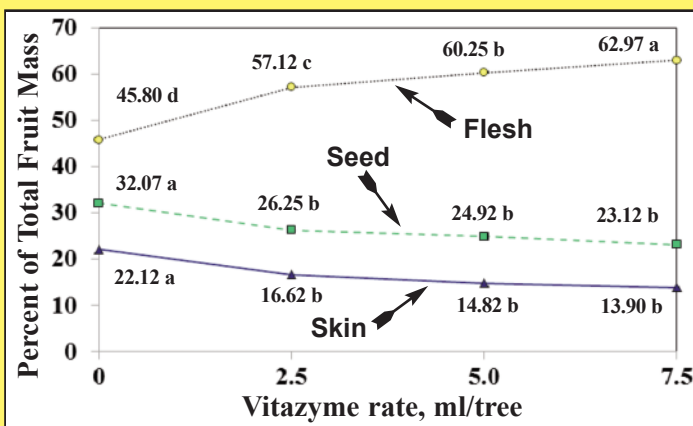
Increase in Skin Thickness

Vitazyme 1	13%
Vitazyme 2	17%
Vitazyme 3	23%

In all cases Vitazyme increased skin thickness, significantly at the 7.5 ml/tree level (23%).

The percentage of flesh of the avocado fruit increased linearly and significantly with the rate of Vitazyme application, while the percentages of skin and seed conversely dropped with those same rates.

Percentage of Flesh, Skin, and Seed¹



¹Ten fruits for each plot were selected, and the flesh, skin, and seeds were separated, weighed, and averaged.

Change with Vitazyme, percentage points

	<u>Flesh</u>	<u>Skin</u>	<u>Seed</u>
Vitazyme 1	+11.32	-5.50	-5.82
Vitazyme 2	+14.45	-7.30	-7.15
Vitazyme 3	+17.17	-8.22	-8.95

Conclusions: The conclusions of the Mexican authors are as follows.

- Vitazyme, at dosages of 0.7, 1.4 and 2.1 liters per hectare of Vitazyme, equivalent to 100, 200 and 200 mL/200 L water in 1390 liters per hectare of solution, each in 4 foliar sprays at intervals of two months after the last harvest, in 8 years old avocado trees, recorded good effects on the evaluated parameters in the avocado crop, achieving significant improvements in days to bud break, to flowering and to fruit set, as well as in yield and quality of fruits, showing statistical differences with the untreated control throughout the development of the trial.
- With four foliar applications of Vitazyme at dosages of 0.7, 1.4 and 2.1 liters per hectare of Vitazyme, equivalent to 100, 200, and 300 mL/200 L water in 1390 liters per hectare of solution, each in 4 foliar sprays

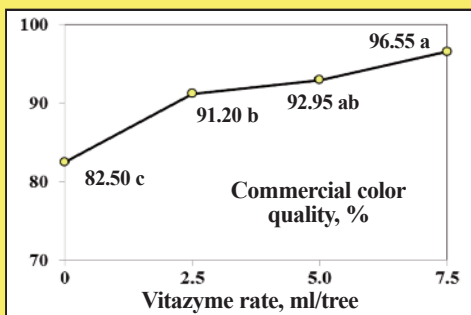
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at intervals of two months after the last harvest, in 8 years old avocado trees, significant yield increases compared with an untreated control of 1.18, 2.18, and 4.11 tons/hectare, or 20, 34, and 64%, respectively, are achieved. Likewise, marked improvements in the quality of the Vitazyme treated fruits are noticed.

3. The use of Vitazyme at dosages of 0.7, 1.4, and 2.1 liters per hectare of Vitazyme, each in 4 foliar sprays at intervals of the two months after the last harvest, is recommended in avocado trees, since it is demonstrated to be an alternative that favorably increased yields per hectare, as well as the quality of avocado fruits.

4. There were no toxic effects to the avocado crop, after applying dosages of 0.7, 1.4, and 2.1 liters per hectare of Vitazyme, equivalent to 100, 200, and 300 mL/200 L water in 1390 liters per hectare of solution.

Uniformity of Color¹



¹100 fruit were evaluated for color qualifying for commercial for commercial sales.

Increase in Uniformity (percentage points)

Vitazyme 1	8.70
Vitazyme 2	10.45
Vitazyme 3	14.05

Significantly more fruit was of commercial color quality with all three Vitazyme treatments, especially the 7.5 ml/tree rate.

Spring Barley

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Tom Stahl

Variety: Gallatin (2-row)

Soil type: clay with volcanic ash

Seedbed preparation: undercutter to loosen soil; anhydrous applicator at 12-inch spacings (4-inches deep)

Previous crop: winter peas (died back from frost)

Planting date: April 30 to May 1, 2014, with an HZ Deep Furrow Drill, rows spaced 16 inches

Experimental design: Two 80-acre fields, separated by a dirt road, were selected for a spring barley study. The east field was treated once with Vitazyme, and the west field served as the untreated control. The objective was to evaluate the effect of this product on barley yield.

1. Control

2. Vitazyme

Fertilization: On April 29, 10 lb/acre of sulfur and 30 lb/acre of anhydrous ammonia were applied.

Vitazyme application: 13 oz/acre on June 24, along with Barrage (2, 4-D) at 16 oz/acre and Brox-m (bromoxynil) at 8 oz/acre; using a Summers tow-behind spray rig

Crop season weather: mixed for spring grains; good July rains but moisture aided covered smut of barley (*ustilago hordei*) development, and August 12, 13, and 15 had heavy rains

Growth results: Twenty plants were dug from each treatment on August 12, and evaluated for five parameters.

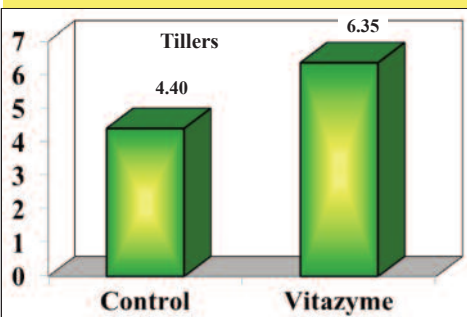
Location: Waterville, Washington

Planting rate: 54 lb/acre



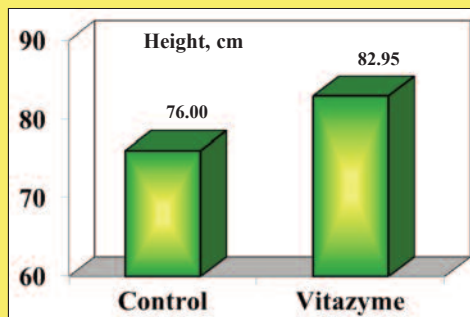
This fine field of barley resulted from a single Vitazyme application added to a herbicide spray.

Tillers Per Plant



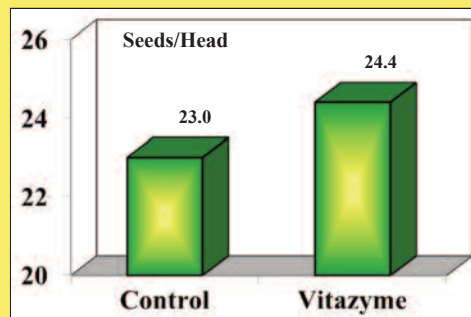
Increase in tillers per plant with Vitazyme: 44%

Plant Height



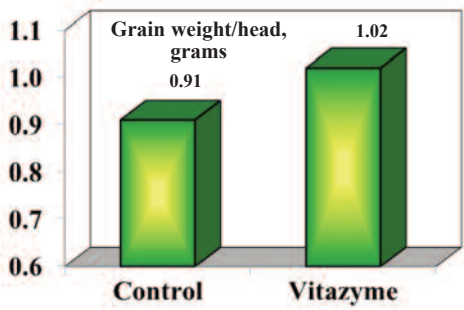
Increase in plant height with Vitazyme: 9%

Seeds Per Head



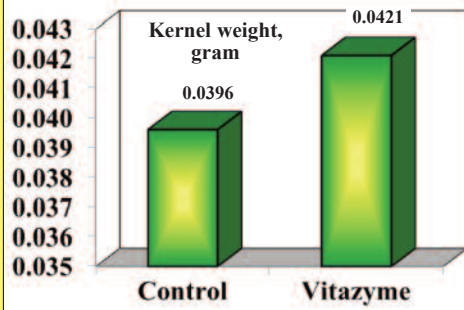
Increase in seeds per head with Vitazyme: 6%

Grain Weight Per Head



Increase in grain weight per head with Vitazyme: 44%

Kernel Weight

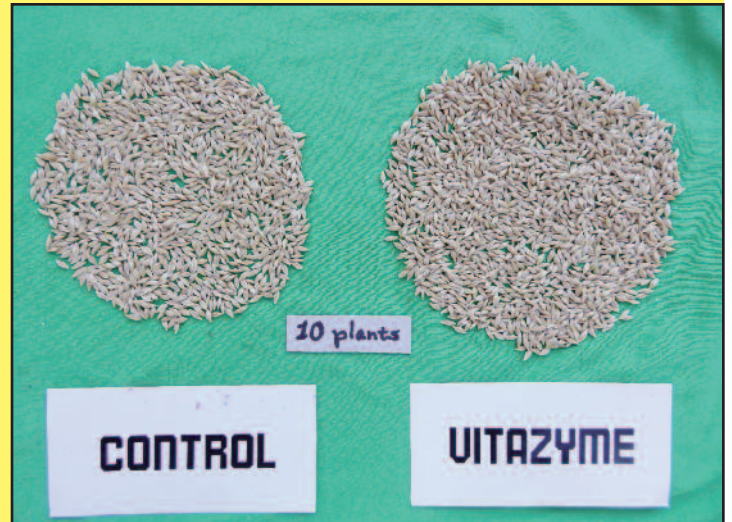


Increase in kernel weight with Vitazyme: 6%

Conclusions: A spring two-row barley trial in central Washington produced excellent improvements in yield traits attributable to Vitazyme. Increases were noted in tillers per plant (44%), plant height (9%), seeds per head (6%), grain weight per head (12%), and kernel weight (6%). All of these increases indicated a substantial improvement in yield, that was unfortunately not able to be quantified through direct measurement. These results display the great utility of using Vitazyme for spring barley production in Washington.



Taller stems, more tillers, bigger heads, and heavier grain resulted from a single application.



Note how much more grain was produced from 10 plants when Vitazyme was applied. Both number and weight of grain were increased.

Dry Beans

Researchers: Pierrot Maei and Valdimir Vincent

Research organization: Acra Industries, Haiti

Location: Croix des Missions, Haiti

Variety: Sequia 347-87

Planting date: unknown

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

1. Control

2. Vitazyme

Fertilization: unknown

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

Harvest date: unknown

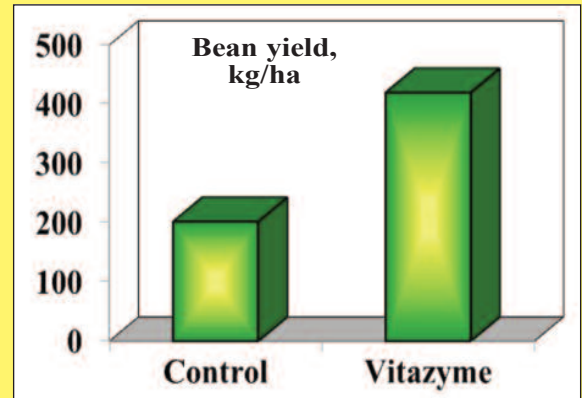
Yield results: see table and graph at right.

Conclusions: A dry bean study in Haiti revealed a great increase in yield with Vitazyme application, the yield more than doubling in this trial. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Increase in dry bean yield with Vitazyme: 108%

Dry Bean Yield

Treatment	Bean yield kg/ha	Yield change kg/ha
Control	201.7	—
Vitazyme	419.7	218.0 (+108%)



Red Beans

Researchers: F. Lucas, L. Saint Jean, and R. Estime

Research organization: CRDD, Bas Boen, Haiti

Trial location: farm of Bas Boen CRDD, Haiti

Variety: Jose Beta

Planting date: December 15, 2012

Experimental design: A red bean field received treatments of four biological products to determine their effects on bean yield and growth characteristics.

1. Control 2. Agronomax 3. Vitazyme 4. SOS + LPN 5. Angre Mevey

Fertilization: unknown

Agronomax: a product containing Cu (0.05%), Mn (0.05%), Mo (0.05%), and humic acid, used for seed and foliar treatments

Vitazyme: applications unknown

SOS + LPN: product and applications unknown

Angre Mevey: product and applications unknown

Harvest date: The crop was harvested March 7, 2013

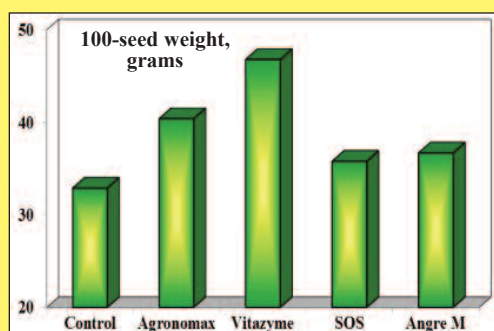
Growth and yield results: see tables and graphs at right.

Conclusions: This red bean trial in Haiti, which compared four biological agents to an untreated control, revealed that all four products improved bean size and yield to some degree, with Vitazyme increasing bean weight by 42%, and yield by 40%. Agronomax produced a 23% bean weight increase, and the same yield as Vitazyme. SOS + LPN and Angre Mevey caused lesser increases in seed weight and yield. This study suffered from a lack of ideal comparisons of products because they were not all of the same nature. For example, Agronomax contains nutrients plus humic acid, while Vitazyme contains biostimulant compounds. Even so, Vitazyme and Agronomax proved to be highly beneficial adjuncts for red bean production in Haiti.

Bean Yield and Growth

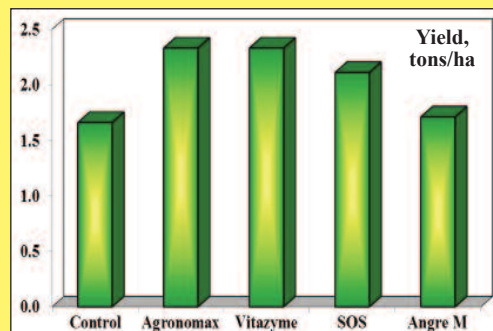
Treatment	Control	Agronomax	Vitazyme	SOS + LPN	Angre Mevey
Plant density, plants/ha	193,339	196,482	202,502	219,620	197,762
Viral disease infection	None	None	None	None	None
Pods/Foot	10	13	13	10	7
Seeds/Pod	3	3	3	4	3
100-seed weight, grams	32.9	40.4	46.8	35.8	36.7
Bean yield, tons/ha	1.66	2.33	2.33	2.11	1.71

100-Seed Weight



Of all treatments, Vitazyme produced the heaviest seeds, followed by Agronomax.

Bean Yield



Both Vitazyme and Agronomax yield 2.33 tons/ha, followed by SOS + LPN and Angre Mevey.

Increase in 100-seed weight

Vitazyme	42%
Agronomax	23%
Angre Mevey	12%
SOS + LPN	9%

Increase in bean yield

Vitazyme	40%
Agronomax	40%
SOS + LPN	27%
Angre Mevey	3%

Black Beans (*Phaseolus vulgaris* L.)

Researcher: Valdimir Vincent, Faculty of Agronomic Sciences

Research organization: University of the Caribbean

Location: Cul-de-sac Farm, Damien, Haiti

Variety: Sequia 342-87

Planting date: December 27, 2012

Seeding rate: 240 seeds/plot

Experimental design: A black bean field experiment was laid out having four treatments, in a randomized complete block design (four replicates), with the purpose of determining the efficacy of Vitazyme to improve the growth and yield of the beans. Commercial fertilizer, manure, and an organic fertilizer were evaluated along with Vitazyme.

1. Vitazyme 2. Supermagro 3. Manure 4. Fertilizer

Fertilization: none

Vitazyme application: (1) Seed treatment (rate unknown); (2) foliar and soil application (rate and timing unknown)

Supermagro application: Supermagro is an organic fertilizer made from anaerobically composted manure from manure of the central unit at Damien. Rate and timing of applications are unknown.

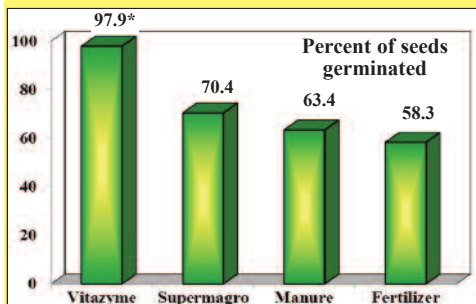
Manure application: Rate and timing are unknown.

Fertilizer: An application of 12-12-20% N-P₂O₅-K₂O was made, presumably shortly before planting, and the rate is unknown.

Statistical analysis: An analysis of variance was performed on the collected data of each parameter.

Bean growth results: Comparisons are made between Vitazyme and the commercial fertilizer values to obtain comparison values.

Percent Germination

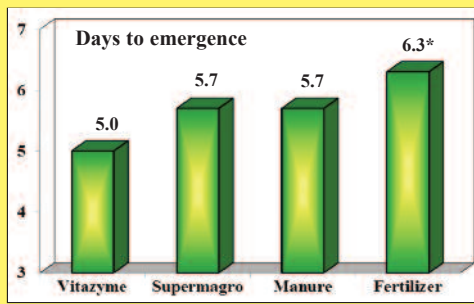


*Significantly greater than the other treatments.

Increase in germination with Vitazyme: 39.5 percentage points

Vitazyme greatly improved germination compared to the other treatments.

Time to Emergence

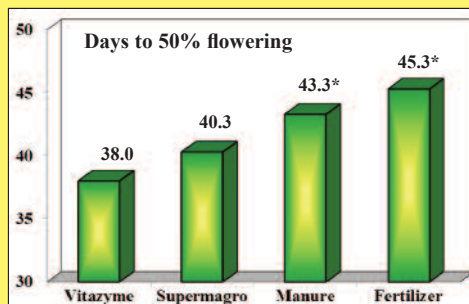


*Significantly greater than the other treatments.

Reduced time to emergence with Vitazyme: 1.3 days

Compared to the other treatments, Vitazyme greatly increased growth rate and reduced the days to emergence.

Days to 50% Flowering¹



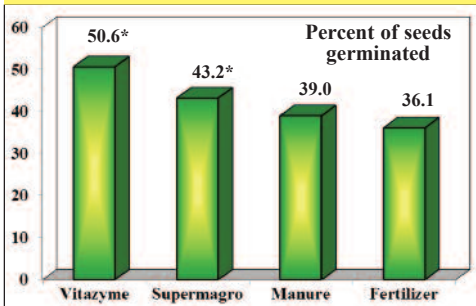
¹The days from planting to when 50% of the plants begin to flower.

*Significantly greater than the other treatments.

Reduced time to 50% flowering with Vitazyme: 7.3 days

Vitazyme treatment greatly reduced the time to flowering, especially compared to manure and fertilizer.

Plant Height at 52 Days¹



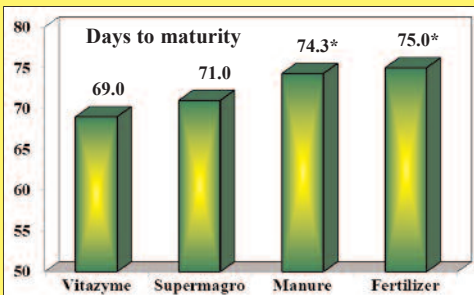
¹The height to the top leaves of 24 plants.

*Significantly greater than the other treatments.

Increase in plant height with Vitazyme: 40%

The Vitazyme and Supermagro improved plant height, at 52 days after planting, considerably above fertilizer alone.

Days to Physiological Maturity

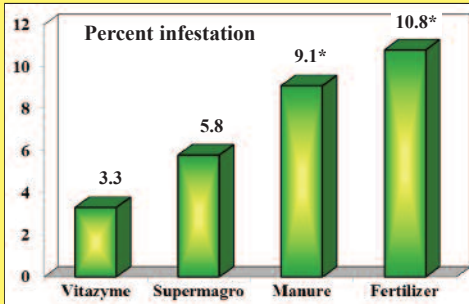


*Significantly greater than the other treatments.

Reduced time to physiological maturity with Vitazyme: 6 days

Both Vitazyme and compost reduced the time to maturity of the plants, by 5.3 to 6.0 days.

Insect Infestation¹



¹Plants infestation by white flies (*Bemisia Tabaci*)

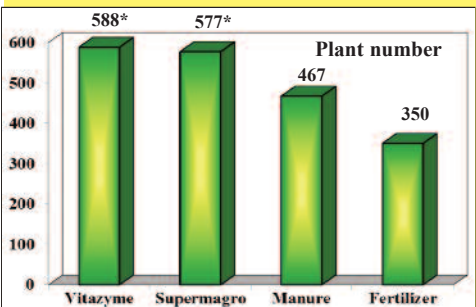
*Significantly greater than the other treatments.

Reduced insect infestation with Vitazyme: 7.5 percentage points

Vitazyme and Supermagro repelled insects significantly better than did fertilizer and manure.

Bean yield results: Vitazyme results are compared with the fertilizer treatment.

Plants Harvested¹

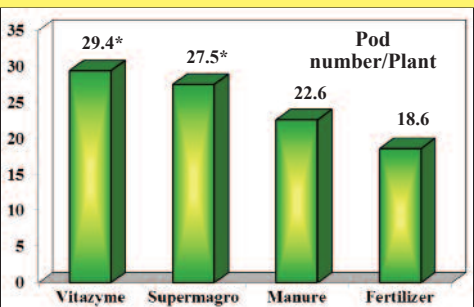


¹Harvestable plants per treatment (3 reps).

*Significantly greater than the other treatments.

Increase in plants harvested with Vitazyme: 68%

Pods Per Plant



*Significantly greater than the other treatments.

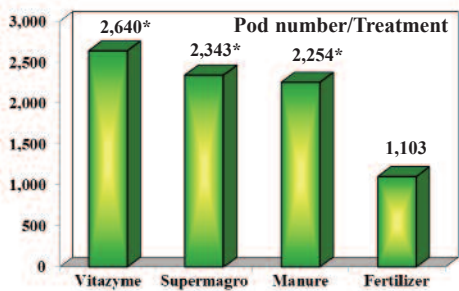
Increase in pods/plant with Vitazyme: 58%

There was a great increase in plants that survived to harvest with Vitazyme and Supermagro.

Not only were there more plants with Vitazyme, but the pod number was greatly increased (58%).

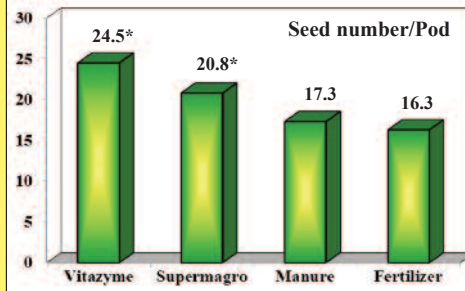
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Pods Per Treatment



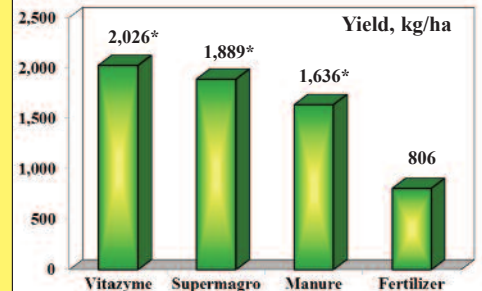
*Significantly greater than the other treatments.

Seeds Per Pod



*Significantly greater than the other treatments.

Final Yield



*Significantly greater than the other treatments.

Increase in pods per treatment with Vitazyme: 139%

The Vitazyme, Supermagro, and manure plots had many more total pods than the commercial fertilizer treatment which had fewer plants and fewer pods/plant.

Increase in seeds per pod with Vitazyme: 50%

Besides having more pods/plant and more plants/plot, the Vitazyme treated plants had significantly more seeds in each pod, as did the Supermagro treatment.

Increase in bean yield with Vitazyme: 151%

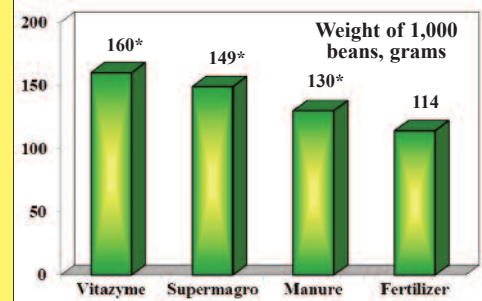
Vitazyme, Supermagro, and manure all produced much greater yields than did fertilizer, with Vitazyme exceeding Supermagro yield by 7%, and the manure by 24%.

Conclusions: A black bean trial in Haiti, comparing Vitazyme with a compost product (Supermagro), manure, and commercial fertilizer revealed that Vitazyme produced the best overall growth in terms of germination (+39.5 %-points), time to emergence (1.3 fewer days), days to flowering (7.3 fewer days), height at 52 days (+40%), days to maturity (6 fewer days), insect infestation (7.5 %-points), plants harvested (+68%), pods per plant (+58%), pods per treatment (+139%), seeds per pod (+50%), and 1,000-bean weight (+40%) compared to the fertilizer treatment. All of these factors worked together to give a 151% yield improvement above fertilizer alone, a 7% yield increase over Supermagro, and a 24% yield enhancement above manure. While the three products compared to Vitazyme are not similar in composition or mode of action, even so Vitazyme proved to be the superior plant growth and yield enhancer in the Haitian study.

Increase in 1,000-bean weight with Vitazyme: 40%

All three organic treatments increased the bean weight significantly above the fertilizer treatment, with Vitazyme producing the heaviest beans,

Weight of 1,000 beans, grams



*Significantly greater than the other treatments.

Blueberries (Organic)

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Variety: Duke

Farmer: Zirkle Fruit Company

Location: Pasco, Washington

Plant age: 8 years

Plant density: 11 feet between rows, 1 foot in-row

Experimental design:

A 13.2-acre block of organically-grown Duke blueberries was split approximately in half, with 53.46 full rows treated with Vitazyme four times during the season to determine the effects of the product on fruit yield and quality. The 58.13 full rows not treated with Vitazyme served as controls.



An excellent set of blueberries, having large size and sugars, produced a 39% yield increase with Vitazyme.



The extent to which Vitazyme improved the size of blueberries in this Washington trial is emphasized in this photo. Four applications were used.

