2008 Field Trial Results

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

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For the thirteenth consecutive year a summary of Vitazyme field trials is presented to convey the great value of this crop biostimulant to enhance crop production. Over a wide variety of crops, soils, and climatic conditions, various production programs using Vitazyme have performed extremely well across the United States and in many foreign countries. The consistency of crop responses has been noteworthy.

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 up to 25% or more of its energy, fixed in the leaves as carbohydrates, amino acids, and other compounds, into the root zone to feed these organisms, for a very good purpose.

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

Vitazyme contains “metabolic triggers” that stimulate the plant to photosynthesize more efficiently, fixing more sunlight energy in the form of carbon compounds to increase the transfer of carbohydrates, proteins, and other growth substances into the root zone. These active agents may enter the plant through either the leaves or the roots. Root growth and exudation are both enhanced. This enhancement activates the metabolism of the teeming population of rhizosphere organisms to a higher level, triggering a greater synthesis of growth-benefiting compounds and a faster release of minerals for plant uptake. Thus the plant-microbial symbiosis is stimulated.

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

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

Vitazyme should be used within the context of a complete crop management system, never by itself. Vitazyme will optimize your existing program by enabling the plant to grow better, thus increasing productivity. Follow this easy-to-use five-point program:

1. If possible, analyze the soil at a reputable laboratory and correct mineral deficiencies and imbalances with expert consultation.
2. Reduce nitrogen fertilizer applications for non-legumes using this test:

   ![Soil Organic Matter Table](image)

<table>
<thead>
<tr>
<th>Soil Organic Matter</th>
<th>Previous Crop</th>
<th>Compaction</th>
<th>Soil NO₃-N Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low(&lt;1.5%) Medium(1.5-3%) High(&gt;3%)</td>
<td>Non- legume Legume</td>
<td>Much Little</td>
<td>Low Medium High</td>
</tr>
<tr>
<td>1 2 3 1 3</td>
<td>1</td>
<td>3</td>
<td>1 3</td>
</tr>
<tr>
<td>10 9 8</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>7 6 5</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

   **Total additive score:**
   - 50-60%: 15
   - 60-70%: 14
   - 70-80%: 13

   **Apply this % of optimum N:**
   - Low: 12
   - Medium: 11
   - High: 10

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 planting 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.
Once again Vitazyme performed excellently across a wide range of soils and climates. Despite adverse weather conditions in some parts of the nation and overseas, the product once again boosted yields in trials on many crops. Note the following studies for 2008, and in particular these major highlights.

Some Highlights for 2008

1. Ukrainian studies on winter canola, winter wheat, spring barley, potatoes, and tomatoes showed consistent yield increases of 7 to 24%. Two applications at 1 liter/ha on canola doubled the 9% yield increase achieved from one application.

2. In Viet Nam, equally consistent yield increases of 11 to 13% were noted with rice, 8 to 10% increases with cabbage, and 12% increases with tea. These results followed excellent test data for rice during the 2007 growing season.

3. Grapes produced admirably in tests with Vitazyme in the California wine country, the San Jaoquin Valley of California, southwestern Michigan, and Ukraine. Of special note, in Michigan the brix level of grapes was raised by 1.8 percentage points with the program, while in Ukraine grape yields were boosted by 28%. Year six of a raisin grape study in California proved that Vitazyme plus an herbal fungal control agent, based on melaleuca, exceeded all other treatments.

4. A Master’s Degree thesis was written at Tarleton State University concerning Vitazyme as a fertilizer supplement in establishing and maintaining turf grasses.

5. Results with winter wheat in west Texas and Ukraine were excellent. One Texas trial produced a 29% grain increase with two 13 oz/acre applications.

6. An oil palm study in Ecuador proved the utility of Vitazyme, alone or together with other products, to greatly stimulate tree root growth and yield potential. A high 0.196 root growth/treatment cost figure was obtained with the full program.

7. Of considerable interest is the fact that five Vitazyme users for bermudagrass in eastern Texas discovered that armyworm damage was virtually nonexistent wherever the product was applied to their fields; neighbors’ fields alongside in many cases has serious losses from the larvae, but Vitazyme gave protection from the insect invasion. More research needs to be done on this observation, very likely a result of lower free amino acid levels and a higher sugar content of the treated leaves.

8. Fruit results continue to be extremely positive. In New York, an apple study produced a 34% increase in yield and a $3,341/acre increase in income, with higher brix and fruit pressure as well.

### Vitazyme Field Tests for 2008

**Apples**

**Researcher:** Robert deBorst, Mantissa Corporation  
**Location:** Cambridge, New Zealand  
**Variety:** unknown  
**Tree age:** young bearing trees  
**Fertilization:** unknown  
**Experimental design:** A second-year apple orchard was divided into Vitazyme treated and untreated areas to determine the effect of the product on tree development, as measured by trunk diameter.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Trunk diameter*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control 1</td>
<td>45.75</td>
<td></td>
</tr>
<tr>
<td>Control 2</td>
<td>45.19</td>
<td></td>
</tr>
<tr>
<td>Control 3</td>
<td>45.23</td>
<td></td>
</tr>
<tr>
<td>Control 4</td>
<td>47.12</td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>45.82 b</strong></td>
<td><strong>4.6 (10%)</strong></td>
</tr>
<tr>
<td>Vitazyme 1</td>
<td>48.94</td>
<td></td>
</tr>
<tr>
<td>Vitazyme 2</td>
<td>49.24</td>
<td></td>
</tr>
<tr>
<td>Vitazyme 3</td>
<td>53.86</td>
<td></td>
</tr>
<tr>
<td>Vitazyme 4</td>
<td>49.63</td>
<td></td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>50.42 a</strong></td>
<td><strong>4.6 (+10%)</strong></td>
</tr>
</tbody>
</table>

*Measured at the same height for each tree. Data is treated as a completely randomized design. Means followed by the same letter are not significantly different at P=0.05, according to the Student-Newman-Keuls Test.

**Conclusions:** In this New Zealand apple study, four applications of Vitazyme markedly increased trunk diameter of these young trees by 10% above the control during a single growing season. The yield of fruit was not measured.

**Increase in trunk diameter in one season: 10%**
Apples
Year Three of a Continuing Study

Researcher: Jim Misiti
Grower: Oded Kalir
Location: Albion, New York

Variety: Ida Red
Soil type: unknown
Tree age: mature grove

Experimental design: A 5-acre orchard was divided, and one part was treated with Vitazyme while the other part was left untreated. The purpose of the study was to evaluate the product's effects on apple yield and quality.

1. Control
2. Vitazyme

Fertilization: unknown

Vitazyme application: four foliar applications, each at 16 oz/acre; (1) pink bloom on May 1, (2) petal fall on May 21, (3) first cover on May 31, and (4) August 10.

Harvest date: November 18, 2008

Quality results: Each value is the average of analyses performed on 50 fruit selected for each treatment on October 14.

Vitazyme increased the strength of apple tissue cell walls to increase fruit pressure, while the starch content was also increased slightly. Soluble solids were also increased with Vitazyme, quite remarkable since the much greater fruit load did not reduce sugars in the fruit tissues. Thus, Vitazyme was apparently stimulating photosynthesis to fix more carbon from the air while enhancing root uptake of nutrients.

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total yield</th>
<th>Trees</th>
<th>Yield</th>
<th>Trees</th>
<th>Yield</th>
<th>Increase</th>
<th>Income*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu</td>
<td>number</td>
<td>bu/acre</td>
<td>trees/acre</td>
<td>bu/acre</td>
<td>bu/acre</td>
<td>$/acre</td>
</tr>
<tr>
<td>Control</td>
<td>1,560</td>
<td>211</td>
<td>7.39</td>
<td>200</td>
<td>1,478.67</td>
<td>——</td>
<td>9,936.68</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1,640</td>
<td>166</td>
<td>9.88</td>
<td>200</td>
<td>1,975.90</td>
<td>497.23 (+34%)</td>
<td>13,278.07</td>
</tr>
</tbody>
</table>

*Based on a value of $6.72/bu

Conclusions: This apple study in western New York proved that four applications of Vitazyme increased apple yield by 34%, producing $3,341.39/acre more income. At the same time there was an increase in sugars with Vitazyme despite a much heavier fruit load. The product also improved fruit pressure through the development of stronger cell walls, and increased fruit starch. These results show the very great value of Vitazyme to increase apple yield and quality in western New York.

- **Increase in fruit pressure: 0.24 percentage point**
- **Decrease in fruit starch: 0.04 percentage point**
- **Increase in fruit brix: 0.12 percentage point**
- **Increase in apple yield: 34%**
- **Increase in income: $3,341.39/acre**
September 23, 2008

To whom it may concern,

I am using Forage Booster and Vitazyme on approximately 130 acres of hay land. I use 500 gallons of water per 2.5 gallons of Vitazyme and 125 lbs of Forage Booster per 25 acres, per application. We use two applications per cutting on a two week interval.

On the second cutting, we averaged three rolls of hay per acre. However, we did run 10 days to two weeks long on the cutting due to some late rains. The rolls were 5x5.5 feet.

The army worm issue seems to be another plus for the product. *We saw no army worms in any of the pastures or meadows fertilized with the Forage Booster.* However, on a 20 acre field that we did not fertilize often, the third cutting had many army worms. This field had about two week's regrowth and the worms ate about a third of it overnight.

Mike Spencer
oz/acre had significantly higher mean root biomass than bermudagrass treated with Vitazyme at 26 oz/acre, the untreated, and fertilizer alone. The mean root weight for the fertilizer alone treatment was the lowest recorded value. In addition, roots from the Vitazyme treated plots were observed to be surrounded by a “tube” of soil, which suggests a rhizospheric support system emanating from the root; this tube was not observed in other treatment samples.

- **Root mass (dry) of seeded Princess 77 bermudagrass (2006)**
  In the seeded Princes 77 bermudagrass trial for 2006, dry root biomass for cores from plots treated with fertilizer in combination with Vitazyme at 6 oz/acre were statistically greater than fertilizer in combination with Vitazyme at 13 oz/acre and the control plots.

- **Visual quality of seeded Princess 77 bermudagrass (11/16/2006)**
  Vitazyme at both 13 and 26 oz.acre increased the visual quality of the Princess 77 bermudagrass above the fertilizer alone or the untreated turf.

- **Chlorophyll indices of Princess 77 bermudagrass treatments (11/17/2006)**
  These data are for one day of evaluation in November of 2006. During all times of evaluation, from August 31 to December 1, significant differences occurred among the six treatments.

- **Root mass (dry) of established TifSport bermudagrass (2006)**
  Although the dry root mass of the various TifSport bermudagrass treatments did not show significant differences, the differences were sizable, the Vitazyme treatments alone showing the greatest root masses.

- **Visual quality of TifSport bermudagrass (11/16/2006)**
  In this trial, Vitazyme increased the visual quality of TifSport bermudagrass for both the fertilized and unfertilized plots. One date has been selected to show here.

- **Chlorophyll indices of TifSport bermudagrass (11/27/2006)**
  With or without fertilizer, Vitazyme at both levels increased — sometimes significantly — the chlorophyll content of the leaves compared to the controls.

*Rating of 1 for dead or absent turf; 10 for ideal turf.

Continued on the next page
Clipping weights of established TifSport bermudagrass (2006)
The values given below are the totals of all 19 readings of grass clippings taken from June 19 to October 16, showing that Vitazyme increased the total grass growth versus the untreated controls.

Root mass (dry) of established Princess 77 bermudagrass (2006)
The treatment with the greatest mean root mass was fertilizer plus Vitazyme at 13 oz/acre, and the lowest was with the untreated grass. Vitazyme always increased root mass above the controls.

Percent turf cover by digital image analysis of seeded Princess 77 bermudagrass (12/2/2006)
At the end of the growing season the percent leaf cover, as determined by digital image analysis, revealed that Vitazyme, both with and without fertilizer, increased the grass cover. This increase in grass cover with Vitazyme appeared to be accentuated as the season progressed.

Shoot biomass (dry) for seeded Princess 77 bermudagrass, greenhouse trial (2006)
While differences in means were not significant due to high experimental error, yet Vitazyme at both rates, in both the fertilized and unfertilized Princess 77 treatments, increased dry shoot biomass.

Percent of diseased pots in a seeded Princess 77 greenhouse trial (2006)
Of great interest in this trial was the fact that the 13 oz/acre rate of Vitazyme caused by far the lowest incidence of plant disease for both the fertilized and unfertilized Princess 77 bermudagrass.

