2005 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 tenth 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 involving 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-rhizosphere 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 NO3-N Test 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</td>
<td>1 3</td>
<td>1 3</td>
<td>1 2 4 6</td>
</tr>
<tr>
<td>Total additive score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply this % of optimum N:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 14 13 12 11 10 9 8 7 6 5</td>
<td>50-60% 60-70% 70-80%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
Crops during 2005 in the United States had to endure severe drought in parts of the Midwest and South, and another cold, wet spring in the Northeast. Yet, Vitazyme performed very well under these stresses, and equally well in other parts of the country. The same consistency in response as seen in years past has continued this year, as evidenced in the pages of this booklet, and as pointed out below in this brief summary of results for the year.

**Some Highlights for 2005**

1. Two more corn studies in North Carolina, conducted through North Carolina State University, displayed once again the ability of the product to reduce leaf fungal infection and improve fertilizer efficiency. A journal publication is expected from these two years of study. Yield increases from Vitazyme alone were from 18 to 38 bu/acre.

2. Cuban results continue to come in, with sugarcane yield increases of 17 to 34%, and rice yield enhancement of 14 to 35%.

3. Raisin and wine grapes in California have performed very well with the Vitazyme program in 2005, carrying forward the results from previous years. The LDS Raisin Vineyard near Fresno, California, completed its third year of studies, and showed that the standard Ethrel treatment to enhance fruit sugar is not necessary if Vitazyme is used instead. Wine grapes near Paso Robles, California, responded extremely well to Vitazyme for the second year, with yields improving by 22% while wine quality may even have been enhanced.

4. The third year of apple trials in western New York once again proved how the program can not only increase average apple size, but also improve brix and fruit pressure (tissue firmness), thus improving storability and crispness. Apple growers will now be able with confidence to utilize this product and its associated program in a much bigger way.

5. In Africa and far western Asia, tests with Vitazyme have shown excellent results on pasture grasses and legumes. In Sub-Saharan Africa the improvement in pastures could have a very positive impact on domesticating the traditionally nomadic Fulani tribes.

6. As the petroleum crisis has doubled fertilizer prices, in some cases, from a year earlier, farmers are faced with serious increases in production costs. To decrease fuel and fertilizer costs, Vitazyme has shown in 2005, as it has in previous years, its ability to improve fertilizer efficiency and decrease soil bulk density, thus helping the farmer become more efficient.

Continuing the consistent responses of Vitazyme on a number of crops, the results shown in this booklet reveal the great efficacy of this product to the farmer. Across all types of soils and climatic conditions, this product and its associated program have provided excellent results in North America as well as on other continents.

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### Alfalfa

**New Product Analysis**

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

**Soil type:** silt loam

**Planting date:** January 28, 2005

**Experimental design:** A replicated pot study (5 reps) was set up in the research greenhouse to evaluate the effect of Vitazyme and Rhizobium bacteria, alone or together, on alfalfa growth. Other products were also evaluated, including a “New” Vitazyme and a potential additive to upgrade Vitazyme.

1. Control
2. Rhizobium only
3. Vitazyme only
4. Vitazyme + Rhizobium
5. “New” Vitazyme
6. Product B
7. “New” Vitazyme + Rhizobium
8. Product B + Rhizobium

**Fertilization:** none

**Vitazyme, “New Vitazyme, and Product B application:**

- 100 ml/pot of a 0.01% solution for Vitazyme and “New Vitazyme; 100 ml/pot of a 0.001% solution for Product B

**Harvest date:** March 30, 2005, 61 days after planting

**Growth results:** At harvest, ten average leaves of each pot were analyzed by a Minolta SPAD meter, and values were averaged.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaf Chlorophyll*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPAD units</td>
<td>SPAD units</td>
</tr>
<tr>
<td>2 (Rhizobium)</td>
<td>44.26 a</td>
<td>9.18 (+26%)</td>
</tr>
<tr>
<td>8 (Prod B + Rhiz)</td>
<td>42.76 a</td>
<td>7.68 (+22%)</td>
</tr>
<tr>
<td>4 (Vita + Rhiz)</td>
<td>42.56 a</td>
<td>7.48 (+21%)</td>
</tr>
<tr>
<td>6 (New Vita + Rhiz)</td>
<td>42.40 a</td>
<td>7.32 (+21%)</td>
</tr>
<tr>
<td>3 (Vitazyme)</td>
<td>39.00 b</td>
<td>3.92 (+11%)</td>
</tr>
<tr>
<td>5 (New Vitazyme)</td>
<td>37.48 c</td>
<td>2.40 (+7%)</td>
</tr>
<tr>
<td>7 (Product B)</td>
<td>36.94 c</td>
<td>1.86 (+5%)</td>
</tr>
<tr>
<td>1 (Control)</td>
<td>35.08 d</td>
<td>—</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test (P=0.10). LSD0.10=1.48 SPAD units.

**Plant Height**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>6 (New Vita + Rhiz)</td>
<td>22.8 a</td>
<td>4.8 (+27%)</td>
</tr>
<tr>
<td>8 (Prod B + Rhiz)</td>
<td>22.0 a</td>
<td>4.0 (+22%)</td>
</tr>
<tr>
<td>4 (Vita + Rhiz)</td>
<td>21.7 a</td>
<td>3.7 (+21%)</td>
</tr>
<tr>
<td>2 (Rhizobium)</td>
<td>21.0 a</td>
<td>3.0 (+17%)</td>
</tr>
<tr>
<td>7 (Product B)</td>
<td>20.2 ab</td>
<td>2.2 (+12%)</td>
</tr>
<tr>
<td>3 (Vitazyme)</td>
<td>20.2 ab</td>
<td>2.2 (+12%)</td>
</tr>
<tr>
<td>1 (Control)</td>
<td>18.0 b</td>
<td>—</td>
</tr>
<tr>
<td>5 (New Vitazyme)</td>
<td>17.8 b</td>
<td>(-) 0.2 (-1%)</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different according to the Student-Newman-Keuls Test (P=0.10). LSD0.10=1.8 cm.

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**SPAD meter, and values from these two years of study. Yield efficiency. A journal publication is expected from these two years of study. Yield increases from Vitazyme alone were from 18 to 38 bu/acre.**

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Continuing the consistent responses of Vitazyme on a number of crops, the results shown in this booklet reveal the great efficacy of this product to the farmer. Across all types of soils and climatic conditions, this product and its associated program have provided excellent results in North America as well as on other continents.
Leaf chlorophyll was significantly increased in every treatment that received Rhizobium bacteria, showing its ability to fix nitrogen and supply it to leaf tissue. Vitazyme significantly increased leaf chlorophyll as well, but less than did Rhizobium, and the New Vitazyme and Product B also increased chlorophyll above the control.

The average height for all of the plants in a pot were averaged to the nearest cm.

All of the Rhizobium treated alfalfa had the tallest plants, with Product B and Vitazyme close behind.

All of the leaves and roots were dried after washing soil from the roots, in a drying oven at about 120°F for 24 hours. Vitazyme + Rhizobium produced the highest dry matter yield, exceeding the control by 34%, followed by Product B + Rhizobium (+26%). Rhizobium bacteria alone also produced a 26% yield increase, while New Vitazyme + Rhizobium gave a 15% yield increase, only slightly more than the Vitazyme alone (+14%).

**Conclusions:** In this greenhouse alfalfa study using three products and Rhizobium bacteria, the Rhizobium, alone or combined with the other products, always exceeded the other four treatments in terms of leaf chlorophyll, plant height, and dry weight. With the all-important dry weight production, Vitazyme plus Rhizobium produced the highest increase, 34% more than the control, while Product B + Rhizobium produced the second highest yield increase at 26%. Vitazyme alone caused a 14% dry matter increase. Vitazyme is shown to be a very powerful alfalfa growth stimulator, especially in combination with Rhizobium bacteria which feed on photosynthate transferred into the roots to feed these nitrogen fixing bacteria.

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**Apples**

**Location:** Kast Farms, Albion, New York  
**Variety:** Empire  
**Experimental design:** The orchard was partially treated with Vitazyme, leaving an untreated control area for comparison of sugar content (brix) and fruit pressure.

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

**Fertilization:** unknown, but the same for both treatments.  
**Vitazyme application:** 24 oz/acre on the leaves at pink (May 5), petal fall (June 1), first cover (June 20), and August 1, 2005  
**Yield results:** No yields were compiled for the 2005 crop because of heavy frost that greatly reduced the apple numbers. The fruit load was about 50% of normal. Even so, the Vitazyme treatment had a heavier fruit load at midsummer than the control.  
**Quality results:** On September 29, 2005, the fruit size was rather small for both treatments, but there were differences in fruit quality.

**Conclusions:** This study on an apple orchard with a reduced fruit load showed that Vitazyme improved fruit quality significantly by improving the firmness of the fruit, and slightly increasing the sugar content. The firmer fruit occurred despite enhanced maturity, which normally would decrease

**Fruit Appearance, Maturity, Pressure, and Brix**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fruit appearance</th>
<th>Maturing</th>
<th>Pressure (psi)</th>
<th>Brix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Normal</td>
<td>Normal</td>
<td>15.22</td>
<td>12.5</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>Darker and waxy</td>
<td>Advanced</td>
<td>16.44</td>
<td>12.8</td>
</tr>
</tbody>
</table>

**Continued on the next page**
flesh firmness. This result shows the ability of Vitazyme to increase the firmness of apple fruit by encouraging the deposition of stronger cell wall compounds such as cellulose and lignin, which should enhance storability of the fruit.

- Increase in fruit brix: +0.3 percentage point

- Increase in fruit pressure: +1.22 percentage points

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**Bermudagrass**

**Tarleton State University**

**Location:** Tarleton State Turfgrass Field Laboratory, Stephenville, Texas  
**Variety:** Princess 77 (new planting) and Tifsport (plugs)  
**Planting date:** June 17, 2005, for the Princess 77; June 16 and 17 for the Tifsport plugs  
**Experimental design:** A three-pronged approach to evaluating the efficacy of Vitazyme in improving the growth of bermudagrass turf was initiated using (1) a newly tilled area seeded to bermudagrass plugs, (2) a newly tilled area receiving evenly spaced bermudagrass plugs, and (3) a commercial golf course. Treatments applied to all three growing environments are given below. Four replicates were used.

1. Control  
2. Fertilizer only  
3. Vitazyme at 13 oz/acre  
4. Vitazyme at 26 oz/acre  
5. Fertilizer + Vitazyme at 13 oz/acre  
6. Fertilizer + Vitazyme at 26 oz/acre

**Fertilization:** Note the treatments for the three test areas  
**Vitazyme applications:** Note the applications for the three test areas. Application was with a hand-pushed, two-wheeled, CO2 pressured boom having four Teejet XR8003 nozzles calibrated to deliver 58 gal/acre at 39 psi.  
**Herbicide applications:** In July, barnyard grass and yellow foxtail were controlled by Drive 75DF + N15. Yellow nutsedge was treated with Image 75DG + N15 + Target 66. In August, broadleaf weeds were controlled by WeedBGone, and Lesco 3Way, Pendulum AquaCap, and Drive 75DF + MES were applied later.  
**Irrigation:** sprinkler to all plots

A 2,500 ft² area was cleared of weeds and grass using glyphosate sprayed on March 3 and April 26 at 2 quarts/acre. The area was tilled and raked smooth, and 5 x 5 foot plots were set up having 1-foot walkways between plots. The plots were seeded at 2 lb/1,000 ft² with Princess 77 bermudagrass. Vitazyme and fertilizer (Lesco 18-24-12% N-P2O5-K2O to give 1 lb P2O5/1,000 ft²) were applied immediately after seeding as a seed treatment. After 2 months, on July 15, Lesco 28-3-10 was applied to give 1 lb N/1,000 ft². This application was repeated August 12 and September 9. On October 7, the final fertilizer treatment of Lesco 5-10-31 was applied at a rate giving 1 lb K2O/1,000 ft². The grass was mowed with a rotary mower to 1.5 inches twice weekly, but during the week of 10/7 the mowing height was lowered to 1.0 inches, which scalped the grass and lowered quality measurements.

**Conclusions:** This replicated bermudagrass turf study at Tarleton State University at Stephenville, Texas, proved how greatly Vitazyme can stimulate root growth, and thus early sod establishment, for a new seeding. The dry root biomass was greatly stimulated by Vitazyme, with or without fertilizer, except where Vitazyme was applied by itself at 26 oz/acre. Fertilizer alone reduced root development below the control, even though leaf development remained aggressive. Vitazyme plus fertilizer at both the 13 and 26 oz/acre rates produced the highest root and shoot biomass,

Continued on the next page
exceeding the control by 28% and 24%, respectively; the fertilizer alone exceeded the control by 18%. This result demonstrates the frequently noted effect of Vitazyme improving nutrient utilization for plants. While shoot biomass was stimulated similarly (30 to 40%) by fertilizer and fertilizer + Vitazyme, the root biomass decreased by 17% with fertilizer alone but increased dramatically with Vitazyme added to the fertilizer. Fertilizer and fertilizer + Vitazyme in some cases improved grass color, cover, and density above the control, but not on every test date. The 13 oz/acre rate of Vitazyme was generally superior to the 26 oz/acre rate in most circumstances.

The plug and golf course trials provided no significant effects of any treatments, although both trials showed positive effects of Vitazyme. The record dry growing season likely adversely affected the outcome of this experiment, and in spite of irrigation reduced the display of significant treatment differences.

Note on root development: Roots from Vitazyme treated plots were observed to be surrounded by a core of soil with intensive rhizosphere activity. This illustrates the usual observation of Vitazyme increasing mycorrhizal and exudation activity along root surfaces to enhance nutrient uptake.

- Increase in root biomass with Vitazyme (13 oz/acre): 30%
- Increase in root biomass with Vitazyme + fertilizer: 13 to 15%
- Increase in shoot biomass with Vitazyme + fertilizer: 30 to 38%

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**Bracharia Brizantha (a perennial grass)**

**Studies in Six African Countries**

**Location:** Cameroon, Nigeria, Central African Republic, Niger, Tchad, and Burkina Faso

**Variety:** Bracharia brizantha

**Soil types:** unknown

**Experimental design:** Four fertility regimes with six replications were applied to experimental plots (4 m²) in six African countries, all with Vitazyme with the exception of an untreated control. Effects on plant growth and biomass were used to evaluate the product.

1. Vitazyme alone
2. Vitazyme + phosphorus fertilizer (P)
3. Vitazyme + nitrogen fertilizer (N)
4. Vitazyme + farmyard manure (FYM)
5. Control

**Fertilization:** 100 kg/ha N (urea), 100 kg/ha P₂O₅ (SSP), and 100 kg/ha dairy manure

**Vitazyme applications:** 20 ml of Vitazyme was added to 250 g of seed for each 4 m² plot of Treatments 1, 2, 3, and 4.

**Plant height and yield results:**

Vitazyme interacted positively with nitrogen and manure to bring excellent grass height responses. By itself Vitazyme exceeded the control by 210%, though phosphorus fertilizer reduced the response somewhat. Plant fresh biomass values closely reflected the plant height measurements. Vitazyme interacted positively with urea fertilizer and manure, but phosphorus fertilizer reduced the yield somewhat compared to Vitazyme alone. Vitazyme produced a 495% increase in moist harvested weight above the control.

*Note: This text continues on the next page.*
Conclusions: In this grass study conducted in six African countries, Vitazyme alone substantially improved grass production and height, and with nitrogen fertilizer and manure the product produced a marked synergism. However, this synergism did not occur with phosphorus fertilizer.