1. Control

2. Vitazyme

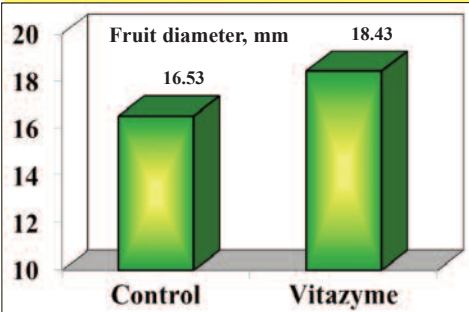
Fertilization: standard nutrient program

Vitazyme application: (1) 13 oz/acre on March 25; (2) 13 oz/acre on April 2; (3) 13 oz/acre on April 29; (4) 13 oz/acre on May 6. A Power-Blast sprayer was used, delivering 100 gal/acre, driven at 2.75 mph.

Harvest date: June 10 and 11, 2014, for the first picking. Other pickings followed, but this was the only picking that was evaluated.

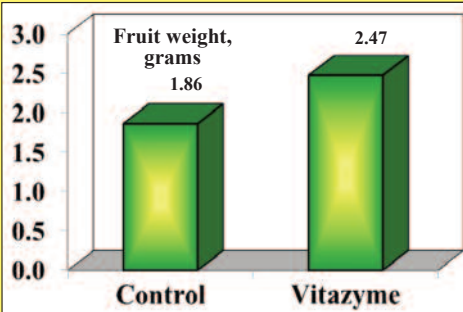
Quality results: On June 10, 50 average berries were collected randomly from both treatments to evaluate the following parameters.

Fruit Size¹



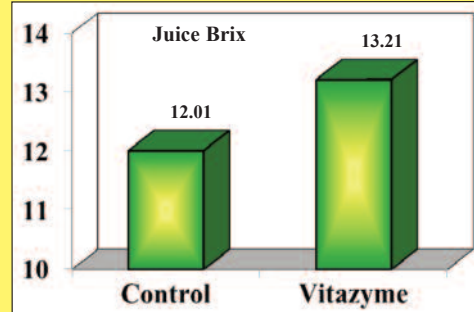
¹Determined using a Cranston fruit sizer.

Fruit Weight¹



¹Determined using a Matrix-500 digital scale.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit size with Vitazyme: 11.5%

Increase in fruit weight with Vitazyme: 33%

Increase in fruit Brix with Vitazyme: 1.20 %-points

Yield results: Only the first picking results are shown at right.

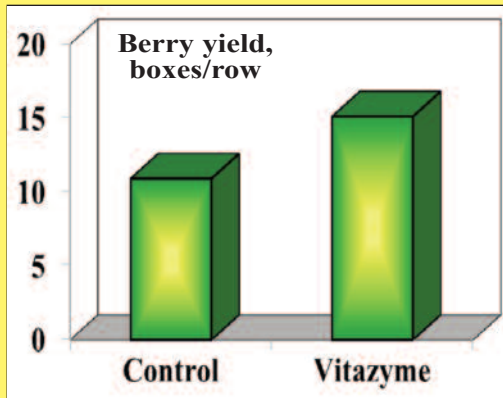
Conclusions: A blueberry trial in central Washington, using four 13 oz/acre applications of Vitazyme, proved that the product

greatly improved both the yield and quality of the berries. Fruit diameter was increased by 11.5%, fruit weight by 33%, and fruit Brix by 1.20 percentage points, indicating the berries were much larger and sweeter than the untreated control berries. A picked yield increase of 39% closely paralleled the 33% heavier fruit. This trial illustrates the pronounced improvement in the yield, quality, and income from blueberries grown with Vitazyme in Washington.

Blueberry Yield

Treatment	Boxes	Rows	Row yield boxes/row	Yield change boxes/row
Control	634	58.13	10.9	—
Vitazyme	807	53.46	15.1	4.2 (+39%)

Increase in berry yield with Vitazyme: 39%



Cabbage

Researcher: Thierry Pelette

Research organization: Acra Industries, Haiti

Location: Belladere, Haiti

Variety: Tropicana

Planting date: unknown

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

1. Control

2. Vitazyme

Fertilization: unknown

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

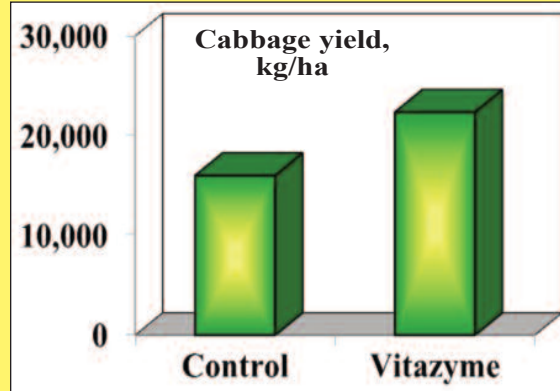
Harvest date: unknown

Yield results: See table and graph at right.

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

Cabbage Yield

Treatment	Cabbage yield bu/acre	Yield change bu/acre
Control	15,999	—
Vitazyme	22,353	6,354 (+40%)



Increase in cabbage yield with Vitazyme: 40%

Prickly Pear Cactus

Researcher: Agustin Fernando Peralta
Research organization: Quimica Lucava
Variety: *Opuntia ficus-indica* (L.) Mill

Farmer: Oliver Castro Garcia
Location: San Martin of the Pyramids, State of Mexico, Mexico

Experimental design: A cactus field was divided into Vitazyme treated and untreated areas to determine the effect of the product on yield. Two applications of Vitazyme were made.

1. Control

2. Vitazyme (2x)

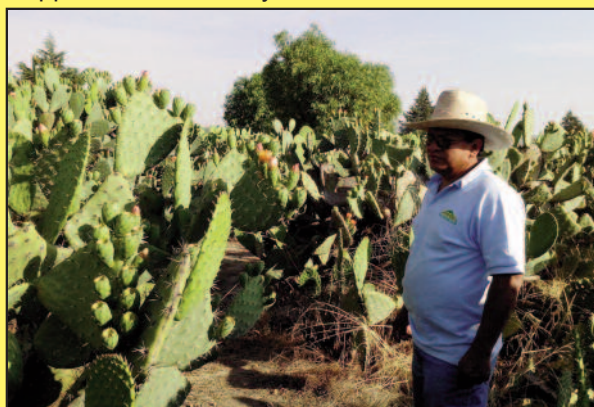
Fertilization: unknown

Vitazyme application: (1) Just before bud break (February 7, 2014) at 1 liter/ha, and (2) about two months later (April 14), also at 1 liter/ha. A pallet gun was used for the applications, with 1 liter of Vitazyme in 1,100 liters of water sprayed on 1 hectare. Along with Vitazyme, for the first application, were added 10 liters/ha of a phosphorus fertilizer, 22 kg/ha of KCl, 2 liters/ha of Afidox, 2 liters/ha of Lucaban, and 2 liters/ha of Sulcoflu.

Harvest date: May 26 to June 20, 2014

Yield results: See table and graph at right.

Two applications of Vitazyme produced an excellent yield increase, of 20% in this Mexican prickly pear cactus study.



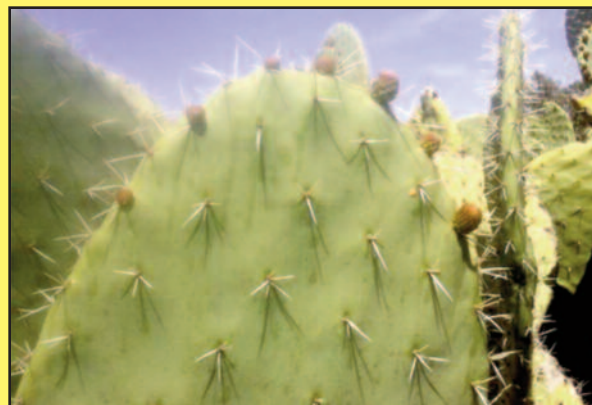
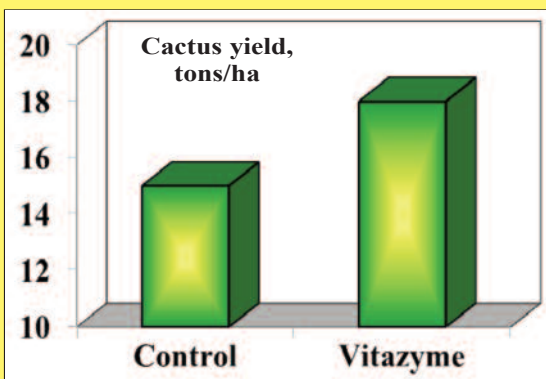
A cactus field in Mexico treated with Vitazyme gave a 20% yield increase.



Note how greatly Vitazyme has stimulated budding on this leaf.

Cactus Yield

Treatment	Area	Cactus yield	Yield increase
		tons/ha	tons/ha
Control	1 ha	15.0	—
Vitazyme	1 ha	18.0	3.0 (+20%)



Without Vitazyme the cactus leaves show much less aggressive budding.

Increase in cactus yield with Vitazyme: 20%

Cherries

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington
Farmer: Zirkle Fruit Company

Location: Pasco, Washington

Variety: Bing
Rootstock: Mazard

Tree density: 20 feet between rows and 18 feet in-row (0.008264 acre/tree), or 121 trees/acre

Tree age: 27 years

Experimental design: A 16.7-acre area of Bing cherries, the equivalent of 84 full rows in this orchard, was sprayed with Vitazyme four times to evaluate the effect of the product on fruit yield and quality. Twelve full rows were left untreated as the control.

1. Control

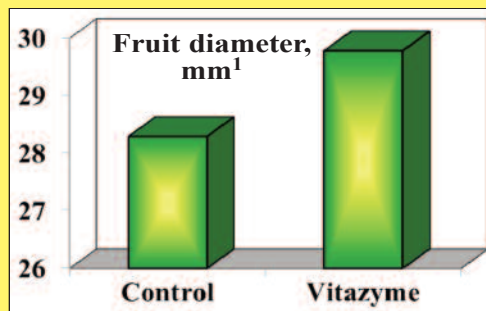
2. Vitazyme

Fertilization: standard nutrient program

Fruit Size

Treatment	Fruit Diameter	Diameter change
	mm	mm
Control	28.29	—
Vitazyme	29.78	1.49 (+5%)

Increase in fruit size with Vitazyme: 5%



¹Determined using a standard sizer card.

Vitazyme application: (1) 16 oz/acre at white (March 17); (2) 16 oz/acre at petal fall (March 26); (3) 16 oz/acre at first cover (April 14); (4) 16 oz/acre a month later (May 13). A Power-Blast sprayer, using 200 gal/acre, driven at 2.75 mph, was used to apply the product.

Growing season weather: favorable except for freezing temperatures (down to 18° F) in some low lying areas of the Vitazyme-treated areas, resulting in frost damage

Harvest date: June 12 to 14, 2014. On June 12, 50 random cherry samples were collected from both treatments to evaluate weight and quality parameters.

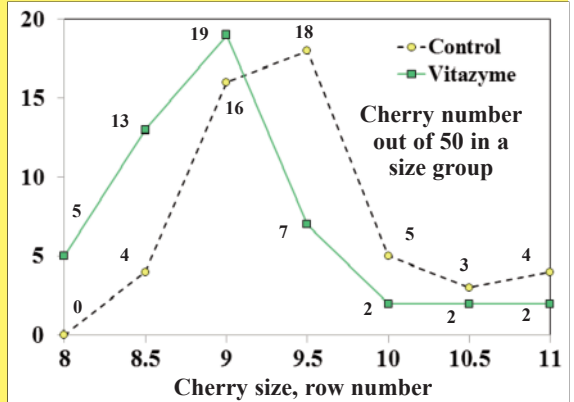
Fruit quality results: See tables and graphs on previous page, at right, and below.

Cherries in Size Groupings

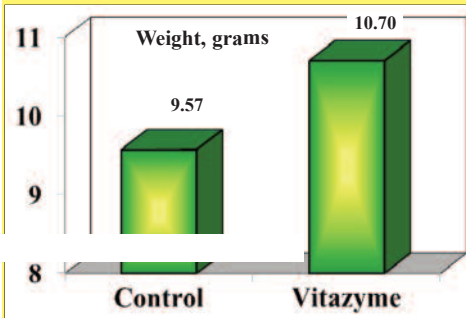
Size, row number ¹	Vitazyme		Control	
	Cherry number	%	Cherry number	%
8	5	10	0	0
8.5	13	26	4	8
9	19	38	16	32
9.5	7	14	18	36
10	2	4	5	10
10.5	2	4	3	6
11	2	4	4	8

¹Cherry sizes are designated by "row", which originated when the size was determined by the number of fruit that would fit across the top of a cherry box. The smaller the number, the larger the cherry. An industry standard cherry sizer card was used.

Cherry Size Review

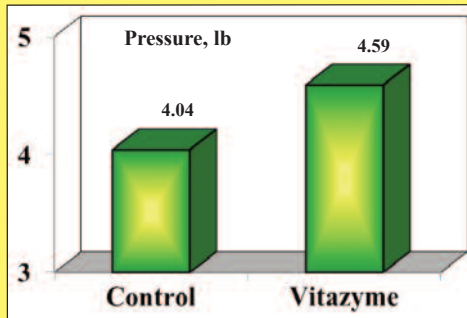


Fruit Weight¹



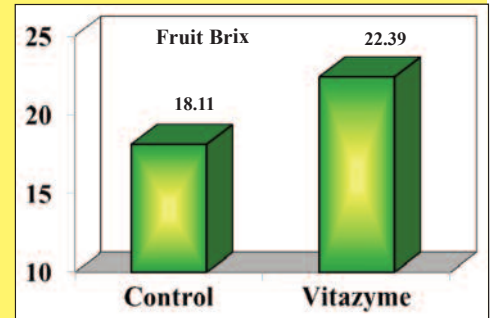
¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined by QA Supplies penetrometer.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit weight with Vitazyme: 12%

Increase in fruit pressure with Vitazyme: 14%

Increase in fruit Brix with Vitazyme: 4.28 %-points

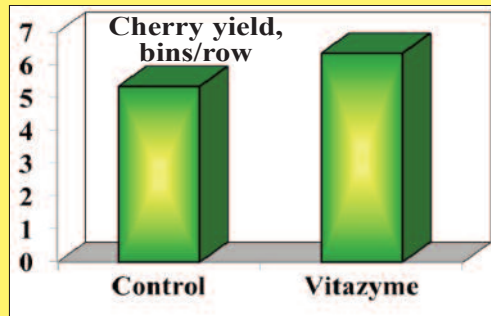
The average cherry size was improved by 5%, and this size improvement is revealed in the size review, where the entire size spectrum is moved towards larger sizes with Vitazyme; 9-row and larger cherries with Vitazyme comprised 74% of the total, but only 40% of the control treatment.

Fruit yield results: The bins from the Vitazyme treated rows were totaled, as were the bins for the untreated rows, to determine harvested yield.

Conclusions: A Bing cherry trial in central Washington, wherein Vitazyme was applied four times, revealed that Vitazyme increased all important fruit quality parameters: weight by 12%, pressure by 14%, Brix by 4.28 percentage points, and grade by moving the size towards the larger row-number ratings; 9-row and larger cherries with Vitazyme comprised 74% of the total, whereas for the control these sizes made up only 40% of the total. A detailed yield analysis based on bin counts produced a 19% yield advantage for Vitazyme, which exceeded the estimated fruit weight increase of 12%, indicating that there was less fruit droppage and abortion with Vitazyme application. Moreover, serious frost damage from 18° F spring temperatures during early development, being more prevalent in the treated areas of the test, did not greatly limit the yield improvement from the product, although the yield increase may have been even greater had not the low temperatures occurred. The Vitazyme program is shown to be an excellent and highly profitable management tool for cherry growers in Washington.

Cherry Yield

Treatment	Total bins	Rows	Yield/Row bins/row	Yield change bins/row
Control	64.25	12	5.35	—
Vitazyme	534.5	84	6.36	1.01 (+19%)



Increase in cherry yield with Vitazyme: 19%



Superior size and coloration, as well as fruit pressure and Brix, resulted from four Vitazyme applications.

Cherries

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Variety: Rainier

Farmer: Zirkle Fruit Company

Rootstock: Mazzard

Location: Pasco, Washington

Tree age: 27 years

Experimental design: A Rainier cherry block of 15.2 acres (41.23 full rows) was treated with Vitazyme four times, except for six full rows that were left untreated to serve as a control. The objective of the study was to evaluate the effect of the product on fruit yield and quality.

1. Control

2. Vitazyme

Fertilization: standard nutrient program

Vitazyme application: (1) 16 oz/acre at white (March 17); (2) 16 oz/acre at petal fall (March 26); (3) 16 oz/acre at first cover (April 14); 16 oz/acre a month later (May 13). A Power-Blast sprayer was used to treat the cherries, at 200 gal/acre and 2.75 mph.

Growing season weather: favorable, except for some frost damage from 18° F temperatures in the low-lying Vitazyme treated areas



A beautiful fruit set has resulted from four Vitazyme applications.



Leaf size and chlorophyll content have been markedly improved with Vitazyme.

Quality results: On June 9, 50 random and average cherries were collected from both treatments for quality analyses, shown below.

Fruit Size

Treatment	Fruit Diameter	Diameter change
	mm	mm
Control	30.19	—
Vitazyme	32.28	2.09 (+7%)

Increase in fruit size with Vitazyme: 7%



Four Vitazyme applications greatly improved Rainier cherry size and coloration.

Cherries in Size Groupings (50 fruit each)

Size, row number ¹	Vitazyme		Control	
	Cherry number	%	Cherry number	%
7.5	5	10	2	4
8	23	46	7	14
8.5	14	28	10	20
9	7	14	16	32
9.5	1	2	12	24
10	0	0	3	6

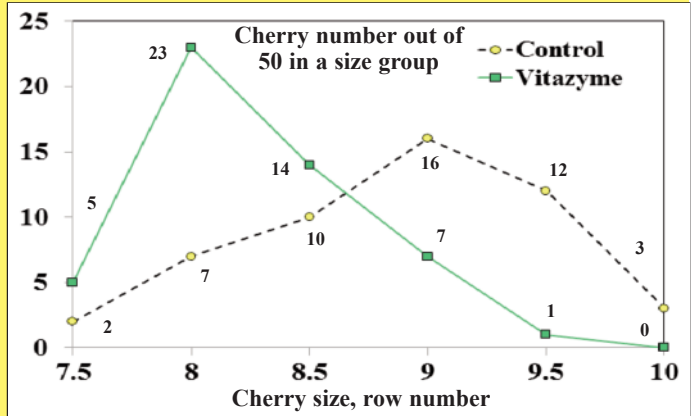
¹Cherry sizes are designated by "row", which originated when the size was determined by the number of fruit that would fit across the top of a cherry box. The smaller the number, the larger the cherry. An industry standard cherry sizer card was used.

The size groups for Vitazyme treated cherries are obviously larger than for the untreated control fruit. The 8.5-row and larger fruit treated with Vitazyme comprise 84% of the total, while the same size groups for the control are only 38% of the total.

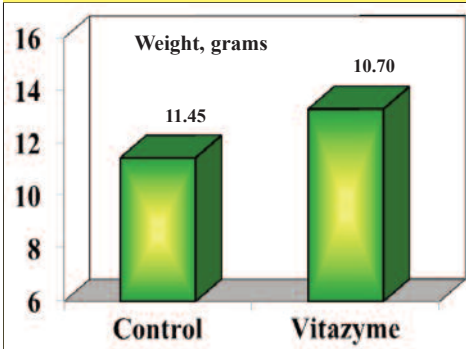
Fruit yield results: The first two pickings were recorded, on June 9 and 10, and June 12 and 13.

Conclusions: A Rainier cherry trial in central Washington revealed considerable improvements in fruit yield and quality with four applications of Vitazyme. Fruit size was increased by 7% on average, with 84% of the treated cherries being 8.5-row or larger; the control cherries had only 38% of the total fruit in these sizes. Fruit weight rose by 16%, fruit pressure by 7%, and fruit Brix by 1.70 percentage points, on top of a yield increase of 19%. This excellent management tool is shown to be a great asset to cherry quality and yield; larger, firmer, and sweeter cherries. These improvements were made in spite of early frost damage to the lower-lying Vitazyme portions of the experimental block.

Cherry Size Review

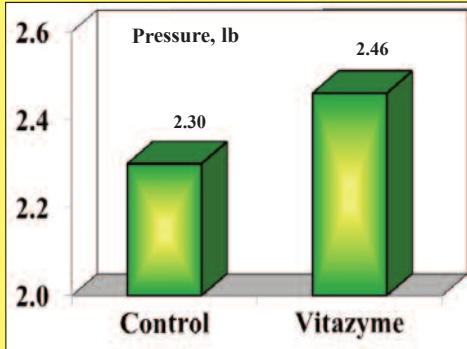


Fruit Weight¹



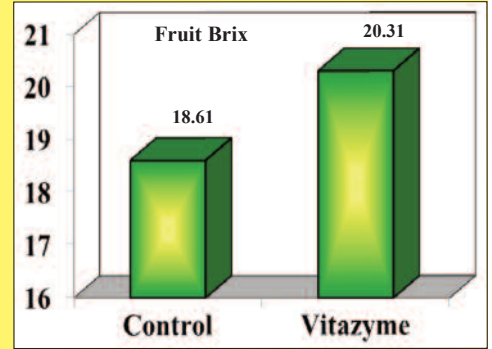
¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined by QA Supplies penetrometer.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit weight with Vitazyme: 16%

Increase in fruit pressure with Vitazyme: 7%

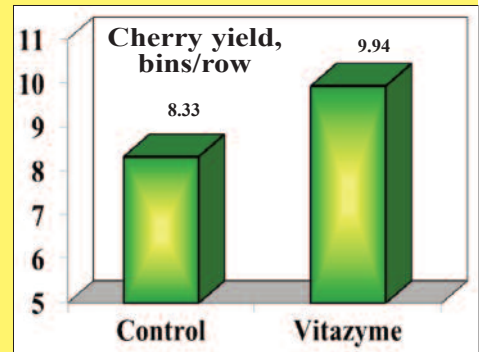
Increase in fruit Brix with Vitazyme: 1.70 %-points

Cherry Yield

Treatment	Picking 1			Picking 2			Total	
	Total bins	Yield/ Row ¹	Difference	Total bins	Yield/ Row ¹	Difference	Yield/ Row ¹	Difference
Control	22.0	3.67	—	28.00	4.67	—	8.33	—
Vitazyme	182.62	4.43	0.76(+21%)	227.38	5.51	0.84 (+18%)	9.94	1.61 (+19%)

¹Vitazyme treated rows = 41.23; control rows = 6.00.

Increase in cherry yield with Vitazyme: 19%



Cherries

A Synergism with Simplot Seaweed

Researchers: Cameron Nystrom, Stemilt Quality Control Porch Analyst, and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Location: Stemilt Hill, Wenatchee, Washington

Rootstock: Mazard

Tree density: 17 feet between rows, 11 feet in-row (0.004293 acre/tree), or 233 trees/acre

Experimental design: A Sweetheart cherry block of 25 acres was divided into two equal parts, one half treated with Simspray seaweed extract five times, and the other half treated with Simspray three times followed by Vitazyme twice. The purpose of the trial was to discover the effects of the two products on cherry quality.

Farmer: Kyle Mathison Orchards

Variety: Sweetheart

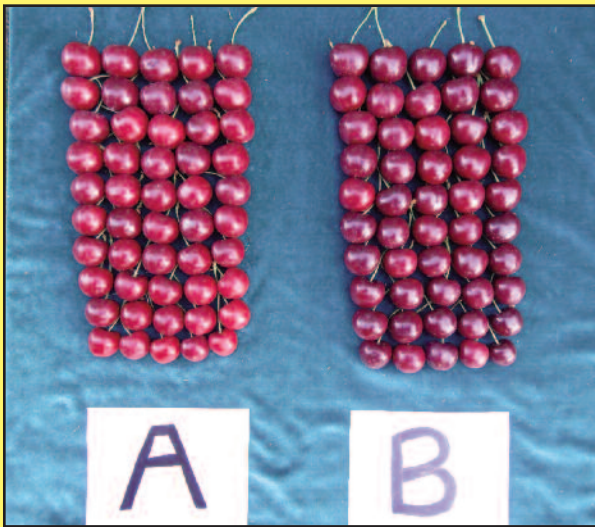
Tree age: 8 years

Continued on the next page



Simspray alone produced cherries that were less mature and colored than when Vitazyme was applied also.

With Vitazyme applied for the last two applications, color and size improved dramatically.



Treatment	Fruit development stage				
	First white	20% bloom	Petal fall	Shuck fall	10 days later
1. Simspray only	16	16	16	16	16
2. Simspray + Vitazyme	16	16	16	0	0
	0	0	0	16	16

Fertilization: 8 tons/acre of compost the fall of 2013; 2 lb/tree of Ca (NO₃)₂ on the soil at petal fall; 2 lb/tree of (NH₄)₂SO₄ in the fall of 2013
Vitazyme application: See the table above. An air-blast sprayer was used which delivered 200 gal/acre, at 2 mph.

Simspray Seaweed Extract: See the table above.

Weather during the growing season: favorable

Harvest date: August 7, 2014

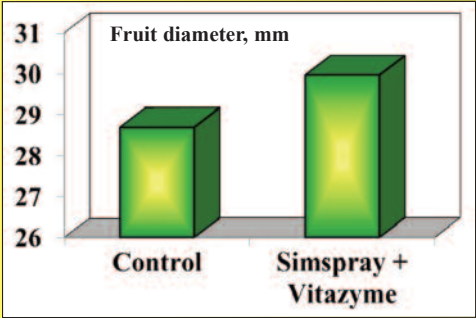
Fruit quality results: Fifty random samples of fruit were collected twice from each treatment to evaluate quality parameters. Data were obtained by Cameron Nystrom.

Not only size, but color, weight, and Brix of the cherries improved with Vitazyme following Simspray.

Cherries in Size Groupings (100 fruit each)

Fruit Size¹

Treatment	Fruit diameter	Diameter change
	mm	mm
Control	28.69	—
Vitazyme	29.96	1.27 (+4%)

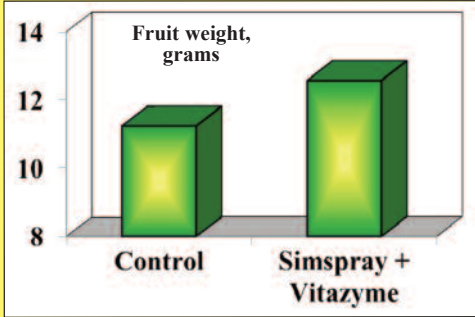


¹Determined using a standard card sizer.