Conclusions, quoted from the thesis: Fertilizer treatments significantly improved color and percentage cover visually, percentage cover by digital image analysis (DIA), shoot clipping biomass, and chlorophyll indices compared to treatments not containing fertilizer. Fertilized plots had higher quality ratings later into the growing season than non-fertilized plots. Vitazyme in combination with a complete fertilizer significantly improved color, percentage cover, and density of Princess 77 seeded bermudagrass. However, the effects of Vitazyme in combination with a complete fertilizer were not significantly different from fertilizer alone in many instances. Vitazyme at the label rate alone did not significantly increase root biomass compared to the nontreated and fertilizer alone; however, Vitazyme treatments had greater root biomass than the non-treated in the 2005 seeded Princess 77 bermudagrass and the 2006 established Princess 77 bermudagrass. Use of DIA did not show many significant differences between fertilizer in combination with Vitazyme and fertilizer alone when other methods could not.

Means followed by the same letter are not significantly different at P=0.10.

Vitazyme application to bermudagrass stimulates both roots and tops, from an initial increase in photosynthetic capacity of the leaves.
Notice the much better rooting, and consequently denser leaf growth and heading, for this barley comparison. Better nutrient utilization is apparent from this test.

**Grain Yield**

![Graph showing grain yield comparison](image)

**Increase in barley yield**
- Vitazyme once ........ +11%
- Vitazyme twice ...... +24%

**Conclusions:** In this Ukraine barley test, conducted on a gray forest-steppe soil, Vitazyme increased grain yield by 11% for one application and 24% for two applications. Likewise, grain quality was substantially improved by Vitazyme application, considering both “hatypa” and test weight of barley grain, especially with two applications. Income was likewise improved substantially, by 234 hrn/ha with one application and by 495 hrn/ha with two. These results show that Vitazyme is a highly viable crop input for barley farmers in Ukraine.

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**Spring Barley**

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

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

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

**Variety:** Vinnytsia 28  **Seeding rate:** 6 mil/ha  **Planting date:** unknown  **Soil Type:** gray forest steppe soil; in the 0-30 cm layer  2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH = 5.5.

**Previous crop:** spring vetch  **Tillage:** tilled to 4-5 cm.

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

1. **Control**  
2. Vitazyme applied once  
3. Vitazyme applied twice

**Fertilization:** In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P2O5-K2O was made. In the spring, 120 kg/ha of nitrogen was applied at two times (50 and 70 kg/ha).

**Vitazyme application:** 1 liter/ha applied on June 12 for Treatment 2, and on May 29 and June 12, 2008, for Treatment 3

**Harvest date:** unknown

**Yield results:** Vitazyme applied once provided a sizable 11% yield increase, whereas two applications gave a 24% increase.

**Quality results:** Vitazyme improved both the “hatypa” and test weight of barley grain, especially with two applications.

**Table: Increase in “hatypa” with Vitazyme**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>“Hatypa” Change</th>
<th>Weight of 100 grains</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>649</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme once</td>
<td>+10</td>
<td>48</td>
<td>+1</td>
</tr>
<tr>
<td>3. Vitazyme twice</td>
<td>+13</td>
<td>51</td>
<td>+4</td>
</tr>
</tbody>
</table>

**Income results:** Based on the current grain price, the increases in income from Vitazyme for the two treatments were as follows:
- Vitazyme once ........ 234 hrn/ha
- Vitazyme twice ...... 495 hrn/ha

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**Bush Beans**

**A Greenhouse Study**

Researchers: Paul W. Syltie, Ph.D.

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

**Planting date:** January 31, 2008

**Pot size:** 1 gallon

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

**Watering:** on-demand

**Temperature:** 55°F  **Soil type:** silt loam

**Experimental design:** A replicated greenhouse pot study was designed to evaluate the effect of Vitazyme, Cold Start, and a seawater concentrate on the growth and development of bush beans. Ten treatments with six replicates were utilized, with different propor-

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**Table: Increase in grain weight with Vitazyme**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>“Hatypa” Change</th>
<th>Weight of 100 grains</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitazyme once</td>
<td>+1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme twice</td>
<td>+4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Table: Treatment**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Vitazyme</th>
<th>Seawater</th>
<th>Cold Start</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 (13 oz/acre)</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3 (13 oz/acre)</td>
<td>90</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>4 (13 oz/acre)</td>
<td>70</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>5 (13 oz/acre)</td>
<td>50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>6 (13 oz/acre)</td>
<td>30</td>
<td>70</td>
<td>0</td>
</tr>
<tr>
<td>7 (13 oz/acre)</td>
<td>10</td>
<td>90</td>
<td>0</td>
</tr>
<tr>
<td>8 (13 oz/acre)</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>9 (26 oz/acre)</td>
<td>50</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>10 (13 oz/acre)</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Continued on the next page
tions of Vitazyme and seawater concentrate for eight of the treatments. The data were analyzed using Analysis of Variance with CoHort software.

**Vitazyme and Seawater applications**: Both products were applied at 13 oz/acre total (1 liter/ha), with the exception of Treatment 9 which received twice this amount. The applications were made using 100 ml of a 0.0016% solution to achieve the 13 oz/acre rate, applied to the soil surface of the pots after planting.

**Harvest date**: On March 5, 33 days after planting, the roots of the plants were washed free of soil, the maximum height of each plant was measured, and the three plants from each pot were placed in a drying oven at about 50°C.

### Plant height results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Height change*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>2 (100% Vitazyme)</td>
<td>41.0 a</td>
<td>1.5 (+4%)</td>
</tr>
<tr>
<td>5 (50:50 Vita:Sea)</td>
<td>40.7 a</td>
<td>1.2 (+3%)</td>
</tr>
<tr>
<td>8 (100% Seawater)</td>
<td>40.6 a</td>
<td>1.1 (+3%)</td>
</tr>
<tr>
<td>10 (100% Cold Start)</td>
<td>39.8 ab</td>
<td>0.3 (+1%)</td>
</tr>
<tr>
<td>1 (Control)</td>
<td>39.5 ab</td>
<td>—</td>
</tr>
<tr>
<td>9 (2x 50:50 Vita:Sea)</td>
<td>39.1 ab</td>
<td>(-) 0.4 (-1%)</td>
</tr>
<tr>
<td>3 (90:10 Vita:Sea)</td>
<td>38.9 ab</td>
<td>(-) 0.6 (-2%)</td>
</tr>
<tr>
<td>4 (70:30 Vita:Sea)</td>
<td>38.4 ab</td>
<td>(-) 1.1 (-3%)</td>
</tr>
<tr>
<td>6 (30:70 Vita:Sea)</td>
<td>37.7 b</td>
<td>(-) 1.8 (-5%)</td>
</tr>
<tr>
<td>7 (10:90 Vita:Sea)</td>
<td>37.4 b</td>
<td>(-) 2.1 (5%)</td>
</tr>
</tbody>
</table>

*Compared to the control treatment.

Conclusions: This greenhouse bush bean study using various proportions of Vitazyme and Seawater concentrate revealed that the 100% concentration of each product produced the greatest dry matter increase. Plant height showed a similar response. There was no consistent pattern of various product proportions producing higher or lower plant heights or dry weights, and doubling the 50:50% Vitazyme:Seawater rate did not result in better plant response; rather, the height and dry weight were slightly, though not significantly, below the control for both parameters. Cold Start instigated a 9% dry weight increase. Most height and dry weight changes were not significantly different from other treatments even though plant height varied by up to 9%, and plant dry weight by up to 18%.

### Increase in dry weight

**Vitazyme, 100% ... 17%**
**Seawater, 100% ... 16%**
**50% Vitazyme + 50% Seawater ..... 15%**

Conclusions: This greenhouse bush bean study using various proportions of Vitazyme and Seawater concentrate revealed that the 100% concentration of each product produced the greatest dry matter increase. Plant height showed a similar response. There was no consistent pattern of various product proportions producing higher or lower plant heights or dry weights, and doubling the 50:50% Vitazyme:Seawater rate did not result in better plant response; rather, the height and dry weight were slightly, though not significantly, below the control for both parameters. Cold Start instigated a 9% dry weight increase. Most height and dry weight changes were not significantly different from other treatments even though plant height varied by up to 9%, and plant dry weight by up to 18%.

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### Cabbage

**Researcher**: unknown  
**Location**: Hoai Duc, Ha Tay, Viet Nam  
**Variety**: KK cross

**Planting density**: unknown  
**Soil Type**: alluvial soils of the Red River  
**Planting date**: spring, 2008

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

1. Control
2. Vitazyme

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

**Harvest date**: unknown, in 2008

*Continued on the next page*
Cabbage treated with Vitazyme in this field show the typical vigor and color noted with all brassica crops that utilize this program.

### Cabbage

**Researcher:** unknown  
**Location:** Thanh Xuan, Soc, Viet Nam  
**Variety:** KK cross  
**Soil Type:** gray, "exhausted" soil  
**Planting date:** spring, 2008  
**Experimental design:** A field of cabbage was divided into Vitazyme treated and untreated areas for the purpose of evaluating the effect of the product on cabbage yield.

1. **Control**  
2. **Vitazyme**

**Fertilization:** unknown  
**Vitazyme application:** two applications of 1 liter/ha each time (times unknown)  
**Income results:** an income increase of 4,140,000 Vnd/ha  
**Conclusions:** Vitazyme in this Viet Nam trial increased cabbage yield by 8%, a very profitable increase on this alluvial river bottom soil. Besides, income was increased substantially.

**Increase in cabbage yield: 8%**

### Cabbage

**Researcher:** unknown  
**Location:** Minh Khai and Tu Liem, Viet Nam  
**Variety:** Dong Du  
**Soil Type:** alluvial soils of the Red River  
**Planting date:** spring, 2008  
**Experimental design:** A field of cabbage was divided into Vitazyme treated and untreated areas for the purpose of evaluating the effect of the product on cabbage yield.

1. **Control**  
2. **Vitazyme**

**Fertilization:** unknown  
**Vitazyme application:** two applications of 1 liter/ha each time (times unknown)  
**Harvest date:** unknown, in 2008  
**Income results:** an income increase of 5,445,000 Vnd/ha  
**Conclusions:** Vitazyme in this Viet Nam trial increased cabbage yield by 10%, a very profitable increase on this alluvial river bottom soil. Besides, income was increased substantially.

**Increase in cabbage yield: 9%**

### Winter Canola

**Researchers:** O.V. Kornijchuk, V. V. Plotnikov, and agronomic scientists  
**Organization:** Vinnytsia State Agricultural Experiment Station of Forage Institute, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine  
**Location:** Ukraine central forest – steppe area of Ukraine near Vinnytsia  
**Variety:** Black Giant Super – Elite  
**Soil Type:** gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH = 5.5.

**Seeding rate:** 6 kg/ha  
**Planting date:** August 18, 2007

**Income results:** an income increase of 5,445,000 Vnd/ha  
**Conclusions:** Vitazyme in this Viet Nam trial increased cabbage yield by 10%, a very profitable increase on this alluvial river bottom soil.
**Tillage:** plowing to 22 cm, and cultivation to 3-4 cm

**Previous crop:** winter wheat

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

**1. Control**

**2. Vitazyme applied in the fall**

**3. Vitazyme applied both fall and spring**

**Fertilization:** In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P₂O₅-K₂O was made. In the spring, 90 kg/ha of nitrogen was applied.

**Vitazyme application:** For Treatment 2, 1 liter/ha over the leaves and soil on October 5, 2007 (8 to 10 leaves), and for Treatment 3, 1 liter/ha on October 5, 2007, and also 1 liter/ha on May 15, 2008 (bloom).

**Harvest date:** unknown

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Seed yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons/ha</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>4.67</td>
<td>–</td>
</tr>
<tr>
<td>Vitazyme 1x</td>
<td>5.11</td>
<td>0.44 (+9%)</td>
</tr>
<tr>
<td>Vitazyme 2x</td>
<td>5.53</td>
<td>0.86 (+18%)</td>
</tr>
</tbody>
</table>

**Income results:** Based on current canola prices, the increase in income from Vitazyme for the two treatments is as follows:

- Fall application ................................... 952 hrn/ha
- Fall and spring application ................. 1,855 hrn/ha

**Conclusions:** A fall application of Vitazyme (1 liter/ha) after planting resulted in a sizeable 9% increase in canola yield in Ukraine. Applying a second 1 liter/ha application in the spring doubled this yield increase to 18%, showing how effective this fertility supplement is to improve yields and profits on canola in Eastern Europe. Income increases were substantial for the two treatments: 952 and 1,855 hrn/ha, respectively.