Research Organization: CCE–Lake Plains Vegetable Program and the New York Crop Research Facility
Location: Batavia, New York Variety: Amtrack (a storage cabbage) Planting date: June 28, 2004
In-row spacing: 14.5 inches Previous crop: turf (several years) Row spacing: 30 inches
Soil test results: organic matter, 3.9%; pH, 7.0; CEC, 9.6 meq/100 g; K, 236 ppm; P (Mehlich), 123 ppm; P (Morgan), 40 ppm; Ca, 1,590 ppm; Mg, 121 ppm; Zn, 2.4 ppm; B, 0.9 ppm; Cu, 2.6 ppm; Al, 758 ppm; base saturation percentages, Ca = 83.1, Mg = 10.5, K = 6.3.
Soil type: clayey
Experimental design: Seven products produced by different companies were applied to cabbages at transplanting to evaluate the effects on yield and growth parameters. Plots contained 20 heads in a single row, with “guard rows” between treatments. Each treatment was replicated four times. Only one product application was made, at planting.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate</th>
<th>Active ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>0</td>
<td>—</td>
</tr>
<tr>
<td>2. RiseR</td>
<td>2.5 gal/acre</td>
<td>7-17-3 + Cu, Mn, and Fe + ZnNH₄-acetate</td>
</tr>
<tr>
<td>3. Super Bio Ag Blend</td>
<td>1.5 gal/acre</td>
<td>3-0-0 + 1% humate + microbes</td>
</tr>
<tr>
<td>4. Alpine EXP + 6-24-6</td>
<td>1 qt/acre + 5 gal/acre</td>
<td>Humic coal product + 6-24-6</td>
</tr>
<tr>
<td>5. Vitazyme + Alpine EXP + 6-24-6</td>
<td>13 oz/acre + 1qt/acre + 5 gal/acre</td>
<td>Biostimulant + above products (see 3)</td>
</tr>
<tr>
<td>6. Fertiactyl GZ</td>
<td>4 pt/acre</td>
<td>13-0-5 + microbes, humates, and fulvic acid</td>
</tr>
<tr>
<td>7. Fertiactyl Starter</td>
<td>7 pt/acre</td>
<td>10-5-10 + humates, fulvic acid, zeatin, and glycin bataine</td>
</tr>
<tr>
<td>8. Hydra-Hume</td>
<td>2 gal/acre</td>
<td>0-0-2 + 12% humate + 4% fulvic acid</td>
</tr>
</tbody>
</table>

Fertilization: 600 lb/acre Cabbage Blend M (14.7-13.1-2.9-0.7% N-P₂O₅-K₂O-S-Zn) broadcast in the spring; two applications of 32% N Nitan (70 lb/acre N) side-dressed during the growing season

Product application: On June 28 at transplanting, furrows in the field were dug with a hoe and the transplants were placed-in-them. The products were poured evenly in 350 gal/acre equivalent of water over the transplants to simulate mechanical planter placement.

Growing season: unusually wet and cool all summer, giving high disease pressure (especially black rot), but low insect pressure

Harvest and yield results: On October 20, 2004, a final overall plant health rating was made. Then every other head, for a total of 10 heads per replicate, was harvested and weighed. Of these 10 heads, five were selected at random to measure individual weight, length, and width. These data were used to estimate head density. Head quality was also judged at harvest.

This New York cabbage trial proved that Vitazyme improved growth better than any other product tested.
No treatment means were significantly different, but there were some notable differences among the treatments. The Hydra-Hume had the highest field (health) rating for barefoot transplants at harvest, while Hydra-Hume, Fertiactyl Starter, Vitazyme, Super Bio, and the control had virtually identical high ratings for plug transplants. Individual head weight was highest for RiseR and Hydra-Hume for barefoot transplants, but by far the highest head weight for plugs was with Vitazyme (+35%). Estimated yields varied considerably for barefoot plants, being highest for RiseR, Hydra-Hume, and the control, while Vitazyme produced by far the highest yield for the plug transplants (+37%). Head density was highest for Fertiactyl GZ with barefoot plants, and for Super Bio and Fertiactyl Starter for plugs.

Conclusions: According to the researchers, “Although not significant, Vitazyme + Alpine EXP 6-24-6 (Treatment 5) on plug transplants had the greatest effect on yield. Compared to the untreated check, this treatment increased yield by 8.5 tons/acre (37.4%) and improved head quality. RiseR and Hydra-Hume also increased yield by 5.6% and 3.8%, respectively, on bare roots, and by 4.0% and 2.6%, respectively, on plugs, although not significantly. Note, Hydra-Hume had a higher percentage of poor quality heads at harvest compared to the untreated check.”

Cost Benefit Per Acre of Materials That Demonstrated Yield Enhancement Capabilities

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Transplants</th>
<th>Rate/Acre</th>
<th>Processing</th>
<th>Yield enhancement1</th>
<th>Cost of product</th>
<th>Cost benefit, $/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Processing</td>
<td>Fresh market</td>
<td>$/gal</td>
<td>$/acres</td>
</tr>
<tr>
<td>RiseR</td>
<td>bare roots</td>
<td>2.5 gal</td>
<td>1.6</td>
<td>77.92</td>
<td>8.25</td>
<td>20.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.5 gal</td>
<td>0.9</td>
<td>43.83</td>
<td>8.25</td>
<td>20.63</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>plugs</td>
<td>13 oz</td>
<td>45.00</td>
<td>4.57</td>
<td>10.00</td>
<td>2.50</td>
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<tr>
<td>Alpine EXP</td>
<td></td>
<td>1 qt</td>
<td>8.5</td>
<td>413.95</td>
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<tr>
<td>6-24-6</td>
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<td>5 gal</td>
<td>8.5</td>
<td>2,142.00</td>
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<td>13.50</td>
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<td>Hydra-Hume</td>
<td>bare roots</td>
<td>2 gal</td>
<td>1.1</td>
<td>53.57</td>
<td>6.50</td>
<td>13.00</td>
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<tr>
<td></td>
<td></td>
<td>2 gal</td>
<td>0.6</td>
<td>29.22</td>
<td>6.50</td>
<td>13.00</td>
</tr>
</tbody>
</table>

1USDA average commodity prices: processing = $48.70/ton; fresh = $252.00/ton.

Increase in head weight: + 35%  
Increase in head yield: +37%

Location: Monroe County, New York  
Variety: Huron  
Soil type: sandy loam  
Previous crop: alfalfa  
Planting date: June 12, 2005 (transplants)  
Experimental design: A cabbage field was partly treated with Vitazyme (10 acres) to evaluate its effect on yield and quality when complementing the grower’s typical program.

1. Control  
2. Vitazyme  
Fertilizer: 1,000 lb/acre of 10-20-20% N-P₂O₅-K₂O, plowed in before planting; 25 gal/acre of a 30% N solution side-dressed in July. Total N: 175 lb/acre.
Vitazyme application: 13 oz/acre applied seven times during the growing season: in the transplant water (13 oz in 500 gal/acre water), and with fungicides and insecticides on June 30, July 16, July 30, August 15, September 7, and September 24
Harvest date: October 7 to 12

Yield results: No actual yield checks were made, but a close estimate based on one-ton boxes showed a modest 6 bu/acre yield increase with Vitazyme.
Income results: At $10/bu of cabbage, the income increased by about $60/acre.

Continued on the next page
Quality and storage results: The Vitazyme treated cabbage was more dense as determined by the weight of 1-ton (40 bushel) storage boxes.

Vitazyme box weight: 1,920 lb (+120 lb)
Control box weight: 1,800 lb

As of late December 2005, the Vitazyme treated cabbages were storing better than the control cabbages.

Conclusions: In this New York cabbage study, Vitazyme increased the yield, density, and storability of cabbage to a highly profitable degree. Results of the treatment in the field could be observed right to the row. Density increases were most likely due to greater soluble solids and tighter leaf development within the head. Improved storability is due to higher soluble solids in the cells and stronger cell walls that resist desiccation and physical damage.

- Increase in yield: + 6 bu/acre
- Increase in cabbage density: + 7%

Coffee

A coffee study was conducted in Cuba on newly grafted plants. Little information is available on study details, but parameters measured are given below, showing a notable benefit of Vitazyme in the growth of the young coffee plants. The dosage rate was 15 ml per plant of an 8 ml/liter (0.8%) Vitazyme solution.

Conclusions: Vitazyme improved young grafted coffee plant growth for all applications, except for the graft soak only (Treatment 2). Plant height was greatest for the graft soak and monthly foliar sprayer (third leaf pair; +30%), and stalk diameter (21%), leaf growth (+10%), and top and root dry weights (+75% and +47%) were also greatest for this treatment. Root length was similar for all foliar Vitazyme applications. It appears that Vitazyme application to the third leaf pair was most effective — especially when coupled with a graft soak — although the second leaf pair application did about as well. The first leaf pair application gave a slightly lower growth response for several parameters.

A full crop of coffee beans results from Vitazyme application in all tropical countries.

Corn

Agriculture Custom Research and Education Services

Location: Cedar Falls, Iowa  
Variety: Pioneer 34N43 (non-GMO)  
Previous crop: soybeans

Soil type: Floyd loam (pH 6.8, organic matter 4.2%, CEC 15.7, good fertility)  
Planting rate: 29,900 seeds/acre  
Planting depth: 1.5 inches

Planting date: May 8, 2005  
Row spacing: 30 inches

Tillage: field cultivator

Experimental design: A Latin square design with eight replicates and eight treatments was set up in a uniform area having 6-row plots of 15 x 40 feet (0.0138 acre). The purpose of the trial was to discover the effect of Vitazyme, a new Vitazyme variant (Product X), a possible synergist with Vitazyme (Product Y), and another possible synergist (Product Z) on corn yield, grain/plant, and grain moisture content. The Student-Newman-Keuls test was used to separate treatment means.

Fertilization: 100 lb/acre of N as 33 gallons/acre of 28-0-0% N-P2O5-K2O; P and K adequate

Vitazyme application: 13 oz/acre or 6.5 oz/acre on

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Product</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Vitazyme</td>
<td>13 oz/acre x 2</td>
</tr>
<tr>
<td>3</td>
<td>Vitazyme + Product Y</td>
<td>13 oz/acre each x 2</td>
</tr>
<tr>
<td>4</td>
<td>Vitazyme + Product Y</td>
<td>6.5 oz/acre each x 2</td>
</tr>
<tr>
<td>5</td>
<td>Product Y</td>
<td>13 oz/acre x 2</td>
</tr>
<tr>
<td>6</td>
<td>Product X + Product Y</td>
<td>6.5 oz/acre each x 2</td>
</tr>
<tr>
<td>7</td>
<td>Product Z</td>
<td>16 oz/acre x 2</td>
</tr>
<tr>
<td>8</td>
<td>Vitazyme + Product Z</td>
<td>13 oz/acre (Vita.) + 16 oz/acre (Z) x 2</td>
</tr>
</tbody>
</table>

Continued on the next page
Several in the Midwest and Northeast.

**Experimental design:** A series of five studies was conducted in northern climates to determine the effectiveness of a new variation of Vitazyme to improve the growth and productivity of corn during cold and wet weather. Previous work had shown some limitations of standard Vitazyme to stimulate corn yield responses when soil temperatures were below 50°F, and the soil was wet, thus inhibiting microbial activity which is essential for Vitazyme’s primary mode of action.

### Conclusions
In this Iowa replicated corn study using four different products, Vitazyme increased corn yields by 2 to 9% (up to 13.2 bu/acre) alone or in combination with another product. A variant of Vitazyme increased yield by 11% when applied with Product Y, while Product Y alone increased yield by 9%. Product Z caused the greatest yield increase: 12%. Grain moisture was not significantly different among all eight treatments, and likewise for corn weight/plant, although Products X + Y (half rate) gave a 4% increase in grain/plant. Income increased with all seven treatments, the greatest being for Product Z ($52.80/acre).

### Grain Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Grain yield*</th>
<th>Change</th>
<th>Moisture*</th>
<th>Change</th>
<th>Grain/Plant*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/acre</td>
<td>%</td>
<td>%</td>
<td>lb/plant</td>
<td>lb/plant</td>
<td></td>
</tr>
<tr>
<td>1. Control</td>
<td>145.4 b</td>
<td>——</td>
<td>18.4 a</td>
<td>—</td>
<td>0.633 a</td>
<td>—</td>
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<tr>
<td>2. Vitazyme</td>
<td>152.4 ab</td>
<td>7.0 (+5%)</td>
<td>19.0 a</td>
<td>+0.6</td>
<td>0.644 a</td>
<td>0.011 (+2%)</td>
</tr>
<tr>
<td>3. Vita + Prod Y</td>
<td>148.8 ab</td>
<td>3.4 (+2%)</td>
<td>19.3 a</td>
<td>+0.9</td>
<td>0.628 a</td>
<td>(-0.005 (-1%))</td>
</tr>
<tr>
<td>4. Vita + Prod Y (1/2 rate)</td>
<td>153.2 ab</td>
<td>7.8 (+5%)</td>
<td>18.9 a</td>
<td>+0.5</td>
<td>0.636 a</td>
<td>0.003 (+0%)</td>
</tr>
<tr>
<td>5. Product Y</td>
<td>158.1 ab</td>
<td>12.7 (+9%)</td>
<td>18.5 a</td>
<td>+0.1</td>
<td>0.646 a</td>
<td>0.013 (+2%)</td>
</tr>
<tr>
<td>6. Prod X + Prod Y (1/2 rate)</td>
<td>161.9 a</td>
<td>16.5 (+11%)</td>
<td>18.9 a</td>
<td>+0.5</td>
<td>0.658 a</td>
<td>0.025 (+4%)</td>
</tr>
<tr>
<td>7. Product Z</td>
<td>163.0 a</td>
<td>17.6 (+12%)</td>
<td>18.7 a</td>
<td>+0.3</td>
<td>0.639 a</td>
<td>0.006 (+1%)</td>
</tr>
<tr>
<td>8. Vita + Prod Z</td>
<td>158.6 ab</td>
<td>13.2 (+9%)</td>
<td>18.7 a</td>
<td>+0.3</td>
<td>0.637 a</td>
<td>0.004 (+1%)</td>
</tr>
</tbody>
</table>

**LSD (P=0.05)**
10.6 0.74

**Standard deviation**
10.5 0.73

**Coeff. of variation**
6.79% 3.89%

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

### Yield Changes

- **Vitazyme**...+5%
- **Vitazyme + Product Y**
  - **Full Rate**...+2%
  - **Half Rate**...+5%
- **Product Y**...+9%
- **Prod X + Prod Y**
  - **Half Rate**...+11%
- **Product Z**...+10%
- **Vitazyme + Product Z**...+9%

The seeds at planting, and on the leaves and soil at knee height (six leaves).

**Product X application:** 6.5 oz/acre on the seeds at planting, and on the leaves and soil at knee height (six leaves).

**Product Y application:** 13 oz/acre or 6.5 oz/acre on the seeds at planting, and on the leaves and soil at knee height (six leaves).

**Product Z application:** 16 oz/acre on the seeds at planting, and on the leaves and soil at knee height (six leaves).

**Harvest date:** October 15, 2005

**Yield and population results:** The two center rows of each plot were harvested with a plot combine, and the grain was weighed with an electronic scale. Plants were counted for the harvested rows.

**Income results:** At $3.00/bu for corn, the following income increases have been calculated.

### Conclusions
In this Iowa replicated corn study using four different products, Vitazyme increased corn yields by 2 to 9% (up to 13.2 bu/acre) alone or in combination with another product. A variant of Vitazyme increased yield by 11% when applied with Product Y, while Product Y alone increased yield by 9%. Product Z caused the greatest yield increase: 12%. Grain moisture was not significantly different among all eight treatments, and likewise for corn weight/plant, although Products X + Y (half rate) gave a 4% increase in grain/plant. Income increased with all seven treatments, the greatest being for Product Z ($52.80/acre).

**Evaluations of a New Cold Weather Product**

**Location:** several in the Midwest and Northeast.

**Experimental design:** A series of five studies was conducted in northern climates to determine the effectiveness of a new variation of Vitazyme to improve the growth and productivity of corn during cold and wet weather. Previous work had shown some limitations of standard Vitazyme to stimulate corn yield responses when soil temperatures were below 50°F, and the soil was wet, thus inhibiting microbial activity which is essential for Vitazyme’s primary mode of action.
Yield results:
Average increase in yield (vs. control) with regular Vitazyme: 6.50 bu/acre
Average increase in yield (vs. control) with new Vitazyme: 10.00 bu/acre
Average increase in yield (vs. regular Vitazyme) of new Vitazyme: 5.54 bu/acre*

*This value does not equal the difference of the above two values because of different comparisons amongst the five sites. The value of 5.54 bu/acre represents a significant increase in corn yield vs. the yields of regular Vitazyme at P=0.02 according to the Student-Newman-Keuls-Test (P=0.10), using individual sites as replicates. Means: 140.1 bu/acre (new Vitazyme), 134.6 (regular Vitazyme); LSD_{0.10}=3.2 bu/acre.

Grain moisture: New Vitazyme reduced grain moisture from the control or regular Vitazyme treatment by an average of 0.64 percentage point over five sites.

Grain weight: New Vitazyme increased grain test weight versus the control or regular Vitazyme by an average of 1.0 lb/bu for three sites.

Corn

Cold Weather Soil Treatment

Location: Pritchett, Texas
Variety: Country Gentleman
Row spacing: 24 inches
In-row spacing: 6 inches
Soil type: Lilbert loamy fine sand, heavily amended (4.5 % organic matter)
Experimental design: An area of 25 x 15 feet was planted to 12 rows of corn, each row being one treatment of a four treatment design having three replicates. The corn was planted in cold weather with the purpose of discovering if any of the treatments would aid in the response of seedling growth during cold weather.