Increase in fruit size with Vitazyme: 4%

Fruit Weight

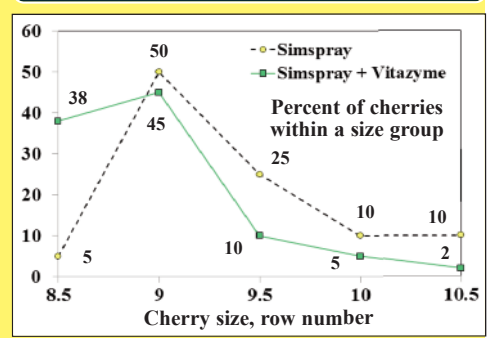
Treatment	Cherry weight	Weight change
	grams	grams
Set 1: Simspray	11.28	—
Simspray + Vitazyme	12.52	1.24 (+11%)
Set 2: Simspray	11.20	—
Simspray + Vitazyme	12.62	1.42 (+13%)
Average: Simspray	11.24	—
Simspray + Vitazyme	12.57	1.33 (+12%)



Increase in fruit weight with Vitazyme: 12%

Size, row number ¹	Simspray	Simspray + Vitazyme
	----- % in a size -----	
8.5	5	38
9	50	45
9.5	25	10
10	10	5
10.5	10	2

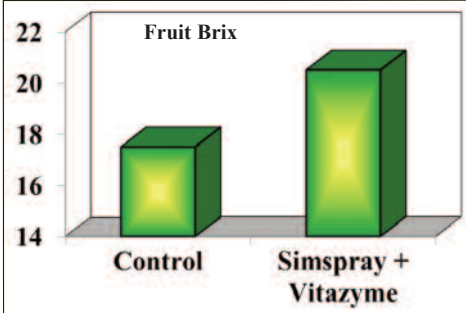
Cherry Size Review



Note that when Vitazyme was added to Simspray the cherry size increased, so that 83% of the fruit were 9-row or larger, versus only 55% for the Simspray alone.

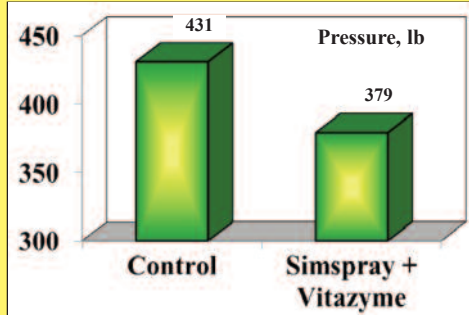
Fruit Brix

Treatment	Fruit Brix	Brix change
	Brix	Brix
Set 1: Simspray	18.0	—
Simspray + Vitazyme	21.0	3.0 %-points
Set 2: Simspray	17.0	—
Simspray + Vitazyme	20.0	3.0 %-points
Average: Simspray	17.5	—
Simspray + Vitazyme	20.5	3.0 %-points



Increase in fruit Brix with Vitazyme: 3.0 %-points

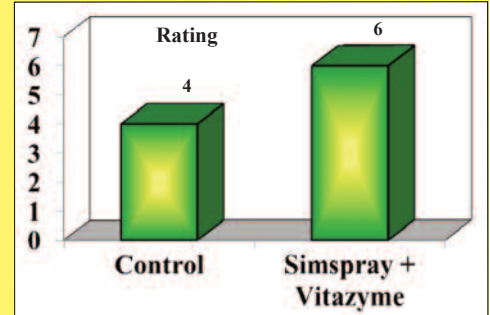
Fruit Pressure



The pressure of the Simspray was greater due to the lack of maturity for many of these cherries treated with Simspray only (i.e., they were still hard.)

Decrease in fruit pressure with Vitazyme: 14%

Color Rating¹



¹A color wheel was used to rate the shade of red, from 1 to 7, 7 being the darkest.

Increase in dark red color with Vitazyme: 2 points

Conclusions: A Sweetheart cherry study in central Washington, using Vitazyme for the last two of five applications after three Simspray seaweed applications, as compared to cherries treated five times with Simspray only, revealed that Vitazyme greatly improved fruit development and quality. Average cherry size was increased (83% 8.5 and 9-row cherries vs. 55% for Simspray), fruit weight was improved (12%), fruit Brix was dramatically raised (3.0 percentage points), and

fruit color was greatly darkened at harvest. A reduction in fruit pressure was caused by hard, immature fruit for the Simspray-only treatment. According to the researchers, the Vitazyme treated fruit was larger, heavier, better colored, and sweeter than the Simspray-only treated fruit. The yield improvement realized from the product would likely be around 12%, the same as the fruit weight increase, assuming fruit set for both treatments was similar. It is likely that cherry quality and yield would have been even greater had Vitazyme been applied early in the season instead of Simspray.

Cherries

A Comparison with Stimplex Seaweed

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: KS Orchards, Silver Hawk

Location: Royal City, Washington

Variety: Skeena

Tree density: 16 feet between rows, 8 feet in-row (0.002938 acre/tree), or 340 trees/acre

Tree age: 5 years

Rootstock: Mazard

Soil type: Adkins very fine sandy loam and Taunton very fine sandy loam

Experimental design: An 8-acre cherry block was divided into two equal halves, one half treated with Stimplex and the other half treated with Vitazyme four times. The purpose of the trial was to determine the effect of the products on cherry quality.

1. Stimplex

2. Vitazyme

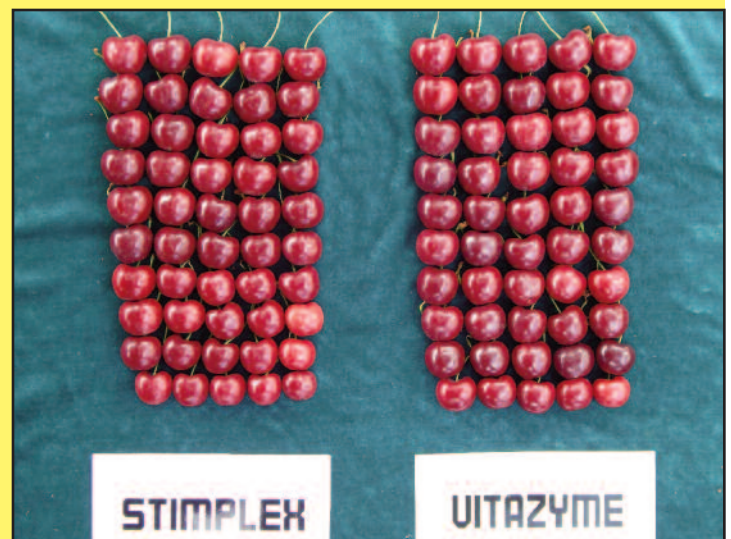
Fertilization: 50 lb/acre of N the fall of 2013, and 35 lb/acre of N in April of 2014

Vitazyme application: (1) 16 oz/acre on April 16; (2) 16 oz/acre on April 23; (3) 16 oz/acre on April 30; (4) 16 oz/acre on May 7. An air-blast sprayer (Rears Powerblast TTN 400) was used to apply the product, at 200 gal/acre and 3 mph.

Stimplex application: 48 oz/acre at the same times as Vitazyme (above)

Growing season weather: favorable: low springtime temperatures but little frost, and high temperatures during fruit maturation and harvest

Harvest date: Samples were taken July 8, which was about harvest time.

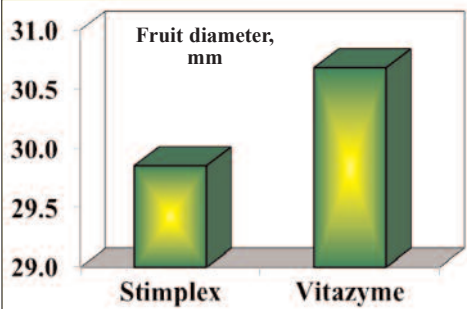


Skeena cherries treated with Vitazyme produced larger, heavier fruit with better pressure and Brix than those treated with Stimplex Seaweed. Continued on the next page

Fruit quality results: Data were collected from 50 randomly selected cherries from the two treatments. Values were averaged from the 50 fruit.

Fruit Size¹

Treatment	Fruit diameter	Diameter change
	mm	mm
Control	29.856	—
Vitazyme	30.681	0.825 (+3%)



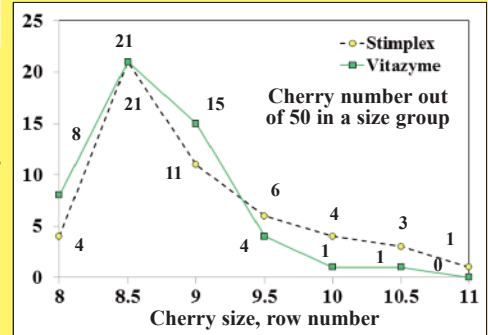
¹Determined using a standard sizer card.

Cherries in Size Groupings (50 fruit each)

Size, row number ¹	Stimplex		Vitazyme	
	Cherry number	%	Cherry number	%
8	4	8	8	16
8.5	21	42	21	42
9	11	22	15	30
9.5	6	12	4	8
10	4	8	1	2
10.5	3	6	1	2
11	1	2	0	0

¹Cherry sizes are designated by "row", which originated when the size was determined by the number of fruit that would fit across the top of a cherry box. The smaller the number, the larger the cherry. An industry standard cherry sizer card was used.

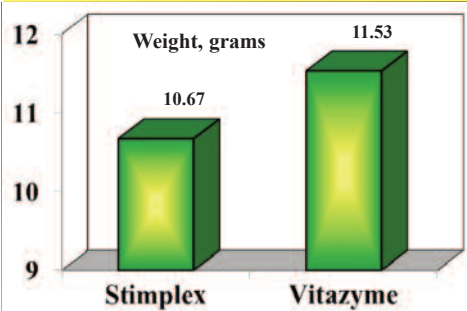
Cherry Size Review



A 3% fruit diameter improvement was realized with Vitazyme versus the Stimplex treatment. Vitazyme moved cherry size toward the larger diameter versus Stimplex.

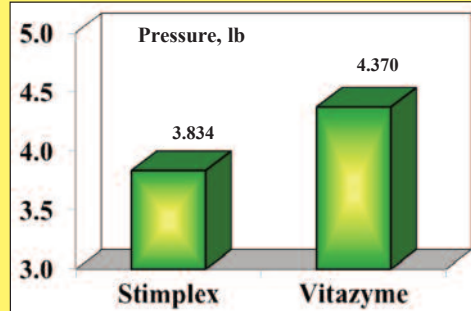
Increase in fruit size with Vitazyme: 3%

Fruit Weight¹



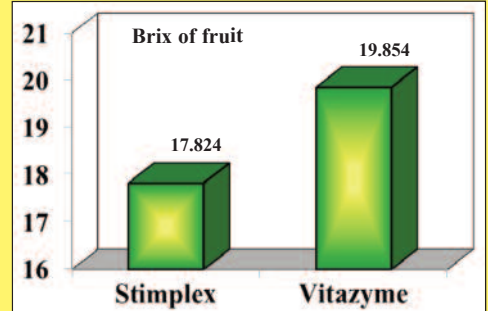
¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined by QA Supplies penetrometer.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit weight with Vitazyme: 8%

Increase in fruit pressure with Vitazyme: 14%

Increase in fruit Brix with Vitazyme: 2.030 %-points

Conclusions: This Skeene cherry study in central Washington revealed that four applications of Vitazyme improved the quality of the fruit substantially compared to four applications of Stimplex seaweed extract. Fruit size was improved by 3%, with size groupings moved toward the larger diameter fruit, as evaluated by "row number" designations. Average cherry weight was increased above Stimplex by 8%, fruit pressure by 14%, and fruit Brix by a full 2.03 percentage points. Though yield was not measured, if the fruit set was similar for both treatments there would be a decided advantage for the Vitazyme treatment. These results prove that Vitazyme is a superior agronomic tool for improving cherry size, grade, storability and less transport damage, and sweetness than is Stimplex seaweed. Moreover, Vitazyme sells for about \$60.00/gal, and is used at 16 oz/acre for four applications, or 64 oz/acre a season, costing about \$30.00/acre. Stimplex, on the other hand, is applied at 48 oz/acre each time, requiring 192 oz/acre for a season, at a cost of about \$50.00/gal; the seasonal cost is around \$75.00/acre. Thus, product cost for Stimplex is 250% higher than for Vitazyme, and the response with the crop is much less. Cherry farmers in Washington would do well to incorporate Vitazyme into their production programs.

Cherries

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Variety: Rainier

Farmer: Martinez Livestock, Inc.

Location: China Bar, near Mattawa, Washington

Rootstock: Mazard

Tree density: 16 feet between rows, 10 feet in-row (0.00367 acre/tree), or 272 trees/acre

Tree age: 23 years

Experimental design: A 19-acre block of Rainier cherries, interspersed with Bing cherries, was divided into two equal parts, with Vitazyme applied four times to one half, and the other half was left as an untreated control. The purpose of the study was to determine the effect of the product on cherry quality.

1. Control

2. Vitazyme

Fertilization: 4 lb/acre of dry nitrogen

Vitazyme application: (1) 16 oz/acre at petal fall; (2) 16 oz/acre 15 days after petal fall; (3) 16 oz/acre 30 days after petal fall; (4) 16 oz/acre 45 days after petal fall. An air-blast sprayer was used giving 100 to 200 gal/acre, with a driving speed of 2.1 to 2.2 mph.

Growing season weather: The weather during the growing season was good for cherry production.

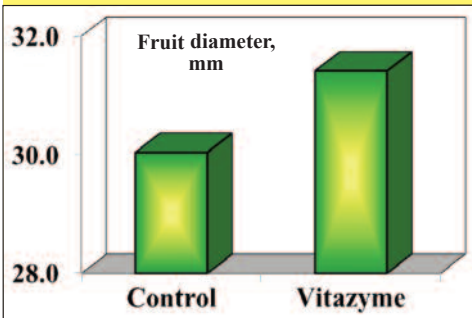
Appearance during the growing season: The researcher and the farmer both noted that the treated cherries were larger than the control cherries, and there was less disease in the treated trees as well.

Harvest date: June 16, 2014

Fruit quality results: Fifty random samples of fruit were collected from each treatment on harvest day for the following evaluations.

Fruit Size¹

Treatment	Fruit diameter	Diameter change
	mm	mm
Control	30.039	—
Vitazyme	31.413	1.374 (+5%)



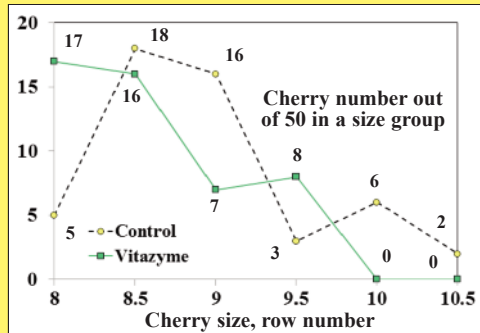
¹Determined using a standard card sizer.

Cherries in Size Groupings (50 fruit each)

Size, row number ¹	Stimplex Cherry		Vitazyme Cherry	
	number	%	number	%
8	17	34	5	10
8.5	16	32	18	36
9	7	14	16	32
9.5	8	16	3	6
10	0	0	6	12
10.5	0	0	2	2

¹Cherry sizes are designated by "row", which originated when the size was determined by the number of fruit that would fit across the top of a cherry box. The smaller the number, the larger the cherry. An industry standard cherry sizer card was used.

Cherry Size Review

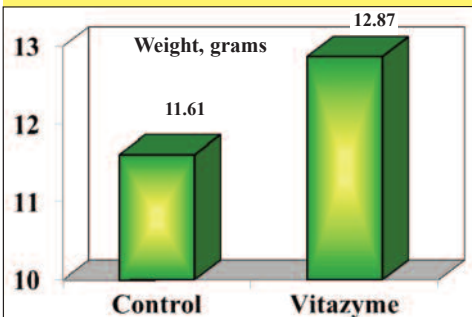


Vitazyme produced a greater fruit diameter than the control by 5%.

Vitazyme moved the cherries into the larger size group; especially at 8-row.

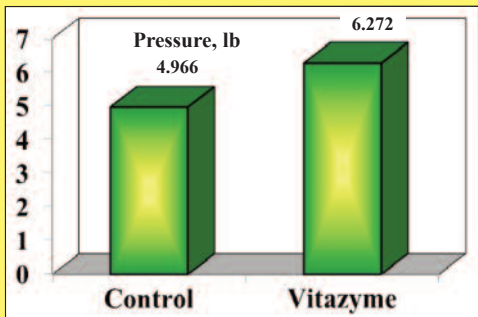
Increase in fruit size with Vitazyme: 5%

Fruit Weight¹



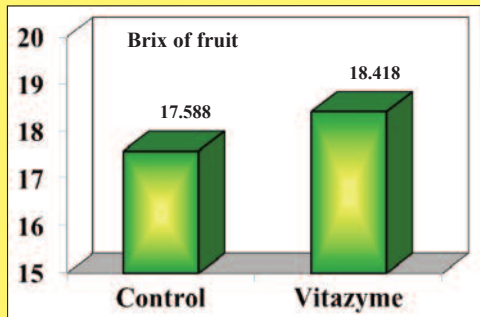
¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined by QA Supplies penetrometer.

Fruit Brix¹



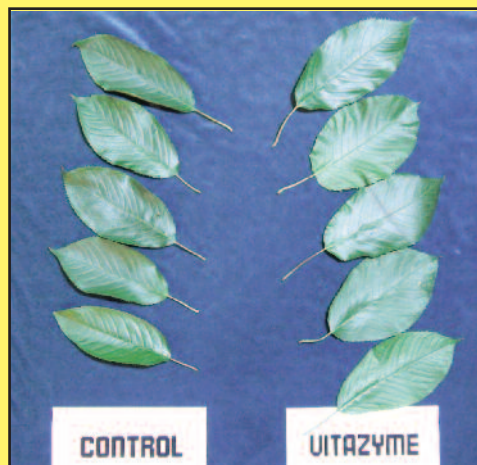
¹Determined using an Atago PAL-1 refractometer.

Increase in fruit weight with Vitazyme: 11%

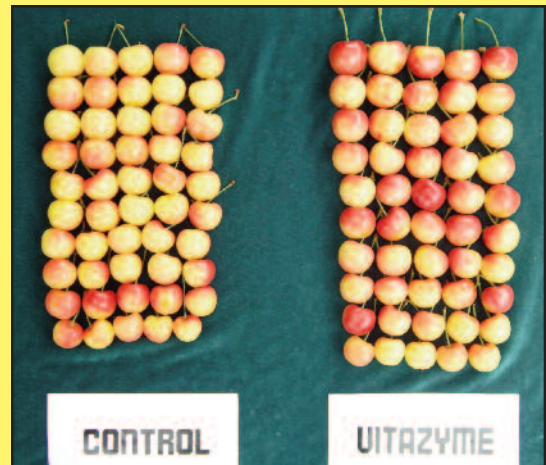
Increase in fruit pressure with Vitazyme: 26%

Increase in fruit Brix with Vitazyme: 0.83 %-point

Conclusions: A Rainier cherry split-orchard trial in central Washington revealed that four 16-ounce applications of Vitazyme, beginning at petal fall, greatly enhanced the quality of the fruit. Fruit diameter was improved by 5%, with 34% of the cherries in the Vitazyme treatment being 8 row, compared to only 10% in the control treatment. Size was moved substantially towards the larger diameter with Vitazyme. Likewise, fruit weight was increased by 11%, fruit pressure by an amazing 26%, and fruit Brix by 0.83 percentage-point compared to the untreated control cherries. The firmer fruit means better transportability and less bruising during marketing, leading to longer shelf life and a better appearance for the consumer. No yield determinations were made, but had they been the Vitazyme treatment would have shown a substantial yield increase versus the control. This simple program is shown to be an excellent complement to successful cherry production in Washington, and due to its low cost, a very profitable one.



Vitazyme treated Rainier cherries displayed larger leaves having more chlorophyll than untreated trees.



Larger, more supple fruit having higher skin pressure and Brix resulted from four Vitazyme applications.

Cherries

Researcher: Casimir Lorentz, Quincy Farm Chemicals, and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Weber Orchards, Sylvestre Evangelista, farm manager

Location: Quincy, Washington

Variety: Bing

Rootstock: Mazard

Soil type: sandy loam

Tree density: 22 feet between rows, 20 feet in-row (0.010101 acre/tree), or 99 trees/acre

Tree age: 32 years

Experimental design: Three blocks (13 acres each) of Bing cherries, seven rows in each of these blocks, were treated with Vitazyme, while the other rows served as untreated controls. The objective of the study was to determine the efficacy of this product to improve the yield of fruit.

1. Control 2. Vitazyme

Fertilization: standard orchard practice

Vitazyme application: (1) 16 oz/acre at first white; (2) 16 oz/acre at petal fall; (3) 16 oz/acre at first cover; (4) 16 oz/acre 7 days after first cover. An air-blast sprayer was used, giving 80 gallons/acre, driven at a speed of 3.5 mph.

Growing season observations: The researcher noted that the Vitazyme treated cherries were larger than the untreated fruit, and they were also sweeter.

Growing season weather: favorable for crop development

Harvest date: June 20, 2014

Yield results: To determine yield, three pounds of cherries were picked randomly for each treatment, and the number of fruit were counted in these samples.

There was a great increase in fruit size with Vitazyme treatment, such that only 116 cherries were needed to total three pounds of fruit, whereas the control treatment required 142 cherries for the same weight. This difference indicates a

16% increase in fruit weight per cherry. If one assumes an equal fruit load on both the control and Vitazyme treated trees, then this difference should indicate a 16% yield increase with Vitazyme.

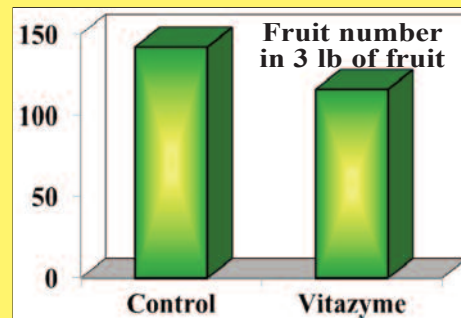
Conclusions: A Bing cherry study in central Washington, applied four times starting at first white, caused considerably larger fruit, which produced a yield increase that most likely approached 18%, if fruit set was the same for both treatments. This program is shown to be highly efficacious for cherry production in the Pacific Northwest.



Three pounds of Bing cherries for the control and Vitazyme treatment revealed a great increase in size (few fruit to equal three pounds) for Vitazyme.

Change in Fruit Size and Weight

Treatment	Fruit number in three lb	Fruit number change
Control	142	—
Vitazyme	116	(-) 26 (-18%)



Likely increase in cherry yield with Vitazyme: 18%

Cherries

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Martinez Livestock, Inc.

Location: China Bar, near Mattawa, Washington

Variety: Bing

Rootstock: Mazard

Tree age: 23 years

Tree density: 16 feet between rows, 10 feet in-row (0.00367 acre/tree), or 272 trees/acre

Experimental design: A 19-acre block of cherry trees was divided into two equal portions, a Vitazyme treated area (four applications) and an untreated control area. The purpose of the study was to evaluate the effect of this product on cherry yield and quality.

1. Control 2. Vitazyme

Fertilization: 4 lb/acre of dry nitrogen

Vitazyme application: (1) 16 oz/acre at petal fall; (2) 16 oz/acre 15 days after petal fall; (3) 16 oz/acre 30 days after petal fall; (4) 16 oz/acre 45 days after petal fall. An air-blast sprayer was used giving 100 to 200 gal/acre, with a driving speed of 2.1 to 2.2 mph.

Growing season weather: The weather during the growing season was good for cherry production.

Appearance during the growing season: Both the researcher and the farmer noted that the treated cherries looked larger and healthier than the control cherries during the growing season.

Harvest date: June 16, 2014



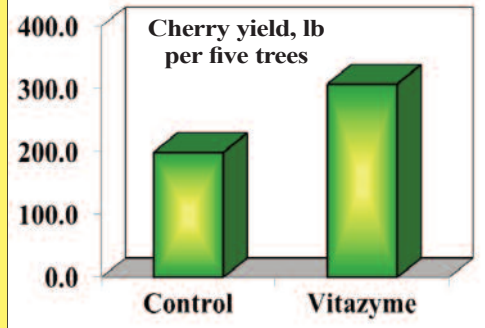
The bin on the right is the total cherry yield from 5 trees treated with Vitazyme (308 lbs). The bin on the left is the total cherry yield from 5 untreated-control trees (199 lbs). Not only did Vitazyme increase yield by a remarkable 55%, the cherries were larger, darker and generally more marketable than those from the untreated-control.

Yield results: Five trees in the Vitazyme treated side were picked and yielded 308 lb, while five trees a few rows away in the untreated side yielded 199 lb. A similar fruit set was selected for the trees from the two sides.

Cherry Yield

Treatment	Yield, 5 trees	Yield, 1 tree	Yield per acre*	Yield increase
	lb	lb	lb	lb
Control	199	39.8	10,826	—
Vitazyme	308	61.6	16,755	5,929 (+55%)

*Based on 272 trees/acre



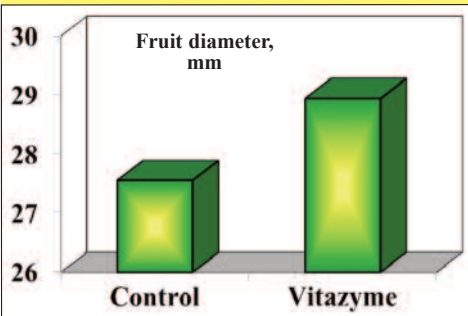
Increase in fruit yield with Vitazyme: 55%

It is clear that the Vitazyme treated cherry yield was remarkably higher (+55%) than the control treatment. As shown below, this yield improvement was due not just to more fruit, but larger fruit as well.

Fruit quality results: Fifty random samples of fruit were collected from each treatment on harvest day for the following evaluations.

Fruit Size¹

Treatment	Fruit diameter	Diameter change
	mm	mm
Control	27,554	—
Vitazyme	28,942	1,388 (+5%)



¹Determined using a standard sizer card.

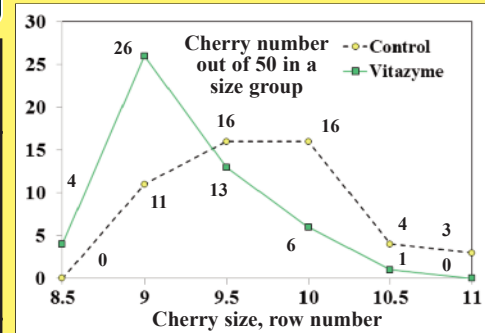
Cherries in Size Groupings (50 fruit each)

Size, row number ¹	Stimplex		Vitazyme	
	Cherry number	%	Cherry number	%
8.5	4	8	0	0
9	26	52	11	22
9.5	13	26	16	32
10	6	12	16	32
10.5	1	2	4	8
11	0	0	3	6

¹Cherry sizes are designated by "row", which originated when the size was determined by the number of fruit that would fit across the top of a cherry box. The smaller the number, the larger the cherry. An industry standard cherry sizer card was used.

