2009 Field Trial Results

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

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

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

**Improved Symbiosis: The Secret of Vitazyme’s Action**

All plants that grow in soils develop an intimate relationship between the roots and the organisms that populate the root zone. The teeming billions of bacteria, fungi, algae, cyanobacteria, protozoa, and other organisms that grow along the root surfaces — the rhizosphere — are much more plentiful than in the bulk of the soil. This is because roots feed the organisms with dead root epidermal cells as well as compounds exuded from the roots themselves. The plant may inject 25% or more of its energy, fixed in the leaves as carbohydrates, amino acids, and other compounds, into the root zone to feed these organisms, for a very good purpose.

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

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

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

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

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

1. Ideally, analyze the soil at a reputable laboratory and correct deficiencies and imbalances with expert consultation.
2. Reduce nitrogen fertilizer applications for non-legumes using this test: Reduce the application each time the fertilizer normally is applied. Legumes normally need no added nitrogen. Vitazyme will accelerate legume nitrogen fixation.
3. Treat the seeds or transplant roots, if possible at planting. Treat seeds with a dilute Vitazyme solution, such as 1 liter of a 5% solution for every 50 kg of seed. Mix the seeds thoroughly in a seed or cement mixer or on a tarp. For excellent results apply the solution directly on the seed row with a planter attachment. Dip or spray transplant roots with a 1% or 2% solution.
4. Apply Vitazyme to the soil and/or foliage. Follow instructions for each crop. In most cases from 10 to 20 oz/acre can be applied per application at one to three times during the cropping cycle. A fall application on stubble is effective to accelerate residue breakdown.
5. Integrate other sound, sustainable management practices into a total program. Use crop rotations, minimum tillage, soil conservation practices, and adapted plant varieties.

### 2009 Vitazyme Field Trial Results

<table>
<thead>
<tr>
<th>Soil Organic Matter</th>
<th>Previous Crop</th>
<th>Compaction</th>
<th>Soil NO$_3$-N Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (&lt;1.5%)</td>
<td>Medium (1.5-3%)</td>
<td>High (&gt;3%)</td>
<td>Non-legume Legume</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>Much Little</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>1</td>
<td>Low Medium High</td>
</tr>
</tbody>
</table>

Total additive score: | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 |

Apply this % of optimum N: | 50-60% | 60-70% | 70-80%
This year presented a unique set of cold and wet, conditions across much of the northern United States, followed by dry and cool weather in the western part of the Midwest. Despite these problems, Vitazyme performed very well in these and other areas, on farms and in trials. Several new marketing areas were initiated, as the following highlights will reveal.

### Some Highlights for 2009

1. **Vitazyme Field Tests for 2009**
   - **Location:** Maryland Farms, Reaboro, Ontario, Canada
   - **Variety:** Pick Seed
   - **Soil type:** clay loam
   - **Cutting date:** July 15, 2009
   - **Experimental design:** A 50-acre silage field in 2008 was divided into two replicates of treated and untreated sections, and silage was made from both sections to determine the feeding value of the forage on the second cutting crop.

   - **Parameter** | **Unit** | **Control** | **Vitazyme** | **Change** |
   - Dry matter, as received | % | 69.08 | 72.33 | 3.25 (+5%) |
   - Protein (CP), N x 6.25 | % | 19.05 | 20.93 | 1.88 (+10%) |
   - UIP Bypass Est. | % of CP | 27.11 | 30.08 | 2.97 (+11%) |
   - Fiber | | |
   - Acid detergent fiber | % | 29.49 | 27.04 | (-2.45 -8%) |
   - Neutral detergent fiber | % | 40.38 | 35.54 | (-4.84 -12%) |
   - Lignin | % | 4.25 | 4.44 | 0.19 (+4%) |
   - Minerals | | |
   - Calcium | % | 1.48 | 1.57 | 0.09 (+6%) |
   - Phosphorus | % | 0.27 | 0.30 | 0.03 (+11%) |
   - Potassium | % | 1.69 | 1.75 | 0.06 (+4%) |
   - Magnesium | % | 0.17 | 0.17 | 0 |
   - Sodium | % | 0.10 | 0.03 | (-0.07 -70%) |
   - Zinc | ppm | 23.80 | 26.10 | 2.30 (+10%) |
   - Manganese | ppm | 22.62 | 20.11 | (-2.51 -11%) |
   - Copper | ppm | 6.90 | 7.18 | 0.28 (+4%) |
   - Energy | | |
   - TDN (est.) | % | 65.34 | 65.34 | 0 |
   - Non-fiber carbohydrates | % | 30.17 | 33.13 | 2.96 (+10%) |
   - Relative feed value | | 156.27 | 172.56 | 16.29 (+10%) |
   - Starch | % | 2.85 | 2.47 | (-0.38 -13%) |
   - WTDN | % | 66.48 | 68.51 | 2.03 (+3%) |
   - WNEL | ppm | 1.51 | 1.58 | 0.07 (+5%) |
   - WNEG | ppm | 0.76 | 0.82 | 0.06 (+8%) |
   - WNEM | ppm | 1.48 | 1.54 | 0.06 (+4%) |
   - Starch as % of NFC | % | 9.45 | 7.46 | (-1.99 -21%) |
   - Conclusions: In this Canadian haylage trial, comparing Vitazyme to an untreated control, the treated haylage showed a uniformly superior quality across most parameters. The changes were nearly all positive, and the reductions uncovered were generally for parameters that were favorable with a reduction. These changes are summarized on the next page.
Of particular interest in this study is a large 10% increase in relative feed value with Vitazyme, and a 10% increase in protein, with a commensurate 13% drop in starch content. Fiber also dropped, allowing for more nutritional components such as protein and minerals. All essential minerals except manganese increased in content of the haylage.