Fertilization: none
Vitazyme and product application: a spray of a 1 oz/gallon solution on the seeds, after planting and before covering; Product B was a 0.1% (w/v) solution of this material.
Weather during germination and early growth: Very cool and moist; two frosts killed a goodly number of plants.

Rainfall: January 27 (trace), 28 (0.14”), 29 (0.01”), 30 (trace), 31 (0.49”); February 1 (0.40”), 2 (0.08”), 6 (0.43”), 7 (1.86”), 9 (0.02”), 12 (0.03”), 13 (0.06”), 18 (trace), 19 (0.02”), 20 (0.02”), 23 (1.03”), 24 (0.31”), 27 (0.20”); March 2 (0.15”), 4 (trace), 9 (0.06”), 15 (0.01”), 16 (trace), 20 (0.01”), 21 (0.69”), 26 (0.02”), 27 (0.74”), 31 (0.55”); April 1 (0.08”), 5 (trace). Total rainfall for the test period: 7.41 inches.

Growth results: On April 7, 2005, 70 days after trial initiation, the individual corn plants were measured. Because of sever frost damage on two days during the study, the plant stand was seriously reduced, and individual plot totals were quite variable. Therefore, the plants were considered as individual replicates throughout the test area and analyzed as a Completely Randomized Design, using CoHort software.

Conclusions: Both the New Vitazyme and Product B in this cold weather growth response study gave significant increases in plant height, of 35% and 30%, respectively. Vitazyme gave a 12% increase in height over the 70-day period of the test. New Vitazyme and Product B hold much promise in stimulating good seedling growth during cold and wet conditions, typical oftentimes of planting conditions in the U.S. and Canada during many planting seasons.

“Let the farmer forever be honored in his calling, for they who labor in the earth are the chosen people of God.”

Thomas Jefferson
**Corn**

New Product Evaluation

**Location:** Gasport, New York  
**Variety:** 36B09 Pioneer  
**Planting date:** May 18, 2005

**Soil type:** Hilton silt loam  
**Previous crop:** soybeans

**Experimental design:** A uniform, 20 acre corn field was divided into two parts, one treated with regular Vitazyme and the other with a new cold-weather version of Vitazyme. The objective was to evaluate differences in corn yield and maturity for these two products.

1. **Regular Vitazyme**  
2. **Cold weather Vitazyme**

**Fertilization:** Preplant: 100 lb/acre high-calcium lime; 100 lb/acre \((NH_4)_2SO_4\) broadcast. At planting: 4.5 gal/acre of 9-18-9 N-P\(_2\)O\(_5\)-K\(_2\)O. At 24 inches height: 19 gal/acre nitrogen solution; 1 gal/acre liquid calcium.

**Vitazyme application:** 13 oz/acre on the seeds at planting, with the 9-18-9

**Herbicidal application:** At emergence: 0.5 pint/acre Dual + 1 pint/acre Atex + 1 gal/acre liquid calcium. At nitrogen solution application: 0.25 pint/acre Bucktil + 1 pint/acre Atex.

**Harvest date:** October 18, 2005

**Yield and grain moisture results:** Yields were calculated by using a combine monitor for both areas, reading a full harvested swath near the dividing boundary for each treatment. Grain moisture readings were taken for both treatments.

- **Increase in yield:** +6%
- **Decrease in grain moisture:** -1.3 percentage points
- **Increase in income:** $36.21/acre

---

**Location:** Gasport, New York  
**Variety:** 34G82 Pioneer  
**Planting date:** May 9, 2005

**Soil type:** Hilton silt loam  
**Previous crop:** soybeans

**Experimental design:** A uniform, 25 acre corn field was divided into two parts, one treated with regular Vitazyme and the other with a new cold-weather version of Vitazyme. The objective was to evaluate differences in corn yield and maturity for these two products.

1. **Regular Vitazyme**  
2. **Cold weather Vitazyme**

**Fertilization:** Preplant: 100 lb/acre high-calcium lime; 100 lb/acre \((NH_4)_2SO_4\) broadcast. At planting: 4.5 gal/acre of 9-18-9 N-P\(_2\)O\(_5\)-K\(_2\)O. At 24 inches height: 19 gal/acre nitrogen solution; 1 gal/acre liquid calcium.

**Vitazyme application:** 13 oz/acre on the seeds at planting, with the 9-18-9

**Herbicidal application:** At emergence: 0.5 pint/acre Dual + 1 pint/acre Atex + 1 gal/acre liquid calcium. At nitrogen solution application: 0.25 pint/acre Bucktil + 1 pint/acre Atex.

**Harvest date:** October 18, 2005

**Yield and grain moisture results:** Yields were calculated by using a combine monitor for both areas, reading a full harvested swath near the dividing boundary for each treatment. Grain moisture readings were taken for both treatments.

- **Increase in yield:** +1%
- **Decrease in grain moisture:** -1.1 percentage points
- **Increase in income:** $36.21/acre

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Continued on the next page
were taken for both treatments. 

**Income results:** The corn volume is estimated at $3.00/bu. Corn drydown cost is estimated at $0.065/bu/point of moisture for a 150 bu/acre corn crop for commercial grain drying.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Crop income $/acre</th>
<th>Drying cost $/acre</th>
<th>Net income $/acre</th>
<th>Change $/acre</th>
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<tbody>
<tr>
<td>Regular Vitazyme</td>
<td>465.00</td>
<td>41.31</td>
<td>423.69</td>
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<tr>
<td>Cold-Weather Vitazyme</td>
<td>469.50</td>
<td>30.52</td>
<td>435.98</td>
<td>+15.29</td>
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</table>

*Drying to 14.0% moisture. **Crop income (–) Drying cost

**Conclusions:** Cold weather Vitazyme in this New York in-farm corn study increased grain yield only slightly over regular Vitazyme, but the grain drydown was substantially enhanced. This drydown benefit was nearly the same as for another study with this product on the same farm, but in that study the yield was also enhanced by 6%. Potential for this new version of Vitazyme appears to be good.

- *Increase in grain yield: +1%*
- *Decrease in grain moisture: -1.1 percentage points*
- *Increase in income: $15.29/acre*

**Corn**

**North Carolina State University**

**Location:** Hertford, North Carolina  
**Soil type:** Roanoke silt loam  
**Population:** 27,000 and 38,000 seeds/acre  
**Variety:** De Kalb Dk 69-71 RR/YG  
**Previous crop:** soybeans  
**Planting date:** April 21, 2005  
**Row width:** 30 inches

**Experimental design:** A split-plot randomized complete block design (four replicates) was placed on a uniform soil area with the main plots containing the two seeding rates. Plots were 10 x 40 feet. Subplots contained starter fertilizer, starter fertilizer + Vitazyme, Vitazyme only, and a control. Evaluations were made on stalk diameter, root parameters, and yield to discover the effects of all variables on these parameters.

**Main Plots**  
1. 27,000 seeds/acre  
2. 38,000 seeds/acre

**Subplots**  
1. Control  
2. Vitazyme  
3. Starter  
4. Vitazyme + Starter

**Fertilization:** A 19-19-0% N-P₂O₅-K₂O fertilizer was applied to the subplots 3 and 4 at a 10 gal/acre rate in a 2 x 2 inch band below and beside the seeds at planting. On June 7, 60 gal/acre of 30% UAN (urea ammonium nitrate) was applied.

**Vitazyme application:** 13 oz/acre on the seeds at planting for subplots 2 and 4

**Weed control:** excellent control with Bicep, Roundup, and atrazine herbicides

**Root and stalk results:** In early July five plants in consecutive order in rows of each treatment were dug, and the soil was washed from the root balls. Roots were pruned and dried, and the stalk diameter at the first internode below each ear was measured. Root ball depth and diameter were also measured.

**Conclusions (by the researcher):** Significant treatment effects or interactions involving Vitazyme were found for the diameter of the root ball, root mass, stalk diameter and grain yield. In the case of the diameter of the root ball there was a significant plant population by treatment interaction.  

Continued on the next page
At the lower plant population of 28,000 plants/acre the combination of 19-19-0 and Vitazyme significantly increased the diameter of the root ball compared to either product used alone or when compared to the untreated check. Neither the 19-19-0 nor Vitazyme when used alone increased the diameter of the root ball compared to the untreated check. In contrast, at the higher plant population, Vitazyme, 19-19-0, or the combination of the two significantly increased the diameter of the root ball compared to the untreated check. Although none of these three treatments were significantly different from each other the combination of Vitazyme and 19-19-0 again tended to have the higher yield. There were no significant interactions for root mass. However, there was a significant treatment effect. Vitazyme when used alone or in combination with 19-19-0 resulted in greater root mass compared to the untreated check. Again, the combination of Vitazyme and 19-19-0 produced the greatest root mass when compared with either treatment used alone. There was also a treatment effect on stalk diameter. The combination of Vitazyme and 19-19-0 increased stalk diameter at the first internode below the ear when compared with the untreated check or with a treatment of only 19-19-0. There was not a significant difference in stalk diameter between a treatment with only Vitazyme and the combination of Vitazyme and 19-19-0. However, the combination did have the largest stalk diameter.

For grain yield there was a significant plant population and treatment interaction. At the lower plant population, Vitazyme alone significantly increased yield compared to either the starter fertilizer or the untreated check; while the combination of starter and Vitazyme resulted in a yield similar to that obtained by Vitazyme alone. In comparison, at the higher plant population, the starter treatment, Vitazyme, or the combination of the two resulted in statistically similar yields but only the Vitazyme or Vitazyme-starter combination had significantly higher yields than the untreated check.

In summary, Vitazyme or Vitazyme in combination with 19-19-0 increased root ball diameter, root mass, stalk diameter, and grain yield compared to an untreated check. While plant disease ratings were not taken in this study, it is unlikely that the Vitazyme effect was related to better disease resistance. It appears that Vitazyme applied to the seeds at planting improves early root development resulting in a larger root mass, greater stalk diameter, and increased yield.

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**Corn**

North Carolina State University

*Location:* Pantego, North Carolina  
*Variety:* De Kalb Dk 69-71 RR/YG  
*Previous crop:* soybeans  
*Planting date:* April 20, 2005  
*Row width:* 30 inches

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**Southern Corn Leaf Blight Rating***

<table>
<thead>
<tr>
<th>Rating</th>
<th>Untreated</th>
<th>Vitazyme</th>
<th>19-19-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
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</tbody>
</table>

**Gray Leaf Spot Rating***

<table>
<thead>
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<td>9.5</td>
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<td>8.5</td>
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</tr>
<tr>
<td>8.0</td>
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</tbody>
</table>

**Grain Yield***

<table>
<thead>
<tr>
<th>Yield (bu/acre)</th>
<th>Untreated</th>
<th>Vitazyme</th>
<th>19-19-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>230</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*Rating System: 1=leaves completely covered with lesions; 10=no disease.  
**Significantly greater than the control. LSD$_{0.05}$= 0.4.  
**Significantly greater than the control. LSD$_{0.05}$= 0.25.
Cotton

Effects of a Late Application

Location: Kennett, Missouri
Planting date: May 6 and 7, 2005
Soil type: Dundee sandy loam, low fertility
Experimental design: A cotton field was treated the same way throughout the field, including Vitazyme applications, except for one area which received a late Vitazyme application.

1. Vitazyme
2. Vitazyme + a late application

Fertilization: 85-60-0 lb/acre N-P2O5-K2O dry spread after emergence
Vitazyme application: (1) Seed treatment, 5% solution on the seeds before planting; (2) 10 oz/acre banded at planting; (3) 5 oz/acre broadcast sprayed 3 weeks after emergence; (4) 5 oz/acre 3 weeks after application 3; (5) 5 oz/acre 3 weeks after application 4. The test area had an additional 11 oz/acre applied on August 8, just before boll cracking.
Sample harvest date: September 22, 2005
Yield and grain moisture results: Two replicates were harvested by hand — 50-foot-long row sections — of the treated and control areas, and lint weight was calculated.
Income results: If the farmer received $0.060/lb of lint, then the extra return from the one late Vitazyme application was $121.20/acre.

Conclusions: In this southeastern Missouri study, with both treatments receiving five Vitazyme applications and the treated area receiving a late, pre-boll cracking treatment, the extra Vitazyme produced an extra 202 lb/acre of lint (+15%), which represented about $121.20/acre more income. Vitazyme application this late in the season apparently stimulated additional chlorophyll synthesis, root initiation, and rhizosphere activity to allow the fixation of additional atmospheric carbon for fiber synthesis. This unforeseen response, along with more uniform bolls throughout the late-treated plants, is an indication of yet another highly profitable use for Vitazyme.

- Increase in lint: +15%
- Increase in income: $121.20/acre

Cotton

- Increase in lint: +15%
- Increase in income: $121.20/acre

Location: Ballinger, Texas
Planting date: June 20, 2003
Row spacing: two rows planted, a row skipped
Irrigation: center pivot (less that optimum)
Experimental design: A uniform field area was divided into twelve plots that were each 30 x 330 feet, with three treatments and four replications, to discover if Vitazyme would enhance cotton yield.

1. Control
2. Vitazyme once
3. Vitazyme twice

Fertilizer: unknown.
Vitazyme application: Treatment 2: 3 oz of Vitazyme in 10 gallons of water, sprayed on the leaves at first square (August 1); Treatment 3: the same as Treatment 2 plus another application September 20
Harvest date: November 20, 2003
Yield results: Lint yields were as follows:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lint yield*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lb/acre</td>
<td>lb/acre</td>
</tr>
<tr>
<td>1. Control</td>
<td>1,110</td>
<td>40 (+4%)</td>
</tr>
<tr>
<td>2. Vitazyme once</td>
<td>1,150</td>
<td></td>
</tr>
<tr>
<td>3. Vitazyme twice</td>
<td>1,180</td>
<td>70 (+6%)</td>
</tr>
</tbody>
</table>

*Significant differences were not given in the report.

Income results: At $0.60/lb, the Vitazyme treatments gave income increases of from $24 to $42 per acre.
Conclusions: This west Texas replicated cotton trial showed that Vitazyme progressively increased lint yield with one and two applications. Increases were from 4 to 6%, giving income increases of from $24 to $42 per acre. These improvements resulted from applications commencing at pinhead square. Better responses would be expected if treatments had begun closer to planting.

- Increase in lint (Vitazyme twice): +6%
- Increase in lint (Vitazyme once): +4%
Dry Beans

Research institution: Instituto de Ciencia Animal

Location: San Jose de las Lajas, Havana, Cuba

Variety: black dry beans

Planting rate: unknown

Soil type: red ferralitic (Eutrustox or Ferralsol)

Planting date: unknown

Experimental design: A field of black dry beans was divided into four replicates in a completely randomized design with each plot comprising 80 meters of row. Evaluations were made on yield and yield parameters to determine the effects of Vitazyme.

1. Control 2. Vitazyme

Fertilization: none  Insecticide applications: none

Vitazyme application: 1.5 liters/ha before flowering  Harvest rate: unknown

Irrigation: none

Experiment

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pod length</th>
<th>Change Pod length</th>
<th>Beans/pod</th>
<th>Change Beans/pod</th>
<th>Malformed beans</th>
<th>Change Malformed beans</th>
<th>Bean yield</th>
<th>Change Bean yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>7.1 b</td>
<td>-</td>
<td>4.5</td>
<td>-</td>
<td>12.6</td>
<td>-</td>
<td>142.19</td>
<td>-</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>7.4 a</td>
<td>+4%</td>
<td>5.2</td>
<td>+16%</td>
<td>6.1</td>
<td>-52%</td>
<td>177.35</td>
<td>+25%</td>
</tr>
</tbody>
</table>

1Significant difference at P=0.01 (SE± 0.01 cm); 2significant difference at P=0.01 (SE±0.05 beans); 3significant difference at P=0.01 (SE±1.15%); 4significant difference at P=0.01 (SE±9.03 kg/ha).

Conclusions: [Report of the Cuban researcher:] “This trial was carried out under adverse conditions, since after planting other field operations (irrigation, fertilization, pesticides, and cultivation) were not implemented. Under these conditions Vitazyme application showed positive effects on bean yield.”

“In spite [of the fact] that the area did not receive cultural attention and Vitazyme was applied before flowering:

• There was greater pod length and number of beans, as well as a smaller number of malformed beans when Vitazyme was applied.
• Yield increased by 24.73% when Vitazyme was applied.
• Under adverse trial conditions (no irrigation, fertilization, and pesticides) Vitazyme showed positive effects.”

“It is recommended to carry out new trials under actual crop production conditions.”