---

**Corn**

**Researcher/Farmer:** Rick Nichols

**Location:** Hebron, Indiana

**Variety:** Pioneer 34Y88 (non-GMO)

**Soil type:** silty clay "gumbo"

**Planting date:** May 4, 2008

**Row spacing:** 30 inches

**Population:** 34,000 seeds/acre

**Experimental design:** A field was divided into a control area receiving no sidedressed nitrogen or Vitazyme, and a treated area receiving both. The objective of the test was to evaluate the effect of combined sidedressed nitrogen plus Vitazyme on crop yield.

**1. Control**

**2. Vitazyme + sidedressed nitrogen**

**Fertilization:** Before planting: 140 lb/acre nitrogen, as urea. At planting: 300 lb/acre 18-46-60% N-P₂O₅-K₂O placed 4 inches to the side of the seeds. At sidedressing, in June (corn about 2 feet tall): 40 lb/acre nitrogen as a 28% solution

**Vitazyme application:** 13 oz/acre with sidedressed nitrogen on the treated area, applied in June at the 2-foot height

**Harvest date:** October 7, 2008

**Yield results:** Six rows of field length were harvested and weighed from each treatment in passes near one another. However, no row length was measured, so per acre yields were not obtained.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/6 rows</td>
</tr>
<tr>
<td>Control</td>
<td>120</td>
</tr>
<tr>
<td>Vitazyme + Sidedress</td>
<td>149 (+17%)</td>
</tr>
</tbody>
</table>

**Conclusions:** In this northern Indiana corn trial, Vitazyme side-dressed with 40 lb/acre of nitrogen as a 28% solution increased the yield by 17% above the control. It was not possible to separate the effects of the nitrogen and the Vitazyme, but it is well documented that Vitazyme enhances the utilization of soil and fertilizer applied nutrients, especially nitrogen.

---

**In Ukraine, the control treatment displayed typical growth and yield for this soil type in 2008; the yield was 4.67 tons/ha.**

**Only one application of Vitazyme in the fall caused a 9% yield increase. Note the darker green, more lush leaf canopy.**

**The full treatment of both fall and spring applications doubled the yield of the fall application alone, to 5.53 tons/ha.**

**Increase in yield with fall application: 9%**

**Increase in yield with fall and spring applications: 18%**

**Increase in canola yield: 17%**
**Corn**

**Researcher/Farmer:** Gary Burkey  
**Location:** Couts, Indiana  
**Variety:** Flexseed 4918 non-GMO  
**Soil type:** silty clay loam “gumbo”  
**Row spacing:** 30 inches  
**Population:** 29,500 seeds/acre

**Planting date:** May 6, 2008

**Soil test:**  
- pH, 6.6;  
- Cation exchange capacity, 24.6 meq/100g;  
- Organic matter, 3.6%;  
- Base saturations, Ca = 65.6%, Mg = 21.8%, K = 1.4%, Na = 0.3%, other bases = 4.8%;  
- H = 6.0%;  
- Estimated N release, 86 lb/acre;  
- S, 9 ppm; P₂O₅, 175 lb/acre;  
- Ca, 6,468 lb/acre;  
- Mg, 1,290 lb/acre;  
- B, 0.9 ppm;  
- P, 1.1 ppm;  
- Zn, 26.7 ppm

**Experimental design:**  
A corn field was treated entirely on the seeds with Vitazyme, and part of the field received a foliar Vitazyme treatment as well, along with two other products in the sprayer tank. The objective of the study was to evaluate the effect of an additional Vitazyme application and these other foliar products on corn yield.

1. Vitazyme on the seeds  
2. Vitazyme on the seeds, plus Vitazyme and two other products on the leaves

**Fertilization:**  
- **Before planting:** 150 lb/acre potassium chloride (0-0-60 N-P₂O₅-K₂O); 100 lb/acre diammonium phosphate (18-46-0 N-P₂O₅-K₂O); 70 lb/acre N from dry urea.  
- **At planting:** 4 gallons/acre 3-18-18% N-P₂O₅-K₂O on the seeds.  
- **At knee-height:** 70 lb/acre N (28% N) side-dressed with a row-crop cultivator.  
- **Foliar spray on July 6:** Tricert K (1 quart/acre of a 50-0-20 N-P₂O₅-K₂O material), manganese (1.5 lb/acre). with Vitazyme.

**Vitazyme application:**  
1. 13 oz/acre on the seeds at planting, along with 3-18-18 fertilizer;  
2. 13 oz/acre sprayed foliar with Tricert K and manganese on July 6

**Weather results:**  
- A wet spring and late planting, few rains in July, and a very dry late July and August, followed by a 12-inch flooding rain in mid-October

**Harvest date:** November 10, 2008

**Yield results:** Eight-row swatches were combined and weighed for both treatments. Due to an extreme rain event in mid-October, water rose so high in the field that the ears were covered for two to three days. In spite of that problem the corn grade was not affected, although untreated corn from neighbors’ fields suffered water damage to their grain.

**Conclusions:**  
In this Indiana in-field corn trial, Vitazyme plus Tricert K and manganese boosted the yield by 18% (37 bu/acre), though it was not possible to separate the individual effects of these products. Vitazyme works in synergism with native soil and applied nutrients to boost utilization, so this great yield increase is not uncommon. Of great interest is the fact that submersion of the ears before harvest for up to three days did not reduce the grain quality, indicating that cell wall integrity and anti-pathogen properties of the grain were likely enhanced by Vitazyme throughout the field.

---

**Corn**

**Researcher/Farmer:** Gary Burkey  
**Location:** Couts, Indiana  
**Variety:** Flexseed 303 Triple-Stack  
**Soil type:** mucky sand  
**Row spacing:** 30 inches  
**Population:** 31,000 seeds/acre

**Planting date:** May 18, 2008

**Soil test:**  
- pH, 7.2;  
- Cation exchange capacity, 22.53 meq/100g;  
- Organic matter, 6.0%;  
- Base saturations, Ca = 70.8%, Mg = 20.5%, K = 4.2%, Na = 0.3%, other bases = 4.2%, H = 0%;  
- Estimated N release, 105 lb/acre;  
- S, 10 ppm; P₂O₅, 468 lb/acre;  
- Ca, 6,376 lb/acre;  
- Mg, 1,110 lb/acre;  
- B, 0.9 ppm;  
- P, 277 ppm;  
- Mn, 29 ppm;  
- Cu, 0.4 ppm;  
- Zn, 6.6 ppm

**Experimental design:**  
A field was treated entirely with Vitazyme on the seeds at planting, and a portion of the field was foliar treated to determine the effect of this later application on crop yield.

1. Vitazyme on the seeds  
2. Vitazyme on the seeds + leaves

Continued on the next page
The roots treated with Vitazyme on the right display the typical response to the program, such as in this Indiana study. Greater carbon fixation leads to a larger root mass.

Conclusions: Vitazyme applied foliar in this northern Indiana corn trial resulted in a substantial 5 bu/acre increase in yield above the treatment receiving only a seed treatment.

- Increase in corn yield: 3%

Corn

A Greenhouse Study

Researcher: Paul W. Syltie, Ph.D.

Variety: yellow dent

Pot size: 1 gallon

Watering: on-demand

Fertilization: Before planting: 150 lb/acre potassium chloride (0-0-60% N-P2O5-K2O); 100 lb/acre diammonium phosphate (18-46-0% N-P2O5-K2O). At planting: 4 gallons/acre 3-18-18% N-P2O5-K2O on the seeds at planting. Sidedressed on June 18, at 5-feet plant height: 40 gallons/acre 28% N.

Vitazyme application: (1) 13 oz/acre on the seeds at planting, with 3-18-18% N-P2O5-K2O over all areas; (2) 13 oz/acre foliar over one portion of the field, on June 18.

Weather results: a wet spring and late planting, few rains in July, and very dry in late July and August, with a flooding rain (12 inches) in mid-October.

Harvest date: December 12, 2008

Yield results: Eight-row swaths were combined and weighed for both treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>155</td>
</tr>
<tr>
<td>2. Vitazyme + Sidedressed N</td>
<td>160 5 (+3%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dry weight</th>
<th>Dry weight change*</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 (100% Cold Start)</td>
<td>9.52 a</td>
<td>1.95 (+26%)</td>
</tr>
<tr>
<td>6 (30:70 Vita:Sea)</td>
<td>8.72 ab</td>
<td>1.15 (+15%)</td>
</tr>
<tr>
<td>5 (50:50 Vita:Sea)</td>
<td>8.71 ab</td>
<td>1.14 (+15%)</td>
</tr>
<tr>
<td>4 (70:30 Vita:Sea)</td>
<td>8.60 abc</td>
<td>1.03 (+14%)</td>
</tr>
<tr>
<td>7 (10:90 Vita:Sea)</td>
<td>8.60 abc</td>
<td>1.03 (+14%)</td>
</tr>
<tr>
<td>3 (90:10 Vita:Sea)</td>
<td>8.42 abc</td>
<td>0.85 (+11%)</td>
</tr>
<tr>
<td>2 (100% Vitazyme)</td>
<td>8.26 bc</td>
<td>0.69 (+9%)</td>
</tr>
<tr>
<td>9 (2x 50:50 Vita:Sea)</td>
<td>8.25 bc</td>
<td>0.68 (+9%)</td>
</tr>
<tr>
<td>8 (100% Seawater)</td>
<td>8.14 bc</td>
<td>0.57 (+8%)</td>
</tr>
<tr>
<td>1 (Control)</td>
<td>7.57 c</td>
<td>—</td>
</tr>
</tbody>
</table>

Statistical analysis:

- Replicate P: 0.0002***
- Treatment P: 0.3636
- Coefficient of variation: 13.61%
- LSD0.01: 1.12 gram

Continued on the next page
In this greenhouse trial, Cold Start increased plant dry weight more than regular Vitazyme or Seawater. Normally both Vitazyme products give similar results under warm conditions. 9%, but Cold Start at 13 oz/acre gave the highest yield increase of all: 26%. Though all Vitazyme, seawater, and Cold Start treatments produced taller corn plants than did the control, none of these increases were significant.

### A Greenhouse Study

**Researcher**: Paul W. Syltie, Ph.D.

**Variety**: yellow dent

**Pot size**: 1 gallon

**Watering**: on-demand

**Experimental design**: A replicated greenhouse pot study was designed to evaluate the effect of various rates of Vitazyme on the growth of corn. Six replicates were included with six treatments, and the data were analyzed using Analysis of Variance with CoHort software.

1. Control
2. Vitazyme at 7.5 oz/acre
3. Vitazyme at 13 oz/acre

**Vitazyme applications**: The 13 oz/acre application was made immediately after planting to the soil surface of the pot, using 100 ml of a 0.0016% solution. Other treatments were multiples of this rate.

**Harvest date**: On March 5, 35 days after planting, the soil was washed from the roots of the plants, and measurements were made of the height of each plant. The plants were then placed in a drying oven at about 50°C for 48 hours.

**Plant height results**: The highest (4 times normal) rate, as well as the triple rate at 50:50 combination (+9%).

**Increase in dry weight**

**Cold Start, 100% ... 26%**

**Vitazyme ............... 11%**

**Seawater, 100% ...... 9%**

**Conclusions**: In this greenhouse corn study, both Vitazyme and concentrated seawater, alone or in combination, boosted plant dry weight above the control, though only the 30:70 and 70:30 combinations did so significantly (+15%). While the 50:50 Vitazyme:Seawater treatment gave an unexpected reduction in increase in dry weight, this value was not significantly different than any of the other Vitazyme and seawater treatments. The double rate at 50:50 Vitazyme:Seawater increased yield by 10 to 14%, the highest increases being with the 0.5x, 2x, and 4x rates. None of these differences were statistically significant, and all exceeded the control.

### Effects on Corn Dry Weight

![Graph showing dry weight results](image)

**Increase in plant height**

**3x Vitazyme ............ 7%**

**1x Vitazyme ............ 6%**

**2x Vitazyme ............ 5%**

**0.5x Vitazyme ............ 5%**

**Conclusions**: In this greenhouse study proved that Vitazyme at several rates increased both plant dry weight and dry weight accumulation.