Researcher: Francis Otto
Location: Cherry Bay Orchards, Suttons Bay, Michigan
Variety: Gala on M26
Age: 12 years
Soil: stony
Experimental design: Two blocks of an orchard of Gala apples were selected to compare the effect of Vitazyme on yield and profitability of the crop. The two blocks were separated by some distance, but located on the same slope.

1. Control
2. Vitazyme

Fertilization: unknown
Vitazyme application: 16 oz/acre sprayed on the leaves at (1) pink, (2) petal fall, and (3) four weeks after petal fall

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Apple yield</th>
<th>Yield change</th>
<th>Apples &gt; 2.5 in</th>
<th>Size change</th>
<th>Yield &gt; 2.5&quot;</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>550 bu/acre</td>
<td>–––</td>
<td>77 %</td>
<td>14 %</td>
<td>423.5 bu/acre</td>
<td>––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>651 bu/acre</td>
<td>101 (+18%)</td>
<td>91 %</td>
<td>14 %</td>
<td>592.4 bu/acre</td>
<td>168.9 (+40%)</td>
</tr>
</tbody>
</table>

Income results: An estimated $11.00/bu is used to calculate these results.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Applied yield¹</th>
<th>Apple value</th>
<th>Income change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>423.5 bu/acre</td>
<td>4,658.50 $/acre</td>
<td>–– $/acre</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>592.4 bu/acre</td>
<td>6,516.40 $/acre</td>
<td>1,857.90 $/acre</td>
</tr>
</tbody>
</table>

¹> 2.5 inch apples for packout.

Extra income with Vitazyme: $1,857.90/acre
Net return for a 33.60/acre Vitazyme investment: $1,835.30/acre

Alfalfa such as this is easy to grow with Vitazyme, usually applied at spring greenup and after each cutting, at 13 oz/acre (1 liter/ha).
Conclusions: This Michigan apple trial proved that Vitazyme can greatly increase apple size and total yield of marketable fruit. Apples > 2.5 inches increased by 14 percentage points above the control with Vitazyme, and the total marketable yield was 40% above the control. This increase led to a remarkable $1,835.30/acre net improvement in income, with a return per dollar invested of $82.21.

Barley

Researcher: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists
Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine
Location: Ukraine central forest-steppe area near Vinnytsia
Seeding rate: 4 million seeds/ha
Variety: Nezabydka
Planting date: April 13, 2009
Previous crop: corn
Tillage: plowing, harrowing, and cultivation
Soil type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.
Experimental design: A uniform field was divided into plots of 1.0 ha each with three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either one or two foliar applications on the yield of spring barley.

1. Control
2. Vitazyme, once foliar
3. Vitazyme, twice foliar

Fertilization: 60 kg/ha N, 30 kg/ha P2O5, and 60 kg/ha K2O.
Vitazyme application: Treatment 2 received 1.0 liter/ha applied to the leaves and soil on May 15, 2009, and Treatment 3 received this first treatment plus a second foliar/soil treatment of 1.0 liter/ha on June 4, 2009.