Fruit — Apples

Researcher: agr.assistance

Location: Wayne County, New York

Variety: Empire

Population: 550 trees/acre

Rootstock: M9

Tree age: 12 years (full-bearing)

Experimental design: Vitazyme was tested on a commercial apple orchard which had some rows treated and other left untreated. At harvest, various fruit parameters were measured to evaluate effects on fruit yield and quality.

1. Control 2. Vitazyme

Fertilization: unknown

Vitazyme application: 16 oz/acre at pink, petal fall, first cover, and 30 days pre-harvest in 100 gallons/acre sprays

Weather for 2005: unusually cool during bloom, and then unusually hot and dry until harvest.

Yield results: At harvest on October 3, 2005, seven trees of similar size and crop load were selected for evaluating the two treatments.

Tree Fruit Yield

<table>
<thead>
<tr>
<th>Fruit weight per tree, lb</th>
<th>71.11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td></td>
</tr>
</tbody>
</table>

- Increase in fruit weight: +7%

Yield Per CSTD*

<table>
<thead>
<tr>
<th>Yield (lb) per CSTD</th>
<th>24.33</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td></td>
</tr>
</tbody>
</table>

- Increase in yield/CSTD: +10%

Apples Per Tree

<table>
<thead>
<tr>
<th>Apples Per Tree</th>
<th>204.14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td></td>
</tr>
</tbody>
</table>

- Increase in apples per tree: +3%

Continued on the next page
**Location**: Blue Moon Gourd Farm, Liberty City, Texas  
**Variety**: several  
**Previous crop**: untilled  
**Area planted**: 0.129 acre  
**Soil type**: very fine sandy loam  

**Fertilization**: dolomitic limestone, 195 lb/acre 10-10-10% N-P₂O₅-K₂O  
**Vitazyme application**: 13 oz/acre in June and July of 2005, on the leaves and soil  
**Comments**: "After losing our early gourds due to a heavy rain, we replanted with just a few varieties over the area. It wasn't long before we began to see growth averaging about a foot a day. At peak season (June) we had leaves that measured 16 to 18 inches wide. Our trellises were completely covered with growth. The miniature vines produced over 100 miniature gourds, and are still producing after Christmas . . . . We believe that the Vitazyme we used was wonderful."

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**Increase in apple yield**: +7.4%  
Vitazyme increased all parameters relating to fruit yield, which resulted in a 7% increase in apple yield.  
**Fruit quality and size results**: All fruit was sized by categories, and the weights for each category were added and percentages for each category were determined. Vitazyme produced larger fruit, especially the fruit over 3.0 inches in diameter; smaller sizes were reduced proportionately. Fruit brix and pressure also increased with Vitazyme treatment.

**Conclusions**: Vitazyme boosted the yield of Empire apples in this western New York trial. According to the investigator, “As in 2004 evaluation, in 2005 Vitazyme treated rows again produced somewhat larger fruit size (+5.5%), higher yield (7.4%), as well as an increase in percentage of 3”-plus diameter fruit. Vitazyme treated fruit were also somewhat firmer (by 0.31 psi) and had slightly higher brix levels (by 0.18 brix) than untreated trees. There were no apparent differences in fruit set, nor were any fruit color differences noted.

- **Increase in mean fruit size**: +5.5%  
- **Increase in fruit PSI**: +1.9%  
- **Increase in fruit brix**: +1.5%

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**Gourds**

**A Testimonial**

Before Vitazyme and balanced soil fertility (July of 2004), the gourds show poor growth.

After Vitazyme application and better fertility in 2005, gourd growth greatly improved.
**Grapes**

**Evaluation of Wine Produced in 2004**

**Vineyard:** Mondello Vineyards  
**Location:** San Miguel, California  
**Variety:** Cabernet Sauvignon

**Experimental design:** Wine was produced from the control and Vitazyme treated areas of the vineyard by Donatoni Winery, Paso Robles, California, according to the state-of-the-art methods. One stainless steel barrel and one oak barrel of each grape batch were produced, beginning September 25, 2004. Initial pH, acidity, brix, and quality data of both lots are recorded in the 2004 Vitazyme Crop Results. Additional results from the two batches are given below. According to these analyses of the wine as conducted by Baker Wine and Grape Analysis, Paso Robles, California, there are no obvious differences between the two wine lots.

### February 17, 2005, analyses

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ethanol %</th>
<th>VA g a/100 ml</th>
<th>pH</th>
<th>Total acidity g tar/100 ml</th>
<th>Malic acid g/liter</th>
<th>Lactic acid g/liter</th>
<th>RS g/100 ml</th>
<th>GF g/100 ml</th>
<th>Density mg/liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>14.97</td>
<td>0.048</td>
<td>3.40</td>
<td>0.82</td>
<td>0.87</td>
<td>0</td>
<td>0.16</td>
<td>0.16</td>
<td>0.9937</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>14.36</td>
<td>0.054</td>
<td>3.45</td>
<td>0.81</td>
<td>1.00</td>
<td>0</td>
<td>0.13</td>
<td>0.11</td>
<td>0.9947</td>
</tr>
</tbody>
</table>

### June 30, 2005, analyses

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ethanol %</th>
<th>VA g a/100 ml</th>
<th>pH</th>
<th>Total acidity g tar/100 ml</th>
<th>Malic acid g/liter</th>
<th>Lactic acid g/liter</th>
<th>RS g/100 ml</th>
<th>GF g/100 ml</th>
<th>Density mg/liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>14.77</td>
<td>0.056</td>
<td>3.42</td>
<td>0.83</td>
<td>0.94</td>
<td>0</td>
<td>0.17</td>
<td>0.13</td>
<td>0.9940</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>14.74</td>
<td>0.059</td>
<td>3.46</td>
<td>0.82</td>
<td>1.04</td>
<td>0</td>
<td>0.17</td>
<td>0.12</td>
<td>0.9943</td>
</tr>
</tbody>
</table>

**Taste tests:** Two tasting sessions for the wine have been conducted as of mid-January, 2006.

### February 8, 2005, taste test

On February 8, 2005, an informal testing panel evaluated the wine from the four barrels of wine. All parties judged the wine from the stainless steel barrels as the least favorite of the four, but **there was strong agreement that the wine produced from the Vitazyme treated wine was superior to the control wine, whether from oak barrels or stainless steel barrels.**

### January 6, 2006, taste test

On January 6, 2006, a tasting panel of seven professionals sampled the two batches of wine — from the control and Vitazyme treatments — and determined that there was very little difference between the two. The Vitazyme raised wine was actually a bit more mellow, mature, and palatable, more ready to market than the control wine, which tended towards a bit more acidity. **This means that (1) the Vitazyme treated grapes, which produced 46% more grapes than the control grapes, in no way produced an inferior wine to the lower yielding treatment; on the contrary, this higher yielding wine was superior, if anything, to the lower yielding control ... and, (2) the Vitazyme wine matured faster than the control wine, making it ready to market faster and enabling the wine producer to turn over his stock faster. Considering both points, the higher yield of grapes per acre and the more rapid turnaround of the wine stocks, the users of Vitazyme in their vineyards will reap considerably more income per acre than those who do not use it.**

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**Grapes (for raisins)**

**Year three of a continuing raisin study**

**Cooperating party:** 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 the third year of a continuing study beginning in 2003 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. An 80-acre, 112 row raisin vineyard was divided into seven treatments on a replicated basis throughout the vineyard, each treatment applied to rows in all parts of the acreage to reduce treatment error and produce accurate results.

**Fertilization:** The whole vineyard received adequate N, P, and K in the irrigation well water. Liquid humate was applied to all areas through the irrigation water from May to August (1,000 gallons total). Zinc and boron were applied foliar at recommended rates to all areas on May 7 along with other materials. Copper and sulfur (for phomopsis) were sprayed with the fulvic acid on all areas on March 18.

**Ethrel treatment:** Ethrel [(2-chloroethyl) phosphonic acid], also known as Ethephon, is a syn-

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Continued on the next page
thetic plant growth regulator that releases ethylene into the plant system. Ethylene hastens sugar production so harvest can occur earlier and more sugars can accumulate. The product was sprayed once, on June 30, at veraison.

Vitazyme application: Vitazyme was applied foliar at 13 oz/acre along with other agents on May 7, May 23, June 28, and August 13 to appropriate treatments.

Finisher 21 application: Finisher 21 is a 21% potassium (K₂O) formulation that was applied foliar at recommended rates, along with other agents, on June 28 only to the appropriate treatments.

Cal Ocho 8% application: Cal Ocho 8% is an 8% calcium formulation, with CaO and carbohydrates, which was applied foliar with other agents on May 7 and June 28 to the appropriate treatments.

Fulvic acid application: Fulvic acid was applied foliar at 1 quart/acre with other agents on March 18, May 7, May 23, June 28, and August 13 to the appropriate treatments.

Dry humate application: Dry humate acid was applied at 10 lb/acre to appropriate areas in October of 2004.

Gibberellin application: Gibberellic acid was sprayed foliar along with other agents at recommended rates on May 23 only, near full bloom.

Weather conditions: The spring was cool and wet, June was very hot (to 100°F), giving early veraison by one week, and the summer and fall were quite warm as well.

Grape sugar and weight results: One-hundred grapes from 16 selected rows of each of four treatments were analyzed with refractometers by University of California personnel on five dates: July 13, July 19, July 27, August 4, and August 10. These grapes were also weighed.

All four treatments produced sugar levels within 0.9 percentage point, the Ethrel treatment producing 18.9 brix with the Vitazyme + Ethrel treatment giving 18.7 brix. The control and Vitazyme + K produced slightly less brix; 18.5 and 18.0, respectively.

The largest grapes were produced by the Vitazyme + Ethrel treatment, followed closely by the Ethrel treatment. The control treatment produced the lightest grapes.

Harvest date: August 26 to September 3, 2005

Yield results: The grapes were harvested by volunteer labor and placed on paper trays between the rows. After 3 to 4 weeks of drying they were picked up and delivered to the Sunmaid raisin packing plant.

The raisins were graded at the

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ethrel</th>
<th>Vitazyme</th>
<th>Finisher 21</th>
<th>Cal Ocho 8%</th>
<th>Fulvic acid</th>
<th>Dry Humates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
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<tr>
<td>5</td>
<td>X</td>
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<tr>
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<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>


**Experimental Design**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Ethrel</th>
<th>Vitazyme</th>
<th>Finisher 21</th>
<th>Cal Ocho 8%</th>
<th>Fulvic acid</th>
<th>Dry Humates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td>O</td>
<td>X</td>
<td>X</td>
<td>X</td>
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</tr>
<tr>
<td>7</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>


**Grape Sugar Content**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>July 13</th>
<th>July 19</th>
<th>July 27</th>
<th>August 4</th>
<th>August 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10.4</td>
<td>13.6</td>
<td>16.0</td>
<td>17.4</td>
<td>18.5</td>
</tr>
<tr>
<td>Ethrel</td>
<td>10.8</td>
<td>13.0</td>
<td>15.8</td>
<td>18.1</td>
<td>18.9</td>
</tr>
<tr>
<td>Vitazyme + K</td>
<td>11.2</td>
<td>13.4</td>
<td>15.8</td>
<td>17.3</td>
<td>18.0</td>
</tr>
<tr>
<td>Vitazyme + Ethrel</td>
<td>10.9</td>
<td>13.5</td>
<td>15.7</td>
<td>17.8</td>
<td>18.7</td>
</tr>
</tbody>
</table>

**Grape Weight**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>July 13</th>
<th>July 19</th>
<th>July 27</th>
<th>August 4</th>
<th>August 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>127.0</td>
<td>144.4</td>
<td>173.2</td>
<td>181.6</td>
<td>181.2</td>
</tr>
<tr>
<td>Ethrel</td>
<td>141.9</td>
<td>155.3</td>
<td>181.5</td>
<td>194.8</td>
<td>198.2</td>
</tr>
<tr>
<td>Vitazyme + K</td>
<td>144.2</td>
<td>146.4</td>
<td>184.8</td>
<td>197.2</td>
<td>184.2</td>
</tr>
<tr>
<td>Vitazyme + Ethrel</td>
<td>142.9</td>
<td>160.5</td>
<td>178.5</td>
<td>195.7</td>
<td>199.9</td>
</tr>
</tbody>
</table>

**Net Raisin Yield**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Raisins</th>
<th>Raisins¹</th>
<th>Raisins²</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>total lb.</td>
<td>53,293</td>
<td>1,665.4</td>
<td>4,663</td>
</tr>
<tr>
<td>2. Ethrel</td>
<td>52,752</td>
<td>1,701.6</td>
<td>4,764</td>
<td>101 (+2%)</td>
</tr>
<tr>
<td>3. Vitazyme + all others</td>
<td>64,977</td>
<td>2,030.5</td>
<td>5,685</td>
<td>1,022 (+22%)</td>
</tr>
<tr>
<td>4. Ethrel + Fin 21 + Cal 8%</td>
<td>51,772</td>
<td>1,670.0</td>
<td>4,676</td>
<td>13 (0%)</td>
</tr>
<tr>
<td>5. Ethrel + Vitazyme + Fin 21 + Cal 8%</td>
<td>54,154</td>
<td>1,805.1</td>
<td>5,054</td>
<td>391 (+8%)</td>
</tr>
<tr>
<td>6. Ethrel + all others</td>
<td>58,634</td>
<td>1,832.3</td>
<td>5,130</td>
<td>467 (+10%)</td>
</tr>
<tr>
<td>7. Ethrel + Vitazyme + all others</td>
<td>59,720</td>
<td>1,990.6</td>
<td>5,574</td>
<td>911 (+20%)</td>
</tr>
</tbody>
</table>

¹One row contained about 180 vines.
²One acre contained 2.8 rows.

Vitazyme has contributed to large bunches of well-filled fruit in the third year of this Madera trial.
Sunmaid raisin plant, and all light and inferior raisins were removed. Those retained for yield results were grade C or better. No gross weights were reported.

**Raisin quality results:** Results were obtained at the Sunmaid raisin processing facility.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Substandards</th>
<th>Change</th>
<th>B and B</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of total</td>
<td>percentage points</td>
<td>% of total</td>
<td>percentage points</td>
</tr>
<tr>
<td>1. Control</td>
<td>9.9</td>
<td>—</td>
<td>47.7</td>
<td>—</td>
</tr>
<tr>
<td>2. Ethrel</td>
<td>6.9</td>
<td>-3.0</td>
<td>51.0</td>
<td>+3.3</td>
</tr>
<tr>
<td>3. Vitazyme + all others</td>
<td>6.5</td>
<td>-3.4</td>
<td>67.5</td>
<td>+19.8</td>
</tr>
<tr>
<td>4. Ethrel + Fin 21 + Cal 8%</td>
<td>7.2</td>
<td>-2.7</td>
<td>55.2</td>
<td>+7.5</td>
</tr>
<tr>
<td>5. Ethrel + Vitazyme + Fin 21 + Cal 8%</td>
<td>6.8</td>
<td>-3.1</td>
<td>48.9</td>
<td>+1.2</td>
</tr>
<tr>
<td>6. Ethrel + all others</td>
<td>5.9</td>
<td>-4.0</td>
<td>60.2</td>
<td>+12.5</td>
</tr>
<tr>
<td>7. Ethrel + Vitazyme + all others</td>
<td>6.0</td>
<td>-3.9</td>
<td>62.7</td>
<td>+15.0</td>
</tr>
</tbody>
</table>

All treatments showed a substantial reduction in substandard raisins, the greatest reduction being for Ethrel + all others and Vitazyme + Ethrel + all others. The highest quality of raisins was for Vitazyme + all others and Vitazyme + Ethrel + all others.

**Income results:** The price of raisins to the farmer is about $1,210 per ton.

**Conclusions:** The third year of this California raisin study showed results similar to the previous two years: Vitazyme plus other Tulare Ag Products materials substantially improved raisin yield and quality above both the control (+22%) and the Ethrel only (+20%) treatments. Ethrel, together with other Tulare Ag Products and Vitazyme, produced a raisin yield increase slightly lower than the Vitazyme treatment without Ethrel (+20%). Other treatments increased raisin raisin yield from 0 to 10% above the control. **Vitazyme compared to Ethrel, adding all other Tulare Ag Products materials, produced a 12% net raisin yield advantage.**

Raisin quality was substantially improved by Vitazyme as well. The product assisted in raising the net raisin yield as well. While all treatments reduced substandard raisins from 2.7 to 4.0%, the percentage of high grade raisins (B and B) was the highest for Vitazyme + other Tulare Ag Products materials (+19.8% above the control), the second highest increase being the same treatment plus Ethrel (+15.0% above the control.)