### Dry weight results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dry weight</th>
<th>Dry weight change*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (Vitazyme, 0.5x)</td>
<td>9.30 a</td>
<td>1.11 (+14%)</td>
</tr>
<tr>
<td>4 (Vitazyme, 2x)</td>
<td>9.30 a</td>
<td>1.11 (+14%)</td>
</tr>
<tr>
<td>6 (Vitazyme, 4x)</td>
<td>9.22 a</td>
<td>1.03 (+13%)</td>
</tr>
<tr>
<td>5 (Vitazyme, 3x)</td>
<td>9.01 a</td>
<td>0.82 (+10%)</td>
</tr>
<tr>
<td>3 (Vitazyme, 1x)</td>
<td>9.00 a</td>
<td>0.81 (+10%)</td>
</tr>
<tr>
<td>1 (Control)</td>
<td>8.19 b</td>
<td>—</td>
</tr>
</tbody>
</table>

*Compared to the untreated control, Treatment 1.

Continued on the next page
Conclusions: In this greenhouse study to evaluate the effects of progressively higher rates of Vitazyme to stimulate corn height and dry weight accumulation, the product proved to significantly increase plant height by 5 to 7% at all but the 4x (52 oz/acre) rate, whereas dry weight significantly increased from 10 to 14% for all of the Vitazyme rates. These data prove that more than just the standard 13 oz/acre rate can be effective in stimulating crop growth, but higher rates do not produce a linear yield or growth increase.

Researcher: Bertel Schou, Ph.D.
Research organization: ACRES (Agricultural Custom Research and Environmental Services), Cedar Falls, Iowa

Variety: Pioneer 34R67 (BBCH Scale:BCOR)
Planting rate: 29,900 seeds/acre

Tillage: conventional (cultivated and harrowed on May 21)

Soil type: Kenyon loam (34% sand, 46% silt, 20% clay, 3.6% organic matter, 15.0 meq/100 grams cation exchange capacity, pH 7.2, good fertility)

Soil test results, initial for all plots (analyzed May 15, 2008): pH, 7.2; organic matter, 3.90%; N, 89 lb/acre; SO₄-S, 6 lb/acre; P₂O₅, 1,076 lb/acre; Ca, 5,407 lb/acre; Mg, 916 lb/acre; K, 298 lb/acre; Na, 52 lb/acre; B, 1.76 lb/acre; Fe, 460 lb/acre; Mn, 176 lb/acre; Cu, 3.4 lb/acre; Zn, 12.6 lb/acre; base saturations: Ca, 72.6%, Mg, 20.5%, K, 2.1%, Na, 0.6%, others, 4.2%

Experimental design: A field was selected to place plots (15 x 40 feet) in a randomized complete block design (five replicates), using two treatments for a long-term field study. These plots are designed to assess the long-term effects of Vitazyme on the yield and growth of corn and soybeans in rotation, but moreover the effects on the physical, chemical, and microbial characteristics of the soil.

1. Control
2. Vitazyme

Fertilization: 120 lb/acre of N as 28% N applied postemergence in 20-inch spaced bands, using drop nozzles from a shielded sprayer

Vitazyme application: 13 oz/acre (1 liter/ha) in the seed furrow at planting (May 21), and 13 oz/acre sprayed over the leaves and soil on July 6, 2008, at the V6 stage

Weed control: Harness Extra preemergent, and Accent postemergent
Microorganism analyses: Soil biological activity was evaluated in the spring and fall to determine product effects on a number of parameters. Soil samples were collected from the root zones of plants from each of the five replicates, and then combined for each treatment and sent to the Soilfoodweb Laboratory in Corvallis, Oregon, for analysis.

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### May 29 analysis (baseline values for future comparisons)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Organism biomass</th>
<th>Active bacteria</th>
<th>Total bacteria</th>
<th>Active fungi</th>
<th>Total fungi</th>
<th>Flagellates</th>
<th>Protozoa</th>
<th>Total nematodes</th>
<th>Total fungi to total bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.81</td>
<td>28.4</td>
<td>1,853</td>
<td>20.4</td>
<td>244</td>
<td>5,718</td>
<td>17,211</td>
<td>34</td>
<td>2.33</td>
<td>0.13</td>
</tr>
<tr>
<td>Vitazyme</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.80</td>
<td>24.7</td>
<td>2,324</td>
<td>13.3</td>
<td>282</td>
<td>3,454</td>
<td>5,738</td>
<td>72</td>
<td>1.84</td>
<td>0.12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Active fungi to total fungi</th>
<th>Active bacteria to total bacteria</th>
<th>Active fungi to active bacteria</th>
<th>Plant-available nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.08</td>
<td>0.02</td>
<td>0.72</td>
<td>75 to 100</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>0.05</td>
<td>0.01</td>
<td>0.54</td>
<td>50 to 75</td>
</tr>
</tbody>
</table>

### September 10 analysis

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Organism biomass</th>
<th>Active bacteria</th>
<th>Total bacteria</th>
<th>Active fungi</th>
<th>Total fungi</th>
<th>Flagellates</th>
<th>Protozoa</th>
<th>Total nematodes</th>
<th>Va mycorrhizae % infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.82</td>
<td>41.6</td>
<td>929</td>
<td>18.7</td>
<td>352</td>
<td>1,690</td>
<td>5,618</td>
<td>169</td>
<td>2.73</td>
<td>0</td>
</tr>
<tr>
<td>Vitazyme</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.81</td>
<td>3.4</td>
<td>1,033</td>
<td>13.4</td>
<td>240</td>
<td>8,594</td>
<td>7,103</td>
<td>103</td>
<td>0.57</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total fungi to bacteria</th>
<th>Active fungi to total fungi</th>
<th>Active bacteria to total bacteria</th>
<th>Active fungi to active bacteria</th>
<th>Plant-available nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.38</td>
<td>0.05</td>
<td>0.04</td>
<td>0.45</td>
<td>50 to 75</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>0.05</td>
<td>0.01</td>
<td>0.54</td>
<td>50 to 75</td>
<td>75 to 100</td>
</tr>
</tbody>
</table>

Differences in microbes between the two treatments are not pronounced, although there was a distinctly greater number of protozoa with the Vitazyme

Continued on the next page
treatment, especially flagellates. There was no VAM mycorrhizal root infection for either treatment. Fungal and bacterial ratios were not very different, but plant-available nitrogen was decidedly greater with the Vitazyme treatment.

Harvest date: The crop was harvested on November 1, 2008, using a Massy-Ferguson 8 plot combine. Two rows 40 feet long were harvested from each plot.

Plant populations: The populations of the two treatments were very similar: 21,414 plants/acre for the control, and 21,235 plants/acre for the Vitazyme treatment. This difference was not significant (P=0.871).

Yield results: Vitazyme significantly increased the yield of corn, by 12.06 bu/acre, a full 10% above the control yield.

Conclusions: In this first year of a long-term trial to evaluate the effects of Vitazyme on the physical, chemical, and microbiological effects of the soil, and on crop response, Vitazyme greatly boosted grain yield (12.06 bu/acre, or 10%) above the control. Baseline soil chemical analyses were completed, as were baseline microbiological analyses. A September 10 microbial analysis revealed that, while both treatments showed minimal differences in most parameters measured, there was a marked 111% increase in total protozoa with Vitazyme. In addition, the supply of plant-available nitrogen was improved by about 25 lb/acre with Vitazyme, a significant factor in the current climate of high and volatile fertilizer prices. Work will continue during the coming years on monitoring the changes brought about by Vitazyme on an array of soil and plant characteristics.

Increase in N availability: 25 lb/acre
Increase in corn yield: 10%

Farmer: Andrew Jones
Researcher: John McKendry, Mantissa Corp. Ltd.
Location: Marlborough, New Zealand
Soil type: Seddern silt loam
Variety: Syngenta 2684
Plant population: 69,000 seeds/ha
Planting date: December 12, 2007
Experimental design: A sweet corn field was divided into Vitazyme treated and control sections to determine if this product would affect sweet corn yield.

1. Control  2. Vitazyme
Fertilization: 300 kg/ha of 15-10-10% N-P₂O₅-K₂O
Vitazyme application: 1 liter/ha with Atrazine on January 9, 2008, at 6 to 8 inches high
Harvest date: April 11, 2008

Yield results: Five different sections of row on both the treated and untreated sides of the field were analyzed for plant number, primary ears, secondary ears, and usable ears in terms of number and weight.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>283</td>
<td>–</td>
<td>70</td>
<td>–</td>
<td>159</td>
<td>–</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>294 (+12%)</td>
<td>32</td>
<td>74</td>
<td>4 (+6%)</td>
<td>284 (+10%)</td>
<td>25</td>
</tr>
</tbody>
</table>

*The control plants had an average of 20.5% greater population for some unknown reason.
Conclusions: In this New Zealand sweet corn study, Vitazyme improved the average ear size of both primary and secondary ears, and increased the weight of usable ears by a very respectable 10%. This product, when incorporated into a total fertility management system, has proven under New Zealand conditions to produce excellent sweet corn yield increases.

Researcher: Jeff Bergeron
Grower organization: Richard Bagdasarian, Inc.
Location: Sunny Mecca, California (Coachella Valley)
Soil type: unknown
Varieties: Flame, Perlette, and Sugraone (table varieties)
Vine spacing: unknown
Experimental design: Three vineyards were selected to evaluate the effect of Vitazyme on table grape quality. The Flame variety was treated on 2.2 acres at the Mecca Star Ranch, the Perlette variety on 4.7 acres at the Sultan Ranch, and the Sugraone variety on 2.7 acres at the Pasha 3 Ranch.
1. Control
2. Vitazyme
Fertilization: unknown
Vitazyme application: See the table to the right.
Quality results: Observations on grape quality are as follows.

Grape Quality Results, Vitazyme vs. Control

<table>
<thead>
<tr>
<th>Variety</th>
<th>Pre-bloom 1</th>
<th>Pre-bloom 2</th>
<th>BB-shot</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Date</td>
<td>Rate*</td>
<td>Date</td>
<td>Rate*</td>
</tr>
<tr>
<td>Flame grapes</td>
<td>March 5</td>
<td>14.8</td>
<td>March 27</td>
<td>13.9</td>
</tr>
<tr>
<td>Sugraone grapes</td>
<td>March 7</td>
<td>14.9</td>
<td>April 11</td>
<td>13.4</td>
</tr>
<tr>
<td>Perlette grapes</td>
<td>March 4</td>
<td>11.7</td>
<td>April 7</td>
<td>13.0</td>
</tr>
</tbody>
</table>

*Rate in ounces/acre

Conclusions: Vitazyme applied to three table grape varieties in the Coachella Valley of California, using four applications, improved the quality markedly with the Flame and Sugraone varieties. These grapes were deeper and more evenly colored than the control treatments alongside, and were a size larger. The Perlette grapes showed a bit more crispness of the fruit, but were produced on old vines that were removed after harvest; the unthrifty growth of this old stock is likely the reason for a less intensive response from Vitazyme. This test has shown that Vitazyme will improve table grape quality significantly.

Grapes (first year)

Crimea National Institute of Grape and Vine Research

Researcher: staff personnel
Location: Crimea National Institute of Grape and Vine Research, Ukraine
Soil characteristics: 1 to 2% organic matter; pH 7.0 to 8.5
Variety: unknown
Soil type: south blacktop (Mollisol)
Experimental design: A nursery area of the research station was selected to treat certain rows of grape plants — either new cuttings or transplants — with Vitazyme at the rates given below.

Cuttings
1. Control (untreated)
2. Vitazyme soak and a foliar application
Fertilization: unknown
Pesticide applications: standard for the station
Vitazyme applications:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>May 24, 2007</th>
<th>August 9, 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuttings</td>
<td>5% soak, 1 hour</td>
<td>1 liter/ha on leaves</td>
</tr>
<tr>
<td>Transplants</td>
<td>2% drench on roots</td>
<td>1 liter/ha on leaves</td>
</tr>
</tbody>
</table>

Observations: The Vitazyme treated plants had larger root systems and better development of the growing points.
Conclusions: Vitazyme treatment has proven to increase root and shoot development of both new cuttings and transplants in Crimea, Ukraine, as compared to untreated controls.

Grape plants grown in a Ukraine nursery responded well to Vitazyme, having larger root systems and better developed growing points. Untreated plants are on the right.
Grapes

Researcher: Bob Dongvillo

Location: Dongvillo Vineyards, Inc., St. Joseph, Michigan

Variety: Concord

Plant age: 40 years

Plant density: 605 vines/acre

Plant spacing: 9 ft between rows, 8 ft in the rows

Experimental design: A grape vineyard was divided into four sections, with three areas treated with different products to evaluate the effects on grape sugar content at harvest. Four rows separated treatments to avoid drift. Yield determinations were not made in this study.