Vitazyme produced a greater fruit diameter than the control by 5%.

Cherry Size Review

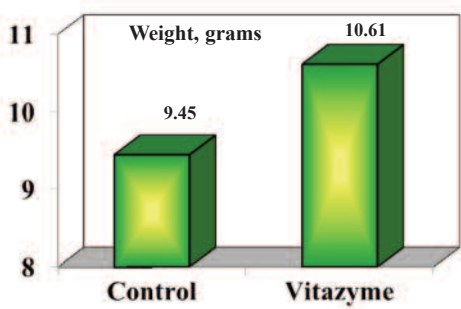


Increase in fruit size with Vitazyme: 5%

Color results: The color of the cherries was deeper red with Vitazyme treatments, as can be clearly seen in photos of the fruit.

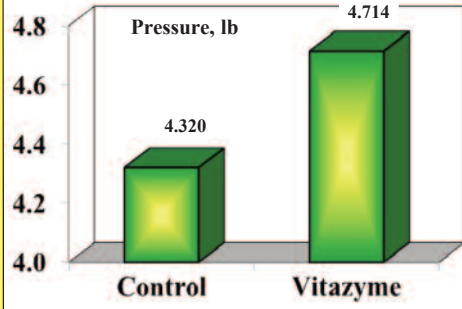
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Fruit Weight¹



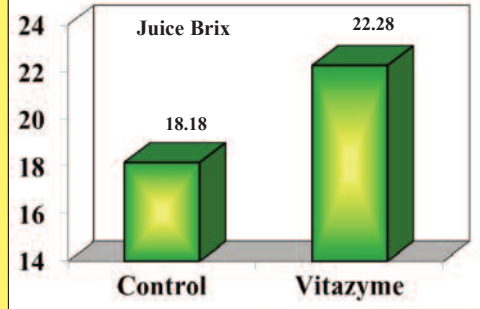
¹Determined using a Matrix-500 digital scale.

Fruit Pressure¹



¹Determined by QA Supplies penetrometer.

Fruit Brix¹



¹Determined using an Atago PAL-1 refractometer.

Increase in fruit weight with Vitazyme: 12%

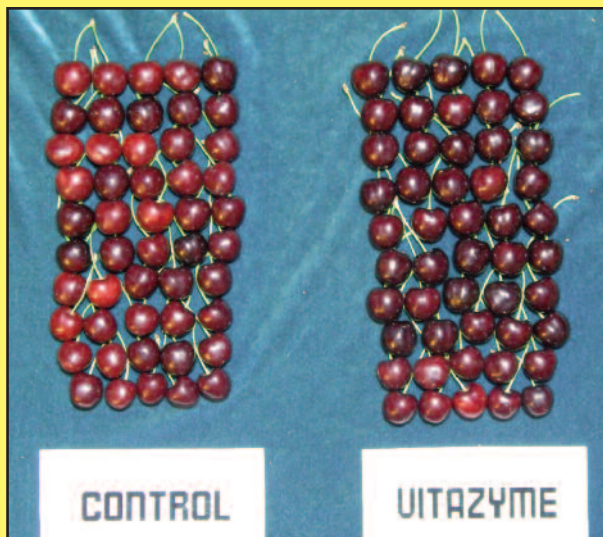
Increase in fruit pressure with Vitazyme: 9%

Increase in fruit Brix with Vitazyme: 4.10 %-points

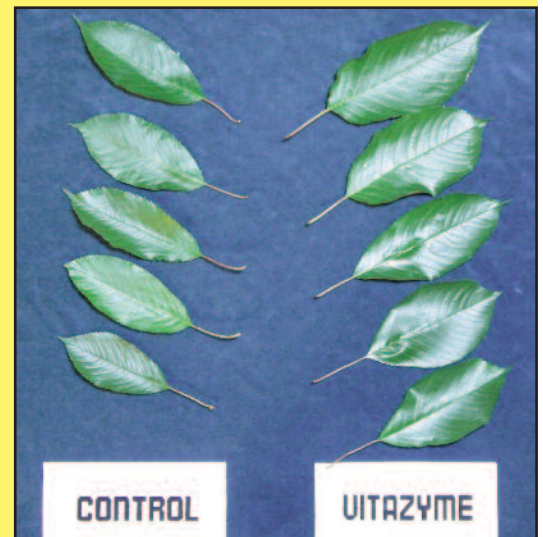


With 4 Vitazyme applications, the cherries on the right display a superior fruit set with better size and color than the untreated cherries on the left.

Conclusions: A Bing cherry split-field study in central Washington, using four 16-oz Vitazyme sprays compared to an untreated control, revealed that cherry yield was markedly enhanced (55%) with Vitazyme. The size of the treated cherries was improved by 5%, and the weight per fruit by 12%, accounting for this great yield difference. Cherry size was moved significantly towards the small row number, giving a larger size for packing. Fruit pressure was increased by 9% with Vitazyme, meaning shipping and spoilage damage would be less, while the Brix level of the fruit was raised by 4.10 percentage points. The higher Brix would further reduce spoilage over time. The gain in income from these four applications would be very high from both a total yield and a quality standpoint. Together with excellent results with cherries in 2013, Vitazyme is shown to be an excellent enhancer of cherry production in Washington.



The cherries on the right were treated with Vitazyme. They are larger and more uniform, with much better color than the untreated cherries on the left.



The leaves from the Vitazyme-treated Bing cherry trees on the right were larger and more chlorophyll-rich than those from the untreated-control on the left.

Cocoa

Farmer: Nguyen Kim Dinh

Location: Ea Po, Dak Nong, Viet Nam

Tree age: year six of bearing

Planting density: 1,100 trees/ha

Fertilization: unknown

Experimental design: A cocoa plantation was selected to evaluate the effects of Vitazyme on tree growth and yield. Fifty trees of three varieties were treated with Vitazyme, while an adjoining 100 trees were left untreated to serve as a control.

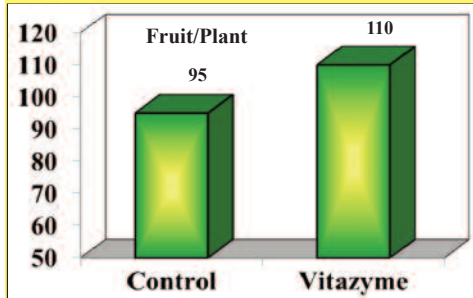
1. Control

2. Vitazyme

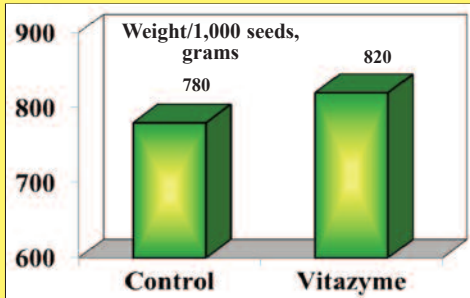
Vitazyme application: The 50 treated trees received 500 ml of Vitazyme in 200 liters of water five times in a year, applied on April 4, August 22, and October 24 of 2012, and January 24 and March 19 of 2013. The total application was 2.5 liters for the 50 trees, or 50 ml of Vitazyme per tree per year in a 0.5% dilution.

Variety TD3

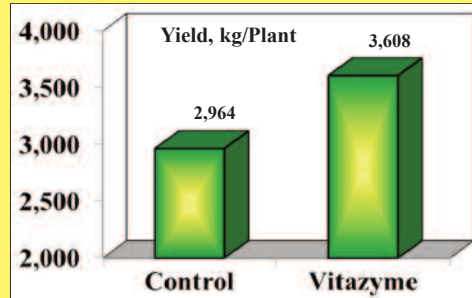
Fruit Per Tree



Weight Per 1,000 Seeds



Seed Yield



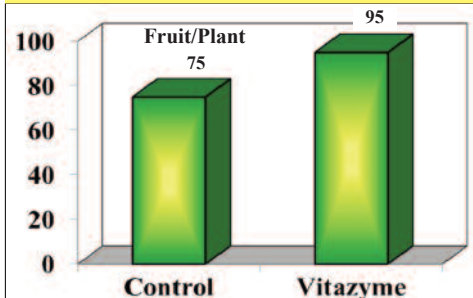
Increase in fruit per tree with Vitazyme: 16%

Increase in 1,000-seed weight with Vitazyme: 5%

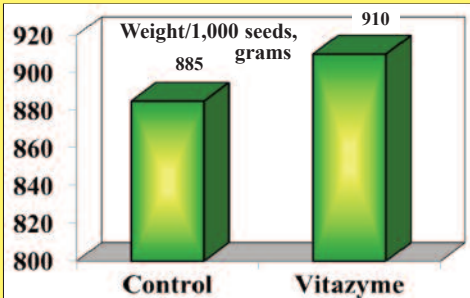
Increase in yield with Vitazyme: 22%

Variety TD5

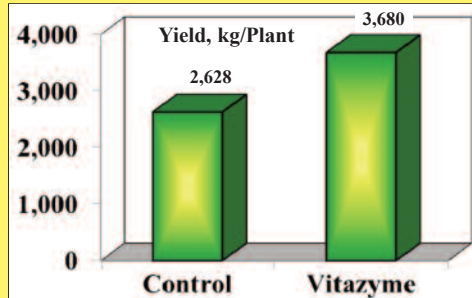
Fruit Per Tree



Weight Per 1,000 Seeds



Seed Yield



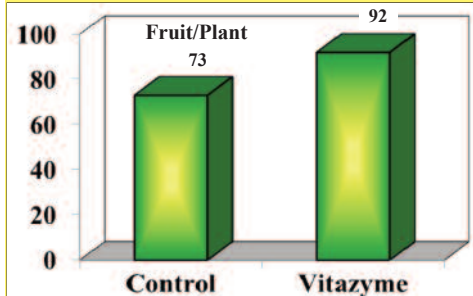
Increase in fruit/tree with Vitazyme: 27%

Increase in 1,000-seed weight with Vitazyme: 3%

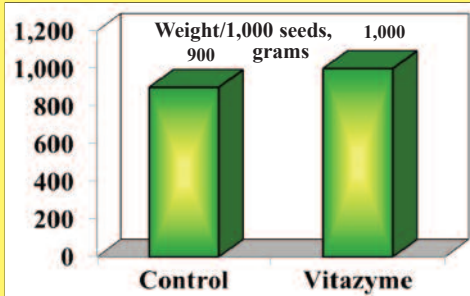
Increase in yield with Vitazyme: 40%

Variety TD9

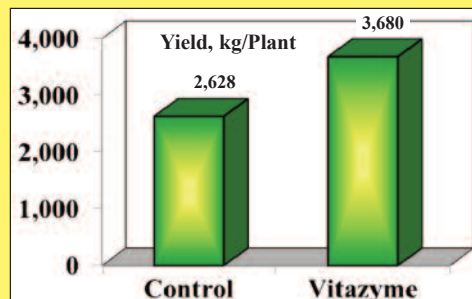
Fruit Per Tree



Weight Per 1,000 Seeds



Seed Yield



Increase in fruit/tree with Vitazyme: 26%

Increase in 1,000-seed weight with Vitazyme: 11%

Increase in yield with Vitazyme: 40%

Continued on the next page

Conclusions: A summary of the results for the three varieties of cocoa, utilized in this Viet Nam Vitazyme trial, is given below.

Cocoa Income

Treatment	Income with Vitazyme		
	TD3	TD5	TD9
Fruit per tree	16%	27%	26%
Weight per 1,000 seeds	5%	3%	11%
Seed yield	22%	40%	40%

All three varieties of cocoa responded favorably to Vitazyme, the fruit per tree increasing by 16 to 27% over the course of five treatments for a year. Seed weight increased by 3 to 11%, while the all-important yield was improved by 22% to 40%. These yield responses were highly profitable. The cost for 2.5 liters of Vitazyme for 50 trees was 700,000 Vietnamese dollars (VND), and the spraying cost was 20,000 VND. Net income increases are shown above.

Increase income with Vitazyme

	TD3	TD5	TD9
Fifty trees	1,147,000	1,608,000	2,330,800
Per hectare, VND	25,247,200	35,391,400	51,277,600
Per hectare, USD¹	1,262.36	1,769.57	2,563.88

¹ Vietnamese Dong = 0.00005 U.S. dollar.

Corn

University of Missouri - Bradford Research Center

Researcher: Manjula Nathan, Ph.D.

Location: University of Missouri Bradford Research Center, Columbia, Missouri

Variety: Dekalb 62-97

Population: 32,000 seeds/acre

Row spacing: 30 inches

Planting date: May 16, 2013

Experimental design: A replicated corn study (six replications), in a randomized complete block design, was established using six-row plots for each treatment, each being 100 feet long (0.03443 acre/plot). The objective of the study was to evaluate the effect of Vitazyme, applied to the seeds and later on the leaves, on leaf nutrient and yield parameters.

1. Control

2. Vitazyme on the seeds and leaves

Fertilization: according to soil test recommendations using 160-46-62 lb/acre N-P₂O₅-K₂O before planting

Vitazyme application: (1) 13 oz/acre equivalent on the seeds, mixed thoroughly, just before planting (6.5 oz of Vitazyme applied to 16,000 seeds); (2) 13 oz/acre on the leaves and soil at the 8-leaf stage (knee height) on July 3.

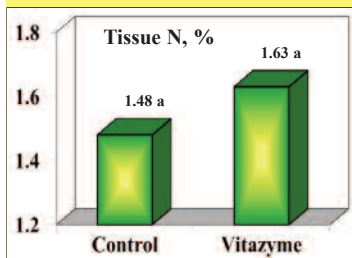
Weather during the 2013 growing season: A wet spring delayed planting; otherwise, conditions for growth were favorable except for a short-duration drought in August and early September. Heavy rain after fertilizer application in May could have caused some nitrogen loss.

Tissue nutrient levels: Ear leaf samples were collected July 26 at silking. These samples were analyzed for N, P, K, Ca, and Mg at the University of Missouri. Vitazyme increased all five tissue elements analyzed, with increases ranging from 3% (K) to 39% (Ca). The Ca and Mg increases were significant, especially Ca (39%), while N, P, and K increases were not significant.



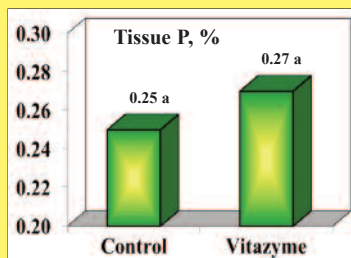
Greater root development has helped the Vitazyme treated corn absorb the needed nutrients to prevent yield loss.

Corn Tissue Nitrogen



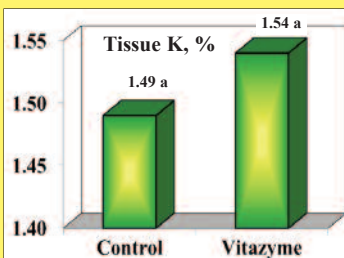
P > F = 0.208

Corn Tissue Phosphorus



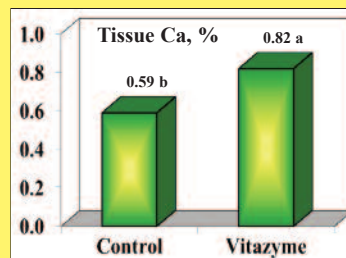
P > F = 0.604

Corn Tissue Potassium



P > F = 0.208

Corn Tissue Calcium



P > F = 0.034

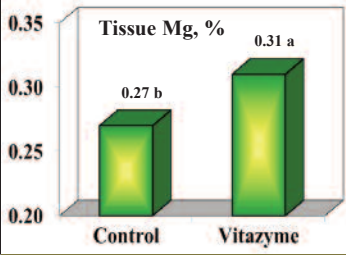
Increase in N with Vitazyme: 10%

Increase in P with Vitazyme: 8%

Increase in K with Vitazyme: 3%

Increase in Ca with Vitazyme: 39%

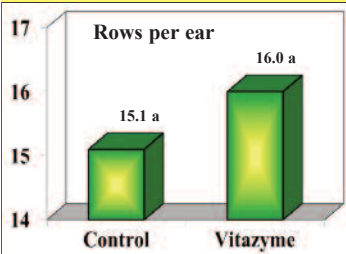
Corn Tissue Magnesium



P > F = 0.079

Increase in Mg with Vitazyme: 15%

Rows On Ears

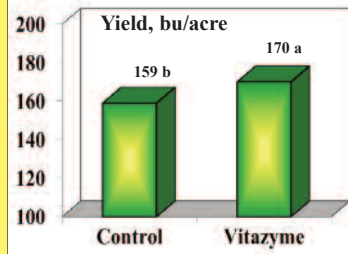


P > F = 0.317

Increase in rows on ears with Vitazyme: 0.9 row

Yield parameter results: Two applications of Vitazyme greatly improved corn grain yield, by 11 bu/acre, above the control.

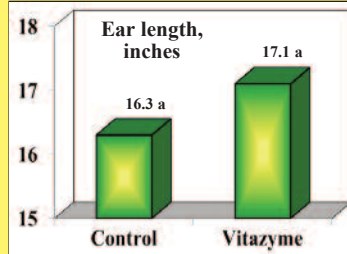
Grain Yield



P > F = 0.99

Increase in grain yield with Vitazyme: 7%

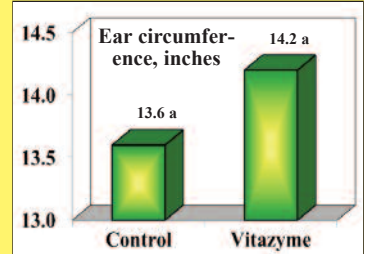
Ear Length



P > F = 0.345

Increase in ear length with Vitazyme: 5%

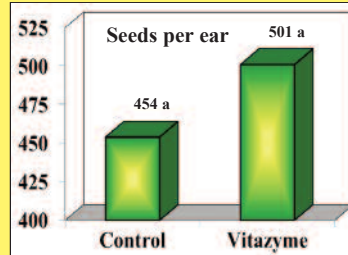
Ear Circumference



P > F = 0.113

Increase in ear circumference with Vitazyme: 4%

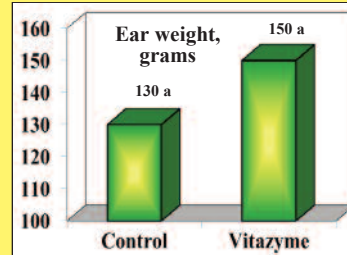
Seeds Per Ear



P > F = 0.172

Increase in seeds per ear with Vitazyme: 10%

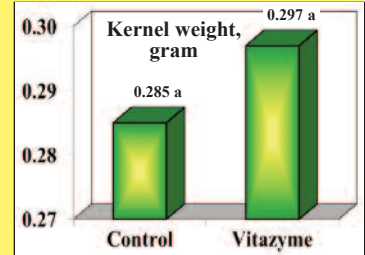
Weight Per Ear



P > F = 0.253

Increase in weight per ear with Vitazyme: 15%

Weight Per Kernel



P > F = 0.474

Increase in weight per kernel with Vitazyme: 4%

Conclusions: A replicated corn trial at the University of Missouri in 2013 revealed that Vitazyme, applied on the seeds before planting, and again at 13 oz/acre to the leaves and soil at V8, improved tissue nutrient levels as well as yield and all harvest parameters, significantly. A summary of these effects is as follows:

Increase with Vitazyme

Yield Parameters

- Grain yield 7%*
- Ear length 5%
- Ear circumference 4%
- Rows per ear 0.9 row/ear
- Seeds per ear 10%
- Weight per ear 15%
- Weight per kernel 4%

Tissue Parameters

- Nitrogen 10%
- Phosphorus 8%
- Potassium 3%
- Calcium 39%*
- Magnesium 15%*

*Significantly greater than the control, at P=0.10 or less.



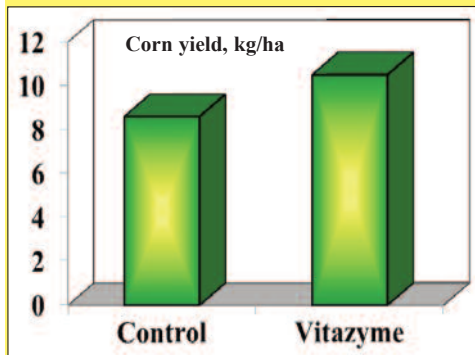
Vitazyme treated corn on the right displays more chlorophyll and no nitrogen deficiency in the lower leaves

Corn

Five Trials in Mexico

El Monte, Jalisco, Mexico

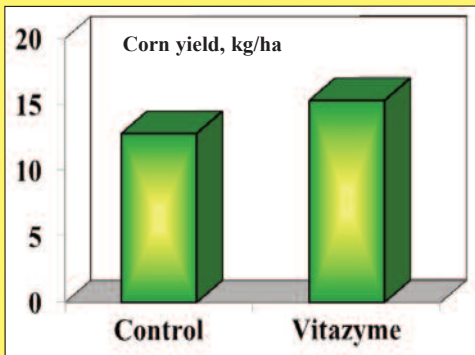
Treatment	Corn yield tons/ha	Yield change tons/ha
Control	8.6	—
Vitazyme	10.5	1.9 (+22%)



Increase in corn yield with Vitazyme: 22%

La Mesita, Jalisco, Mexico

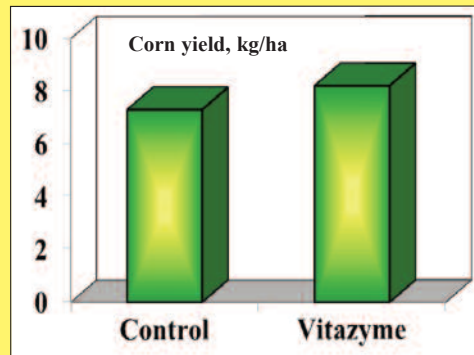
Treatment	Corn yield tons/ha	Yield change tons/ha
Control	12.8	—
Vitazyme	15.3	2.5 (+20%)



Increase in corn yield with Vitazyme: 20%

El Llano, Jalisco, Mexico

Treatment	Corn yield tons/ha	Yield change tons/ha
Control	7.30	—
Vitazyme	8.21	0.91 (+12%)



Increase in corn yield with Vitazyme: 12%

Researcher: unknown

Research organization: Quimica Lucava

Experimental design: All trials utilized a split field, with Vitazyme applied to a portion to determine effects of the product on yield.

1. Control
2. Vitazyme (2X)

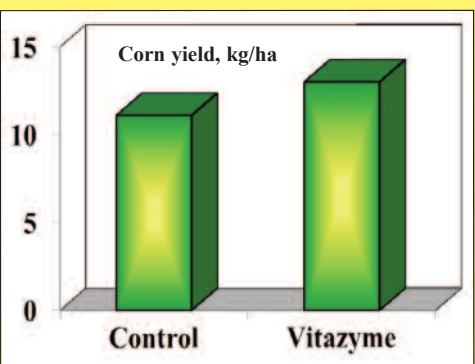
Fertilization: unknown

Vitazyme application: (1) 0.25 liter/ha on the seeds at planting; (2) 1 liter/ha sprayed on the plants and soil 30 days later.

Conclusions: These five Mexican corn trials showed excellent yield responses to Vitazyme, when applied to the seeds and later to the leaves and soil. The average yield increase was 2.49 tons/ha, or 36% more than the control plants, giving an overall increase in profit of 6,826 pesos/ha (\$546.08/ha). With a cost:benefit rate of 13:7:1, this Vitazyme program is highly recommended for corn growers across Mexico.

Camino a la Coronilla, Jalisco, Mexico

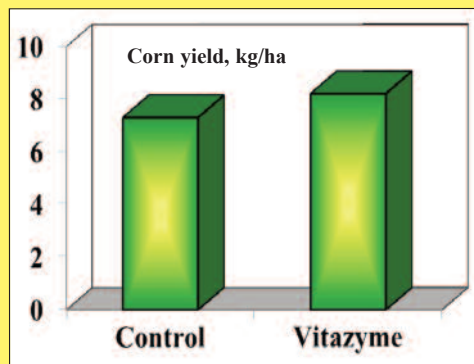
Treatment	Corn yield tons/ha	Yield change tons/ha
Control	11.1	—
Vitazyme	13.0	1.9 (+17%)



Increase in corn yield with Vitazyme: 17%

San Juan Acozac, Puebla, Mexico

Treatment	Corn yield tons/ha	Yield change tons/ha
Control	4.75	—
Vitazyme	10.00	5.25 (+111%)



Increase in corn yield with Vitazyme: 111%

Economic Evaluation of All Trials

Income from the average yield increase (2.49 tons/ha)	7,476 pesos
Cost of Vitazyme (1.25 liters/ha)	500 pesos
Cost of application	150 pesos
Profit (income versus costs)	6,826 pesos
Cost:Benefit ratio	13.7:1

Corn

Agricultural Custom Research and Education Services (ACRES)

Researcher: Bertel Schou, Ph.D.

Research organization: Agricultural Research and Educational Services

Location: Cedar Falls, Iowa

Variety: Pioneer PO453 AM (Roundup Ready)

Planting date: May 8, 2014

Planting rate: 38,000 seeds/acre

Planting depth: 1.5 inches

Soil type: Aredale loam (36% sand, 42% silt, 22% clay, 4.6% organic matter, pH = 6.2, cation exchange capacity = 17.6 meq/100 g)

Soil test results: (Perry Agricultural Laboratory, Bowling Green, Missouri): total exchange capacity = 18.29 meq/100 g, pH = 5.8, organic matter = 2.7%, nitrogen = 74 lb/acre, sulfur (as sulfate) = 36 lb/acre, phosphorus (P) = 131 lb/acre, calcium (Ca) = 2,973 lb/acre, magnesium (Mg) = 707 lb/acre, potassium (K) = 264 lb/acre, sodium (Na) = 80 lb/acre, boron (B) = 3.16 lb/acre, iron (Fe) = 693.6 lb/acre, manganese (Mn) = 118.4 lb/acre, copper (Cu) = 2.8 lb/acre, zinc (Zn) = 5.6 lb/acre; percent base saturations: Ca = 54.3, Mg = 16.10, K = 1.85, Na = 0.95, other bases = 5.80%, H = 21.00.

Row width: 30 inches **Planting conditions:** good

Tillage: conventional **Previous crop:** soybeans

Experimental design: A small-plot corn study was conducted to evaluate the effect of Vitazyme and seaweed exact, using two applications, alone and in combination, on the yield of corn. There were four replications, with each plot four rows x 30 feet (10.00689 acres/plot); the two middle rows were harvested for analysis. A randomized complete block design was used.

Fertilization: All areas received 90 lb/acre of urea ammonium nitrate (UAN) on June 9.