Income with the Vitazyme plus other Tulare Ag products was increased by $618.31 above the control, and by $335.78 above the similar treatment when Ethrel was used instead of Vitazyme. Vitazyme and other Tulare Ag Products materials have for the third year been shown to produce the highest yields of the highest quality raisins. **Ethrel did well only when combined with Tulare Ag Products materials, but that 10% yield increase was dwarfed by the Vitazyme treatment with those same inputs (+22%).**

Since Vitazyme and other components in the study have been shown to produce sugar (Brix) levels similar to Ethrel treated grapes — Ethrel being used primarily to increase grape brix levels — and the yields are substantially increased above the Ethrel treatments, there is no apparent reason to apply Ethrel to grapes if Vitazyme and its program are utilized. This is especially true when considering the vine damage that Ethrel causes, since it produces ethylene, which triggers senescence in the vines.

**Income increase (Vitazyme + other materials): $618.31/acre**

---

**Vineyard:** Rainbow’s End  
**Location:** San Miguel, California  
**Variety:** Cabernet Sauvignon  
**Pruning:** cane  
**Grafting:** none (self-rooted)  
**Plants/acre:** 605

**Row spacing:** 12 x 6 feet  
**Grape plant age:**  15 years  
**Irrigation:** drip  
**Yield goal:** 4 tons/acre

**Soil type:** loam high-calcium subsoil, low organic matter  
**Experimental design:** A grape vineyard was divided into two parts, one part treated with Vitazyme and the other part left untreated to evaluate the effects of the product on grape yield and quality, and on wine quality. Treatments over all areas of the vineyard were otherwise identical. Both treatments were evaluated for quality parameters during the preharvest period. The two lots of wine was also to be evaluated for quality during the following year.

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

**Irrigation:** drip irrigation about 15 to 18 hours once a week, as needed, until 2 weeks before harvest

**Fungicide:** applied regularly as needed

**Fertilization:** 9-18-9 or 3-18-18 (+ micronutrients) applied 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 applied in the irrigation water periodically

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Grapes at Rainbow’s End Vineyard treated with Vitazyme are much fuller and darker.

Continued on the next page
**Location:** San Miguel, California

**Vitazyme application:** (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break; (2) 13 oz/acre with 9-18-9 fertilizer and 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 11, 2005

**Preharvest to harvest grape and juice quality:** Grapes from both treatments were collected randomly on September 7 and 22, and October 11, the grapes were crushed, and the juice was analyzed for brix (soluble solids, mostly sugars), total acidity, and pH at Baker Wine and Grape Analysis, Paso Robles, California.

**Tillage:** none; mowing of weeds in the interrows

**Vitazyme application:**

- (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break
- (2) 13 oz/acre with 9-18-9 fertilizer and 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)

**Irrigation:** drip

**Grafting:** none (self-rooted)

**Grape plant age:** 5 years (second harvest)

**Shoot trimming:** yes

**Bunch thinning:** yes

**Row spacing:** 12 x 6 feet

**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. 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. Eventually a taste panel will evaluate the quality of the two wines after sufficient aging.

**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:** 200 lb/acre (NH₄)₂SO₄ broadcast in March before bud break; 9-18-9 or 3-18-18 (+ micronutrients) applied

**Preharvest to harvest grape and juice quality:**

- Grapes were harvested on October 11, 2005,
- The juice was evaluated for color and chemical factors.
- Quality parameters were similar for the two treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Color density</th>
<th>Color hue</th>
<th>Total phenolics</th>
<th>Anthocyanins</th>
<th>Density</th>
<th>Potential alcohol</th>
<th>Ammonia (NH₃)</th>
<th>Amino acid</th>
<th>Yeast active nitrogen</th>
<th>Malic acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>13.93</td>
<td>0.52</td>
<td>39.00 ppm</td>
<td>453 grams/liter</td>
<td>1.292</td>
<td>14.2%</td>
<td>46 ppm</td>
<td>102 ppm</td>
<td>148 grams/liter</td>
<td>0.52 ppm</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>13.27</td>
<td>0.49</td>
<td>37.30 ppm</td>
<td>441 grams/liter</td>
<td>1.301</td>
<td>14.2%</td>
<td>54 ppm</td>
<td>83 ppm</td>
<td>137 grams/liter</td>
<td>0.99 ppm</td>
</tr>
</tbody>
</table>

**Grape juice quality at harvest:** The grapes were harvested on October 11, 2005, and the juice was evaluated for color and chemical factors. Quality parameters were similar for the two treatments.

**Yield results:** Harvest results were collected during picking on October 11. Thinning had been performed uniformly over all areas, so product effects could be due only to changes in grape size and juice density.

**Income results:** Based on a $1,000/ton grape value, the extra 1,089 lb (0.545 ton) of grapes produced $545.00 more income per acre.

**Wine making:** Separate lots of wine were made from both the control and Vitazyme treated grapes and will be followed for quality and flavor during the coming months.

**Conclusions:** Vitazyme treatment of Cabernet Sauvignon grapes in this California study showed that Vitazyme is capable of increasing grape size, and thus total yield (11% in this test), while not sacrificing the sugar content of the juice. All areas of the vineyard were thinned to achieve a 4 ton/acre yield, so product effects were due to larger fruit. There was little difference in color or quality parameters of the two treatments. The separate wines made from these two treatments will be followed for quality and flavor during the coming months.

**Increase in grape yield: 11%**

**Increase in income: $545.00/acre**
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 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 25, 2005

**Chlorophyll content:** On August 15, 30 random leaf samples from each treatment were analyzed with a Minolta SPAD chlorophyll meter to determine leaf chlorophyll levels. These levels relate directly to the ability of the plants to fix carbon and sunlight energy into plant structural and reproductive (grape) tissue.

**Vine growth:** The researcher noted that there was considerably 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 the following differences (per plant):

- **Control plants:** 64 feet of canes, evenly distributed in 1, 2, and 3-foot lengths
- **Vitazyme plants:** 92 feet of canes, nearly half of them being about 2 feet long

**Preharvest to harvest grape and grape juice quality:** Grapes from each treatment were randomly collected at four dates before and at harvest: September 7 and 22, and October 11 and 24. These samples were crushed, and the juice was analyzed for brix (soluble solids, mostly sugars), total acidity, and pH at Baker Wine and Grape Analysis, Paso Robles, California.

**Remarkably, the higher yielding Vitazyme treatment did not produce grapes that were significantly lower in sugar content, showing the ability of the product to stimulate photosynthesis, carbon fixation, and mineral uptake to provide for the heavier grape load.**

**Grape juice quality at harvest:** The grapes were harvested on October 24, 2005, and the juice was evaluated for color and chemical factors. Quality parameters were similar for both treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaf chlorophyll Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SPAD units</td>
</tr>
<tr>
<td>Control</td>
<td>43.6</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>45.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brix</th>
<th>Sep 7</th>
<th>Sep 22</th>
<th>Oct 11</th>
<th>Oct 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20.9</td>
<td>25.7</td>
<td>25.9</td>
<td>25.9</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>20.4</td>
<td>25.4</td>
<td>25.4</td>
<td>25.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Acidity, g tar/100 ml</th>
<th>Sep 7</th>
<th>Sep 22</th>
<th>Oct 11</th>
<th>Oct 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.67</td>
<td>0.67</td>
<td>0.63</td>
<td>0.68</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>0.67</td>
<td>0.59</td>
<td>0.68</td>
<td>0.67</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>pH</th>
<th>Sep 7</th>
<th>Sep 22</th>
<th>Oct 11</th>
<th>Oct 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.33</td>
<td>3.32</td>
<td>3.35</td>
<td>3.46</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>3.37</td>
<td>3.32</td>
<td>3.36</td>
<td>3.46</td>
</tr>
</tbody>
</table>

**Wine making:** On October 24, 2005, a ton of grapes from both treatments was picked and

**Income results:** Based on a $1,000/ton value of the grapes, the extra 1,288 lb (0.644 ton) of grapes produced $644.00 more income per acre.

**Wine making:** On October 24, 2005, a ton of grapes from both treatments was picked and

**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. Thinning had been performed equally on all areas, so Vitazyme effects were expressed entirely on grape and branch size.

**Income results:** Based on a $1,000/ton value of the grapes, the extra 1,288 lb (0.644 ton) of grapes produced $644.00 more income per acre.

**Wine making:** On October 24, 2005, a ton of grapes from both treatments was picked and **Continued on the next page**

22 / Vitazyme Field Tests for 2005
The following data is a summary of the three-year trial conducted by Jamie Hansen and Tulare Ag Products at the L.D.S. Fresno Raisin Vineyard. These mature Thompson seedless grapes, raised on sandy to light clayey soils, received drip irrigation as well as certain foliar and soil treatments during this three-year period. Results were obtained from rows highly randomized throughout the 80-acre vineyard to give a very accurate, unbiased result across all soil types and vineyard conditions. Treatments became more varied for year 2 (four total), and even more varied for year 3 (seven total). Not all treatments are shown below for year 3.

Based on the information given on the next page, several conclusions can be drawn:

1. Vitazyme alone outyielded Ethrel alone by 6% (2003 only).
2. Ethrel alone outyielded the control by 10% (2004 and 2005 averaged).
3. Ethrel + K + Ca + fulvic acid outyielded the control by 10% (2005 only).
4. Vitazyme + K + Ca + fulvic acid outyielded the control by 33% (2004 and 2005 averaged), and outyielded Ethrel only by 21% (2004 and 2005 averaged).
(5) Vitazyme + K + Ca + fulvic acid outyielded Ethrel + K + Ca + fulvic acid by 11% (2005 only).

(6) Ethrel + Vitazyme + K + Ca + fulvic acid reduced yield compared to Vitazyme + K + Ca + fulvic acid only by 7% (2004 and 2005 averaged), though they increased yield above Ethrel only by 13% (2004 and 2005 averaged).

(7) Ethrel + Vitazyme + K + Ca + fulvic acid outyielded Ethrel + K + Ca + fulvic acid by 9% (2005 only).

Partitioning of cause of the yield increases:
- Vitazyme vs. Ethrel with K, Ca, and fulvic acid: +11%
- Vitazyme vs. Ethrel with no other additives: +6%
- Average increase due to Vitazyme: +8.5%

This study reveals that Vitazyme is a highly viable substitute for Ethrel in raisin grape culture. Its addition as a foliar treatment for grapes substantially increases raisin yields, with or without additional K, Ca, and fulvic acid sprayed foliar but especially with these additional materials. By far the greatest yield increase was produced by Vitazyme plus K, Ca, and fulvic acid; Ethrel in the foliar mix with Vitazyme comparatively reduced yields by 7%.

In addition, observations on the vines showed significant vine and leaf damage due to the senescence effects of Ethrel, whereas Vitazyme encouraged healthy leaf and vine development.

Ethrel tended to cause slightly higher sugar values than did Vitazyme in 2003 and 2005, but the reverse was true in 2004. Because of significantly improved yields and quality with Vitazyme during all three years, however, the sugar differences had little effect on the treatment differences in overall net raisin yield.

Only one year, 2005, has reported Sunmaid raisin quality information.

Raisin quality results: These results show that while the substandard raisin percentage varied little for all of the treatments, the “B and B” raisins were by far the highest with Vitazyme + K + Ca + fulvic acid, being 20% above the control and 5% higher than the next highest treatment, which was Vitazyme + Ethrel + K + Ca + fulvic acid. Fulvic acid tended to boost raisin quality, for in the treatments in which it was left out the “B and B” raisins were lowest. Ethrel was not positively correlated with high “B and B” percentages.

### Guava

**Location:** “Carlos Balino” Organic Estate, Santo Domingo, Villa Clara Province, Cuba

**Soil type:** Cambisol (Eutropept)

**Cultivar:** dwarf variety

**Transplanting date:** September 2, 2004

**Experimental design:** A 6-month-old guava plantation was divided into treated and untreated areas to evaluate the effect of Vitazyme on tree growth, fruit number, and yield at 9 months after transplanting. Three application regimes were used.

1. Control (no Vitazyme)
2. Vitazyme at 30 days after transplanting
3. Vitazyme at 30 and 60 days after transplanting
4. Vitazyme at 30, 60, and 90 days after transplanting

**Fertilization:** unknown

**Vitazyme application:** A 0.5% solution was applied by backpack sprayer on the tree leaves and the soil over the root zone at 30, 30 and 60, and 30, 60, and 90 days after transplanting for the three treatments.

**Tree growth:** At 9 months after transplanting the height of the trees was measured to give means for each treatment. It was also noticed that there were more leaves and larger leaves per tree for the Vitazyme treatment versus the untreated control trees.

**Yield results:** Mean, fruit number and yield were determined for each treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fruit per tree</th>
<th>Change in fruit number</th>
<th>Fruit yield</th>
<th>Fruit per tree</th>
<th>Change fruit yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>10</td>
<td>-</td>
<td>153</td>
<td>0.77</td>
<td>-</td>
</tr>
<tr>
<td>2. Vitazyme once</td>
<td>28</td>
<td>(+180%)</td>
<td>625</td>
<td>1.56</td>
<td>0.79 (+103%)</td>
</tr>
<tr>
<td>3. Vitazyme twice</td>
<td>24</td>
<td>(+140%)</td>
<td>882</td>
<td>2.21</td>
<td>1.44 (+187%)</td>
</tr>
<tr>
<td>4. Vitazyme three times</td>
<td>36</td>
<td>(+260%)</td>
<td>620</td>
<td>2.07</td>
<td>1.30 (+169%)</td>
</tr>
</tbody>
</table>

*Increase in tree height: +19 to 35%

*Continued on the next page
**Conclusions:** In the words of the Cuban researchers, 
“1. Vitazyme in 1, 2 and 3 applications of a 0.5% concentration benefited a dwarf variety guava plant growth as compared to the untreated control.

2. Guava ripe fruit yield was greater with two Vitazyme applications (at 30, 60, and 90 days from transplanting), followed by three and one Vitazyme applications at 30, 60, and 90 days and only at 30 days . . . with 1.44, 1.30, and 0.79 kg/plant increases, respectively.”

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**Lettuce**

**Ranch:** Labradores parcel 48, Mexico  
**Company:** Agricola Nieto SPR deRL  
**Soil type:** unknown  
**Variety:** Cleopatra  
**Previous crop:** unknown  
**Planting date:** November 30, 2004  
**Experimental design:** A one-hectare area of lettuce was treated three times with Vitazyme, and had a 40% nitrogen fertilizer reduction, to compare the effects on yield with an adjoining parcel of land that received no Vitazyme and 100% fertilizer, but was otherwise treated the same.

1. Control, 100% N  
2. Vitazyme, 60% N

**Fertilizer:** The usual recommended N-P-K fertilizer was applied to the control treatment, but only 60% of that amount of N was applied to the Vitazyme treated parcel.

**Vitazyme application:** (1) 1 liter/ha at planting; (2) 1 liter/ha to the leaves and soil early in the production cycle; (3) 1 liter/ha to the leaves and soil later in the production cycle

**Yield results:** At harvest the lettuce was packed in boxes containing 24 heads each, and these boxes were counted for both treatments. Vitazyme increased lettuce yield considerably despite a greatly reduced rate of nitrogen application.

**Income results:** Based on calculations of the lettuce price ($0.05 per 950 lb), the cost of packing (2.30 pza per 24-head box), and the cost of fertilizer and Vitazyme, the following economic results were determined.

**Economic benefits per hectare**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost (pesos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased income per bin with Vitazyme</td>
<td>1,571.83</td>
</tr>
<tr>
<td>Increased income in packing with Vitazyme</td>
<td>6,474.96</td>
</tr>
<tr>
<td>Reduced cost of fertilizer with Vitazyme</td>
<td>874.49</td>
</tr>
<tr>
<td>Total economic benefit with using Vitazyme</td>
<td>8,921.28</td>
</tr>
</tbody>
</table>

**Conclusions:** Vitazyme greatly increased income with lettuce for this production field in Mexico, by increasing yield by 23% despite a 40% nitrogen fertilizer reduction. This yield increase led to an income increase of 8,921.28 pesos per hectare.

This study reveals how Vitazyme’s active agents are able to improve the efficiency of nitrogen use through reducing losses from denitrification, leaching, and other means, while enabling a more vigorous rhizosphere microflora to generate more of its own fixed nitrogen, and make better use of applied and native nitrogen.