Fertilization: 28% nitrogen at 60 lb/acre before bud break, and 15 lb/acre after bloom and fruit set

Vitazyme and other product applications: One liter/ha of Vitazyme was applied twice with an air-blast sprayer, using 50 gallons of water per acre and a travel speed of 5 mph: foliar spray on June 22 (post bloom), and August 16 (veraison). The other two products were applied at the recommended times and rates.

Grape sugar results: Grapes from each treatment were sampled for brix, with the following results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Grape sugar</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>15.3</td>
<td>0.0</td>
</tr>
<tr>
<td>2. Goemar MZ63</td>
<td>16.2</td>
<td>0.9</td>
</tr>
<tr>
<td>3. Ridge Bio-Stim</td>
<td>15.0</td>
<td>0.3</td>
</tr>
<tr>
<td>4. Vitazyme</td>
<td>17.1</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Conclusions: This southwestern Michigan study with Vitazyme and two other products on grapes proved that Vitazyme was by far the superior product in increasing grape sugar. Its increase of 1.8 percentage points above the control exceeded the next closest rival, Goemar MZ63, by 200%, while the other product, Ridge Bio-Stim reduced the grape sugar slightly. Vitazyme is shown to improve grape sugar significantly, which is a considerable help to growers of grapes for juice, wine, or raisins, since sugars are a key to grape quality.

In 2001 an evaluation of grape roots was made on Kliewer Farms, near Reedley, California, to determine the effects of several products on various rhizosphere organisms. The samples were evaluated by Elaine Ingham at the Soil Food Web, Corvallis, Oregon, and by BBC Laboratories, Tempe, Arizona.

Soil type: clay loam

Trellis system: standard T-bar

Age: established

Variety: Ruby seedless

Spacing: 12 ft between rows, 8 ft in the row

Vitazyme applications: The end of the drip line was disconnected and attached to a hose from a sprayer tank. Then 100 gallons of Vitazyme solution were applied in the row under 50 psi. A 13 oz/acre rate was applied, or 1.6 oz in the 100 gallons, on April 23, 2001.

BBC Labs SoilFoodWeb

<table>
<thead>
<tr>
<th>Grape row number</th>
<th>Material</th>
<th>Yeasts and Molds</th>
<th>Active Fungal Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 (1)</td>
<td>Control</td>
<td>4.5 x 10⁴</td>
<td>22.1</td>
</tr>
<tr>
<td>30 (2)</td>
<td>Compost tea concentrate</td>
<td>3.4 x 10⁴</td>
<td>15.0</td>
</tr>
<tr>
<td>31 (3)</td>
<td>Awaken</td>
<td>1.4 x 10⁴</td>
<td>28.2</td>
</tr>
<tr>
<td>32 (4)</td>
<td>ZAP</td>
<td>3.0 x 10⁴</td>
<td>17.1</td>
</tr>
<tr>
<td>33 (5)</td>
<td>Vitazyme</td>
<td>4.1 x 10⁴</td>
<td>61.5</td>
</tr>
<tr>
<td>34 (6)</td>
<td>Super Bio</td>
<td>2.5 x 10⁴</td>
<td>50.6</td>
</tr>
<tr>
<td>35 (7)</td>
<td>Metazyme Extra</td>
<td>3.0 x 10⁴</td>
<td>34.1</td>
</tr>
<tr>
<td>36 (8)</td>
<td>ZAP FFS #1</td>
<td>3.0 x 10⁴</td>
<td>22.4</td>
</tr>
<tr>
<td>37 (9)</td>
<td>Jenner 8 Plus</td>
<td>3.5 x 10⁴</td>
<td>35.0</td>
</tr>
<tr>
<td>38 (10)</td>
<td>ZAP FFS #2</td>
<td>5.1 x 10⁴</td>
<td>19.4</td>
</tr>
<tr>
<td>39 (11)</td>
<td>Soilweb.com Product A</td>
<td>3.5 x 10⁴</td>
<td>29.8</td>
</tr>
<tr>
<td>40 (12)</td>
<td>Soilweb.com Product B</td>
<td>4.6 x 10⁴</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Organism population results: The soil and roots of all treatments were sampled on June 18, 2001, 56 days after product application, and submitted to the laboratories on June 20, 2001. Sampling was performed by obtaining a soil core to 6 inches on the outer edge of the drip zone of 25 sites (every third plant), along with the treated row. Care was taken to clean and sterilize the probe between core samplings, and the collection bucket was cleaned and sterilized between product samplings.

Note the superiority of the Vitazyme treated Concord grapes on the right. Bunch size and individual grape diameter are both noticeably larger than the controls.

Increase in grape sugar: 1.8 percentage points

These young grapes in California show the type of response to be expected when Vitazyme is applied in the drip system.

Continued on the next page
Conclusions: ZAP FFS #2, the control, and Soilweb.com Product B had the highest rhizosphere yeast and mold levels, from 4.5 to 5.1 x 10^4 CFU/gdw, but Vitazyme had nearly as high levels: 4.1 x 10^4 CFU/gdw. On the other hand, Vitazyme had by far the highest rhizospheric active fungal biomass of 61.5 ug/gram; the next highest level was 50.6 for Super Bio, and all other values are considerably less. These results show that Vitazyme performed the best of all eleven treatments in this California grape root zone microorganism stimulation study.

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**Crimea National Institute of Grape and Vine Research**

**Researcher:** staff personnel  
**Location:** Crimea National Institute of Grape and Vine Research, Ukraine  
**Variety:** Aligote  
**Soil type:** south blacktop (Mollisol)  
**Soil characteristics:** 1 to 2% organic matter; pH 7.0 to 8.5  
**Experimental design:** A vineyard of table grapes was divided into two Vitazyme treatments besides the standard (control) applications of fertility and pesticide treatments. The treatments were as follows:

1. Control
2. Vitazyme, three applications at 1 liter/ha
3. Vitazyme, three applications at 2 liters/ha (first two), and 1 liter/ha (last one)

**Fertilization:** unknown  
**Pesticide applications:** standard for the station  
**Vitazyme applications:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pre-flower</th>
<th>BB-size grapes</th>
<th>Verasion</th>
<th>Vitazyme application rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>liters/ha</td>
<td>liters/ha</td>
<td>liters/ha</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*May 30, 2007  
*June 25, 2007  
*August 20, 2007

Fruit sugar results: No actual sugar values for the grapes were given, but the difference between the control and the treated grapes are as follows:

- **Increase in grape sugar, Treatment 1:** 4.3 percentage points
- **Increase in grape sugar, Treatment 2:** 5.8 percentage points

**Yield results:** see table to the left

**Conclusions:** This southern Ukraine study at the Crimea National Institute of Grape and Wine Research showed that Vitazyme, applied at either 1 liter/ha three times, or 2 liters/ha twice with a last application of 1 liter/ha, significantly increased both grape yield and sugars. The sugars increased by 4.3 to 5.8 percentage points, while the yield was boosted by 20 to 26%, the highest increase with the 1 liter/ha rate applied three times. The grape program using Vitazyme has proven to be a highly effective means by which both yields and sugar content can be raised at a minimal input cost. The increased photosynthesis and nutrient uptake triggered by the product's active agents were able to fill the extra yield of grapes with abundant sugars so that they were sweeter than the lower yielding control.

**Yield increase with Vitazyme**

- Vitazyme, 1 liter/ha ......... 26%
- Vitazyme, 2 liters/ha ....... 20%

---

In Crimea, Ukraine, these table grapes with Vitazyme produced a greater tonnage of larger and much sweeter fruit.
**Grapes** (for raisins)

Crimea National Institute of Grape and Vine Research

*Researcher:* staff personnel  
*Location:* Crimea National Institute of Grape and Vine Research, Ukraine  
*Variety:* Ranniy Magaracha (table grape)  
*Soil type:* south blacktop (Mollisol)  
*Experimental design:* A vineyard of table grapes was divided into two Vitazyme treatments besides the standard (control) applications of fertility and pesticide treatments. The treatments were as follows:

1. Control  
2. Vitazyme, three applications at 1 liter/ha  
3. Vitazyme, three applications at 2 liters/ha (first two), and 1 liter/ha (last one)

*Fertilization:* unknown  
*Pesticide applications:* standard for the station  
*Vitazyme applications:*  

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pre-flowera</th>
<th>BB-size grapesb</th>
<th>Verasionc</th>
<th>liters/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>---</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>---</td>
</tr>
</tbody>
</table>

*a* May 30, 2007  
*b* June 25, 2007  
*c* July 19, 2007

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>8.72</td>
<td>-</td>
</tr>
<tr>
<td>2. Vitazyme, 1 liter/ha three times</td>
<td>10.00</td>
<td>1.28 (+15%)</td>
</tr>
<tr>
<td>3. Vitazyme, 2 liters/ha + 1 liter/ha</td>
<td>11.15</td>
<td>2.43 (+28%)</td>
</tr>
</tbody>
</table>

Fruit sugar results: No actual sugar values for the grapes were given, but the difference between the control and the treated grapes are as follows:

* Increase in grape sugar, Treatment 1: 2.5 percentage points
* Increase in grape sugar, Treatment 2: 4.3 percentage points

**Conclusions:** In this Ukrainian table grape study, Vitazyme was shown to produce much greater yields and a higher sugar content when applied at either 1 liter/ha three times, or at 2 liters/ha twice and 1 liter/ha once ... but especially in the latter case, where the grape sugar and yield were nearly doubled compared to the 1 liter/ha rate. Yield increases were from 15 to 28%, while grape sugar also rose – by from 2.5 to 4.3 percentage points – showing that despite higher yields the plants were still able to produce more sugars to further fortify the heavier load with additional soluble solids. This study proves the great viability of Vitazyme to aid in table grape production in Ukraine.

Note the excellent vine growth of these table grapes in Crimea; they have plenty of vigor to fill a heavy grape load.

**Grapes** (for wine)

**Year Five of a Continuing study**

*Researcher:* John Broeke, and Richard Sauret, Vineyard Consultant  
*Location:* San Miguel, California  
*Plants/acre:* 605  
*Variety:* Cabernet Sauvignon  
*Soil type:* loam, high-calcium subsoil, low organic matter

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

*Yield increase with Vitazyme*

Vitazyme, 1 liter/ha ........ 15%  
Vitazyme, 2 liters/ha ...... 28%

**Grape yield**

*Yield increase with Vitazyme*

Vitazyme, 1 liter/ha ........ 15%  
Vitazyme, 2 liters/ha ...... 28%

The bunches of table grapes in this Crimea test were much bigger than for the control, and also were sweeter.

**Conclusions**

In this Ukrainian table grape study, Vitazyme was shown to produce much greater yields and a higher sugar content when applied at either 1 liter/ha three times, or at 2 liters/ha twice and 1 liter/ha once ... but especially in the latter case, where the grape sugar and yield were nearly doubled compared to the 1 liter/ha rate. Yield increases were from 15 to 28%, while grape sugar also rose – by from 2.5 to 4.3 percentage points – showing that despite higher yields the plants were still able to produce more sugars to further fortify the heavier load with additional soluble solids. This study proves the great viability of Vitazyme to aid in table grape production in Ukraine.

The bunches of table grapes in this Crimea test were much bigger than for the control, and also were sweeter.