Vitazyme application: (1) 13 oz/acre in-furrow at planting (May 8, 2014) using 38 ml/gallon at 10 gallons/acre; (2) 13 oz/acre on the leaves and soil at V6 (July 2, 2014), using 26 ml/gallon at 15 gallons/acre

Seaweed application: obtained from Ocean Organics; (1) 2 quarts/acre applied in-furrow at planting (May 8, 2014), using 189 ml/gallon at 10 gallons/acre; (2) 2 quarts/acre applied foliar after V6 (July 2, 2014) using 126 ml/gallon at 15 gallons/acre

Weather for 2014: Growing conditions for the trial were very good, with temperatures below normal and precipitation consistent throughout the crop cycle, except for a few days in June and August.

Irrigation: overhead center-pivot irrigation on June 12 and 13, and on August 11 to 14, and 18.

Harvest date: October 21, 2014, using a Massey-Ferguson plot combine

Plant population results:

Populations for the four treatments were very similar, without significant differences.

Grain moisture results: See table and graph at right.

Grain yield results: The two center rows of each plot were harvested.

Conclusions: A replicated corn study in east-central Iowa revealed that Vitazyme increased corn yield by 5.5%, followed closely by seaweed at



This corn trial at Cedar Falls, Iowa, revealed that Vitazyme increased corn yield by 5.5% (about 9 bu/acre), and seaweed also produced a good increase.

Treatment	In-furrow at planting	Foliar
1. Control	0	0
2. Vitazyme	13 oz/acre	13 oz/acre
3. Seaweed	2 quarts/acre	2 quarts/acre
4. Vitazyme + Seaweed	13 oz/acre + 2 quarts/acre	13 oz/acre + 2 quarts/acre

Plant Population

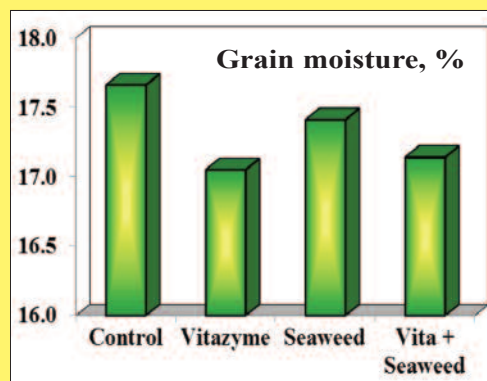
Treatment	Population*	Population change
	plants/acre	plants/acre
1. Control	34,065 a	—
2. Vitazyme	35,140 a	1,075 (+3%)
3. Seaweed	34,489 a	424 (+1%)
4. Vitazyme + Seaweed	34,111 a	46 (0%)
LSD (P = 0.05)	2,388	
CV	4.24%	
Treatment F	0.462	
Treatment probability	0.716	

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

Grain Moisture

Treatment	Grain moisture*	Moisture change
	%	%
1. Control	17.66 a	—
2. Vitazyme	17.05 a	(-) 0.61
3. Seaweed	17.41 a	(-) 0.25
4. Vitazyme + Seaweed	17.14 a	(-) 0.52
LSD (P = 0.05)	0.78	
CV	2.82%	
Treatment F	1.276	
Treatment probability	0.340	

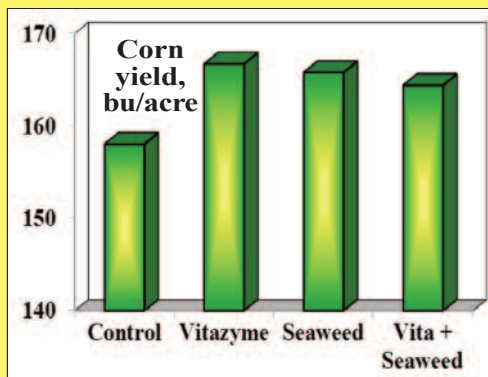
*Means followed by the same letter are not significantly different at P = 0.05, according to the Student-Newman-Keuls Test.



Continued on the next page

4.4%, and the combined products at 4.0%. Those increases were consistent, but no synergism was displayed between the two materials. Grain moisture was reduced by 0.61 percentage-point with Vitazyme, which gave the greatest reduction for the three treatments compared with the control. While these increases for the three treatments were not significant, they were consistently greater than the control so can be assumed to be real.

Corn Yield



Treatment	Corn yield*	Yield change
	bu/acre	bu/acre
1. Control	158.03 a	—
2. Vitazyme	166.70 a	8.67 (+5.5%)
3. Seaweed	165.78 a	7.75 (+4.9%)
4. Vitazyme + Seaweed	164.40 a	6.37 (+4.0%)
LSD (P = 0.05)	10.03	
CV	3.83%	
Treatment F	1.558	
Treatment probability	0.266	

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

Corn

Researcher: unknown

Research organization: Kernel Company, LLC, Ukraine

Location: Man'kivs'ky District, Cherkasy Region, Viktorivka Village, Ukraine

Variety: DK 440

Planting rate: 75,000/ha

Planting date: April 8, 2014

Previous crop: soybeans

Soil type: Chernozem, with 3.7% organic matter

Seedbed preparation: disk-plowing to 6-8 cm, plowing to 22-24 cm, harrowing, two cultivations to 5 - 6 cm.

Experimental design: A corn field was divided into a Vitazyme treated area and an adjoining control area, with the objective of evaluating the effect of this product on soybean yield. All other treatments — herbicides and fertilizers — were identical over the entire area.

1. Control

2. Vitazyme

Fertilization: 90 kg/ha of nitrogen broadcast and incorporated before planting, and 10-26-26 kg/ha of N-P₂O₅-K₂O applied in-furrow at planting.

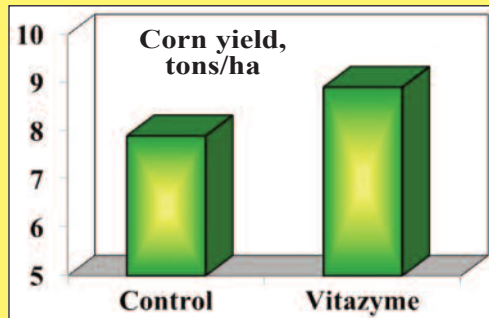
Vitazyme application: 1 liter/ha sprayed on the leaves and soil at the 5 to 6 - trifoliate stage, on May 3

Yield results: See table and graph at right.

Income results: The gross income minus expenses for the two treatments revealed the Vitazyme improved net income by 2,090 UAH/ha (\$132.72/ha at 1UAH = 0.0635 USD).

Treatment	Corn yield	Yield change
	tons/ha	tons/ha
Control	7.90	—
Vitazyme	8.91	1.01 (+13%)

Increase in corn yield with Vitazyme: 13%



Increase in income with Vitazyme: 2,090 UAH/ha

Conclusions: This corn trial in Ukraine, using a single 1 liter/ha Vitazyme application at the 5 to 6-leaf stage, revealed a substantial 13% yield increase, which netted the farmer an extra 2,090 UAH/ha (\$132.72/ha). This result shows as have many other corn trials in Ukraine over the past years, the great efficacy of the Vitazyme program to boost yields and profits.

Leeks

Researcher: Waking Novembre

Research organization: Acra Industries, Haiti

Location: Mirebalais, Haiti

Variety: unknown

Planting date: unknown

Harvest date: unknown

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

1. Control

2. Vitazyme

Fertilization: unknown

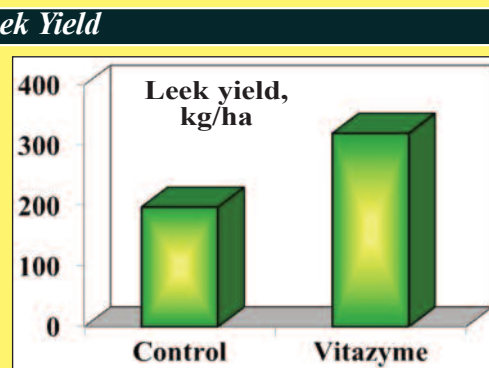
Vitazyme application: 1 liter/ha (13 oz/acre)

Yield results: See table and graph at right.

Conclusions: A leek study in Haiti revealed a great increase in yield with Vitazyme application, a full 62% higher than the untreated control. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Treatment	Leek yield	Yield change
	kg/ha	kg/ha
Control	198	—
Vitazyme	320	122 (+62%)

Increase in leek yield with Vitazyme: 62%



Lettuce

Researchers: Eng. Lucero Fernandez and Eng. Adrian Zapata

Farmer: Eng. Carlos Buen Rostro, owner of Agricola Amigo Packing Company

Research organization: Quimica Lucava

Variety: green leaf

Trial location: Rancho Jaramillo, Villagran, Guanajuato, Mexico

Planting date: February 11, 2014

Experimental design: A lettuce field had 16 rows selected to treat twice with Vitazyme, once on the transplants and once foliar/soil, to evaluate the effect of the product on yield.

1. Control

2. Vitazyme (2x)

Fertilization: unknown

Vitazyme application: (1) Seedling treatment in flats, by dipping the plantlets and media into a 0.5% solution (500 ml in 100 liters of water), on February 10, one day before transplanting; (2) a 1 liter/ha foliar spray on the small plants and soil, on March 3, 21 days after transplanting.

Harvest date: April 7, 2014

Yield results: To assess the lettuce yield, 25 plants were harvested from each area and weighed.

Lettuce Yield

Treatment	Plants harvested	Total weight	Weight/Plant	Plants/Ha	Weight/Ha	Weight change
		kg	kg	plants	kg/ha	kg/ha
Control	25	13.5	0.540	80,000	43,200	—
Vitazyme	25	14.1	0.564	80,000	45,120	1,920 (+5%)

Increase in lettuce yield with Vitazyme: 5%

Pre-harvest evaluation: A few days before harvest, plants from both treatments were dug and photographed, showing superior root and leaf development with Vitazyme.

Shelf-life evaluation: The lettuce heads for the two treatments were stored under room conditions for 72 hours. The Vitazyme treated heads showed better strength, less wilting, and reduced waste compared with the untreated heads. As a side note, it was discovered that the untreated heads attracted many more white flies than did the Vitazyme treated heads.

Conclusions: A field-scale lettuce trial in Mexico revealed a small but significant increase in yield (5%), resulting from several noted improvements due to Vitazyme's active agents.

- Greater root and leaf growth
- More uniformity of growth across the field
- Improved resistance to pests, diseases, and stress

A shelf-life study revealed improved storability of Vitazyme treated lettuce, making it easier for store managers to utilize the crop.

Okra

Researcher: Rock Lubin

Research organization: Acra Industries, Haiti

Location: Mirebalais, Haiti

Variety: unknown

Planting date: unknown

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

1. Control

2. Vitazyme

Fertilization: unknown

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

Harvest date: unknown

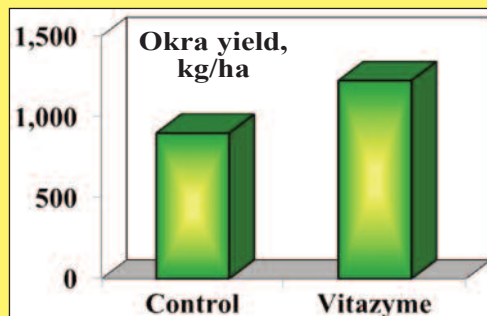
Yield results: See table and graph at right.

Conclusions: An okra study in Haiti revealed a great increase in yield with Vitazyme application, a full 36% above the untreated control. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Okra Yield

Treatment	Okra yield	Yield change
	kg/ha	kg/ha
Control	900	—
Vitazyme	1,225	325 (36%)

Increase in okra yield with Vitazyme: 36%



Onions

Researcher: Waking Novembre

Research organization: Acra Industries, Haiti

Location: Mirebalais, Haiti

Variety: unknown

Planting date: unknown

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

1. Control 2. Vitazyme

Fertilization: unknown

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

Harvest date: unknown

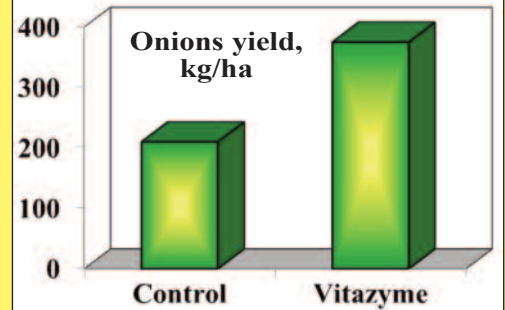
Yield results: See table and graph at right.

Conclusions: An onion study in Haiti revealed a great increase in yield with Vitazyme application, up 79% from the untreated control. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Onion Yield

Treatment	Onion yield kg/ha	Yield change kg/ha
Control	210	—
Vitazyme	375	165 (+79%)

Increase in onion yield with Vitazyme: 79%



Peanuts

Researcher: Rock Lubin

Research organization: Acra Industries, Haiti

Location: Boucan Carre, Haiti

Variety: unknown

Planting date: unknown

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

1. Control 2. Vitazyme

Fertilization: unknown

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

Harvest date: unknown

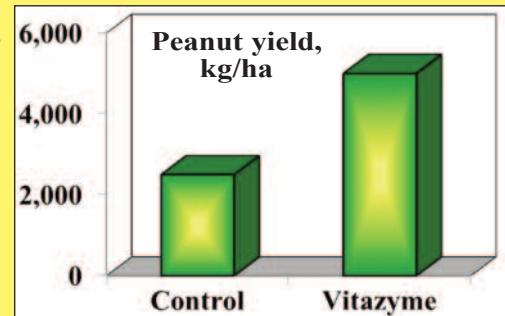
Yield results: See the table and graph at right.

Conclusions: A peanut study in Haiti revealed a great increase in yield with Vitazyme application, a doubling of the yield versus the untreated control. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Peanut Yield

Treatment	Peanut yield kg/ha	Yield change kg/ha
Control	2,500	—
Vitazyme	5,000	2,500 (+100%)

Increase in peanut yield with Vitazyme: 100%



Pears (Organic)

Synergism with Simplex Seaweed Extract

Researchers: Eloina Chavez, quality control leader, Stemilt Pear Receiving, and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Kyle Mathison Orchards

Variety: D'Anjou

Location: Stemilt Hill, Wenatchee, Washington

Tree age: 59 years

Rootstock: unknown

Tree density: 20 feet between rows, 10 feet in-row (0.0045913 acre/tree), or 218 trees/acre

Experimental design: A 4.0-acre block of pears was treated five times with Simplex seaweed, and a neighboring 13-acre block was treated with Simplex followed by Vitazyme. The objective of the study was to evaluate the effect of the products on pear quality and yield.

Treatment	Prebloom	20% bloom	80% bloom	Post-bloom 1*	Post-bloom 2*
Block 1: Simplex	X	X	X	X	X
Block 2: Simplex	X	X	X	O	O
Vitazyme	O	O	O	X	X

*Blight Ban and foliar nutrients added.

Fertilization: 7 tons/acre of compost

Vitazyme application: 16 oz/acre for both post-bloom applications. An air-blast sprayer delivered 200 gal/acre, driven 2 to 2.4 mph.

Simplex application: 48 oz/acre for all applications

Blight Ban and foliar nutrients: These products were added with the Vitazyme or Simplex.

Growing season weather: favorable



Vitazyme clearly has increased pear size when applied for the last two applications following three Stimplex seaweed sprays.

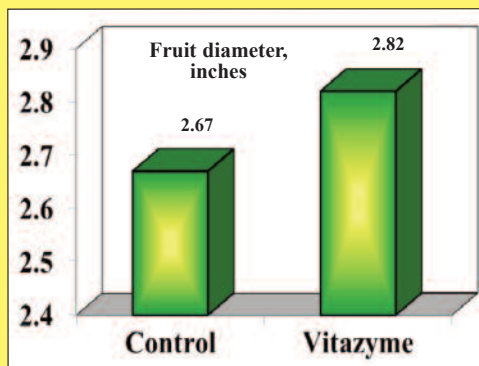
Fruit quality results: Forty-four pears of average size were picked from both treatments to evaluate fruit quality parameters. These analyses were performed at the Stemilt Quality Control facilities. Notice the great improvement in pear size for the larger diameters. Size 90 and larger constitutes 77% of the total fruit for the Vitazyme treatment, while Stimplex only had 36% of the fruit in the same size categories.

Conclusions: This Washington pear study revealed that Vitazyme, applied twice after three Stimplex seaweed applications, greatly increased pear quality above the Stimplex only treatment. Fruit size was moved toward the larger categories; 77% of the Vitazyme treated pears were size 90 or larger compared to only 36% for the Stimplex only treated pears. Fruit weight increased by 12% and fruit Brix by 0.72 percentage point, showing that Vitazyme produced larger, sweeter pears. A slight drop in fruit pressure with the product was of no practical consequence since both treatments provided high pressure values.



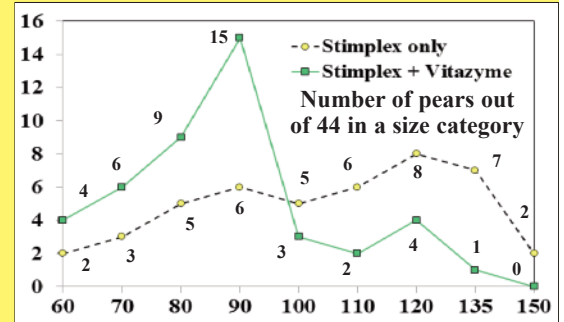
Vitazyme following Stimplex in this Washington trial revealed the effect of Vitazyme to improve fruit size, weight, and Brix versus Stimplex alone.

Fruit Size



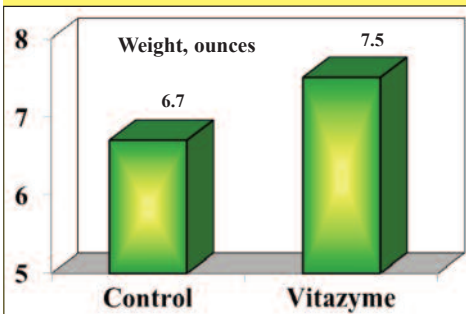
Increase in fruit diameter with Vitazyme: 6%

Pear Size Grade Review¹



¹Pears were sized by Eloina Chavez, quality control leader for Stemilt Pear Receiving. Size 60 is the largest, and size 150 is the smallest.

Fruit Weight¹

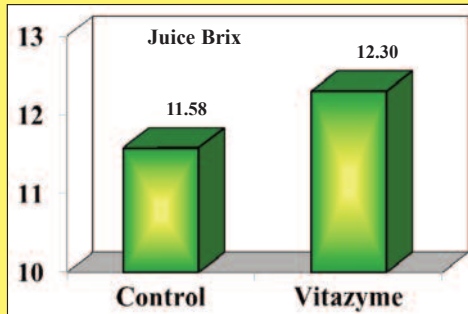


¹Determined using a Matrix-500 digital scale.

Increase in fruit weight with Vitazyme: 12%

A great increase in average fruit weight was noted.

Fruit Brix¹

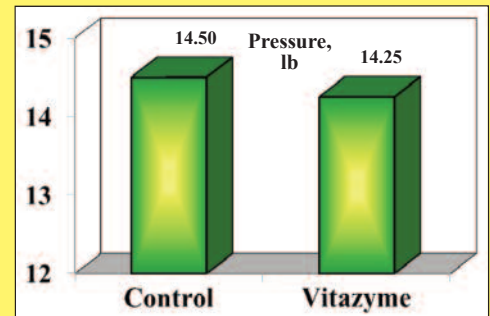


¹Determined using an Atago PAL-1 refractometer.

Increase in fruit Brix with Vitazyme: 0.72 %-points

A sizable improvement in fruit sugars means better tasting, sweeter fruit.

Fruit Pressure¹



¹Determined by a FirmTech automated digital firmness tester.

Decrease in fruit pressure with Vitazyme: 2%

This slight decrease in fruit firmness is of little consequence, since any value above 12 lb pressure is excellent for marketing.

Continued on the next page

Peppers (Chili)

Researcher: Thierry Pelette

Research organization: Acra Industries, Haiti

Location: Belladere, Haiti

Variety: West Indies

Planting date: unknown

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

1. Control **2. Vitazyme**

Fertilization: unknown

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

Harvest date: unknown

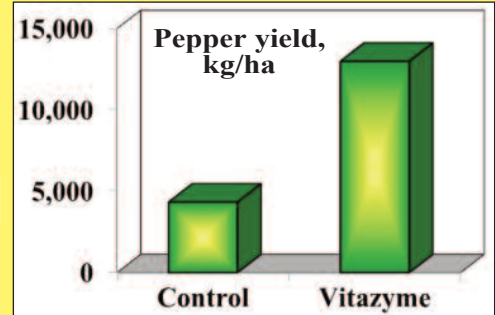
Yield results: See table and graph at right.

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

Peanut Yield

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

Increase in chili pepper yield with Vitazyme: 300%



Potatoes

Researcher: unknown

Research organization: Viva Plus LLC, Ukraine

Variety: Marphona

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

Planting date: unknown

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

1. Control **2. Vitazyme**

Fertilization: unknown

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

Yield results: See table and graph at right.

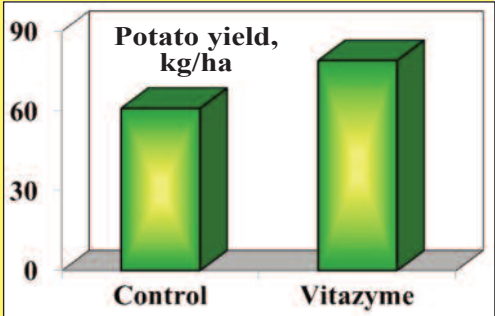
Potato Yield

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



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

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



Increase in tuber yield with Vitazyme: 30%

Potatoes in Ukraine responded very well to Vitazyme, in this trial producing a 30% yield increase.

Rice

Researcher: Dinack Lewis

Research organization: Acra Industries, Haiti

Location: Verrette, Haiti

Variety: La Crete and TCS

Planting date: unknown

Harvest date: unknown

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

1. Control **2. Vitazyme**

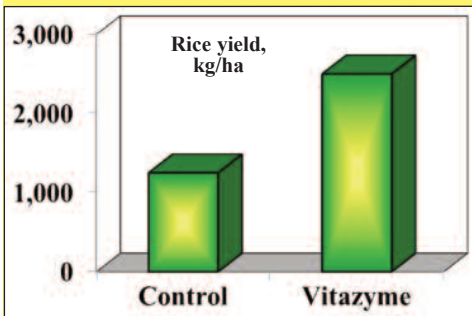
Fertilization: unknown

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

Yield results: See the tables and graphs below.

Trial 1 - La Cretes

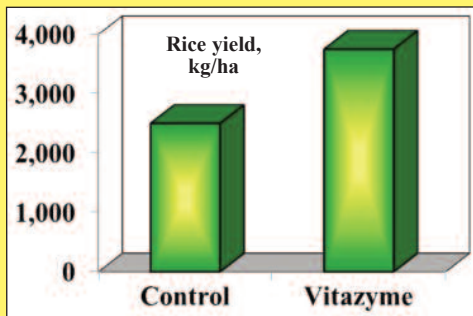
Treatment	Rice yield kg/ha	Yield change kg/ha
Control	1,250	—
Vitazyme	2,500	1,250 (+100%)



Increase in rice yield with Vitazyme: 100%

Trial 1 - TCS

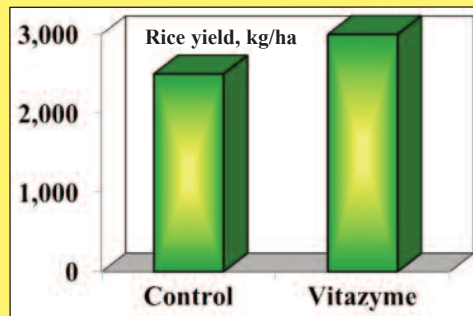
Treatment	Rice yield kg/ha	Yield change kg/ha
Control	2,500	—
Vitazyme	3,750	1,250 (+50%)



Increase in rice yield with Vitazyme: 50%

Trial 1 - TCS

Treatment	Rice yield kg/ha	Yield change kg/ha
Control	1,250	—
Vitazyme	2,500	1,250 (+100%)



Increase in rice yield with Vitazyme: 100%

Conclusions: A series of three rice trial at Verrette, Haiti, produced very high yield increases of grain in every instance, ranging from 50 to 100%. The value of Vitazyme to improve rice yields in Haiti is thus amply demonstrated.

Rice

Researcher: Emmanuel Joseph

Location: Petite-Rivieri, Haiti

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

1. Control 2. Vitazyme

Fertilization: unknown

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

Harvest date: unknown

Yield results: See table and graph at right.

Conclusions: A rice study in Haiti revealed a great increase in yield with Vitazyme application, the yield rising by an amazing 50%. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Research organization: Acra Industries, Haiti

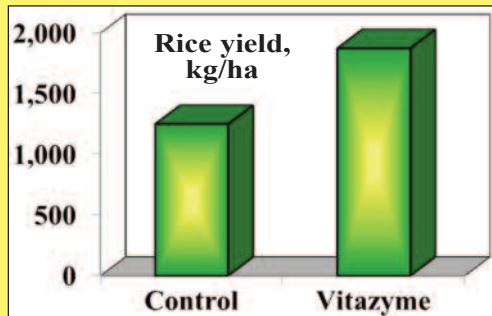
Variety: TCS

Planting date: unknown

Rice Yield

Treatment	Rice yield kg/ha	Yield change kg/ha
Control	1,250	—
Vitazyme	1,875	625 (+50%)

Increase in rice yield with Vitazyme: 50%



Rice

Researchers: J. Derice and Z. Bien-Aime

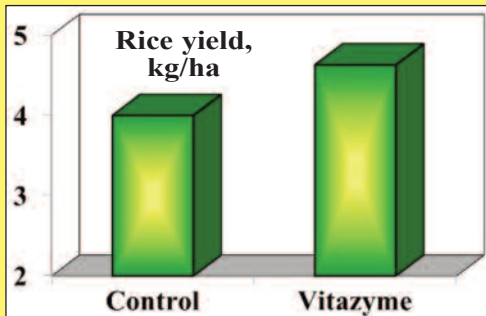
Research organization: Oliver Castro Garcia

Variety: TCS-10

Rice Yield

Treatment	Rice yield kg/ha	Yield change kg/ha
Control	4.00	—
Vitazyme, block 1	4.75	0.75 (+20%)
Vitazyme, block 2	4.50	0.50 (+13%)
Vitazyme, average	4.64	0.64 (+16%)

Increase in rice yield with Vitazyme: 16%



Research organization: Ag Sio Tech, Inc., Haiti

Location: SRI Duval-Roehe/Cross Souquets, Haiti

Planting date: unknown

Experimental design: A rice field was divided into three parcels, one an untreated control and two treated with Vitazyme to evaluate the effect of the product on rice grain yield.