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**Increase in yield with reduced N: +23%**

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**Papaya (young plants)**

**Research organization:** Tropical Fruit Culture Research Institute, Havana, Cuba  
**Location:** Jaguey Grande Citrus Experiment Station, Cuba  
**Soil substitute:** soil, citricompost, and zeolite (30-20 v/v)  
**Varieties:** red Maradol and Solo Sunrise  
**Planting date:** November, 2004

**Experimental design:** Vitazyme, mycorrhizae, and trichoderma were applied to pre-germinated papaya seedlings that were transplanted in 14x20 cm bags. The four treatments were applied to six replicates, with 10 plants per treatment, to determine effects of the treatments on various growth parameters.

1. Control  
2. Mycorrhizae  
3. Vitazyme  
4. Mycorrhizae + Vitazyme + Trichoderma

**Fertilization:** unknown

**Vitazyme application:** 10 ml/liter of water, sprayed on the trees and soil at planting

**Mycorrhizal application:** A pool of strains from INCA; 20 grams/bag in the soil at planting

**Trichoderma application:** from IIFT labs; 20 grams of the full mixture per pot with a backpack sprayer

**Watering:** “Pyramidal water” was applied on alternate days.

**Growth results:** Every 10 days, measurements of plant height, stalk diameter, and leaf number were made. The values given below are at 30 days after treatment.

**Conclusions:** According to the Cuban researchers,
1. Under semi-controlled conditions, best results in the Maradol variety were found in mycorrhizae and Vitazyme treatments, with more than 10 cm in 30 days. The combined mycorrhizae + Vitazyme + trichoderma treatment was also higher than the control.

2. In the Solo variety inoculation with mycorrhizae, Vitazyme application, and the combined mycorrhizae + Vitazyme + trichoderma treatments favored most seedling growth, showing values above 10 cm, and were also higher than those of the Maradol variety.

3. In both the Maradol and Solo Sunrise varieties, treatments of mycorrhizae and mycorrhizae + Vitazyme + trichoderma showed best results in stalk diameter, with values close to 4 mm, followed by Vitazyme that reached a diameter above 3.5 mm. Similar results were found in number of leaves in both varieties.

   - **Increase in plant height**  
     - (cv. Maradol): 72%
     - (cv. Solo): 63%

   - **Increase in stalk diameter**  
     - (cv. Maradol): 9%
     - (cv. Solo): 17%

   - **Increase in leaf number**  
     - (cv. Maradol): 2%
     - (cv. Solo): 29%

### Plant Height

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Plant height</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>cv. Maradol</td>
<td>cm</td>
<td>cv. Solo</td>
</tr>
<tr>
<td>1. (Control)</td>
<td>6.0</td>
<td>___</td>
</tr>
<tr>
<td>2. (Mycorr.)</td>
<td>10.3 (-72%)</td>
<td>11.4</td>
</tr>
<tr>
<td>3. (Vitazyme)</td>
<td>10.3 (-72%)</td>
<td>11.6</td>
</tr>
<tr>
<td>4. (Mycorr. + Vita. + Trico.)</td>
<td>8.1 (+35%)</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>7.1</td>
<td>4.3 (+61%)</td>
</tr>
<tr>
<td></td>
<td>11.4</td>
<td>4.5 (+63%)</td>
</tr>
<tr>
<td></td>
<td>11.5</td>
<td>4.4 (+62%)</td>
</tr>
</tbody>
</table>

### Stalk Diameter

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stalk diameter</th>
<th>Stalk diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mm</td>
<td>mm</td>
</tr>
<tr>
<td>cv. Maradol</td>
<td>mm</td>
<td>cv. Solo</td>
</tr>
<tr>
<td>1. (Control)</td>
<td>3.40</td>
<td>3.43</td>
</tr>
<tr>
<td>2. (Mycorr.)</td>
<td>3.75 (+10%)</td>
<td>3.81 (+11%)</td>
</tr>
<tr>
<td>3. (Vitazyme)</td>
<td>3.71 (+9%)</td>
<td>3.52 (+3%)</td>
</tr>
<tr>
<td>4. (Mycorr. + Vita. + Trico.)</td>
<td>3.73 (+10%)</td>
<td>4.00 (+57%)</td>
</tr>
</tbody>
</table>

### Leaf Number

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaf number</th>
<th>Leaf number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cv. Maradol</td>
<td>cv. Solo</td>
</tr>
<tr>
<td>1. (Control)</td>
<td>7.00</td>
<td>5.01</td>
</tr>
<tr>
<td>2. (Mycorr.)</td>
<td>7.52 (+7%)</td>
<td>8.00 (+60%)</td>
</tr>
<tr>
<td>3. (Vitazyme)</td>
<td>7.15 (+2%)</td>
<td>6.48 (+29%)</td>
</tr>
<tr>
<td>4. (Mycorr. + Vita. + Trico.)</td>
<td>7.18 (+3%)</td>
<td>8.02 (+60%)</td>
</tr>
</tbody>
</table>

### Papaya

**Location:** Cuba, Fruit Research Station  
**Variety:** unknown  
**Age of trees:** first production

**Experimental design:** Papaya trees were planted in a plantation setting at the research station to evaluate the effects of Vitazyme on growth and production. The trees had been started from seedlings, and treated periodically with Vitazyme from the beginning. One portion of the plantation was treated with Vitazyme and another portion was left untreated.

1. Control  
4. Vitazyme

**Fertilization:** unknown  
**Vitazyme treatments:** periodically at 1 liter/ha to the leaves and soil

**Growth and production results:** At an unknown date, evaluations were made for tree growth and fruit production based on the average of 15 trees per treatment.

- **Increase in trunk diameter:** 11%
- **Increase in tree height:** 12%
- **Increase in fruit per tree:** 54%

**Conclusions:** This papaya study in Cuba at a fruit research station revealed that Vitazyme greatly increased the number of fruit produced per tree, by 54% over the control. This increase resulted from trees that were larger and more vigorous, and which had more blossoms and bore more fruit than the controls. The treated trees fixed more sunlight energy and atmospheric CO₂ to produce greater tree growth and fruit.
**Papaya (seedlings)**

**Research organization:** Tropical Fruit Culture Research Institute, Havana, Cuba  
**Location:** Jaguey Grande Citrus Experiment Station, Cuba  
**Variety:** red Maradol  
**Planting date:** November, 2004

**Soil substitute:** 35% cattle manure, 15% rice husk, and 50% topsoil

**Experimental design:** Vitazyme and mycorrhizae were applied to newly planted papaya seeds in trays containing the substrate mix. The seeds had been soaked for 48 hours in "pyramidal water" before planting. Also, seeds for all but the control treatment came from "energetically treated" fruits. The study was completely randomized with five replications.

1. Mycorrhizae  
2. Mycorrhizae + Vitazyme  
3. Control  
4. Vitazyme

**Fertilization:** Leaf yellowing was corrected by application of earthworm castings during vigorous tree growth.

**Vitazyme application:** Method, time, and amount of treatment are unknown.

**Mycorrhizae application:** a pool of strains from INCA; method, rate, and timing of applications are unknown

**Watering:** Irrigation water was applied every other day initially, and daily after the trees had gained some size.

**Growth results:**

All treatments had germinating seeds by eight days after planting, and all viable seeds had germinated by 12 days after planting.

The mycorrhizal inoculation provided the greatest germination percentage, followed by Vitazyme, and then mycorrhizae + Vitazyme. The control provided the lowest germination rate.

The height of the trees was measured seven times from December 8, 2004, to January 29, 2005. Only the final measurement values for January 29 are shown on the graph to the right.

**Conclusions:** According to the Cuban researchers,

1. The inoculation of Maradol papaya seeds with a mycorrhizal pool was the most effective treatment on germination, followed by Vitazyme application. The control showed the lowest germination percentage.
2. Under controlled conditions, the combination mycorrhizae + Vitazyme favored seedling growth. The inoculation with mycorrhizae and Vitazyme application, independently, showed similar values, while the control showed the shortest plants.

- **Increase in plant height (Vitazyme):** 7%
- **Increase in plant height (Vitazyme + mycorrhizae):** 13%

---

**Peanuts**

**Location:** Whitheral, Texas  
**Variety:** TamSpan 90  
**Population:** 100 lb/acre  
**Previous crop:** cotton  
**Soil type:** medium sandy loam  
**Planting date:** May 15, 2004  
**Row spacing:** 40 inches to middles, 8 inches on berm

**Experimental design:** A center-pivot field was divided into two 33.5-acre areas, with one part receiving Vitazyme and the other no product. All other treatments were the same for both areas.

1. Control  
2. Vitazyme

**Fertilizer:** 11-52-0% N-P₂O₅-K₂O applied pre-plant, with some liquid calcium and nitrogen applied through the irrigation system

**Vitazyme application:** 13 oz/acre at planting, sprayed on the soil in a 10-inch band behind the planter; 13 oz/acre sprayed on the leaves and soil at early bloom

**Irrigation:** about one inch per week during the primary growing period

**Weather:** a fairly cool summer with good rainfall all year

**Harvest date:** dug in early October, and picked up November 1 to 6

**Yield results:** Results were affected by excessive weed growth from considerable rainfall, the Vitazyme area more so because it was on the outside of the circle. The Vitazyme area was also lower, on part of an old lake bottom.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Peanut yield (lb/acre)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3,329</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>3,521</td>
<td>+192 (+6%)</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different (P=0.05).
Quality and income results: Based on payment reports, the average prices for the peanuts were as follows:
- Control: $0.1861/lb, or $372.20/ton
- Vitazyme: $0.1869/lb, or $373.80/ton

* Increase in yield: 6%

Conclusions: This west Texas field-scale peanut study revealed that Vitazyme produced a small (6%) but highly profitable yield increase, which was of slightly higher quality and produced $38.54/acre more income. This increase came despite the Vitazyme treatment having a more serious weed problem than the control, and being located on an old lake bed which, during this wet year, hindered maximum yields.

Peanuts
A Greenhouse Growth and Nodulation Study

Note the effect of Vitazyme on plant maturity and peanut development in this greenhouse study.

Harvest date: On April 26, 68 days after planting, the soil was washed from the roots of the plants, and growth determinations were made. The plants were then placed in a drying oven at about 140°F for 36 hours to dry the tissue and develop

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Peanut yield</th>
<th>Peanut value*</th>
<th>Value change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3,329</td>
<td>619.53</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme*</td>
<td>3,521</td>
<td>658.07</td>
<td>38.54</td>
</tr>
</tbody>
</table>

*See the prices above.

Vitazyme had the tallest plants (+32%) of all six treatments, significantly greater than all but Product B. The New Vitazyme and 100% Vitazyme + Product B were not significantly taller than the control; apparently the products gave an excess of active agents.

All Treatments produced many greater peanuts of >0.5 cm diameter than did the control, and all values were significantly greater than the control except Vitazyme + Product B at 100%.

Vitazyme alone produced the greatest number of Rhizobium fixing nodules on the peanut roots. All treatments significantly exceeded the control, from 130% to 230%. Vitazyme gave the greatest dry weight increase of all treatments, which was statistically equal to Product B and Product B + Vitazyme. Eventual peanut yield should be proportional to early dry matter accumulation, as determined here.

Conclusions: In this greenhouse peanut study in Texas, Vitazyme produced the greatest plant height, Rhizobium nodulation, and dry matter accumulation of all six treatments. Vitazyme + Product B (at 50% levels) produced the most young peanuts, but
there was no statistical difference between that treatment and all others except the control. Since total peanut production is directly related to early dry matter accumulation, these results with Vitazyme predict that it would produce the greatest final peanut yield in the field. The active agents in Vitazyme stimulated chlorophyll production, plant metabolism, and energy transfer to the roots to feed a high population of Rhizobium bacteria which fixed high amounts of nitrogen for the greatest growth.

- Increase in root nodules: 230%
- Increase in peanut number (Vitazyme + Product B): 336%
- Increase in plant height: 32%
- Increase in dry weight: 75%

**Pennisetum Purpureum**

**Location:** Cuba  
**Planting date:** September, 2004  
**Growth stage:** new planting  
**Variety:** Pennisetum purpureum cv. Cuba CT-115  
**Tillage:** unknown  
**Experimental design:** A uniform test area was marked off in 27m² plots, upon which two treatments were established in a completely randomized design (four replicates). Evaluations were made of plant growth characteristics as well as leaf pigment content.

1. Control  
2. Vitazyme

**Fertilization:** none  
**Vitazyme applications:** 13 oz/acre (1 liter/ha) at planting

**Conclusions:** In this Cuban trial with the forage grass Pennisetum purpureum cv. Cuba CT-115, Vitazyme produced several significant improvements in grass growth and quality.

1. Germination was increased throughout the 80-day test period.

### Leaves, Stalks, and Dead Tissue Composition of Total Tissue

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaves*</th>
<th>Change</th>
<th>Stalks</th>
<th>Change</th>
<th>Dead matter*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>22.12 b</td>
<td>—</td>
<td>62.14</td>
<td>—</td>
<td>15.74 a</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>28.32 a</td>
<td>+6.20</td>
<td>64.75</td>
<td>+2.61</td>
<td>6.93 b</td>
<td>-8.81</td>
</tr>
</tbody>
</table>

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

### Dry Matter Content of Leaves, Stalks, and Whole Plants

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaves*</th>
<th>Change</th>
<th>Stalks</th>
<th>Change</th>
<th>Whole plant</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>31.45</td>
<td>—</td>
<td>28.00</td>
<td>—</td>
<td>28.19</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>32.94 +1.49</td>
<td>28.95 +0.95</td>
<td>29.35 +1.16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Leaf Photosynthetic Pigment Content

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Chlorophyll a</th>
<th>Change</th>
<th>Chlorophyll b</th>
<th>Change</th>
<th>Carotenoids*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.73</td>
<td>—</td>
<td>0.71</td>
<td>—</td>
<td>0.44 b</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.93 0.20 (+12%)</td>
<td>0.71 0</td>
<td>0.55 a 0.11 (+25%)</td>
<td>0.11 (+25%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.01.

### Yield Results

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fresh matter*</th>
<th>Change</th>
<th>Dry matter*</th>
<th>Change</th>
<th>Leaves**</th>
<th>Change</th>
<th>Dead tissue**</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>9.53 b</td>
<td>—</td>
<td>2.69 b</td>
<td>—</td>
<td>0.59 b</td>
<td>—</td>
<td>0.42 a</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>10.41 a 0.88 (+16%)</td>
<td>3.10 a 0.41 (+15%)</td>
<td>0.86 a 0.27 (+46%)</td>
<td>0.21 b 0.21 (-100%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.05.  
**Means followed by the same letter are not significantly different at P=0.01.
2. Plant density was improved at every stage during the 80-day growth period, with 2.3 more plants per square meter with Vitazyme at 80 days.
3. Stool and stalk density at the end of the test period were both increased with Vitazyme, by 8% in each case.
4. The relative composition of leaves, stalks, and dead tissue was much more favorable for the Vitazyme treated grass, with a greater percentage of leaves and stalks and a reduction of dead tissue.
5. The dry matter content of the entire plant was higher with Vitazyme.
6. Vitazyme produced a 16% higher fresh yield, a 15% higher dry matter yield, a 46% greater leaf yield, and only half the dead tissue as the control.
7. Both the chlorophyll and carotenoid photosynthetic pigments were increased by the Vitazyme versus the control grass. Vitazyme has been shown in this study to a powerful adjunct to typical management practices for the production of Pennisetum purpureum in Cuba.

- Increase in stools: +8%
- Increase in stalks: +8%
- Increase in fresh matter yield: +16%
- Increase in leaf yield: +46%
- Increase in chlorophyll a: +12%
- Increase in carotenoids: +25%

**Potatoes**

**Location**: Hooper, Colorado  
**Variety**: Norkotah 296  
**Soil type**: sandy loam  
**Previous crop**: barley  
**Planting date**: May 3, 2005  
**Row spacing**: 34 inches  
**In-row spacing**: 11 inches  
**Experimental design**: A center-pivot irrigated, uniform potato field was partially treated with Vitazyme (30 acres), and an adjoining area of 30 acres was left untreated. The object of the study was to compare the effects of Vitazyme on tuber yield.

1. Control  
2. Vitazyme

**Fertilization**:  
1. Control: preplant, 286 lb/acre (NH₄)₂SO₄ and 167 lb/acre KCl; at planting, 42 lb/acre 10-34-0 N-P₂O₅-K₂O, 3.5 lb/acre Thiosol 12-0-0-29 (S), and 2 lb/acre ammoniated Zn; in-season, 25 lb/acre 28-0-0-5 (S)  
2. Vitazyme: 13 oz/acre shortly after plant emergence, through the irrigation system of the first irrigation; 13 oz/acre at tuber initiation through the irrigation system

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

**Harvest date**: September 20, 2005  
**Yield results**: All weights were gathered by weighing trucks on a scale from both treatments.