Continued on the next page
**Irrigation:** semi-dryland system: four times of deep irrigation (18 to 20 hours of drip irrigation) from mid-June to late August  
**Fungicides:** applied as needed  
**Fertilization:** No (NH₄)₂SO₄ was used in 2007, but urea (low biuret) was added to the foliar spray. A 9-18-9 or 3-18-18 (+ micronutrients) was applied with urea every two to three weeks at 2 to 3 gallons/acre during much of the growing season, usually with sulfur after veraison. A blue-green algae solution was applied in the irrigation water periodically  
**Tillage:** cover crop disked in  
**Vitazyme application:** (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break; (2) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at BB-sized fruit; (3) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at veraison; (4) 13 oz/acre 8 weeks before harvest (the end of August)  
**Harvest date:** October 21, 2008  
**Weather conditions:** A severe frost occurred during flowering, which seriously affected pollination and berry set. In addition, heat and high winds during bloom further damaged berry set so that the yield was seriously reduced for both treatments, but more so with the Vitazyme treatment than with the control. In the Vitazyme treated area 61 plants had some form of burn, whereas the control area had 13 affected plants.  
**Vine growth:** The researchers noted that there was more leaf and vine growth for the Vitazyme treated grapes, perhaps 30% more total leaf mass than for the control plants. An analysis of canes for the plants of the two treatments revealed more cane growth with Vitazyme application as well.  
**Grape juice quality at harvest:** The grapes were harvested on October 21, 2008, and the juice was evaluated for chemical factors. Quality parameters were similar for both treatments. Note that the brix level for the Vitazyme treated grapes is 0.7 percentage point higher than for the control, indicating a higher quality juice from these treated grapes.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>GF</th>
<th>Brix</th>
<th>Total acidity</th>
<th>pH</th>
<th>Lactic acid</th>
<th>VA</th>
<th>Ammonia (NH₃)</th>
<th>Amino acid</th>
<th>Yeast active nitrogen</th>
<th>Malic acid</th>
<th>Tartaric acid</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20</td>
<td>25.4</td>
<td>0.50</td>
<td>4.02</td>
<td>0.1</td>
<td>0.047</td>
<td>108</td>
<td>141</td>
<td>249</td>
<td>1.74</td>
<td>4.47</td>
<td>2,551</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>24</td>
<td>26.1</td>
<td>0.49</td>
<td>4.20</td>
<td>0.1</td>
<td>0.050</td>
<td>132</td>
<td>175</td>
<td>307</td>
<td>2.06</td>
<td>4.58</td>
<td>3,288</td>
</tr>
</tbody>
</table>

*Based on 605 plants per acre

**Yield results:** Grape yields were recorded for both treatments on the eastern end of the vineyard where soil characteristics were uniform. A border area between the treatments was avoided to remove possible product drift effects. Because there was severe pollination disruption from a severe frost, followed by high winds and hot temperatures at bloom, during which the Vitazyme treatment was more severely affected than the control, the bunches had many aborted berries and a greatly reduced yield from previous years. Thus, the yield data have little value for 2008.  

At the end of the growing season, the first frost, there was more total foliage and more actively synthesizing leaves for the Vitazyme treatment.  

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

**Wine making:** On October 21, 2008, a half ton of grapes from both treatments was picked and crushed, and that day the winemaking process began. See the schedule on the next page for details.  

**October 21** The grapes were destemmed and cold soaked for 48 hours. During this time tartaric acid was added to raise the acidity to 0.7.  

**October 23.** Yeast was added to the destemmed grapes, as well as yeast nutrient (diammonium phosphate, yeast cell walls, and other items), and Color Pro (an enzyme material to extract more color from the skins, and stabilize the color).  

**October 31.** After 8 days of fermentation, the juice was pressed from the mash. At this point there was 3% sugar left. Malic acid bacteria were added at this point to convert the malic acid to lactic acid. The fermenting wine was then placed in stainless steel barrels. Each barrel yielded 148 gallons of juice per ton of grapes.  

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

**Conclusions for the fifth year:** The fifth year of this California wine grape study was very unlike the previous four years, in which the yield increase averaged 29% per year. In 2008 the highly unfavorable weather conditions at blossom time resulted in a poor berry set, especially with the Vitazyme treatment, that gave yields for both treatments about 50% lower than the previous year. Thus, the yield data for 2008 is not relevant to true treatment effects. Juice quality, however, was superior for the Vitazyme treatment in 2008, with a brix level 0.7 percentage point higher for the Vitazyme treatment. A view of the vineyard during the entire year showed superior vine and  

**Continued on the next page**
leaf growth for Vitazyme compared to the control.
The yields for the first four years of the study are as follows:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>2004 (Yr 1)</th>
<th>2005 (Yr 2)</th>
<th>2006 (Yr 3)</th>
<th>2007 (Yr 4)</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.565</td>
<td>2.994</td>
<td>2.980</td>
<td>4.628</td>
<td>3.042</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>2.287 (0.722 (+46%))</td>
<td>3.588 (0.644 (+22%))</td>
<td>3.869 (0.889 (+30%))</td>
<td>5.869 (1.241 (+27%))</td>
<td>3.903 (0.888 (+29%))</td>
</tr>
</tbody>
</table>

The first four years of this Cabernet Sauvignon vineyard study produced an average of 29% more grapes with Vitazyme applied four times during the growing season. With the wine from these two treatments being equivalent each year — by some opinions even favoring Vitazyme — there is every reason for the grape grower to utilize Vitazyme in his production system to greatly increase yield without decreasing wine quality.

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**Grapes** (for raisins)

**Year Six of a Continuing Raisin Study**

**Researcher:** Jamie Hansen  
**Cooperating party:** David Morgan, Tulare Ag Products, Tulare, California  
**Location:** LDS Fresno Raisin Vineyard, Madera, California  
**Variety:** Thompson seedless  
**Soil type:** Very sandy to light clay  
**Irrigation:** drip

**Experimental design:** This test is in its sixth year of a continuing raisin study that began in 2003. The study was designed initially to evaluate the effects of Ethrel and Vitazyme (plus other Tulare Ag products), alone or in combination, on the yield and quality of raisin grapes. In 2006, however, the study was modified to evaluate the best possible combinations of Ethrel and seaweed treatments on top of a background application of Vitazyme, potassium (Finisher 21), calcium (Cal Ocho 8%), and fulvic acid. Then, in 2007 the treatments were again modified to include a seaweed product (Excite), with or without Vitazyme. The 2008 study was in most ways a repeat of the 2007 work, but with an additional product added with Vitazyme in one treatment. An 80-acre, 112-row raisin vineyard was divided into seven treatments on a replicated basis throughout the vineyard, with each treatment applied to rows in different areas of the vineyard to produce accurate results. Each treatment covered about 11 acres. All treatments had vines pruned to five or six canes.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Excite 2-18-36</th>
<th>Excite 1-1-17</th>
<th>Excite 17-17-17</th>
<th>Vitazyme</th>
<th>AZ41</th>
<th>Finisher 21</th>
<th>Zinc, Boron</th>
<th>Cal Ocho 8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb/acre</td>
<td>lb/acre</td>
<td>lb/acre</td>
<td>lb/acre</td>
<td>oz/acre</td>
<td>lb/acre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (same as 2007)</td>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2 (same as 2007)</td>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0.5</td>
<td>4.5</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4 (same as 2007)</td>
<td>0</td>
<td>2.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
<td>10</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>6 (same as 2007)</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7 (same as 2007)</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Dates applied**  
(see below times for details)

<table>
<thead>
<tr>
<th>Dates applied</th>
<th>four</th>
<th>four</th>
<th>four</th>
<th>three every</th>
<th>verasion</th>
<th>1 week</th>
<th>verasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>(for raisins)</td>
<td>times</td>
<td>times</td>
<td>times</td>
<td>10-14 days</td>
<td>pre-bloom</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fertilization:** The whole vineyard received adequate N, P, and K in the irrigation well water.  
**Vitazyme application:** Vitazyme was applied foliar at 16 oz/acre two weeks bloom, two weeks after bloom, and at verasion.

**Excite application:** Various seaweed formulations with analyses of 2-18-36% N-P2O5-K2O (Excite 2-18-36), 1-1-17 (Excite 1-1-17), or 17-17-17 (Excite 17-17-17) were applied at 1, 2, or 4.5 lb/acre for the indicated treatments four weeks before bloom, at bloom, four weeks after bloom, and two weeks before verasion.

**AZ41:** This is a formulation of Australian melaleuca, aloe vera, and orange peel oil used to help control leaf fungal diseases. It was applied every 10 to 14 days from late April to July 1. For this treatment (5) there were no fungicides applied all growing season. The product is reputed to impart SAR (System Acquired Resistance) to plants.

**Finisher 21 application:** Finisher 21 is a 21% potassium (K2O) formulation that was applied foliar at the recommended rate, along with other materials to all treatments at verasion in late June.

**Cal Ocho 8% application:** Cal Ocho 8% is an 8% calcium formulation, with CaO and carbohydrates. It was applied foliar at the recommended rate with other agents to all treatments at verasion in late June.

**Zinc, boron, calcium, and potassium application:** These were applied one week before bloom.

**Gibberellin application:** A single gibberellic acid application was made to the leaves at the recommended rate at the bloom stage, about May 10, along with Pristine.

**Fungicide applications:** Standard fungicides were applied at typical rates and dates for all but Treatment 5, which received AZ41.

**Weather conditions:** The year was dryer than normal, and especially hot around blossom and verasion time; the remainder of the year was mild. This weather led to poor raisin quality.

**Harvest date:** unknown

**Yield results:** The grapes were harvested by volunteer labor and placed on paper trays between

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Continued on the next page
Itazyme: 10 to 18%

4. Excite 1-1-17 (2.0 lb) 1,558.7 4,364.4 — —
5. Vitazyme + AZ41 (10 oz) 1,920.2 5,376.6 +504.6 (vs. 1) +10
6. Vitazyme + Excite 1-1-17 (1.0 lb) 1,581.8 4,429.0 — ---
7. Excite 1-1-17 (1.0 lb) 1,710.4 4,789.1 +424.7 (vs. 4) +10

1. Vitazyme + Excite 2-18-36 (4.5 lb) 1,740.0 4,872.0 +756.0 (vs. 2) +18
2. Excite 2-18-36 (4.5 lb) 1,470.0 4,116.0 — —
3. Excite 17-17-17 (4.5 lb) 1,383.0 3,872.4 — —
4. Excite 1-1-17 (2.0 lb) 1,558.7 4,364.4 — —
5. Vitazyme + AZ41 (10 oz) 1,920.2 5,376.6 +504.6 (vs. 1) +10
6. Vitazyme + Excite 1-1-17 (1.0 lb) 1,581.8 4,429.0 — ---
7. Excite 1-1-17 (1.0 lb) 1,710.4 4,789.1 +424.7 (vs. 4) +10

Yield change:

1. The best yielding treatment by far was the Vitazyme + AZ41 (Melaleuca + Aloe vera + orange peel) treatment, producing 10% more raisins than the next highest treatment. This treatment used no conventional fungicides, yet had excellent fungal control throughout the season and no powdery mildew whatsoever. All other treatments received conventional fungicides.

2. Excite 17-17-17 alone at 4.5 lb/acre produced the lowest yield (3,872.4 lb/acre), being 6% lower than the next lowest yield (Excite 2-18-36 alone at 4.5 lb/acre).

3. Vitazyme + Excite 2-18-36 at 4.5 lb/acre gave the second highest yield, which exceeded Excite 1-1-17 alone by 18%.

4. On the other hand (see point 3), Vitazyme + Excite 1-1-17 at 1 lb/acre gave an 8% lower yield than Excite 1-1-17 alone at 1 lb/acre.

5. Excite 1-1-17 at 1 lb/acre gave a 10% higher yield increase than Excite 1-1-17 at 2 lb/acre; more was not better.

6. Quality of the raisin crop for 2008 was much reduced from previous years due to very hot weather at blossom and veraison. The substandards and B and B yields varied within a fairly narrow range, with Excite 1-1-17 at both rates producing the highest B and B turnouts. These results are quite different than those experienced in 2007, when the Excite 1-1-17 at both 1 and 2 lb/acre gave the best yields. This year the 1-1-17 Excite formulation at 1 lb/acre performed better than at 2 lb/acre, but was still below the yield of Vitazyme + Excite 2-18-36 at 4.5 lb/acre, and far below Vitazyme + AZ41. The separation of the sprays of Vitazyme + Excite by 10 to 14 days this year may have helped the activity of both products, since there may be an overabundance of growth regulating substances when both are applied at the same time, confusing the plants' metabolism.

Vitazyme with Excite 2-18-36 performed much better than Excite 2-18-36 alone (+18%), but Vitazyme with Excite 1-1-17 performed less well than Excite 1-1-17 alone (-8%). The reasons for this reversal are unclear, but the extra nutrients applied with the Excite 2-18-36 may have helped Vitazyme trigger added growth, a nutrient interaction effect well-documented with many crops. It would have been interesting to note the effect Vitazyme would have along with Excite 17-17-17.

Differences in response to Vitazyme for 2008 are likely due to (a) a reduction in carryover effects of Vitazyme for the 2007 cropping years, (b) a separation of the application of Vitazyme and Excite by 10 to 14 days, and (c) a particularly stressful year for grapes, during which Vitazyme effects tend to be more emphasized. Above all other results for 2008, the Vitazyme + AZ41 treatment holds excellent promise for producing the highest yields of raisins grapes without the use of conventional fungicides, making organic raisin production at this location a true possibility.