1. Control 2. Vitazyme

Continued on the next page

Fertilization: unknown
Vitazyme application: 1 liter/ha at an undetermined time.
Yield results: See table and graph on the previous page.



This rice plot in Haiti received Vitazyme, and shows the usual excellent growth and chlorophyll response to this biostimulant.



An untreated control rice plot shows much less aggressive growth and yield potential.

Conclusions: This rice trial in Haiti revealed that Vitazyme substantially increased grain yield, by 16%, a sizable improvement which makes this program highly viable for rice farmers.

Rice

Researcher: Willeme
Variety: TCS

Research organization: Acra Industries, Haiti
Planting date: unknown

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

1. Control 2. Vitazyme

Fertilization: unknown

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

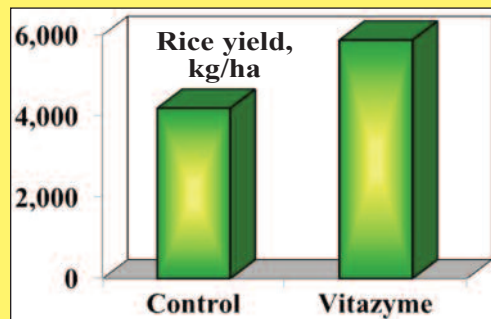
Harvest date: unknown

Yield results: See table and graph at right.

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

Rice Yield

Treatment	Rice yield kg/ha	Yield change kg/ha
Control	4,199	—
Vitazyme	5,879	1,680 (+40%)



Increase in rice yield with Vitazyme: 40%

Rice

A Synergism Study with Azomite

Researcher: Jose Luis Staufert, Quimica Lucava, S.A., Veracruz, Mexico

Farmer: Mr. Alvaro Santos

Location: Piedras Negras, Veracruz, Mexico

Variety: unknown

Planting date: unknown

Experimental design: A rice plot was treated with Vitazyme and Azomite, and compared with an untreated adjoining plot to determine the effect of the products on rice growth and yield.

1. Control

2. Vitazyme + Azomite

Fertilization: unknown

Vitazyme application: 1 liter/ha (13 oz/acre) sprayed by backpack sprayer on the leaves at the tillering stage (December 5, 2013), 45 days after transplanting. The adjuvant Lucapega (nonylphenoethoxylate + polyglycol) was added at 2 m/liter of water, with 300 liters/ha of water applied.

Azomite application: Azomite is a colloidal clay deposit that is comprised of 65% silicon and 65 macro and micro elements. It was applied also at the tillering stage on December 5, 2013, at the prescribed rate of 100 kg/ha broadcast.

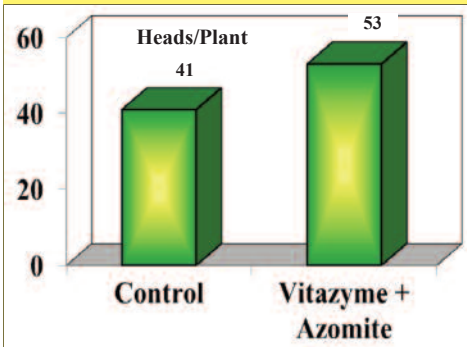
Growth results: Vitazyme + Azomite gave marked effects.

1. A healthier crop with lower incidence of rice blast disease (*Piricularia orizae*)
2. Uniform growth across the treated area
3. Improved root and top growth
4. Increased tillering
5. Greater head formation

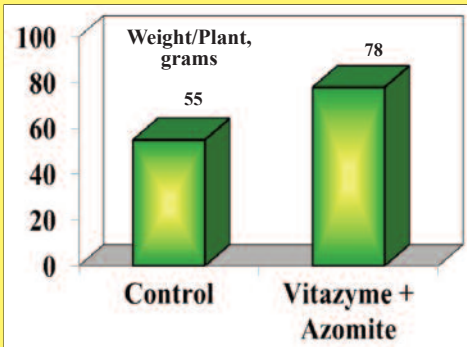
Harvest date: July 28, 2014

Yield results: Ten samples were collected on July 1 from each of the two treatments, and the results were averaged for the samples. The yield was calculated from the collected samples.

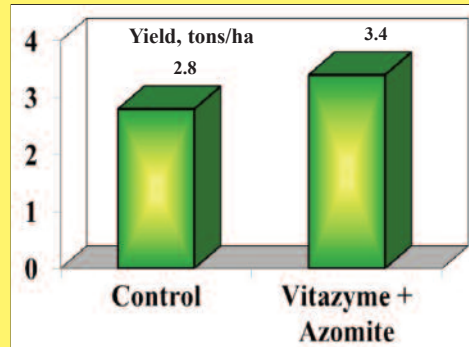
Heads Per Plant



Head Weight Per Plant



Grain Yield

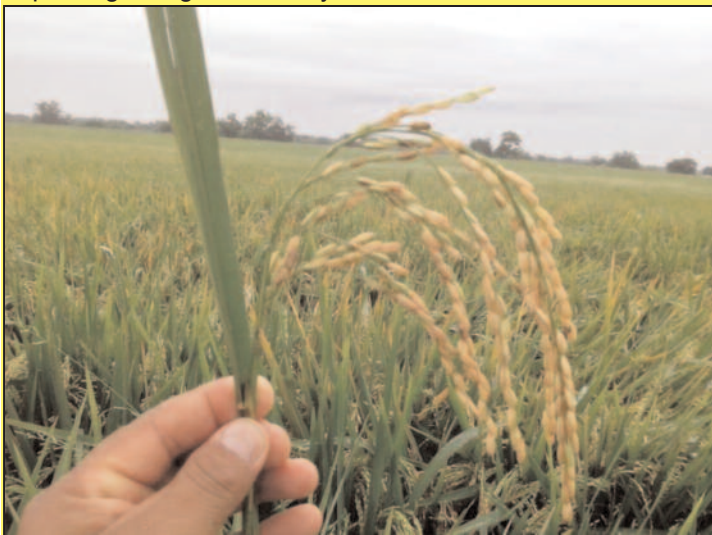


Increase in heads per plant with Vitazyme + Azomite: 29%

Increase in head weight per plant with Vitazyme + Azomite: 42%

Increase in grain yield with Vitazyme + Azomite: 21%

Conclusions: A small-scale rice trial involving the use of Vitazyme and Azomite revealed that the two products work very well together. Heads per plant, a response to increased tillering, improved by 29% above the control, while head weight per plant increased by 42%, and grain yield by 21%. The uniformity of the treated crop across the slope was noteworthy, and the grower was convinced that the products did a fine job of improving rice growth and yield.



Heavy, well-filled rice heads resulted from Vitazyme and Azomite treatment in Mexico, with yield increased by 21%.



Increased head and plant size, as well as stalk strength, from Vitazyme and Azomite application are evident, on the right, in this photo.

Rice

Researcher: Dorinval Wilem

Location: Ti Petit Riviere, Artibonite, Haiti

Experimental design: A rice field was selected and treated in an area with Vitazyme, alone or with soluble nutrients, foliar applied twice during the growth cycle. A nutrients only area also was treated. The objective of the study was to evaluate the effectiveness of the product to improve rice yield under Haitian conditions.

Research organization: Ministry of Agriculture, Haiti

Variety: Madame Couzouse (MGG)

1. Control
2. Vitazyme (2x)
3. Vitazyme (2x) + Nutrients
4. Nutrients only

Continued on the next page

Fertilization: Treatment 3 received 4 cups of 20-20-20 and 9-58-8% N-P₂O₅-K₂O in 16 oz of water.

Vitazyme application: (1) 1.25 liters/ha on the leaves and soil at the tillering stage (30 to 50 cm in height), on January 24, 2013 (45 days after transplanting); (2) 1.25 liters/ha on the leaves and soil, about 60 days after planting. A backpack sprayer was used for both applications, using 100 ml of Vitazyme in 1 liter of water. Treatment 3 received fertilizer nutrients along with these applications.

Yield results: No yield results were taken, but the researcher estimated a 30 to 35% yield increase with Vitazyme alone. No yield estimates on the other treatments were given.

Increase in rice yield with Vitazyme alone: 30 to 35%

Conclusions: A field rice study in Haiti revealed that Vitazyme alone can increase the yield a substantial 30 to 35%. Yield enhancement is normally increased even more along with nutrients, but no yield determination was made with Vitazyme and nutrients combined.



Trials on rice in Haiti were unusually conducted using a backpack sprayer, and produced excellent yield responses.

Soybeans

University of Missouri - Bradford Research Center



Early in the season, these soybeans are showing considerably better root and top development with Vitazyme.

Much greater root development of these soybeans at a University of Missouri trial proved that Vitazyme could improve root and top growth parameters, in particular branches and seeds per branch.

Researcher: Majula Nathan, Ph.D.

Location: University of Missouri Bradford Research Center, Columbia, Missouri

Variety: Pioneer 94MO1

Population: 180,000 seeds/acre

Row spacing: 30 inches

Planting date: June 12, 2013

Experimental design: A replicated soybean study (four replications) was set up using a randomized complete block design, with plots four rows wide and 400 feet long (0.09183 acre per plot.) Two Vitazyme applications were made — at planting on the seeds and at bloom — to determine the effect of the product on soybean leaf tissue analysis, bean yield, and growth and seed parameters.

1. Control

2. Vitazyme on the seeds and leaves

Fertilization: according to soil test recommendations using 0-46-62 lb/acre N-P₂O₅-K₂O before planting

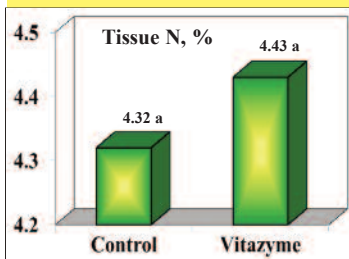
Vitazyme application: (1) 13 oz/acre equivalent on the seeds, mixed thoroughly, just before planting; (2) 13 oz/acre on the leaves and soil at full bloom (R-2) on July 17.

Weather during the 2013 growing season: A wet spring delayed planting, and a drought in August and early September caused some abortion of pods.

Tissue nutrient levels: The youngest, most fully expanded leaves were collected at R-5, on September 6, from 24 plants of each plot for nutrient analysis. These samples were analyzed for N, P, K, Ca, and Mg at the University of Missouri. There was very little change in tissue elemental levels with Vitazyme application compared with the control treatment.

Growth and yield parameter results: Before harvest, various plant and seed parameters were measured.

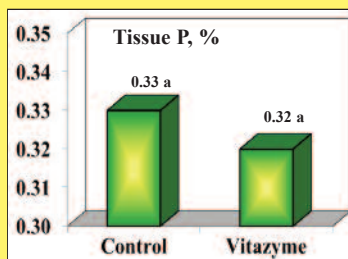
Soybean Tissue Nitrogen



P > F = 0.364

Increase in N with Vitazyme: 3%

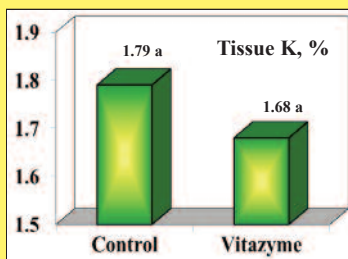
Soybean Tissue Phosphorus



P > F = 0.567

Increase in P with Vitazyme: 3%

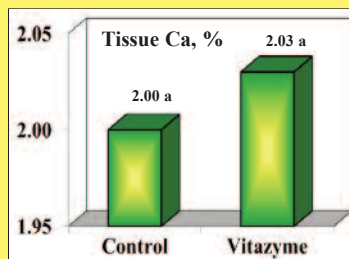
Soybean Tissue Potassium



P > F = 0.306

Increase in K with Vitazyme: 7%

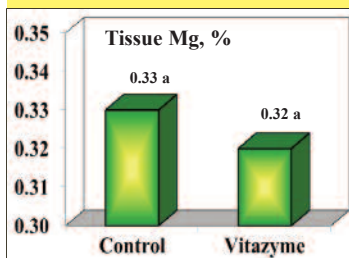
Soybean Tissue Calcium



P > F = 0.034

Increase in Ca with Vitazyme: 2%

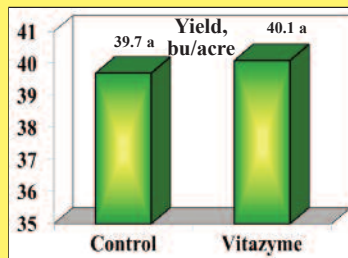
Soybean Tissue Magnesium



P > F = 0.556

Increase in Mg with Vitazyme: 3%

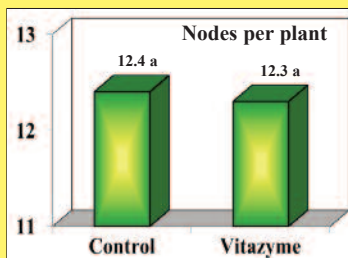
Soybean Yield



P > F = 0.840

Increase in soybean yield with Vitazyme: 1%

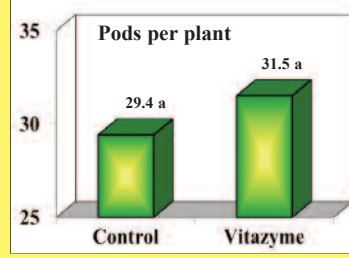
Nodes Per Plant



P > F = 0.806

Decrease in nodes per plant with Vitazyme: -1%

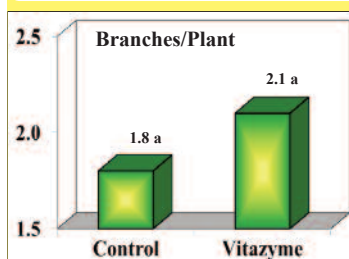
Main Stem Pods Per Plant



P > F = 0.179

Increase in main stem pods per plant with Vitazyme: 7%

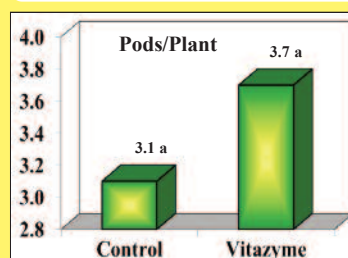
Branches Per Plant



P > F = 0.396

Increase in branches per plant with Vitazyme: 17%

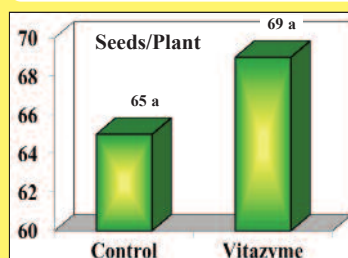
Branch Pods Per Plant



P > F = 0.433

Increase in branch pods per plant with Vitazyme: 19%

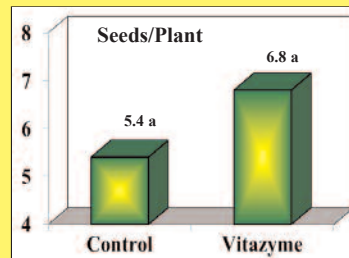
Main Stem Seeds Per Plant



P > F = 0.350

Increase in main stem seeds per plant with Vitazyme: 6%

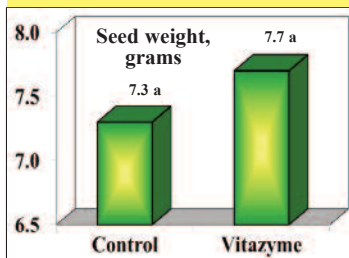
Branch Seeds Per Plant



P > F = 0.387

Increase in branch seeds per plant with Vitazyme: 26%

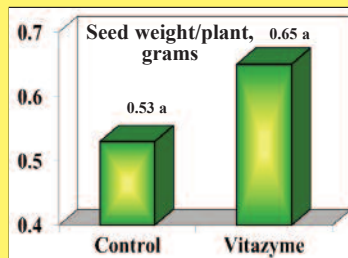
Main Stem Seed Weight Per Plant



P > F = 0.603

Increase in main stem seed weight per plant with Vitazyme: 5%

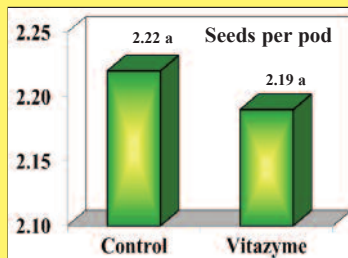
Branch Seed Weight Per Plant



P > F = 0.351

Increase in branch seed weight per plant with Vitazyme: 23%

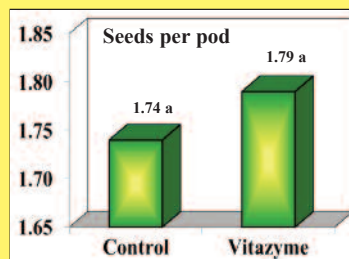
Main Stem Seeds Per Pod



P > F = 0.755

Decrease in main stem seeds per pod with Vitazyme: -1%

Branch Seeds Per Pod



P > F = 0.679

Increase in branch seeds per pod with Vitazyme: 3%

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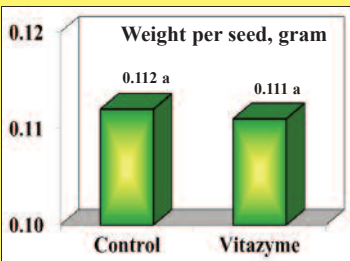
Soybean yield was increased only 1% by Vitazyme, although most plants characteristics were improved substantially, in particular pod number, branches, and seed weight per plant. However, pod abortion during the summer drought caused a loss of yield potential by season's end.

Crude protein and oil results: The crude protein and oil content of the beans were determined at the University of Missouri, and showed little difference between the two treatments, Vitazyme being only slightly higher for both.

Crude Protein and Oil

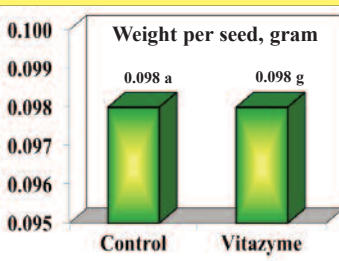
Treatment	Crude protein	Oil
	%	%
Control	23.7	37.4
Vitazyme	23.9	37.5

Main Stem Weight Per Seed



P > F = 0.830

Branch Weight Per Seed



P > F = 0.994

Increase in main stem weight per seed with Vitazyme: 1%

Conclusions: A replicated soybean trial at the University of Missouri in 2013 proved that Vitazyme can substantially improve plant and seed characteristics. In this study, however, a summer drought caused many pods to abort so that the potential yield increase was reduced to only 1%. Tissue element levels were changed little, and bean oil and protein levels were only slightly elevated by Vitazyme. Plant and seed characteristics were affected as follows.

Change with Vitazyme	
Nodes per plant	-1%
Main stem pods per plant	+7%
Branches per plant	+17%
Branch pods per plant	+19%
Main stem seeds per plant	+6%
Branch seeds per plant	+26%
Main stem seed weight	+5%
Branch seed weight per plant	+23%
Main stem seeds per pod	-1%
Branch seeds per pod	+3%
Main stem weight per seed	+1%
Branch weight per seed	0%

Soybeans
Agricultural Custom Research and Education Services (ACRES)

Researcher: Bertel Schou, Ph.D.

Location: Cedar Falls, Iowa

Planting rate: 53 lb/acre

Soil type: Aredale loam (36% sand, 42% silt, 22% clay, 4.6% organic matter, pH = 6.2, cation exchange capacity = 17.6 meq/100 g)

Soil test results: (Perry Agricultural Laboratory, Bowling Green, Missouri): total exchange capacity = 25.00, pH = 5.8, organic matter = 3.2%, nitrogen = 82 lb/acre, sulfur (as sulfate) = 30 lb/acre, phosphorus = 117 lb/acre, calcium (Ca) = 5,793 lb/acre, magnesium (Mg) = 805 lb/acre, potassium (K) = 232 lb/acre, sodium (Na) = 75 lb/acre, boron (B) = 2.36 lb/acre, iron (Fe) = 686.6 lb/acre, manganese (Mn) = 109.6 lb/acre, copper (Cu) = 3.0 lb/acre, zinc (Zn) = 11.6 lb/acre; base saturations: Ca = 57.9, Mg = 13.4, K = 1.2, Na = 0.9, other bases = 5.8, H = 21.0.

Row width: 30 inches

Planting conditions: good

Tillage: conventional

Previous crop: corn

Experimental design: A randomized complete block design of a small plot study was used to evaluate the effect of Vitazyme and seaweed, alone and together, on the yield of soybeans. The treatments were replicated four times, and plants were four rows wide x 30 feet long (0.00689 acre/plot).

Research organization: Agricultural Research and Educational Services

Variety: NuTech 7240 (Roundup Ready)

Planting date: May 19, 2014

Planting depth: 1.5 inches



This soybean trial at ACRES Research, Cedar Falls, Iowa, proved that Vitazyme increased soybean yield by 13%, or nearly 7 bu/acre.

Fertilization: according to soil test
Vitazyme application: (1) 13 oz/acre in-furrow at planting (May 19, 2014) using 38 ml/gallon at 10 gallons/acre; (2) 13 oz/acre on the leaves and soil at V6-R1 (July 2, 2014), using 26 ml/gallon at 10 gallons/acre

Treatment	In-furrow at planting	Foliar
1. Control	0	0
2. Vitazyme	13 oz/acre	13 oz/acre
3. Seaweed	2 quarts/acre	2 quarts/acre
4. Vitazyme + Seaweed	13 oz/acre + 2 quarts/acre	13 oz/acre + 2 quarts/acre

Seaweed application: obtained from Ocean Organics; (1) 2 quarts/acre in-furrow at planting (May 19, 2014) using 189 ml/gallon at 10 gallons/acre; (2) 2 quarts/acre on the leaves and soil at V6-R1 (July 2, 2014) using 126 ml/gallon at 15 gallons/acre

Weather for 2014: Growing conditions for the trial were very good with below-normal temperatures and adequate precipitation, except for a few days in June and August that received irrigation water.

Harvest date: October 6, 2014

Bean moisture results: The moisture content of the beans was nearly identical for all four treatments.

Bean yield results: Vitazyme significantly increased the soybean yield at P = 0.005, a great increase above the control, and greater than the seaweed by 6%. The combined products showed no synergism in this study.

Conclusions: A replicated soybean study in east-central Iowa revealed that two applications of Vitazyme significantly increased the soybean yield above the control (+13%).

Seaweed at two applications increased bean yield by 7%, which was statistically equal to the Vitazyme treatment as well as to the control. The two products combined did not reveal a synergism, though possibly a synergism could be realized if the two were applied separately, perhaps a week apart as revealed on studies on grapes.

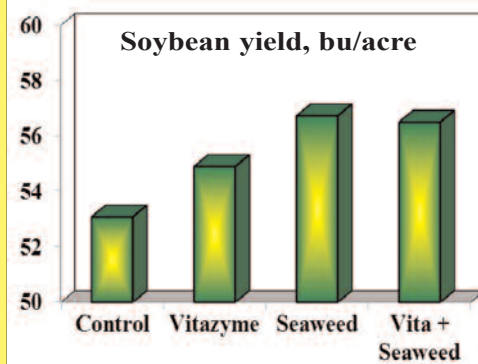
Soybean Moisture

Treatment	Bean moisture	Moisture change
	%	%
1. Control	13.45	—
2. Vitazyme	13.47	(+) 0.02
3. Seaweed	13.44	(-) 0.01
4. Vitazyme + Seaweed	13.44	(-) 0.01

Soybean Yield

Treatment	Bean yield ¹	Yield change
	bu/acre	bu/acre
1. Control	53.08 b	—
2. Vitazyme	59.90 a	6.82 (+13%)
3. Seaweed	56.73 ab	3.65 (+7%)
4. Vitazyme + Seaweed	56.50 ab	3.42 (+6%)
LSD (P = 0.05)	3.04	
CV	3.36%	
Treatment F	8.627	
Treatment probability	0.005	

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



Increase in soybean yield with Vitazyme: 13%

Sugar Beets (for seed)



The size of the beet plants is obviously greater with Vitazyme application.

Vitazyme treated plants on the right will yield considerably more seed than the untreated plants on the left.

Researchers: Allen Smith, Wilbur Ellis crop consultant, Paul W. Syltie, Ph.D., and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Bill Worth, Precision Seed Production

Location: Quincy, Washington

Planting date: early March

Planting rate: unknown

Previous crop: fallow

Soil type: black loamy sand

Irrigation: center pivot

Seedbed preparation: conventional

Weather during the growing season: a very dry and hot year

Experimental design: A 65-acre beet field was divided into sectors of 44 acres treated with Vitazyme early, and 21 acres untreated, using a center-pivot irrigation system for application. A later Vitazyme

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application was made to the entire field, with the objective of evaluating the effect of this product on the yield of beet seed.

1. Vitazyme early

2. Vitazyme early + late

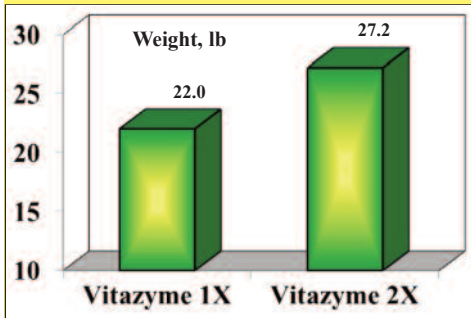
Fertilization: 50-75-100 lb/acre of N-P₂O₅-K₂O, 1 lb/acre boron, 5 lb/acre magnesium, and 1 lb/acre copper

Vitazyme application: (1) 13 oz/acre in late March after emergence on 44 acres; (2) 13 oz/acre over all areas on July 14, well after seed-set, along with insecticide, fungicide, and nutrients

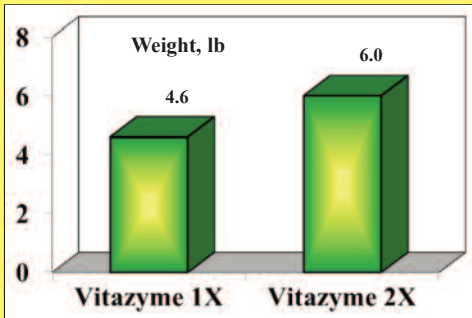
Sampling date: August 11, shortly before harvest

Growth results: See the graphs below.