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

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

- Increase in tuber yield: +5%  
- Increase in income: $181.50/acre

**Potatoes**

**Research organization**: Batabano VCE, Havana Province, Cuba  
**Farm**: Farm 14  
**Variety**: Ajiba  
**Soil type**: red ferralitic  
**Previous crop**: unknown  
**Planting date**: unknown  
**Irrigation**: center pivot  
**Experimental design**: Two potato fields received Vitazyme on one portion (8.05 ha), with a small fertilizer reduction on the treated portion, to evaluate the productive effects on potato tuber yield and quality.

1. Control (100% fertilizer)  
2. Vitazyme (90% fertilizer)

**Fertilization**:  
1. Control: 1.490 kg/ha of a 9-13-17% N-P₂O₅-K₂O fertilizer; Vitazyme: 1.341 kg/ha of the same fertilizer.  
2. Control: 1.341 kg/ha; Vitazyme: 1.207 kg/ha.

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

**Tuber yield, cwt/acre**

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>504.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>528.2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIELD 1 — Tuber Yield**

<table>
<thead>
<tr>
<th>Tuber yield, tons/ha</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Continued on the next page
**Research organization:** Guira de Melena VCE, Havana Province, Cuba  
**Farms:** Fregat 1, Fregat 2, and Mamey  
**Variety:** Chieftan  
**Soil type:** red ferralitic  
**Irrigation:** center pivot  
**Planting date:** unknown  
**Previous crop:** unknown  
**Experimental design:** A potato field was treated with Vitazyme once over 5.4 hectares, while the rest of the field was left untreated, to evaluate the product’s effect on tuber yield.  

1. Control  
2. Vitazyme  

- **Fertilizer:** the same for both treatments: 1,341 kg/ha of a 9-13-17% N-P₂O₅-K₂O fertilizer  
- **Vitazyme application:** 3.44 liters/ha to the leaves and soil at 60 days after planting  
- **Harvest date:** unknown  
- **Yield results:** See the graph on the right.  
- **Conclusions:** Vitazyme applied only one time, but at a high rate (3.49 liters/ha), doubled the tuber yield in this Cuban on-farm potato trial. Both treatments were treated equally in all other ways. These results illustrate the potential of Vitazyme to benefit potato yields in Cuba.

**Tuber yield increase:** +100%

---

**Location:** Matanzas Province, Cuba  
**Variety:** Romano  
**Soil type:** red ferralitic  
**Irrigation:** row irrigation  
**Planting date:** unknown  
**Previous crop:** unknown  
**Experimental design:** A potato field was treated with Vitazyme once over 5.4 hectares, while the rest of the field was left untreated, to evaluate the product’s effectiveness to improve tuber yield under equal fertilization.  

1. Control  
2. Vitazyme  

- **Fertilizer:** the same for both treatments: 1,341 kg/ha of a 9-13-17% N-P₂O₅-K₂O fertilizer  
- **Vitazyme application:** 3.44 liters/ha to the leaves and soil at 60 days after planting  
- **Harvest date:** unknown  
- **Yield results:** See the graph on the right.  
- **Conclusions:** Vitazyme applied only one time, but at a high rate (3.49 liters/ha), doubled the tuber yield in this Cuban on-farm potato trial. Both treatments were treated equally in all other ways. These results illustrate the potential of Vitazyme to benefit potato yields in Cuba.

**Tuber yield increase:** +100%

---

**Potatoes**

**Treatment**  
<table>
<thead>
<tr>
<th>Tuber yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>tons/ha</td>
<td>tons/ha</td>
</tr>
<tr>
<td>Fregat 1</td>
<td>25.49</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>26.97</td>
</tr>
<tr>
<td>Fregat 2</td>
<td>26.04</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>26.25</td>
</tr>
<tr>
<td>Mamey</td>
<td>18.10</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>22.83</td>
</tr>
</tbody>
</table>

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

---

**Note:** The greater number of tubers on the right, these plants having darker green leaves for greater carbon fixation.
Potatoes

Researchers: unknown
Location: Los Mochis, Sinaloa, Mexico
Variety: Mondial
Planting date: February 10, 2004
Planting density: 70,000 pieces/ha
Irrigation: trickle
Row spacing: 90 cm
Soil type: Barriol

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

1. Control
2. Vitazyme two times
3. Vitazyme four times

Fertilization: 194-206-238-7-47 lb/acre of N, P₂O₅, K₂O, Mg, and Ca, distributed during the growing season as 72-150-91 pre-plant, 19-38-19-1 (Mg) at emergence, 52-11-58 5(Mg)-19(Ca) at tuber initiation, 41-7-54-1(Mg)-19(Ca) at tuber filling, and 10-0-16-9(Ca) at ripening

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

Fungicide and insecticides: Syngenta products

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

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

Conclusions: In this Mexican potato study, Vitazyme applied at 1 liter/ha at planting and again two weeks later produced an excellent, significant (at P=0.05), 16% yield increase. This increase translated into 10,300 pesos/ha more net income, while increasing the percentage of first class tubers from 26% in the control to 34% with Vitazyme. Four Vitazyme applications per cropping cycle is an excellent potato treatment in Mexico.

Rice

Preliminary Results On Large-Scale Field Trials

Researchers: unknown
Location: Los Palacios, Cuba
Variety: unknown

Preliminary conclusions: Although few details of these Cuban large-scale field trials are presently available, Vitazyme is shown to have a great effect on rice yield, increasing the average yield by a consistent 14 to 15% over the controls.

Farm: Agricola

- Increase in grain yield (Agricola): +15%

- Increase in grain yield (Cubanacan): +14%

Farm: Cubanacan
**Rice**

**Location:** CAI rice growers, Ruta Invasoría, Province Camagüey  
**Research organization:** Ministry of Agriculture, Rice Agroindustrial Production Group, Havana, Cuba  
**Variety:** unknown  
**Soil type:** unknown  
**Planting date:** spring, 2004  
**Experimental design:** A large rice field was divided into two parts, one treated with Vitazyme and the other left untreated, in an effort to evaluate the product's effectiveness in large-scale trials.  

<table>
<thead>
<tr>
<th>1. Control</th>
<th>2. Vitazyme</th>
</tr>
</thead>
</table>

**Fertilizer:** standard protocol  
**Vitazyme application:** 1.5 liters/ha, most likely at planting  
**Weather:** There was a very limited supply of water at the final stages of rice development.  

**Yield results:** Note the results on the right  

**Conclusions:** This large-scale field trial in Cuba proved that Vitazyme, applied only once at 1.5 liters/ha, greatly increased grain yield (+17%), despite a serious water shortage late in the growing season.  

---

**Note how Vitazyme has produced more roots and stronger shoots in this field comparison.**

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**Rice**

**Location:** CAI rice growers, Los Palacios, Province P. del Río  
**Agriculture, Rice Agroindustrial Production Group, Havana, Cuba**  
**Soil type:** unknown  
**Experimental design:** Full scale production trials with Vitazyme were initiated on large blocks of land, using two different application regimes. Yields for field areas were determined by actual harvest data.  

**Fertilization:** standard protocol  
**Vitazyme application:** Trial 1, 1 liter/ha; Trial 2, 1.5 liters/ha twice.  
**Weather:** There was a very limited supply of water at the final stages of rice development.  

**Yield results:** See on the left.  

**Conclusions:** This two-part large scale rice trial in Cuba revealed that Vitazyme, applied once at 1 liter, or twice at 1.5 liters/ha, increased grain yield significantly, by 14% (1 liter/ha), and 17% (1.5 liters/ha twice). This product can greatly increase rice production in Cuba compared to untreated areas.  

---

**Rice**

**Location:** CAI rice growers, sur del Jibaro, Province Sancti Spiritus  
**Research organization:** Ministry of Agriculture, Rice Agroindustrial Production Group, Havana, Cuba  
**Variety:** unknown  
**Soil type:** unknown  
**Planting date:** spring, 2004  
**Experimental design:** Large rice fields were used to compare the effectiveness of Vitazyme on the yield of rice grain. One field area was left untreated while the other field was treated with Vitazyme; all other treatments were identical for the two parcels.  

<table>
<thead>
<tr>
<th>1. Control</th>
<th>2. Vitazyme</th>
</tr>
</thead>
</table>

**Fertilization:** standard protocol  
**Vitazyme application:** 1.5 liters/ha, most likely at planting  
**Weather:** Water was limited, delayed the harvest, and affected yield.  

**Conclusions:** In this Sancti Spiritus, Cuba, large-scale rice study, Vitazyme increased grain yield by 35% despite considerable moisture stress.  

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**Increase in grain yield:** +14%  
**Increase in grain yield:** +17%  
**Increase in grain yield:** +35%  

---

**Grain yield, tons/ha**

- Trial 1: 2.72, 3.10  
- Trial 2: 2.42, 2.82

---

**Grain yield, tons/ha**

- Control: 2.13, 2.50

---

**Grain yield, tons/ha**

- Control: 1.85, 2.50

---

33 / Vitazyme Field Tests for 2005
Location: Cedar Falls, Iowa  
Variety: Pioneer 92M72 (non-GMO)  
Soil type: Floyd loam (pH 6.8, organic matter 4.2%, CEC 15.7, good fertility)  
Previous crop: corn  
Population: 179,000 seeds/acre  
Planting date: May 10, 2005  
Row spacing: 15 inches  
Tillage: conventional  

**Experimental design:** A Latin square design with eight replicates and eight treatments was set up in a uniform area having 6-row plots of 15 x 40 feet (0.0138 acre). The purpose of the trial was to discover the effect of Vitazyme, a new Vitazyme variant (Product X), a possible synergist with Vitazyme (Product Y), and another possible synergist (Product Z) on soybean yield and bean moisture content. The Student-Newman-Keuls test was used to separate treatment means.

**Fertilization:** none (residual fertility from corn last year)  
**Vitazyme application:** 13 oz/acre on the soil surface about one week before planting  
**Weather:** cooler than normal  
**Results:** About August 26 the data shown below was collected. Forty plants from each field area, closely separated, were dug with a potato fork — four plants per dig with 10 digs — and trifoliate leaves and pods were counted for the 40 plants.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Trifoliates Change</th>
<th>Pods Change</th>
<th>Roots Change</th>
<th>Biological activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>420</td>
<td>1,100</td>
<td>Standard roots structure</td>
<td>No fungi seen; few sowbugs*</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>520 (+24%)</td>
<td>1,330 (+21%)</td>
<td>Long, stronger main roots</td>
<td>More fungal threads on corn residue; many sowbugs*</td>
</tr>
</tbody>
</table>

*Fungi are the first organisms to begin crop residue breakdown. Sowbugs consume the organic material that is breaking down.

**Conclusions:** This Indiana soybean study revealed that only one Vitazyme application at planting increased the number of trifoliate leaves by 24%, while pods were increased by 21%. In addition, root growth and soil biological activity were enhanced. Unfortunately a yield check could not be made because the product was applied across the rows, making it impossible to keep treatments separate while combining down the field.

- **Increase in trifoliate leaves:** +24%  
- **Increase in pods:** +21%

---

**Soybeans**

Agricultural Custom Research and Education Services

Location: Coatesville, Indiana  
Variety: Pioneer 93 B68  
Soil type: Fincastle silty clay loam  
Previous crop: corn  
Population: 179,000 seeds/acre  
Planting date: May 10, 2005  
Row spacing: 15 inches  

**Experimental design:** A soybean field was treated on one part, across the rows, with Vitazyme, and the other part was left untreated.

1. Control  
2. Vitazyme

**Fertilization:** none (residual fertility from corn last year)  
**Vitazyme application:** 13 oz/acre on the soil surface about one week before planting  
**Weather:** cooler than normal  

**Results:** The two center rows of each plot were harvested with a plot compost.
In this New York squash study, Vitazyme produced a highly profitable yield increase as well as better storability of the fruit, meaning more of the stored squash made it to market to further increase the marketable yield.

**Yield Changes**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Bean yield* Change</th>
<th>Moisture* Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/acre</td>
<td>%</td>
</tr>
<tr>
<td>1. Control</td>
<td>39.3 b</td>
<td>15.45 a</td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>45.0 a (+15%)</td>
<td>15.67 a (+0.22)</td>
</tr>
<tr>
<td>3. Vita + Prod Y</td>
<td>45.4 a (+16%)</td>
<td>15.41 a (-0.04)</td>
</tr>
<tr>
<td>4. Vita + Prod Y (1/2 rate)</td>
<td>45.0 a (+15%)</td>
<td>16.15 a (+0.70)</td>
</tr>
<tr>
<td>5. Product Y</td>
<td>43.4 a (+10%)</td>
<td>15.51 a (+0.06)</td>
</tr>
<tr>
<td>6. Prod X + Prod Y (1/2 rate)</td>
<td>44.7 a (+14%)</td>
<td>15.51 a (+0.06)</td>
</tr>
<tr>
<td>7. Product Z</td>
<td>44.1 a (+12%)</td>
<td>15.95 a (+0.50)</td>
</tr>
<tr>
<td>8. Vita + Prod Z</td>
<td>45.0 a (+15%)</td>
<td>16.04 a (+0.59)</td>
</tr>
</tbody>
</table>

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

**Income results:** At $4.50/bu for soybeans, the following income increases have been calculated.

### Treatment

<table>
<thead>
<tr>
<th>Bean increase Extra income</th>
</tr>
</thead>
<tbody>
<tr>
<td>bu/acre</td>
</tr>
<tr>
<td>$/acre</td>
</tr>
<tr>
<td>2. Vitazyme</td>
</tr>
<tr>
<td>3. Vita + Prod Y</td>
</tr>
<tr>
<td>4. Vita + Prod Y (1/2 rate)</td>
</tr>
<tr>
<td>5. Product Y</td>
</tr>
<tr>
<td>6. Prod X + Prod Y (1/2 rate)</td>
</tr>
<tr>
<td>7. Product Z</td>
</tr>
<tr>
<td>8. Vita + Prod Z</td>
</tr>
</tbody>
</table>

**Location:** Monroe County, New York

**Variety:** buttercup

**Soil type:** clay loam

**Planting date:** May 31, 2005

**Yield results:** One-acre areas, near each other, were flagged for the treated and control portions of the field near harvest time. Three areas were picked separately and the yields were determined.

**Storage results:** On December 15, about 3 months after harvest, the treated squash removed from storage boxes and washed were noticeably better than the untreated squash, having fewer bruised and rotten spots and fewer rejections. This improvement with Vitazyme was likely due to stronger cell walls and higher soluble solids in the cell walls of the fruit, a normal response to Vitazyme application.

**Conclusions:** In this New York squash study, Vitazyme produced a highly profitable yield increase as well as better storability of the fruit, meaning more of the stored squash made it to market to further increase the marketable yield.
Stylosanthes Guinensis Cook (a forage legume)

Studies in Six African Countries

Location: Cameroon, Nigeria, Central African Republic, Niger, Tchad, and Burkina Faso

Variety: Stylosanthes guinensis Cook

Experimental design: Four fertility regimes were applied to experimental plots (4 m²) in six African countries, all with Vitazyme with the exception of an untreated control. Effects on nodulation were used to evaluate the product.

1. Vitazyme alone
2. Vitazyme + phosphorus fertilizer (P)
3. Vitazyme + nitrogen fertilizer (N)
4. Vitazyme + farmyard manure (FYM)
5. Control

Fertilization: 100 kg/ha N (urea), 100 kg/ha P₂O₅ (SSP), and 100 kg/ha dairy manure

Vitazyme applications: 20 ml of Vitazyme was added to 250 g of seed for each 4 m² plot of Treatments 1, 2, 3, and 4.

Nodulation results: Nodules were counted in one square meter of plants for each determination.

Vitazyme alone increased legume nodulation by 103% over the control. All other treatments exceeded the control as well, especially the nitrogen and farmyard manure treatments with Vitazyme. Phosphorus plus Vitazyme did not produce as great an increase as did the other treatments.

Conclusions: In this six country African trial, Vitazyme performed admirably by inducing a 103% increase in forage legume nodulation. In combination with nitrogen and farmyard manure the increases were even greater, from 186 to 253% above the control, showing an excellent synergism between these materials. Vitazyme has been proven by this study to be an excellent stimulator of forage legume nodulation, and thus of legume growth potential in tropical countries.

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Stylosanthes Hamata Cook (a forage legume)

Studies in Six African Countries

Location: Cameroon, Nigeria, Central African Republic, Niger, Tchad, and Burkina Faso

Variety: Stylosanthes hamata Verano

Experimental design: Four fertility regimes with six replications were applied to experimental plots (4 m²) in six African countries, all with Vitazyme with the exception of an untreated control. Effects on nodulation were used to evaluate the product.