**Yield increase with Vitazyme: 10 to 18%**
Researchers: Paolo Parducci (Summer Zone, Quito, Ecuador), and Alain Durand (Olepsa, Ecuador)
Location: an oil palm plantation at Las Golondrinas in Canton Rosa Zarate, Province of Esmeraldes
Sponsoring organization: Summer Zone, Quito, Ecuador
Crop: African oil palm (Elais guinensis Jacq)
Population: 1,200 trees/ha
Age of plantation: 10 years
Area treated: An area of 8.8 ha was selected in the plantation to distribute five treatments with five replicates; the adjoining trees were used as a control.

Objectives of the study:
1. Evaluate the root development of African oil palms treated with Vitazyme and other products of Summer Zone.
2. Determine the effectiveness of the various Summer Zone products when fertilizer is reduced by 30% of normal.
3. Calculate the economic viability of the various treatments and Summer Zone products.

Products used in the study:
Vitazyme. A natural biostimulant containing various growth regulators, vitamins, glycosides, and other growth agents, registered by OMRI (Organic Materials Review Institute).
Pacha Mama. A natural humic, fulvic, and ulmic acid concentrate containing 88% or more humic acids and 12% essential minerals, registered by Control Union Skal and Organic Farming U.S.A.
Novaplex. A complete nutritional combination of minerals, carbohydrates, amino acids, vitamins, and growth regulators derived from marine kelp, and registered by OMRI, Control Union Skal, and the U.S.E.P.A.
Nitro 30. A water-soluble fertilizer containing 25.5% nitrogen, of which 4.5% is ammonium-N.
TKO Phosphite. A true water-soluble phosphite for fungal control of plants, containing 29% P2O5 and 26% K2O.
SZ Calcio. A calcium nitrate product containing 9% calcium, 3.2% nitrate nitrogen, and 2.8% ammonium nitrogen.

Root growth results: Root growth of the oil palms was evaluated both at the beginning of the study and in July, three months after application. Olepsa personnel collected samples of new roots in the radicular area of trees for each treatment, and quantified them by the number of new roots.

All of the treatments caused sizable increases in root mass above the control, but especially Treatment 5, which incorporated five of the six materials, including Vitazyme. Treatments 2, 4, and 6 all increased root mass by about 50%; 2 and 6 included Vitazyme.

Economic evaluation: Please see the next page.
Product performance: A calculation is made on the next page of the product performance in terms of root growth increase versus program cost (root growth increase/program cost).

Conclusions: In this Ecuadorian oil palm rooting study, all treatments provided root mass increases over the three-month test period, of from 13 to 73%, the greatest value with Treatment 5 (all products except SZ Calcio). Product costs, with the 30% fertilizer reduction, were below the 100% fertilizer control, the lowest cost being for Treatment 6 (Vitazyme only). In terms of total product performance, Treatment 5 did the best, giving a ratio of 0.196, followed by Treatment 6 (Vitazyme only), giving a ratio of 0.159. These data confirm...
Researchers: O.V. Kornijchuk, V. V. Plotnikov, and agronomic scientists

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

Location: Ukraine central forest – steppe area near Vinnytsia

Variety: Finka Elite

Seeding rate: 2.8 tons/ha

Planting date: May 12, 2008

Previous crop: winter wheat

Soil Type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH = 5.5.

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

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

1. Control
2. Vitazyme applied once

Fertilization: In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P₂O₅-K₂O was made.

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

Harvest date: unknown

Yield results: See the table (right).

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

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

• Increase in tuber yield: 10%

The white potatoes tested in Ukraine show the great effect Vitazyme had on both tuber number and size. The product enabled the plants to better utilize soil nutrients.
**Rice**

**Location:** Heip Hoa and Bac Giang, Viet Nam  
**Soil Type:** “exhausted” soil  
**Planting rate:** unknown

**Experimental design:** A field of rice was divided into a Vitazyme treated area and an untreated control alongside to evaluate the product’s effects on rice yield.

1. Control
2. Vitazyme

**Fertilization:** unknown

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

**Harvest date:** unknown

**Yield results:** See the results to the right.

**Income results:** an increase of 2,105,000 Vnd/ha with Vitazyme

**Conclusions:** Despite the fact that few details on the conduct of this Vietnamese study are available, Vitazyme increased the yield of rice on this “exhausted” soil by 13%, an excellent improvement. The income increase was likewise very good.

**Increase in rice yield: 13%**

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**Rice**

**Location:** Nhur Quynh and Hung Yen, Viet Nam  
**Soil Type:** alluvial soils of the Red River  
**Planting rate:** unknown

**Experimental design:** A field of rice was divided into a Vitazyme treated area and an untreated control alongside to determine the effect of the product on yield.

1. Control
2. Vitazyme

**Fertilization:** unknown

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

**Harvest date:** unknown

**Yield results:** see tables and graphs at right

**Income results:** an income increase of 3,150,000 Vnd/ha for Field 1, and of 2,895,000 Vnd/ha for Field 2

**Conclusions:** In 2008 on an alluvial soil, this Vietnamese rice study with Vitazyme showed an excellent 11% grain yield increase for both fields investigated. The yields brought an excellent income increase in both cases as well. The nearly identical results for the studies shows that the product performs consistently, as it did in similar studies in Nhur Quynh, Hung Yen, Heip Hoa, and Bac Giang in 2007, where 11% and 13% yield increases on this same variety of rice were achieved.
**Sugar Cane**

**Researcher:** Unknown  
**Location:** Sancti-Spiritus, Cuba  
**Variety:** Melones  
**Soil Type:** unknown  
**Experimental design:** A sugar cane field was divided into a control area of 4.7 ha, and a Vitazyme treated area of 4.7 ha to determine the effect of the product on crop production.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total cane yield</th>
<th>Area yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>332.2 tons/4.7 ha</td>
<td>70.7 tons/ha</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>471.8 471.8 471.8</td>
<td>100.4 tons/ha</td>
<td>29.7 tons/ha (+42%)</td>
</tr>
</tbody>
</table>

Income results: an increase of 1,793,000 Vnd/ha with Vitazyme

**Conclusions:** Despite the fact that few details on the conduct of this Vietnamese study are available, Vitazyme increased the yield of rice on this alluvial soil by 11%, an excellent improvement. The income increase was likewise very good.

- **Increase in rice yield:** 11%

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**Tea**

**Researcher:** unknown  
**Location:** Dong Hy, Thai Nguyen, Viet Nam  
**Variety:** unknown  
**Soil type:** gray soil of the midlands  
**Planting density:** unknown  
**Experimental design:** A portion of a tea plantation was treated with Vitazyme, and the remainder was left untreated, to determine the effect of the product on tea leaf yield.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaf Yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>78.59 quintals/ha</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>89.34 quintals/ha</td>
<td>10.75 quintals/ha (+14%)</td>
</tr>
</tbody>
</table>

Income increase: Plantation 1 gave an income increase of 1,187,000 Vnd/ha.

**Conclusions:** These two tea trials with Vitazyme in Viet Nam gave excellent increases: 14% and 12% above the untreated controls. The 14% increase gave an excellent income increase of 1,187,000 Vnd/ha, showing that Vitazyme is a highly viable tea amendment for Viet Nam.

- **Increase in tea yield:** 14%
Tomatoes

These Ukraine tomatoes gave an excellent yield of high quality from Vitazyme application. The two applications used in this study are fewer than recommended.

• Increase in tomato yield: 7%

Watermelons

State University Peninsula of Santa Elena, Ecuador

Location: Unit of Production and Research, Faculty of Agrarian Sciences, State University Peninsula of Santa Elena, Sinchal – Barcelona Commune, Manglaralto Parish, Peninsula of Santa Elena, Ecuador

Variety: Dona Flor (a type of Charleston Grey)

Soil type: loamy sand, well-drained

Planting date: November, 2004

Experimental design: A field of watermelons was planted using 45 plants for each plot. Each plot was 9 x 9 meters, or 81 m², but the “useful” area of each plot was 8 x 3 meters, or 24 m². A total of eight treatments, with four replications in a randomized complete block design, were used to evaluate the effect of Vitazyme on a stem length, female flowers, fruit number, fruit weight and size, yield, and economic factors.

Fertilization: Nitrogen (N) and phosphorus (P) were applied as DAP [(NH₄)₂SO₄], and potassium (K) was applied as K₂SO₄. Distribution: 20% of N, P, and K 15 days after planting; 40% of N and P, and 30% of K before flowering; 40% of N and P, and 50% of K at fruit development.

Vitazyme application: (1) Soaking of seeds in a 10% Vitazyme solution for 10 minutes, then planting 24 hours later; (2) 40 cc of Vitazyme in 20 liters of water sprayed to the leaves 20 days after planting; (3) same as (2) 40 days after planting; (4) same as (2) 60 days after planting.

Harvest date: All harvest data and yield results were obtained by 100 days after planting.

Growth results: See the results on the next two pages. Vine length at 40 and 60 days was actually less with Vitazyme at the 250 kg/ha N rate, but at the 0 and 150 kg/ha N rates Vitazyme produced somewhat longer vines. As expected, the lowest N level (0 kg/ha) produced significantly shorter vines, though Vitazyme significantly boosted vine length at 40 days after planting.

Female flower number was the greatest for Vitazyme at each nitrogen level, though these increases, up to 17%, were not statistically significant (P=0.05). The number of commercially viable fruit was also higher with Vitazyme, from 11 to 43 greater, than the control. Due to variability between plots, however, these differences were not significant. Melon dimensions in general were increased with Vitazyme, both melon length and diameter, but these differences were not significant except at the 0 kg/ha N rate. The fourth harvest produced less advantage for Vitazyme, the control slightly exceeding Vitazyme at the 150 and 250 kg/ha N rates.

Yield results: These results are on the next two pages. As can be clearly seen from this data, Vitazyme produced much higher yields of watermelons than the untreated controls at the same N levels. While these
differences were not significant due to the fairly high experimental error, they were
consistently in favor of Vitazyme by
from 18 to 71%, the highest being the
no nitrogen control.  Of considerable
interest is the fact that increasing N levels reduced crop response slightly, as has
been experienced in trials with other
crops: as fertility reaches a maximum, the
crop response to Vitazyme diminishes
because one is approaching the maxi-
mum yield potential under the environ-
mental conditions present.

Economic analyses:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Vine Length*</th>
<th>Change**</th>
</tr>
</thead>
<tbody>
<tr>
<td>(200 N)</td>
<td>1.42 a</td>
<td>—</td>
</tr>
<tr>
<td>(150 N + Vita)</td>
<td>1.41 a</td>
<td>0.12 (+9%)</td>
</tr>
<tr>
<td>(250 N)</td>
<td>1.34 a</td>
<td>—</td>
</tr>
<tr>
<td>(150 N)</td>
<td>1.29 a</td>
<td>—</td>
</tr>
<tr>
<td>(200 N + Vita)</td>
<td>1.28 a</td>
<td>(-) 0.14 (-10%)</td>
</tr>
<tr>
<td>(250 N + Vita)</td>
<td>1.23 a</td>
<td>(-) 0.11 (-8%)</td>
</tr>
<tr>
<td>(0 N + Vita)</td>
<td>0.92 b</td>
<td>0.30 (+48%)</td>
</tr>
<tr>
<td>(0 N)</td>
<td>0.62 b</td>
<td>—</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not signif-
icantly different at P-0.05.  CV=14.7%.
**Comparisons are made at the same N level:
Treatments 1 vs. 5, 2 vs. 6, 3 vs. 7, and 4 vs. 8.
Conclusions: Vitazyme in this Ecuador university study produced great increases in melon yield and income compared to the untreated controls at all nitrogen levels. Yield increases ranged from 18 to 71%, a response to better nutrient utilization with Vitazyme as evidenced by greater fruit numbers and female flowers, and generally greater melon dimensions. Vine length at 40 and 60 days after planting did not reflect these increases in yield. Income was greatly boosted by Vitazyme, especially at the 150 kg/ha nitrogen application, where the increase was $1,897.60/ha above the control, with a cost/benefit of 4.30. All cost/benefits with Vitazyme were substantially enhanced above the control, proving that Vitazyme use with watermelons in Ecuador is a highly viable practice for farmers.