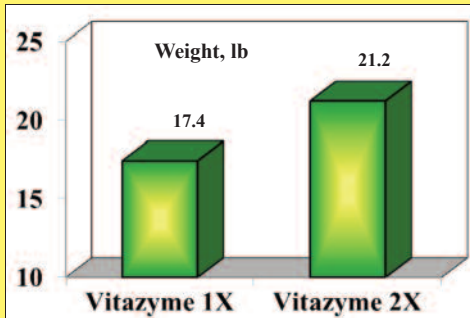
Total Plant Weight



Root Weight



Top Weight



Increase in total plant weight with Vitazyme: 24%

Increase in root weight with Vitazyme: 30%

Increase in top weight with Vitazyme: 22%

Conclusions: A beet seed trial in central Washington, using Vitazyme applied shortly after plant emergence and again after seed formation in July, compared with only the later application, revealed through plant sampling that the two applications improved total plant, root, and top weights by 24, 30, and 22% respectively. There was no way to determine actual seed yields for either treatment, but observations in the field indicated that the seed yield was proportional to vegetative growth. However, due to a late second Vitazyme application it is unlikely that this additional product increased seed yield, unless the addition plant vigor reduced seed loss due to disease and insect damage.



Untreated beet plants, uprooted and drying, show a good yield potential, but are not comparable to the treated beets in the accompanying photo.



Note the great size improvement of plants after two Vitazyme applications.

Sugar Beets

Farmer: Michael Stamer, and Darrel Ike (consultant)

Researchers: James Anderson and Darrol Ike

Location: Gilsrud-Mandt Farm, Benson, Minnesota

Variety: Beta 90RR54

Soil type: silt loam

Population: 57,000 seeds/acre

Row spacing: 30 inches

Planting date: May 16, 2014

Experimental design: A uniform sugar beet field was divided into untreated and Vitazyme treated portions, with all other practices the same across the field. The objective of the study was to determine the effect of the product on the total yield and sugar yield of the beets.

1. Control

2. Vitazyme

Fertilization: 3 gallons/acre of APP starter in-furrow at planting

Vitazyme application: 13 oz/acre at planting with the starter, on May 16

Weather during the growing season: very wet spring followed by favorable rain and temperatures

Weed control: herbicides

Fungicides: unknown

Harvest date: October 16

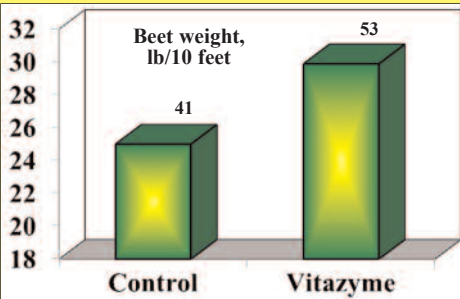
Yield and sugar results: Several 10-foot row sections were dug in late September for both treatments, a few rows away from the dividing line of the trial, and at each end of the field. Each row section was 0.0005739 acre. Most samples were sent to the Southern Minnesota Sugar Beet Cooperative Laboratory, but two samples from each treatment were sent to Minnesota Valley Testing Laboratories, Inc., in New Ulm, Minnesota.

Southern Minnesota Sugar Beet Cooperative

Treatment		Clean weight	Beet number	Weight per beet	Sugar content	Sugar weight	Sugar yield ¹	
		lb/10 ft	number/10 ft	lb	%	lb/10 ft	lb/acre	
Control	1	21.44	16	1.34	15.50	3.32	5,785	
	2	29.86	15	1.99	14.45	4.31	7,510	
	3	25.36	19	1.33	15.49	3.93	6,848	
	4	17.50	16	1.09	15.57	2.72	4,740	
	5	29.64	18	1.65	15.11	4.48	7,806	
	6	28.61	17	1.68	14.84	4.25	7,406	
	7	23.61	13	1.82	15.96	3.77	6,569	
	8	20.63	18	1.15	15.00	4.59	7,998	
	9	25.60	17	1.51	15.47	3.96	6,900	
	10	27.66	18	1.54	15.77	4.36	7,597	
Mean		24.99	16.7	1.51	15.32	3.92	6,916	
Vitazyme	1	30.30	18	1.68	13.95	4.23	7,371	
	2	30.79	20	1.54	13.56	4.18	7,284	
	3	28.31	18	1.57	15.79	4.47	7,789	
	4	29.80	20	1.48	14.06	4.19	7,301	
	5	26.87	12	2.49	13.98	3.76	6,552	
	6	33.95	24	1.41	14.34	4.86	8,469	
	7	30.45	15	2.03	13.68	4.17	7,266	
	8	28.56	14	2.04	13.86	3.96	6,900	
	Mean		29.88	17.6	1.78	14.15	4.23	7,367
	F-value		11.57	0.58	3.82	22.80	2.16	2.16
P-value		0.0032*	0.4572	0.0662*	0.0002*	0.1587	0.1587	

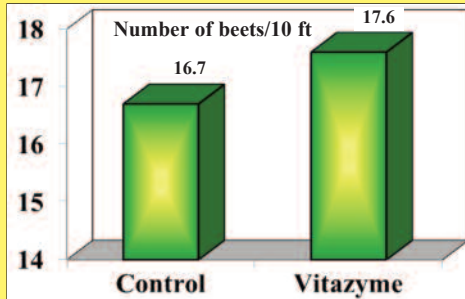
¹A row 10 x 2.5 ft = 0.0005739 acre. Statistical analyses were performed using a completely randomized design.

Clean Beet Weight



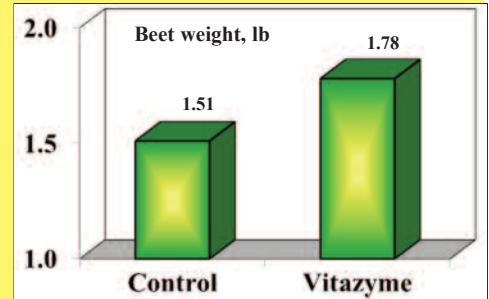
Increase in beet weight with Vitazyme: 29%

Beet Number



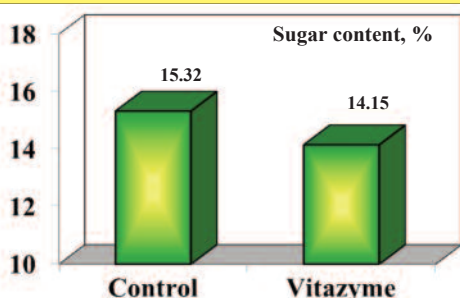
Increase in beet number with Vitazyme: 5%

Weight Per Beet



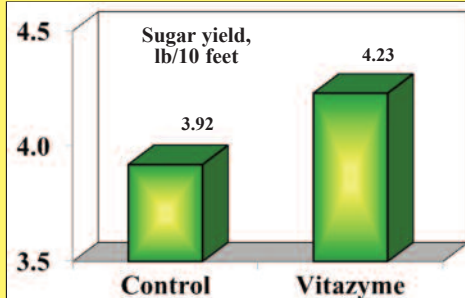
Increase in weight per beet with Vitazyme: 18%

Beet Sugar Content



Decrease in beet sugar with Vitazyme: 1.17 %-pts

Beet Sugar Yield



Increase in beet sugar yield with Vitazyme: 8%

These results show a significant increase in clean beet weight with Vitazyme. Beet number increased with Vitazyme as well, but not significantly. Weight per beet was increased at P = 0.66, and the sugar content was significantly less with Vitazyme; this result conflicted with sugar analyses performed at Minnesota Valley Testing Laboratories in New Ulm (see below). Sugar production per acre was increased at P = 0.159.

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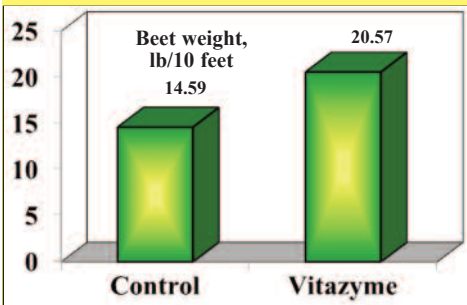
Minnesota Valley Testing Laboratories, Inc. New Ulm, Minnesota (analyzed October 13, 2014)

Treatment		Moisture (as received)	Sugar content (as received)	Sugar content (dry)	Beet weight (as received)	Sugar yield	Sugar yield ¹
		%	%	g/100 g	lb/10 ft	lb/10 ft	lb/acre
Control	1 (south)	78.5	16.58	77.12	13.04	2.16	3,764
	2 (north)	80.1	14.94	75.08	16.44	2.46	4,286
	Mean	79.3	15.76	76.1	14.59	2.31	4,025
Vitazyme	1 (south)	78.9	15.70	74.41	23.12	3.63	6,325
	2 (north)	80.2	15.07	76.11	18.02	2.72	4,739
	Mean	79.6	15.39	75.26	20.57	3.18	5,532

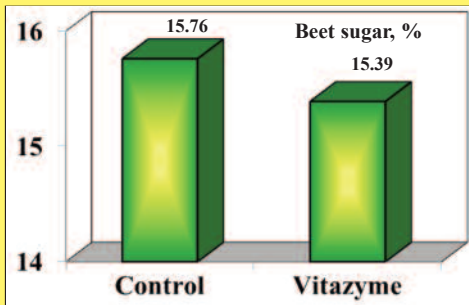
¹A row 10 x 2.5 ft = 0.0005739 acre. Statistical analyses were performed using a completely randomized design.

According to this analysis, the sugar output from Vitazyme treatment was considerably greater than the control as compared with the Southern Minnesota Sugar Beet Cooperative results. This was due to a higher sugar content in the Vitazyme treated beets than detected in the MSBC lab, and an even greater weight differential.

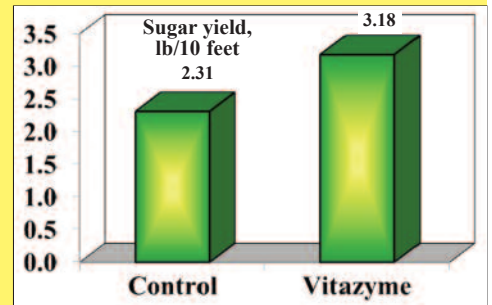
Sugar Beet Weight



Beet Sugar Content



Sugar Yield



Increase in beet weight with Vitazyme: 41%

Decrease in sugar content with Vitazyme: (-) 0.37 %-pts

Increase in sugar yield with Vitazyme: 38%



A split-field sugar beet trial near Benson, Minnesota, revealed excellent results for Vitazyme applications.



Several row samples were dug from the treated and untreated sides of the boundary, with large differences in beet characteristics.

Conclusions: A split-field sugar beet study in south-central Minnesota revealed that a single 13 oz/acre Vitazyme application in-furrow at planting increased the yield of sugar considerably. The amount of increase depended upon the laboratory which performed the analyses, which values are summarized below.

Change with Vitazyme

	Beet weight	Beet number	Weight/Beet	Sugar content	Sugar yield
Sugar beet coop lab	+29%	+5%	+18%	-1.17 %-point	+8%
Minnesota Valley lab	+41%	—	—	-0.37 %-point	+38%

Based on these results, the sugar content of the beets was marginally reduced with Vitazyme, but the yield was greatly increased (29 to 41%), giving a net sugar yield increase of between 8 and 38%. These increases should be of major interest for those farmers wishing to improve the production and profitability of sugar beets.



Beet weight was increased by 29 to 41% above the untreated control, from only one in-furrow application. Notice the best size difference.



Here is a close-up of Vitazyme effects on beet size. Sugar yield was up to 38% higher with Vitazyme.

Sunflowers

Researcher: unknown **Research organization:** Kernel Company, LLC, Ukraine
Location: Man'kivs'ky District, Cherkasy Region, Viktorivka Village, Ukraine **Variety:** NK Dolbi
Planting rate: 50,000/ha **Planting date:** May 19, 2014 **Previous crop:** winter wheat
Soil type: Chernozem, with 3.7% organic matter

Seedbed preparation: disk-plowing to 6-8 cm, plowing to 22 - 24 cm, harrowing, two cultivations to 5-6 cm
Experimental design: A sunflower field was divided into a Vitazyme treated area and an untreated control, to discover the effects of the product on seed yield and profitability. All plant protection and fertilization regimes were identical for both treatments.

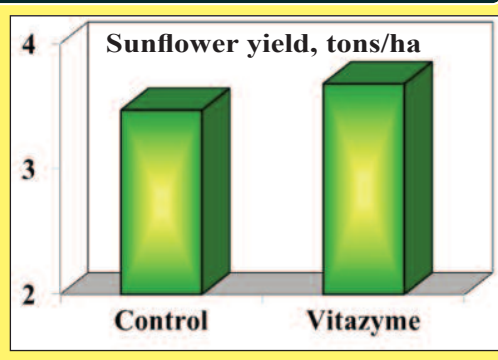
1. Control 2. Vitazyme
Fertilization: 50 kg/ha of nitrogen broadcast and incorporated before planting, and 10-26-26 kg/ha of N-P₂O₅-K₂O in-furrow at planting.
Vitazyme application: 1 liter/ha sprayed on the leaves and soil at the 6-leaf stage, on June 14
Yield results: See table and graph at right.
Income results: Income and expense calculations showed that the 1 liter/ha application increased net income by 956 UAH/ha (\$60.71/ha at 1UAH = 0.0635 USD).

Sunflower Yield

Treatment	Sunflower yield tons/ha	Yield change tons/ha
Control	3.47	—
Vitazyme	3.68	0.21 (+6%)

Increase in sunflower yield with Vitazyme: 6%

Increase in income with Vitazyme: 956 UAH/ha



Conclusions: Sunflowers grown in Ukraine responded excellently to a single 1 liter/ha application of Vitazyme at the 6-leaf stage. The yield was improved by 6%, resulting in an increase in income of 956 UAH/ha (\$60.71/ha), showing the excellent utility of utilizing this program on sunflowers in Ukraine.

Tomatoes

Researcher: Augustin Peralta Fernando **Farmer:** Mauricio Portillo
Research organization: Quimica Lucava **Trial location:** Huexca, Morelos, Mexico
Variety: unknown **Transplanting date:** February 12, 2014

Experimental design: A tomato field was divided into an untreated control area and a Vitazyme treated area, to evaluate the effect of this product on tomato fruit yield. A transplant and two foliar applications were made.

1. Control 2. Vitazyme, transplant and foliar (2x)
Fertilization: unknown
Vitazyme application: (1) At transplanting, the plant trays were dipped in a 0.5% solution (500 ml in 100 liters of water; (2) foliar spray 30 days after planting (March 12) of 1 liter/ha Vitazyme, with Afidox (1 liter/ha), Econil 720

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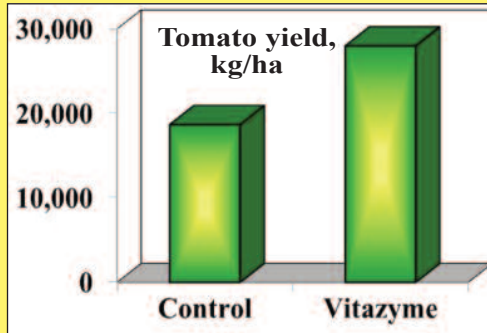
(1.5 liters/ha), Actara (1 gram/liter of water), and Lucapega (250 ml/ha); (3) foliar spray during flowering of 1 liter/ha Vitazyme, with Lucambda (300 ml/ha), Protecprid 20 PS (300 g/ha), Rally 40 W (100 g/ha), Sulfoclor (1 liter/ha), and Lucapega (300 ml/ha).

Harvest date: Three pickings were made from May 20 into June, 2014.

Yield results: One hectare of both treatments was harvested for test purposes.

Tomato Yield

Treatment	Picking 1	Picking 2	Picking 3	Total	Yield Change
	----- kg/ha -----				
Control	3,732	10,635	4,293	18,660	—
Vitazyme	5,022	13,389	9,483	27,894	9,324 (+49.5%)



Increase in tomato yield with Vitazyme: 49.5%

Conclusions: The comments of the researcher are given below.

- Vitazyme had 49.5% higher yield compared to the control: 27.984 tons per hectare versus 18.66 tons per hectare, equivalent to 9.234 tons per hectare (307.8 taras of 30 kilos) higher yield with Vitazyme than the control.
- The harvest of the Vitazyme treatment was much better also in quality, since it was observed:
 - Larger fruit size.
 - More uniform fruits.
 - Greater consistency of the fruit.
 - Better defined division of carpels of the fruit.
 - More uniform color.
- In addition to the previous features, in the Vitazyme treatment the following was observed:
 - Greater drought stress resistance.
 - Less damage in the fruit by sun spot.
 - Greater leaf growth.
- The growers were convinced of the effect of Vitazyme and that this product by itself makes the difference in crops.



At Morelos, Mexico, the untreated control showed considerable space between rows and average growth and yield.



Next to the control, Vitazyme treatment improved growth and yield greatly (+49.5%), as seen by nearly closed inrow spaces.

Tomatoes

Researcher: Waking Novembre

Research organization: Acra Industries, Haiti

Location: Mirebalais, Haiti

Variety: Jocelyne Roma

Planting date: unknown

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

1. Control

2. Vitazyme

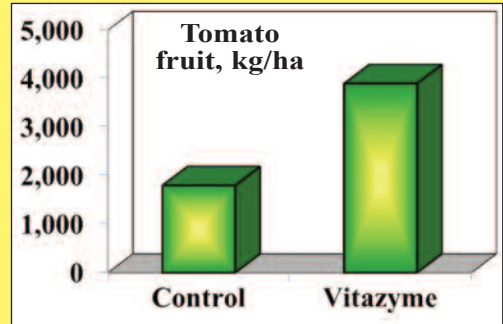
Fertilization: unknown
Vitazyme application: 1 liter/ha (13 oz/acre)
Harvest date: unknown
Yield results: See the graph and table at right.

Conclusions: A tomato study in Haiti revealed a great increase in yield with Vitazyme application, the fruit harvest 117% higher than for the untreated control. This program is shown to hold great promise in helping to alleviate food production problems in this developing country.

Tomato Yield

Treatment	Tomato yield kg/ha	Yield change kg/ha
Control	1,800	—
Vitazyme	3,900	2,100 (+117%)

Increase in fruit yield with Vitazyme: 117%



Tomatoes

Researcher: Herman Guillermo Avila R. **Research organization:** Agroglobal S.A., Cundinamarca, Colombia
Location: La Escuelita Farm (Mrs. Luis Romero), Municipality of Formeque, Colombia **Variety:** Ichiban (indeterminate)
Transplanting date: unknown **Root spacing:** 1 meter
Experimental design: A tomato trial under greenhouse conditions was initiated using plots that were 4 meters wide (four rows) and 5 meters long (20 m²). The purpose of the trial was to compare the effects of Vitazyme, in three applications, on tomato yield and growth as compared to the untreated control in a replicated (three reps) completely randomized block design.

Rep 1	Rep 2	Rep 3
Vita 1	Control	Vita 2
Vita 2	Vita 1	Vita 3
Vita 3	Vita 2	Control
Control	Vita 3	Vita 1

Treatment	Vitazyme treatment*		
	At 45 days	At 60 days	At 75 days
	----- ml/liter of spray -----		
Control	0	0	0
Vitazyme 1	2.5	2.5	2.5
Vitazyme 2	5.0	5.0	5.0
Vitazyme 3	7.5	7.5	7.5

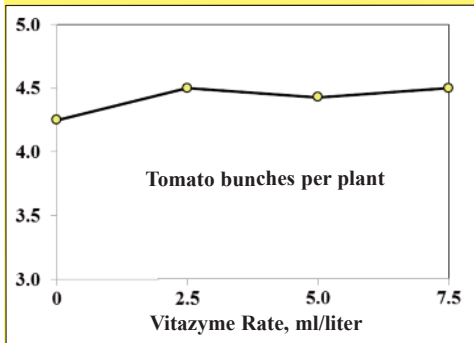
*Days after transplanting. Application rates are 0.25% (2.5 ml/liter), 0.5% (5.0 ml/liter), and 0.75% (7.5 ml/liter).

Fertilization: at recommended rates to all plots
Vitazyme application: 2.5, 5.0, or 7.5 ml/liter of spray applied at 45, 60, and 75 days after transplanting (see the table)

Plant and fruit development results: Five plants of a central row of each plot were used for these evaluations.

Bunches Per Plant

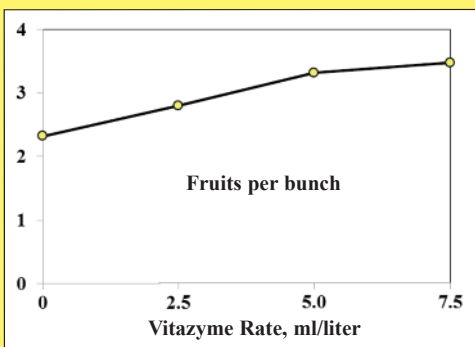
Treatment	Bunch number	Bunch changes
Control	4.25 a	—
Vitazyme 1	4.50 a	0.25 (+6%)
Vitazyme 2	4.43 a	0.18 (+4%)
Vitazyme 3	4.50 a	0.25 (+6%)



Little effect on number per plant was noted with Vitazyme, though there was a 4 to 6% increase.

Fruits Per Bunch

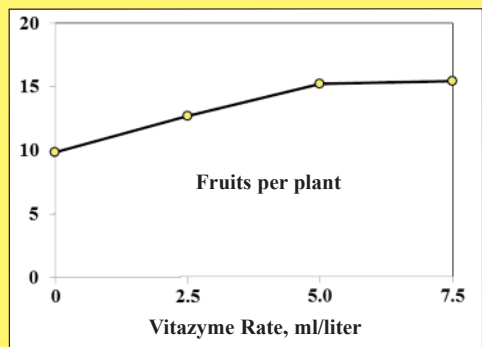
Treatment	Fruits per bunch	Fruits/bunch change
Control	2.32 c	—
Vitazyme 1	2.80 b	0.48 (+21%)
Vitazyme 2	3.32 a	1.00 (+43%)
Vitazyme 3	3.48 a	1.16 (+50%)



A nearly straight-line relationship exists between Vitazyme application rate and fruit number per bunch, the increase going from 21% at the low rate to 50% at the high rate.

Fruits Per Plant

Treatment	Fruits per plant	Fruits/plant change
Control	9.81 c	—
Vitazyme 1	12.68 b	2.87 (+29%)
Vitazyme 2	15.22 a	5.41 (+55%)
Vitazyme 3	15.42 a	5.61 (+57%)



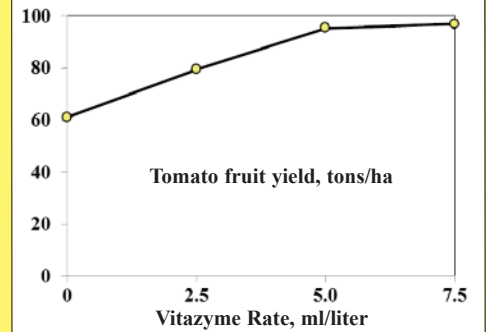
A great increase in the number of fruit per plant was noted at all three application rates, the 5.0 and 7.5 ml/liter rates giving 55 to 57% fruit increases above the control.

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Conclusions: This replicated tomato study in Columbia proved that Vitazyme can greatly improve tomato fruit yield by increasing the fruit number per plant, which is a function of the number of fruits in each bunch. Application of 0.25% three times, at 45, 60, and 75 days after transplanting significantly increased fruit yield above the control, by 30%, while applications of 0.50 and 0.75% increased yields by 56 and 59%, respectively. These increases resulted from significant increases in fruits per bunch and fruits per plant. Vitazyme is shown to be an excellent stimulator of plant growth and yield for Columbian tomato culture.

Fruits Yield

Treatment	Fruits yield tons/ha	Yield change tons/ha
Control	61.0 c	—
Vitazyme 1	79.4 b	18.4 (+30%)
Vitazyme 2	95.3 a	34.3 (+56%)
Vitazyme 3	96.8 a	35.8 (+59%)



Vitazyme elicited a major fruit yield increase at all three application rates, but especially at the two highest rates, when a 56 and 59% increase over the control were achieved.

Increase with Vitazyme at ...

	0.25%	0.50%	0.75%
Fruits per bunch	21%	43%	50%
Fruits per plant	29%	55%	57%
Fruit yield	30%	56%	59%

Wheat

Researcher: Eddie Pearson **Farmer:** C.J. Parker **Location:** Lonoke, Arkansas **Variety:** bearded wheat
Experimental design: Three fields of wheat — 17, 16, and 16 acres — were treated once with Vitazyme at spring green-up to determine the effect of the product on wheat growth characteristics and yield. An adjoining untreated field served as a control.
1. Control **2. Vitazyme**

Fertilization: unknown

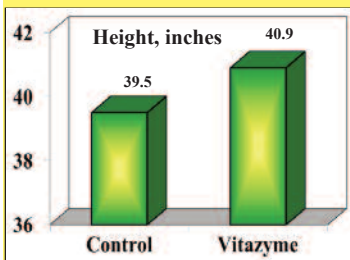
Vitazyme application: 13 oz/acre on the leaves and soil on March 7, 2013

Growing season weather: favorable

Harvest date: mid-June

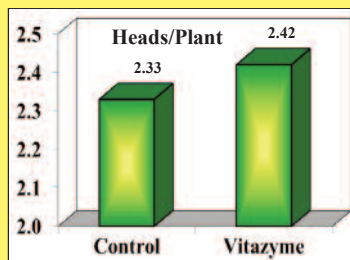
Plant characteristics at harvest: Twelve representative plants, having a similar plant density, from each treatment were selected and measured for several parameters.

Plant Height



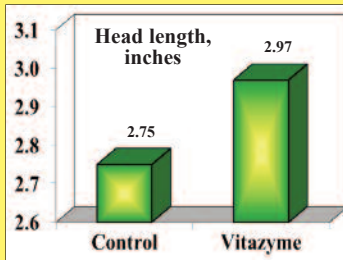
Increase in plant height with Vitazyme: 4%

Heads Per Plant



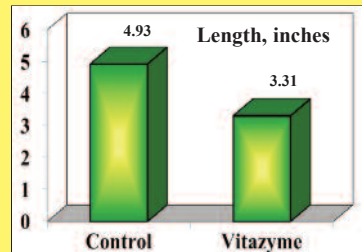
Increase in heads per plant with Vitazyme: 4%

Head Length



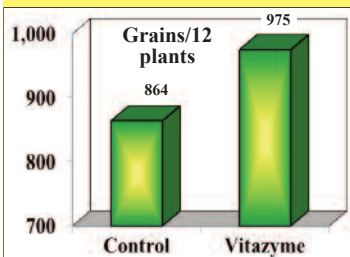
Increase in head length with Vitazyme: 8%

Flag Leaf to Head



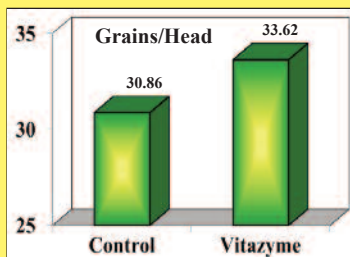
Decrease in stem length from flag leaf to head with Vitazyme: 33%

Grains Per 12 Plants



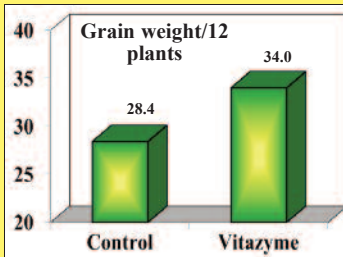
Increase in grains/12 plants with Vitazyme: 13%

Grains Per Head



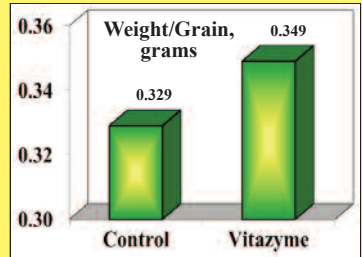
Increase in grains/head with Vitazyme: 9%

Grain Weight



Increase in grain weight/12 plants with Vitazyme: 20%

Weight Per Grain



Increase in weight/grain with Vitazyme: 6%

Yield results: Accurate yield measurements were possible for only portions of the three Vitazyme treated fields, and these results are given below. The control field yield was not determined.