1. Vitazyme alone
2. Vitazyme + phosphorus fertilizer (P)
3. Vitazyme + nitrogen fertilizer (N)
4. Vitazyme + farmyard manure (FYM)
5. Control

Fertilization: 100 kg/ha N (urea), 100 kg/ha P₂O₅ (SSP), and 100 kg/ha dairy manure

Vitazyme applications: 20 ml of Vitazyme was added to 250 g of seed for each 4 m² plot of Treatments 1, 2, 3, and 4.

Nodulation results: Nodules were counted in one square meter of plants for each determination.

Vitazyme alone increased root nodulation by 150% over the control. In combination with nitrogen and farmyard manure, Vitazyme greatly boosted nodulation, though with phosphorus the nodulation was slightly depressed.

Conclusions: Vitazyme applied with farmyard manure and nitrogen in this six-country African trial greatly boosted the nodulation of this tropical forage legume, by up to 286% above the control. Vitazyme alone more than doubled nodulation. The product shows great promise in increasing tropical legume production.

---

Nodules per Square Meter

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cameroon</th>
<th>Nigeria</th>
<th>Central African Rep.</th>
<th>Niger</th>
<th>Tchad</th>
<th>Burkina Fasso</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vitazyme</td>
<td>40</td>
<td>40</td>
<td>75</td>
<td>40</td>
<td>60</td>
<td>40</td>
<td>49.2</td>
</tr>
<tr>
<td>2. Vita + P</td>
<td>35</td>
<td>35</td>
<td>60</td>
<td>25</td>
<td>40</td>
<td>35</td>
<td>38.3</td>
</tr>
<tr>
<td>3. Vita + N</td>
<td>75</td>
<td>55</td>
<td>70</td>
<td>50</td>
<td>100</td>
<td>65</td>
<td>69.2</td>
</tr>
<tr>
<td>4 Vita + FYM</td>
<td>90</td>
<td>65</td>
<td>80</td>
<td>65</td>
<td>130</td>
<td>80</td>
<td>85.0</td>
</tr>
<tr>
<td>5. Control</td>
<td>15</td>
<td>20</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>10</td>
<td>24.2</td>
</tr>
</tbody>
</table>

Nodules per square meter
Sugar Cane

Preliminary Results On Large-Scale Field Trials

Location: Calderon Cooperation Farm, Blocks 14, 12, 75, and 8
Soil type: Cambisol (Eutropept)
Row spacing: 1.6 meters
Previous crop: sugar cane, all harvested between February and April of 2003
Experimental design: Four sugar cane fields — a new planting (Block 14, Field 1), first ratoon (Block 12, Fields 4 and 5), second ratoon (Block 75, Fields 1 and 2), and third ratoon (Block 8, Fields 1 and 2) — were divided into Vitazyme treated and control areas to evaluate the product’s effects in large scale field situations.

1. Control
2. Vitazyme

Fertilization: according to SERFE (Fertilizer Service) recommendations, or 60 to 80 kg/ha N in ratoon cane; no fertilizer for newly planted cane

Vitazyme application: a Shogun backpack sprayer with a 16 liter capacity and a 300 l/ha spray volume (hollow cone nozzles), having 50% of the area treated in 80 cm bands over the rows. Rate: 1 liter/ha.

Harvest yield estimates: Stalk diameter and length were determined for 10 samples in four plots per treatment. Stalk population counts were made in 10 meters of row in four plots per treatment as well to determine stalks per meter of row. Then all of the stalks in one meter of row were cut, counted, and weighed to determine mean stalk weight. Finally, using stalks per meter and mean stalk weight, with a row spacing of 1.6 meters, the cane yield was determined in metric tons/ha.

Variety C8612, planted in June of 2003; age 6 months at measurement; area treated, 8.03 ha

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stalk length</th>
<th>Change</th>
<th>Stalk diameter</th>
<th>Change</th>
<th>Stalk population</th>
<th>Population change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>121.9</td>
<td>–––</td>
<td>2.54</td>
<td>–––</td>
<td>8.8</td>
<td>–––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>125.9</td>
<td>4.0 (+3%)</td>
<td>2.82</td>
<td>0.28 (+11%)</td>
<td>12.3</td>
<td>3.5 (+40%)</td>
</tr>
</tbody>
</table>

- Increase in stalk length: +3%
- Increase in stalk diameter: +11%
- Increase in stalks/meter: +40%

First Ratoon

Variety C87-51; area treated, 12.06 ha; one application

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stalk length</th>
<th>Length change</th>
<th>Stalk diameter</th>
<th>Diameter change</th>
<th>Stalk population</th>
<th>Population change</th>
<th>Stalk weight</th>
<th>Weight change</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>189.2</td>
<td>–––</td>
<td>2.23</td>
<td>–––</td>
<td>9.03</td>
<td>–––</td>
<td>0.69</td>
<td>–––</td>
<td>38.94</td>
<td>–––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>201.4</td>
<td>12.2 (+6%)</td>
<td>2.33</td>
<td>0.10 (+4%)</td>
<td>9.00 -0.03 (0%)</td>
<td>0.81</td>
<td>0.11 (+16%)</td>
<td>45.56</td>
<td>6.62</td>
<td>(+17%)</td>
</tr>
</tbody>
</table>

Cane yield, tons/ha

- Increase in stalk length: +6%
- Increase in stalk diameter: +4%
- Increase in stalk weight: +16%
- Increase in cane yield: +17%

Without Vitazyme the sugar cane growth in this trial is typical for Cuba.

With Vitazyme, note how aggressive the sugar cane growth has become.

Continued on the next page
Preliminary results: Vitazyme, at 1 to 2 liters/ha total application, showed great promise in markedly increasing sugar production in these Cuban cane trials. As of the end of 2004, total cane growth and estimated cane yields increased substantially with Vitazyme, the all-important cane yield increasing by 17%, 28%, and 34% for first, second, and third year ratoon cane, respectively. Growth of newly planted cane also revealed excellent responses in stalk diameter and stalk population 6 months after planting and treating with Vitazyme.

### Second Ratoon

**Variety C87-51; area treated, 10.0 ha; one application**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stalk length</th>
<th>Length change</th>
<th>Stalk diameter</th>
<th>Diameter change</th>
<th>Stalk population</th>
<th>Population change</th>
<th>Stalk weight</th>
<th>Weight change</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>216.2</td>
<td>-3.8 (-2%)</td>
<td>2.33</td>
<td>0.01 (0%)</td>
<td>11.83</td>
<td>0.84</td>
<td>62.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>212.0</td>
<td>-3.8 (-2%)</td>
<td>2.34</td>
<td>0.01 (0%)</td>
<td>12.80</td>
<td>0.97 (+8%)</td>
<td>79.22</td>
<td>17.11 (+28%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Increase in stalk population: +8%**
- **Increase in stalk weight: +18%**
- **Increase in cane yield: +28%**

### Third Ratoon

**Variety C1051; area treated, 7.52 ha; two applications**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stalk length</th>
<th>Length change</th>
<th>Stalk diameter</th>
<th>Diameter change</th>
<th>Stalk population</th>
<th>Population change</th>
<th>Stalk weight</th>
<th>Weight change</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>170</td>
<td></td>
<td>2.51</td>
<td></td>
<td>8.15</td>
<td></td>
<td>39.22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>175</td>
<td>5 (+3%)</td>
<td>2.67</td>
<td>0.16 (+6%)</td>
<td>10.65</td>
<td>2.50 (+31%)</td>
<td>52.58</td>
<td>+13.36 (+34%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Increase in stalk length: +3%**
- **Increase in stalk diameter: +6%**
- **Increase in stalk population: +31%**
- **Increase in stalk weight: +3%**
- **Increase in cane yield: +34%**

Sugar Cane

**Location:** Marcelino Matidueña, Province of Guayas, Ecuador  
**Variety:** Saccharum officinarum  
**Soil type:** clayey  
**Experimental design:** A uniform soil area was selected alongside a water channel, where six rows were treated with Vitazyme and Stimplex seaweed to determine effects on sugarcane seed piece germination and growth.

1. Control  
2. Vitazyme + Stimplex treatment of seed pieces  

**Fertilization:** none  
**Vitazyme and Stimplex application:** Seed pieces were immersed before planting in a solution of 1 liter of Vitazyme and 1 liter of Stimplex in 100 liters of water.  
**Tiller numbers and height:** See the next page.  
**Shoot structure:** Vitazyme + Stimplex produced many more secondary tillers per seed piece than did the control, and the leaves were of a stronger, more vital nature.  
**Conclusions:** Vitazyme + Stimplex applied to the sugar cane seed pieces before planting resulted in a marked increase in tiller germination and vigor. The number of shoots per seed piece increased by 46% above the control at 45 days after planting, and shoots per meter of row by 30%. Treated shoot height also was 12% greater than the control, and the shoots were stronger with wider leaves.

CONTINUED ON THE NEXT PAGE
### Sweet Corn

**Organization:** Aguijares SPRL  
**Location:** Santa Teresa, Tabla 1, Mexico  
**Variety:** unknown  
**Soil type:** unknown  
**Planting date:** April, 2004  
**Experimental design:** A sweet corn field was divided into two portions, one hectare treated with the usual fertilizer and the other treated with 30% less nitrogen and Vitazyme three times. Growth and yield parameters were evaluated to determine Vitazyme effects.

#### 1. Control

- **Growth, quality, and yield results:** Ten meter samples of the corn were harvested from each treatment for evaluations.  
- **Income results:** The yield increase was 3,200 kg/ha, at 1,300 pesos/ton.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Tender&quot; corn</td>
<td>10.0</td>
<td>9.8</td>
</tr>
<tr>
<td>&quot;Useful tender&quot; corn</td>
<td>88</td>
<td>85</td>
</tr>
<tr>
<td>&quot;Monlono tender&quot; corn</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Length, cm</td>
<td>16.5</td>
<td>18.5</td>
</tr>
<tr>
<td>Diameter, cm</td>
<td>4.4</td>
<td>4.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stalk diameter, cm</td>
<td>1.81</td>
<td>2.03</td>
</tr>
<tr>
<td>Plant height, m</td>
<td>1.80</td>
<td>2.27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross weight, kg</td>
<td>21.1</td>
<td>24.3</td>
</tr>
<tr>
<td>&quot;Trashed&quot; weight, kg</td>
<td>15.95</td>
<td>18.40</td>
</tr>
</tbody>
</table>

#### 2. Vitazyme (3 applications)

- **Fertilization:** Control, the "usual" N-P-K application; Vitazyme, 30% less nitrogen  
- **Vitazyme application:** 1 liter/ha on the soil at planting; 1 liter/ha on the leaves and soil twice during growth  
- **Growth, quality, and yield results:** Ten meter samples of the corn were harvested from each treatment for evaluations.  
- **Income results:** The yield increase was 3,200 kg/ha, at 1,300 pesos/ton.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased income from the extra yield</td>
<td>3,439 pesos/ha</td>
<td></td>
</tr>
<tr>
<td>Savings in nitrogen fertilizer</td>
<td>1,000 pesos/ha</td>
<td></td>
</tr>
<tr>
<td>Total benefit of Vitazyme</td>
<td>4,438 pesos/ha</td>
<td></td>
</tr>
<tr>
<td>Product cost</td>
<td>722 pesos/ha</td>
<td></td>
</tr>
<tr>
<td>Net increase in income</td>
<td>3,716 pesos/ha</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusions:** Vitazyme applied to sweet corn in this Mexican study produced a 12% increase of higher quality corn. The ears were longer and thicker, on taller and stronger stalks despite a 30% reduction in nitrogen fertilizer application. The economic benefit to the farmer was 3,716 pesos/ha, even without any consideration of the improved corn quality.

**Income Summary**

- Increased income from the extra yield: 3,439 pesos/ha  
- Savings in nitrogen fertilizer: 1,000 pesos/ha  
- Total benefit of Vitazyme: 4,438 pesos/ha  
- Product cost: 722 pesos/ha  
- Net increase in income: 3,716 pesos/ha

Vitazyme treated sweet corn shown here has considerably more root mass than the control, with much more soil clinging to the roots ... indicating a more vigorous rhizosphere. The ears are more mature as well with the Vitazyme treatment.

---

**Table:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Total seed pieces</th>
<th>Meters of row</th>
<th>Shoots, Oct. 1^2</th>
<th>Shoots, Oct. 18^3</th>
<th>Shoots per seed</th>
<th>Shoots per meter of row</th>
<th>Average height, cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1,239</td>
<td>110</td>
<td>505</td>
<td>0.41</td>
<td>845</td>
<td>0.69</td>
<td>7.67</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>938</td>
<td>96</td>
<td>580</td>
<td>0.62</td>
<td>949</td>
<td>1.01</td>
<td>9.97</td>
</tr>
</tbody>
</table>

1Four rows for each treatment were measured and totalled.  
2Thirty days after planting.  
3Forty-five days after planting.
Improvement in Fertilizer Efficiency with Vitazyme

Evidence from Replicated Field Trials — 1995 to 2004

The following studies demonstrate the effectiveness of Vitazyme for improving fertilizer nitrogen efficiency. Compare the improvement of yield with Vitazyme at each nitrogen level, and also the enhancement of yield with Vitazyme at a lower nitrogen level compared to the untreated yield at a higher nitrogen level (see the dotted lines). All of these studies have been conducted by universities, government testing stations, or contract researchers and have been statistically analyzed. For the full reports, go to www.vitalearth.com.

<table>
<thead>
<tr>
<th>Location</th>
<th>Year</th>
<th>Nitrogen lb/acre</th>
<th>Yield no Vitazyme</th>
<th>Yield with Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ames, Iowa (field corn)</td>
<td>1995</td>
<td>80</td>
<td>79.5 bu/acre</td>
<td>87.2 bu/acre</td>
</tr>
<tr>
<td></td>
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<td>120</td>
<td>80.4 bu/acre</td>
<td>89.1 bu/acre</td>
</tr>
<tr>
<td>Burlington, Iowa (field corn)</td>
<td>1996</td>
<td>80</td>
<td>127.6 bu/acre</td>
<td>155.2 bu/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120</td>
<td>155.2 bu/acre</td>
<td>165.6 bu/acre</td>
</tr>
<tr>
<td>Ames, Iowa (field corn)</td>
<td>1997</td>
<td>0</td>
<td>151.7 bu/acre</td>
<td>158.8 bu/acre</td>
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<td>183.5 bu/acre</td>
<td>186.6 bu/acre</td>
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<td>191.3 bu/acre</td>
<td>190.1 bu/acre</td>
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<td>Crossville, Tennessee (sweet corn)</td>
<td>1999</td>
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<td>3.8 tons/acre</td>
<td>4.9 tons/acre</td>
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<tr>
<td>Cedar Falls, Iowa (field corn)</td>
<td>2003</td>
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<td>145.8 bu/acre</td>
<td>155.4 bu/acre</td>
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<td>160</td>
<td>159.9 bu/acre</td>
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<tr>
<td>Elizabeth City, NC (field corn)</td>
<td>2004</td>
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<td>54.0 bu/acre</td>
<td>98.5 bu/acre</td>
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<td>138.4 bu/acre</td>
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<td>155.6 bu/acre</td>
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<td>159.4 bu/acre</td>
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<td>280</td>
<td>139.9 bu/acre</td>
<td>161.5 bu/acre</td>
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<tr>
<td>Clarkton, North Carolina (field corn)</td>
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<td>181.6 bu/acre</td>
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<td>170.2 bu/acre</td>
<td>162.6 bu/acre</td>
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<td>112</td>
<td>145.9 bu/acre</td>
<td>166.8 bu/acre</td>
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<td>151.2 bu/acre</td>
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<tr>
<td>Havana Province, Cuba (sweet potatoes)</td>
<td>2003</td>
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<td>26.73 tons/ha</td>
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<td></td>
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<td>32.33 tons/ha</td>
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<tr>
<td>Mantanzas Province, Cuba (sugar cane)</td>
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<td>109</td>
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<td>10.81 tons/ha</td>
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<td>73</td>
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<td>8.14 tons/ha</td>
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<td>8.94 tons/ha</td>
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<td>9.73 tons/ha</td>
<td>12.06 tons/ha</td>
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<tr>
<td>Santiago de Cuba, Cuba (sugar cane)</td>
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<td>11.95 tons/ha</td>
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<td>42</td>
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<td>15.05 tons/ha</td>
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<td>12.21 tons/ha</td>
<td>16.50 tons/ha</td>
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<tr>
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<td></td>
<td>88</td>
<td>4.65 tons/ha</td>
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<td>2.88 tons/ha</td>
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