### Improvement of Income with Vitazyme At the Same N Level

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Initial inputs Fert. + Vita. Total</th>
<th>12% F.C.*</th>
<th>Total Yield</th>
<th>Income</th>
<th>Cost/Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (0 N)</td>
<td>1,595.02</td>
<td>0</td>
<td>1,595.02</td>
<td>79.62</td>
<td>1,674.64</td>
</tr>
<tr>
<td>2 (150 N)</td>
<td>1,595.02</td>
<td>450.38</td>
<td>2,045.40</td>
<td>102.11</td>
<td>2,147.51</td>
</tr>
<tr>
<td>3 (200 N)</td>
<td>1,595.02</td>
<td>514.40</td>
<td>3,109.42</td>
<td>105.30</td>
<td>2,214.72</td>
</tr>
<tr>
<td>4 (250 N)</td>
<td>1,595.02</td>
<td>568.54</td>
<td>2,163.56</td>
<td>108.00</td>
<td>2,271.56</td>
</tr>
<tr>
<td>5 (0 N + Vita)</td>
<td>1,595.02</td>
<td>27.50</td>
<td>1,622.52</td>
<td>81.00</td>
<td>1,703.52</td>
</tr>
<tr>
<td>6 (150 N + Vita)</td>
<td>1,595.02</td>
<td>477.80</td>
<td>2,072.90</td>
<td>103.48</td>
<td>2,176.38</td>
</tr>
<tr>
<td>7 (200 N + Vita)</td>
<td>1,595.02</td>
<td>541.90</td>
<td>2,136.92</td>
<td>106.68</td>
<td>2,243.60</td>
</tr>
<tr>
<td>8 (250 N + Vita)</td>
<td>1,595.02</td>
<td>596.04</td>
<td>2,191.06</td>
<td>109.38</td>
<td>2,300.44</td>
</tr>
</tbody>
</table>

*Finance cost

```latex
\begin{tabular}{|c|c|c|c|c|c|c|}
  \hline
  Treatment & Initial inputs Fert. + Vita. & Total & 12% F.C.* & Total Yield & Income & Cost/Benefit \\
  \hline
  1 (0 N)   & 1,595.02                          & 0        & 1,595.02    & 79.62  & 1,674.64     & 14.38        & 1,150.40 | 0.69     \\
  2 (150 N)& 1,595.02                          & 450.38   & 2,045.40    & 102.11 | 2,147.51     & 93.36        & 7,468.80 | 3.48     \\
  3 (200 N)| 1,595.02                          & 514.40   & 3,109.42    & 105.30 | 2,214.72     & 83.73        & 6,698.40 | 3.02     \\
  4 (250 N)| 1,595.02                          & 568.54   & 2,163.56    & 108.00 | 2,271.56     & 92.76        & 7,420.80 | 3.27     \\
  5 (0 N + Vita) | 1,595.02 | 27.50 & 1,622.52 | 81.00 & 1,703.52 & 24.55 & 1,964.00 | 1.15 \\
  6 (150 N + Vita) | 1,595.02 | 477.80 & 2,072.90 & 103.48 & 2,176.38 & 117.08 & 9,366.40 | 4.30 \\
  7 (200 N + Vita) | 1,595.02 | 541.90 & 2,136.92 & 106.68 & 2,243.60 & 117.08 & 8,069.60 | 3.60 \\
  8 (250 N + Vita) | 1,595.02 | 596.04 & 2,191.06 & 109.38 & 2,300.44 & 117.08 & 8,788.00 | 3.82 \\
  \hline

**Wheat**

Researcher: Richard Stonewigg

Research Organization: Lachian Kenya Limited

Location: near Nairobi, Kenya

Experimental design: An area of winter wheat was divided into small plots, with soil treatments in the main plots and foliar treatments in the sub-plots. The treatments were as follows:

**Main Plot Treatments** (soil applications at planting) 
- Control
- Control + Twin N
- Vitazyme + Turbo-Seed + Zn
- Vitazyme + Turbo-Seed + Zn + Impact Ca
- Urea + Diammonium P
- Urea + Diammonium P + Impact Ca
- Vitazyme
- Vitazyme + Impact Ca

**Sub-Plot Treatments** (foliar applications) 
- Twin N
- Impact Ca
- Impact Ca + Twin N

**Fertilization:** Turbo-Seed is soluble phosphorus + zinc, copper, and magnesium EDTA + humic acid (to help prevent scorching); this was sprayed into the seed row at 15 kg/ha. Trade Corp Zn is a zinc formulation, applied to the soil at 100 g/ha.

**Diagnos:** Diammonium phosphate (DAP) and urea were both applied to the soil at 150 kg/ha each.

**Foliar feeding:** Twin-N is nitrogen-fixing microbes, applied to the leaves at 1 vial/ha. Impact Ca is a calcium + nitrogen formulation sprayed on the leaves at 5 liters/ha.

**Vitazyme application:** 1 liter/ha sprayed in the seed row at planting

Yield results: See the results on the next page.

The Vitazyme treatment in this Kenya test is on the left. Note the larger and longer leaves, and roots which are much more extensive than the control. More total photosynthesis means greater plant development.
Wheat Yield

Treatment | Yield | Yield change* kg/ha kg/ha
--- | --- | ---
1. Control + Twin N | 1.218 | —
2. Control + Impact Ca | 1.212 | —
3. Vitazyme + Turbo-Seed + Zn + Twin N | 1.526 308 (+25%)
4. Vitazyme + Turbo-Seed + Zn + Impact Ca | 1.294 82 (+7%)
5. Urea + DAP + Twin N | 1.629 417 (+34%)
6. Urea + DAP + Impact Ca | 1.094 (-) 118 (-10%)
7. Vitazyme + Twin N | 1.704 486 (+40%)
8. Vitazyme + Impact Ca | 1.475 263 (+22%)

*Comparisons are made with the appropriate control treatment: Treatments 3, 5, and 7 versus Treatment 1, and Treatments 4, 6, and 8 versus Treatment 2.

Conclusions: In this Kenya study using various soil and foliar products, all soil applied products stimulated yield, but to different degrees, and with considerable interaction with other products (which effects could not be interpreted due to a lack of replication). The interaction of soil applied products was highest, by far, with Twin N, and the lowest with Impact Ca, giving the following average yields:

- **Increase in wheat yield with Vitazyme only:** 31%

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Grain yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.215</td>
<td>—</td>
</tr>
</tbody>
</table>
| Vitazyme + Turbo-Seed + Zn | 1.410 195 (+16%)
| Urea + DAP | 1.362 147 (+12%)
| Vitazyme | 1.590 375 (+31%) |

Average of the Twin-N and Impact Ca treatments for all four main-plot treatments:

- Twin N (Treatments 3, 5, and 7): 1,620 kg/ha
- Impact Ca (Treatments 4, 6, and 8): 1,288 kg/ha
- Increase with Twin N vs. Impact Ca: 322 kg/ha (+26%)

Vitazyme worked very well with Turbo-Seed and zinc to increase the yield by 25% with Twin N, and by 7% with Impact Ca. The highest average yield, however, was with Vitazyme alone with Twin N or Impact Ca, as shown in the table above.

**Wheat**

Researchers: O.V. Kornijchuk, V. V. Plotnikov, and agronomic scientists
Agricultural Experiment Station of Forage Institute, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine

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

**Variety:** Podolyanka, Donets’ka 48, and Polis’ka 90

- the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH = 5.5.

**Previous crop:** spring vetch

**Tillage:** tilled to 4-5 cm.

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

1. **Control**
2. **Vitazyme applied two times**

**Fertilization:** In the fall of 2007 a broadcast application of 30-60-90 kg/ha N-P₂O₅-K₂O was made. In the spring, 120 kg/ha of nitrogen was applied at two times (50 and 70 kg/ha).

**Vitazyme application:** 1 liter/ha applied on April 22, and again on May 13, 2008

**Yield and quality results:** Vitazyme increased wheat grain yield by 6 to 11% for the three varieties, and improved the gluten and protein levels for all three varieties.

**Increase in wheat yield with Vitazyme only:** 31%

- **Increase in wheat yield with Vitazyme only:** 31%
- **Increase in gluten with Vitazyme:** Donets’ka 48 **0.5%-pts**
- **Increase in protein with Vitazyme:** Donets’ka 48 **0.6%-pts**

**Income results:** Based on current grain prices, the increase in income from Vitazyme for the three varieties was as follows:
**Conclusions:** Vitazyme applied twice during the spring growth period resulted in a substantial 6 to 11% increase in yield; Podolyanka variety gave the highest increase, that resulted in a 747 hrn/ha income increase. The quality of the grain was also improved with Vitazyme, the gluten content increasing from 0.5 to 1.0 percentage points, and crude protein from 0.5 to 0.8%. These results prove that this crop treatment is highly effective for improving the yield, quality, and income of winter wheat in Ukraine on these gray forest-steppe soils. Had Vitazyme been applied to the seeds in the fall, or to the newly emerged plants, it is likely that the results would have been even more favorable than with only spring applications.

**Wheat**

**Researcher/Farmer:** Blaine Middleton  
**Location:** Lamesa, Texas ["East Home" Farm]

<table>
<thead>
<tr>
<th>Variety</th>
<th>TAM 111 hard red winter wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting rate</td>
<td>75 lb/acre</td>
</tr>
<tr>
<td>Watering</td>
<td>center-pivot irrigation with electronic treatment</td>
</tr>
<tr>
<td>Experimental design</td>
<td>An irrigated circle was divided into treated and untreated sections. A 30-acre area was treated by irrigation water with Vitazyme, while the remaining area under the circle was left untreated. An adjacent 30-acre area of wheat served as the control.</td>
</tr>
</tbody>
</table>

**Fertilization:**  
(1) 270 lb/acre of 9-21-21-5% N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O-S spread dry at planting; (2) 30 gal/acre of 32% N through the center pivot system during March 8 to 15, 2008.

**Vitazyme application:** (2) 13 oz/acre (1 liter/ha) after emergence, on December 7, 2007; (2) 13 oz/acre at spring greenup, on February 20.

**Irrigation, rainfall, and weather:** The summer was hotter than normal, and rainfall was very limited, only 2.4 inches of rain.

Irrigations: 19 in all, totaling 14.3 inches.

**Harvest date:** June 5, 2005

**Yield results:** Results are shown on the right.

**Income results:** A value of $8.00/bu is used in this table.

**Conclusions:** In this hard red winter wheat study in western Texas, Vitazyme applied twice through the irrigation water during a hot, dry summer provided a superb yield increase of 29%. This increase resulted in an income increase of $163.20/acre, showing the great ability of Vitazyme to assist wheat growers in semi-arid regions. Presumably the product is enabling the crop to make a better use of fertilizer nitrogen and other nutrients, as demonstrated in several other studies.

*Increase in income: $163.20/acre

### Treatment Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total yield, 30 acres</th>
<th>Yield Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>124,600 bu*</td>
<td>69.2 bu/acre</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>161,220 bu*</td>
<td>89.6 bu/acre</td>
</tr>
</tbody>
</table>

*Based on 60 lb/bu for wheat.

**Wheat**

**Researcher/Farmer:** Blaine Middleton  
**Location:** Lamesa, Texas ["West Home" Farm]

<table>
<thead>
<tr>
<th>Variety</th>
<th>TAM 111 hard red winter wheat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting date</td>
<td>November 14, 2007</td>
</tr>
<tr>
<td>Row width</td>
<td>9.5 inches</td>
</tr>
<tr>
<td>Watering</td>
<td>center-pivot irrigation with electronic treatment</td>
</tr>
<tr>
<td>Experimental design</td>
<td>An irrigated circle was divided into treated and untreated sections. A 30-acre area was treated by irrigation water with Vitazyme, while an adjacent untreated 30-acre area of wheat served as the control.</td>
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**Fertilization:**  
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**Vitazyme application:** (2) 13 oz/acre (1 liter/ha) after emergence, on December 7, 2007; (2) 13 oz/acre at spring greenup, on February 20.

**Irrigation, rainfall, and weather:** The summer was hotter than normal, and rainfall was very limited, only 2.4 inches of rain.

Irrigations: 19 in all, totaling 14.6 inches.

**Harvest date:** June 4, 2008

**Yield results:**

**Income results:** A value of $8.00/bu is used in this table.

**Conclusions:** In this hard red winter wheat study in western Texas, Vitazyme applied twice through the irrigation water during a hot, dry summer provided a very large yield increase of 16%. This increase resulted in an income increase of $96.80/acre, showing the great utility of Vitazyme for wheat production in western Texas. Presumably the product is enabling the crop to make a better use of fertilizer nitrogen, as demonstrated in several other studies.

*Increase in wheat yield: 16%

*Increase in income: $96.80/acre