Conclusions: A wheat study in Arkansas revealed that Vitazyme, applied once in March, produced excellent growth and yield responses. The treated plants exceeded the control plants in all categories, giving 20% greater weight of grain per plant, and 6% heavier grain. The fields yielded up to 94.6

bu/acre, the average for the three fields being 86.1 bu/acre, even with some irregular low areas of field 1 producing less and reducing the yield. The Vitazyme program is shown to be an excellent management tool for wheat farmers in Arkansas.

Wheat Yield

Treatment	Harvested area	Gross yield	Area yield
	acres	bu	bu/acre
Field 1	16.0	1,252	78.3
Field 2	11.3	1,069	94.6
Field 3	11.4	1,013	88.9
Total	38.7	3,334	86.1

Wheat

Researchers: Juan Cruz Castaneda Vega, Quimica Lucava, S.A., Jalisco, Colima and Nayarit, Mexico

Farmer: Mr. Alejandro

Location: Zapotlan del Rey, Jalisco, Mexico

Variety: unknown

Planting date: unknown

Experimental design: A wheat field was divided into a Vitazyme treated area of 1 hectare, and the rest of the field served as a control to evaluate the effect of the product on wheat growth and yield.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 1 liter/ha (13 oz/acre) sprayed by a tractor-mounted boom sprayer just before tillering, on December 5, 2013. An output of 300 liters/ha was made. The product was applied together with a fungicide, and with an adjuvant similar to "Break Thru" (1 ml/liter of spray).

Crop growth observations: The researcher noted the following with Vitazyme treatment:

1. A healthier crop, with no striped (yellow) rust
2. An even crop
3. Greater root and leaf growth

Harvest date: April 24, 2014

Yield results: The treated hectare and an adjoining untreated hectare of wheat were harvested and weighed.

Conclusions: This Vitazyme wheat study in Jalisco, Mexico, revealed that a single 1 liter/ha application, applied in the late fall before tillering, greatly enhanced leaf and root development, and produced uniformity across the field. A yield increase of 19% was produced. The farmer realized, at harvest, that crop responses to soil differences were minimized across the treated hectare. He was convinced that Vitazyme did a fine job of increasing crop yield under difficult cropping conditions.

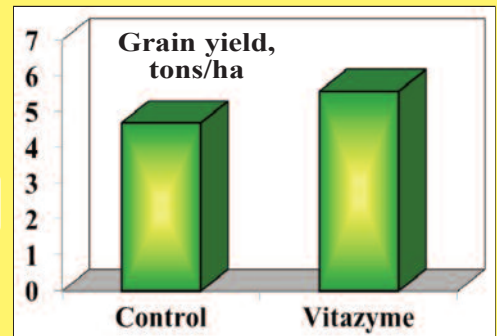


This wheat field in Jalisco, Mexico, produced a 19% yield increase when Vitazyme was applied with a fungicide and adjuvant before tillering.

Wheat Yield

Treatment	Grain yield	Yield change
	tons/ha	tons/ha
Control	4.69	—
Vitazyme	5.57	0.88 (+19%)

Increase in grain yield with Vitazyme: 19%



Spring Wheat

Researchers: Allen Smith, Wilbur Ellis Crop Consultant, Paul W. Syltie, Ph.D., and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Variety: Glee dark northern spring wheat

Seedbed preparation: conventional

Experimental design: A 55-acre field was divided into a 25-acre Vitazyme treated area and a 30-acre untreated control area. The objective of the study was to determine the effects of the product on wheat growth characteristics.

Farmer: Ross McCreary

Seeding rate: 134 lb/acre

Previous crop: alfalfa

Location: Quincy, Washington

Planting date: April 10, 2014

Soil type: silt loam

1. Control

2. Vitazyme

Fertilization: unknown

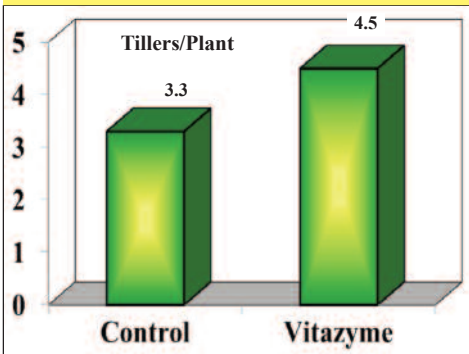
Vitazyme application: 13 oz/acre on May 11, 2014

Growing season weather: very hot

Harvest and sampling date: August 11, 2014

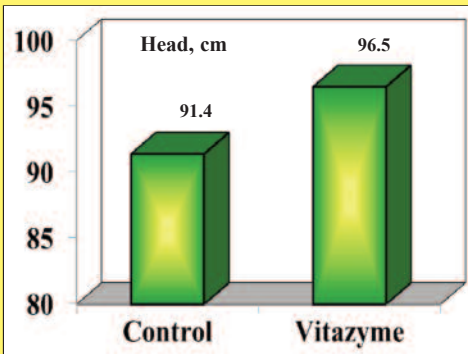
Plant mapping results: Ten typical and randomly selected plants were dug from each treatment, and several parameters were measured. All measured plant parameters displayed sizable improvements with Vitazyme, especially tillers, grains per head, and grain weight per head.

Tillers Per Plant



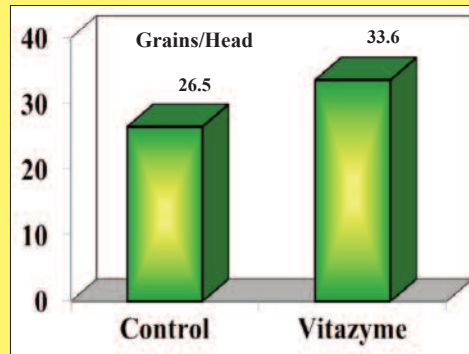
Increase in tillers per plant with Vitazyme: 36%

Plant Height



Increase in plant height with Vitazyme: 6%

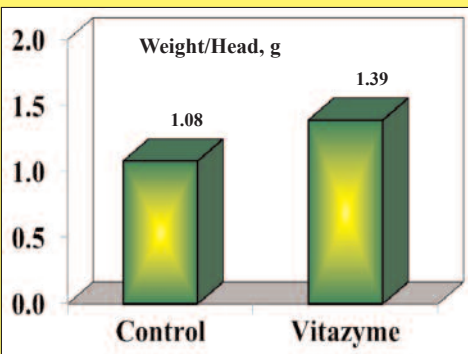
Grains Per Head



Increase in grains per head with Vitazyme: 27%

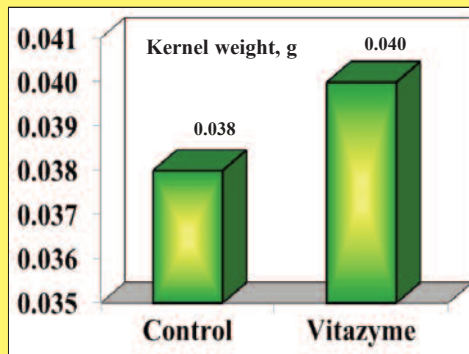
Conclusions: This spring wheat trial in central Washington revealed Vitazyme, applied once in early May, stimulated improvements in all measured parameters, increasing tillering by 36%, grains per head by 27%, grain weight per head by 29%, and even kernel weight by 5%. Yield was not able to be measured, but the program increased grain yield by an undetermined amount. The farmer at harvest noted improvements in tillering and head size, and believed the yield was increased by at least 20% with Vitazyme. This program has shown fine potential to enhance spring wheat production in Washington.

Grain Weight Per Head



Increase in grain weight per head with Vitazyme: 29%

Kernel Weight



Increase in kernel weight with Vitazyme: 5%

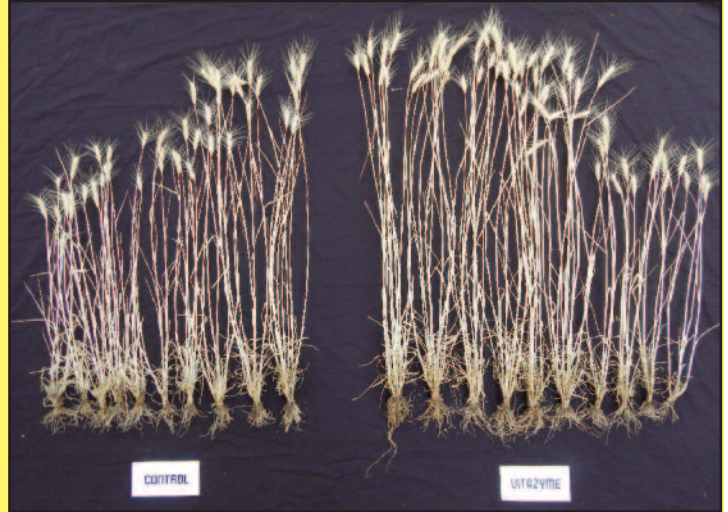


A Quincy, Washington, wheat trial revealed that one spring application of Vitazyme increased tillers, height, grains per head, and grain weight per head.



Note the greatly increased seeds per 10 plants with Vitazyme treatment. The yield increase was likely close to 30%, proportional to the increase in grain weight per head.

Winter Wheat



This Washington winter wheat trial produced excellent growth with Vitazyme, as shown here.

Note the superior size of plants, and head number and length, for this trial with Vitazyme

Researchers: Dale Whaley, Washington State University Douglas County Extension Service, and Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Farmer: Jordan Farms

Planting date: August 28, 2013

Tillage: conventional

Soil type: clayey

Experimental design: Two quarter sections of land planted to winter wheat were each divided approximately in half, with one portion treated with Vitazyme to evaluate the effect of this product on crop yield, as well as on certain parameters. The product was applied once fairly late in the growing season.

Variety: Eltan

Planting rate: 50 lb/acre

Previous crop: winter wheat and fallow

Weed control: herbicides

1. Control

2. Vitazyme

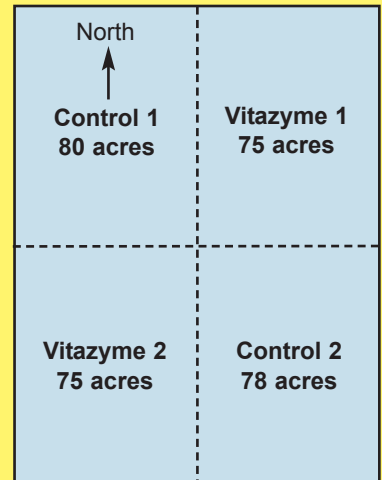
Fertilization: 55 lb/acre of anhydrous ammonia

Vitazyme application: 13 oz/acre in late May. A Flex Coil boom sprayer was used.

Growing season weather: excessive rain during fall planting, and record-low rainfall in 2014

Harvest date: August 4 and 5, 2014. Samples of plants were collected July 29, six days before harvest.

Plant mapping results: Twenty typical plants from each of the four portions were dug by both researchers, and results are averaged for all 20 plants.



Plant Traits

Parameter		Control	Vitazyme	Change
Tillers per plant	Field 1	4.85	6.40	
	Field 2	4.35	5.85	
	Mean	4.60	6.13	1.53 (+33%)
Plant height, cm	Field 1	74.15	80.10	
	Field 2	76.4	89.3	
	Mean	75.3	84.7	9.4 (+12%)
Grains per head	Field 1	29.2	33.7	
	Field 2	24.2	30.6	
	Mean	26.7	32.2	5.5 (+21%)
Grain weight per head, g	Field 1	1.04	1.46	
	Field 2	0.79	1.14	
	Mean	0.92	1.30	0.38 (+41%)
Kernel weight, g	Field 1	0.0356	0.0395	
	Field 2	0.0327	0.0371	
	Mean	0.0342	0.0383	0.0041 (+12%)
Test weight, lb/bu	Field 1	60.8	61.0	
	Field 2	61.0	60.8	
	Mean	60.9	60.9	0

Improvements in Plant Traits with Vitazyme

- Tillers/Plant 33%**
- Plant height 12%**
- Grains/Head 21%**
- Grain weight/Head 41%**
- Kernel weight 12%**
- Test weight 0%**

All plant characteristics improved with Vitazyme application, on both fields and in every case. Especially noteworthy are the increases in tillers/plant (33%), grains/head (21%), and grain weight/head (41%). An increase in kernel weight of 12% is also noteworthy.

Yield results: The farmer noticed a definite differences in color and height of the crop when he combined the fields.

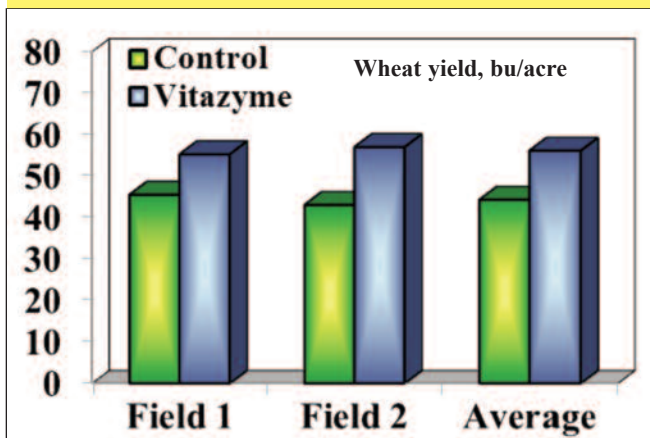
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Winter Wheat Yield

Treatment	Field 1 ^a			Field 2 ^b			Total Area	
	Total yield	Area yield	Yield change	Total yield	Area yield	Yield change	Average yield	Yield change
Control	bu 3,640	bu/acre 45.50	bu/acre —	bu 3,356	bu/acre 43.03	bu/acre —	bu/acre 44.27	bu/acre —
Vitazyme	4,143	55.24	9.74 (+21%)	4,274	56.99	13.96 (+32%)	56.12	11.85 (+27%)

^aControl = 80 acres; Vitazyme = 75 acres.

^bControl = 78 acres; Vitazyme = 75 acres.



Increase in wheat yield with Vitazyme: 27%



Conclusions: A winter wheat trial in Washington involving two contiguous split-acre parcels, with Vitazyme applied once in late May, revealed that the product improved nearly all measured plant parameters at harvest, including tillers per plant (33%), plant height (12%), grains per head (21%), grain weight per head (41%), and kernel weight (12%). Test weight was not affected. Yield was improved by an impressive 27% for both split fields, a difference that the farmer could clearly see while harvesting. All of the crop sold as Number 1 Wheat. These results show the great value of utilizing Vitazyme to enhance winter wheat programs in central Washington.

The grain from 10 plants from each treatment reflects the 27% yield improvement with Vitazyme treatment. Only one 13 oz/acre application was made, in late May.

Winter Wheat



A single Vitazyme application, sprayed with a herbicide, produced an excellent wheat crop as shown here.

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Location: Waterville, Washington

Seeding rate: 36 lb/acre



The Vitazyme treated wheat plants display superior height, tillering, and head size.

Farmer: Brandt Farms

Variety: Eltan

Planting date: August 22, 2013

Seedbed preparation: conventional

Previous crop: winter wheat and summer fallow
Soil type: volcanic ash mixed with sand and clay
Experimental design: A 120-acre field of winter wheat was divided into two parts, one being about 40 acres which received Vitazyme once in the spring. The purpose of the study was to determine the effects of this product on wheat growth and yield.

1. Control **2. Vitazyme**

Fertilization: 65 lb/acre of N

Vitazyme application: 13 oz/acre sprayed in late April along with a herbicide. A Summers Ultimate NT 90-foot boom sprayer was used.

Growing season weather: a dry year overall

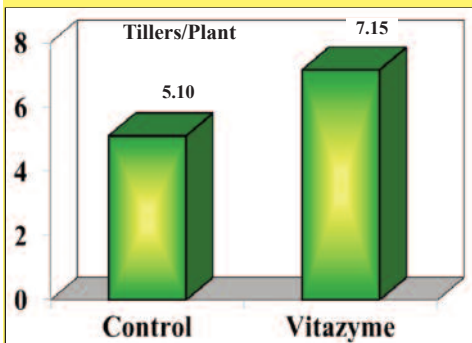
Plant mapping results: On August 1, four days before harvest, 20 random and average plants from both treatments were dug and evaluated for several parameters.

All five measured parameters were improved with Vitazyme application, in particular tillers per plant. Head size and grain weight per head were also notably increased.



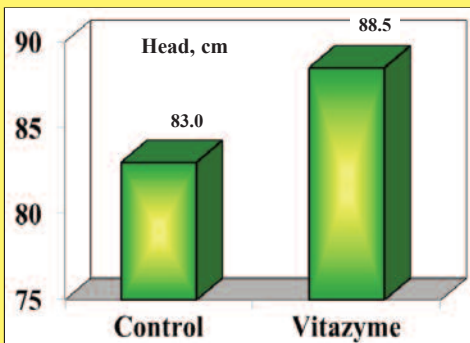
Seeds from 10 plants for both the treated and control treatments reveal an obvious advantage for Vitazyme. Grain weight per head was increased by 13%.

Tillers Per Plant



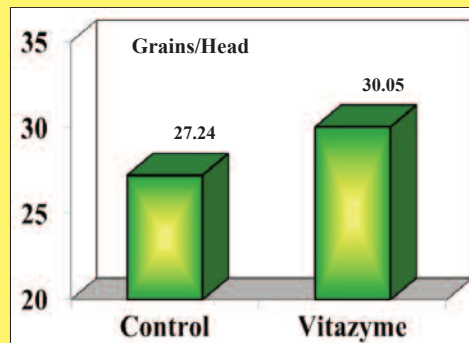
Increase in tillers per plant with Vitazyme: 40%

Plant Height



Increase in plant height with Vitazyme: 7%

Grains Per Head



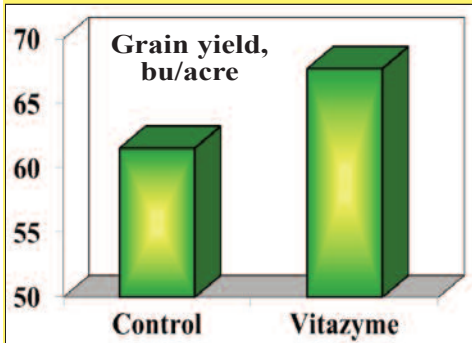
Increase in grains per head with Vitazyme: 10%

Harvest date: August 5, 2014

Yield results: Multiple 1.3-acre strips, one combine width, were harvested in each treatment, and the combine monitor yield values were averaged.

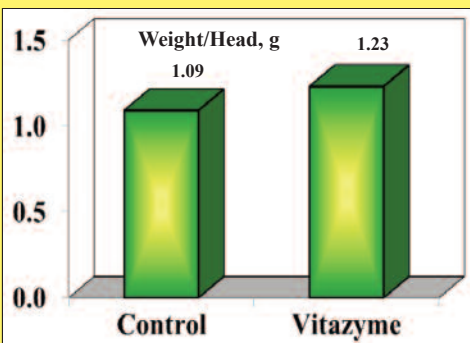
Wheat Yield

Treatment	Grain yield bu/acre	Yield change bu/acre
Control	61.53	—
Vitazyme	67.69	6.16 (+10%)



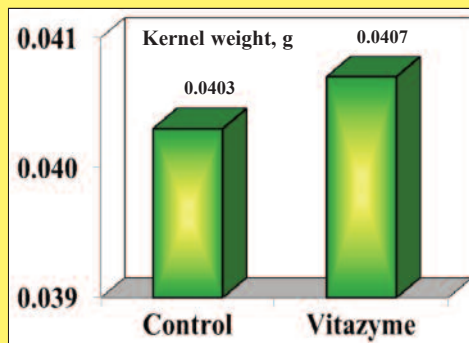
Increase in grain yield with Vitazyme: 10%

Grain Weight Per Head



Increase in grain weight per head with Vitazyme: 13%

Kernel Weight



Increase in kernel weight with Vitazyme: 1%

Conclusions: A field scale winter wheat trial in central Washington revealed that Vitazyme, applied in late April at 13 oz/acre with a herbicide, stimulated all measured plant parameters, and boosted yield by 10%. This increase resulted in about \$37.00/acre more income, with a cost of Vitazyme of only about \$6.00/acre, a \$31.00 net return, or a cost:benefit ratio of 6.2:1. Tillering was greatly improved (40%) by this single application, but plant height, grains per head, and grain weight per head were also elevated. The farmer noticed shortly after the Vitazyme treatment that the wheat grew back quicker in the tractor and sprayer tracks than in the untreated control areas. This program for wheat growers is highly recommended to enhance yields and profits in Washington.

Winter Wheat

Researcher: Jacob Hesseltine, Vital Grow Distribution LLC, Waterville, Washington

Location: Withrow, Washington

Previous crop: winter wheat and summer fallow

Seedbed preparation: conventional (harrowing, plowing, and cultivation)

Experimental design: A field of winter wheat totalling 193 acres was divided into a Vitazyme treated area (105 acres) and an untreated control area (88 acres), with one application, to determine the effect of the product on wheat yield.

Farmer: Jordan Farms

Planting rate: 43 lb/acre

Soil type: sandy loam

Variety: Eltan

Planting date: September 10, 2013

1. Control

2. Vitazyme

Fertilization: 45 lb/acre of anhydrous ammonia

Vitazyme application: 13 oz/acre sprayed on May 20 along with Olympus Flex broadleaf and grass killer, using a flex-coil boom sprayer

Weather for 2014: Rain delayed planting, and rainfall during the growing season was at a record low.

Harvest date: July 23 to 28, delayed by rain

Yield results: See table and graph at right.

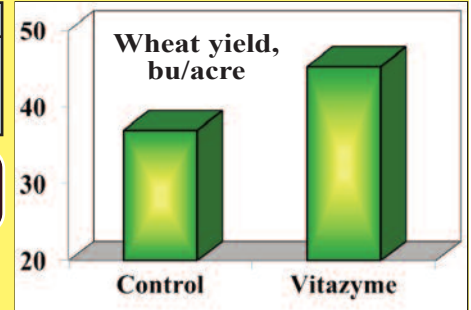
Grain test weight results: The control treatment gave 62.3 lb/bu test weight, while the Vitazyme treatment gave 62.4 lb/bu, nearly identical. Both treatments produced No. 1 wheat since the test weight exceeded 60 lb/bu.

Income results: Wheat was selling for \$6.12/bu at the time of harvest. A Vitazyme price of \$60.00/gal is used for the calculations; 13 oz/acre would cost \$6.00.

Conclusions: A winter wheat large-field study in central Washington revealed that one 13 oz/acre application of Vitazyme, applied with a herbicide, improved the yield by 8.4 bu/acre, a 23% increase. Using the current wheat price, that increase gave \$51.41/acre more income, representing an 8.57:1 cost:benefit ratio for the \$6.00/acre product investment. Such a great improvement in yield and income for a small investment, while requiring no extra trip across the field, reveals the excellent value of Vitazyme for wheat growers in the Pacific Northwest.

Wheat Yield

Treatment	Wheat yield bu/acre	Yield change bu/acre
Control	37.0	—
Vitazyme	45.4	8.4 (+23%)



Increase in wheat yield with Vitazyme: 23%

Wheat Income

Treatment	Wheat yield bu/acre	Wheat income \$/acre	Income change \$/acre
Control	37.0	226.44	—
Vitazyme	45.4	277.85	51.41

Cost:Benefit ratio with Vitazyme: 8.57:1

Increase in income with Vitazyme: \$51.41/acre

Brassinosteroids, the Hot Topic in Growth Regulation for the 21st Century

For many decades it was thought by plant physiologists that the major classes of growth regulators had already been discovered. Those classes are the auxins, cytokinins, and gibberellins, plus abscissic acid and ethylene.

Times have changed, and in 1979 J.W. Mitchell and co-workers isolated 4 mg of a compound from 227 grams of bee-collected rape pollen that turned out to be extremely active in plant systems. This compound was named brassinolide, since it came from a Brassica crop.

Since that time hundreds of studies have been done on the effects of not just brassinolide, but a whole array of related brassinosteroids on many types of plants. However, the road to understanding these unique compounds has not been an easy one, and even today it is not certain where these compounds are synthesized in plants. They are produced in all plant tissues, but are present at extremely low levels, and they act by unleashing or inhibiting specific genes in nuclear DNA, these effects then being transmitted to RNA and the enzymes that produce the compounds essential for growth and function in plants.

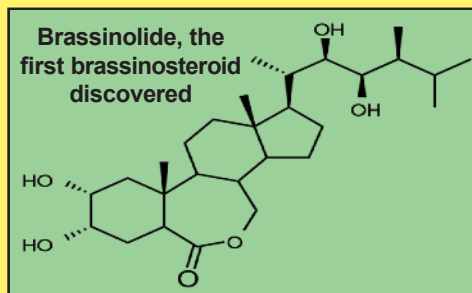
Brassinosteroids are noted for many effects on cells, tissues, and organs of plants, including the following:

- Promotion of cell expansion and elongation, working

together with auxin to do so

- Aiding in cell division and cell wall regeneration
- Affecting cell membrane electrical and osmotic properties
- Improving chlorophyll development and photosynthesis
- Helping the plant resist diseases
- Enhancing vascular (xylem and phloem) differentiation
- Causing pollen tube elongation
- Protecting the plant from stresses of many sorts

It is this last effect—improving stress tolerance—that relates to the brassinosteroids' ability to affect protein and nucleic acid metabolism. These stresses include high or low temperatures, dry or wet conditions, soil salinity, and pathogen attacks. Since virtually all crops are stressed to some degree, the value of these amazing compounds can be appreciated.



Vitazyme contains levels of brassinosteroids that are within the active range (20 to 50 mg/ha for a 1 liter/ha application), and thus the great value of this product may be appreciated for all crops. As more research unfolds over the next few years, the mode of action of these amazing growth regulators in Vitazyme will become clearer.