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Barley yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons/ha</td>
<td>tons/ha</td>
</tr>
<tr>
<td>1. Control</td>
<td>4.60</td>
<td>–</td>
</tr>
<tr>
<td>2. Vitazyme, once foliar</td>
<td>5.03</td>
<td>0.43 (+9%)</td>
</tr>
<tr>
<td>3. Vitazyme, twice foliar</td>
<td>5.16</td>
<td>0.56 (+12%)</td>
</tr>
</tbody>
</table>

Quality results:

- **Crude Protein:**
  - Control: 9.9
  - Vitazyme once: 9.8
  - Vitazyme twice: 9.9

- **Grain Weight:**
  - Control: 632 grams/liter
  - Vitazyme once: 646 grams/liter
  - Vitazyme twice: 652 grams/liter

- **1,000 Grain Weight:**
  - Control: 56.0 grams
  - Vitazyme once: 57.5 grams
  - Vitazyme twice: 58.3 grams

Income results:

- **Income increase with Vitazyme on seeds:** 144 hrn/ha
- **Income increase with Vitazyme on seeds + leaves:** 48 hrn/ha

Conclusions: This spring barley trial in Ukraine, using Vitazyme as either one or two foliar applications at 1.0 liter/ha each time, revealed that both treatments boosted yield significantly. The single applications sprayed on the leaves and soil produced a 9% grain yield increase, whereas two foliar applications produced a 12% yield increase. Vitazyme did not increase grain protein, but increased grain weight per liter (2 to 3%) and 1,000 grain weight (3 to 4%). Such results prove the great value of this program to increase barley yields and profits in Ukraine.

Continued on the next page
Experimental design: A uniform field was divided into plots of 1.0 ha each with three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either one or two foliar applications on the yield of spring barley.

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Barley yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>4.67</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme, seeds</td>
<td>5.17</td>
<td>0.50 (+11%)</td>
</tr>
<tr>
<td>3. Vitazyme, seeds + leaves</td>
<td>5.44</td>
<td>0.77 (+16%)</td>
</tr>
</tbody>
</table>

• Increase in barley yield with Vitazyme, seed treatment: 11%
• Increase in barley yield with Vitazyme, seed + foliar treatment: 16%

Income results:

- Income increase with Vitazyme on seeds: 360 hrn/ha
- Income increase with Vitazyme on seeds + leaves: 376 hrn/ha

Conclusions: Barley treated with Vitazyme in this Ukraine test revealed that a 1.0 liter/ha seed application produced an excellent 11% grain yield increase, while an additional foliar 1.0 liter/ha application further improved yield to 16%. Moreover, quality factors were improved with Vitazyme: crude protein (a favorable reduction, or small increase), grain weight (+2 to 8%), grains per head (+6 to 11%), and grain weight per head (+8 to 14%).

Barley

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

Variety: Lofant

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

Location: Ukraine central forest-steppe area near Vinnytsia

Planting date: April 13, 2009

Tillage: plowing, harrowing, and cultivating

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

Experimental design: A uniform field was divided into plots of 1.0 ha each with three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either one or two foliar applications on the yield of spring barley.

1. Control
2. Vitazyme, once foliar
3. Vitazyme, twice foliar

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

Vitazyme application: Treatment 2 received 1.0 liter/ha applied to the leaves and soil on May 15, 2009, and Treatment 3 received this first treatment plus a second foliar/soil treatment of 1.0 liter/ha on June 4, 2009.

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Barley yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>4.61</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme, seeds</td>
<td>5.06</td>
<td>0.45 (+10%)</td>
</tr>
<tr>
<td>3. Vitazyme, seeds + leaves</td>
<td>5.21</td>
<td>0.60 (+13%)</td>
</tr>
</tbody>
</table>

• Increase in barley yield with Vitazyme, once foliar: 11%
• Increase in barley yield with Vitazyme, twice foliar: 16%
**Quality results:**

<table>
<thead>
<tr>
<th>Crude Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control: 10.5</td>
</tr>
<tr>
<td>Vitazyme once: 10.0</td>
</tr>
<tr>
<td>Vitazyme twice: 10.6</td>
</tr>
</tbody>
</table>

**Income results:**

- **Income increase with Vitazyme on seeds:** 360 hrn/ha
- **Income increase with Vitazyme on seeds + leaves:** 376 hrn/ha

**Conclusions:** This spring barley trial in Ukraine, using Vitazyme as either one or two foliar applications at 1.0 liter/ha each time, revealed that both treatments boosted yield significantly. The single application sprayed on the leaves and soil produced a 10% yield increase, whereas two foliar applications produced a 13% yield increase. Vitazyme also did not increase grain protein, but increased grain weight per liter and 1,000 grain weight (up to 4%). Such results prove the great value of this program to increase barley yields in Ukraine.

**Bush Beans**

**A comparison of two formulations**

**Researcher:** Paul W. Syltie, Ph.D.  
**Variety:** Topcrop  
**Pot size:** 1 gallon  
**Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas  
**Planting rate:** 10 seeds/pot, thinned to three plants  
**Planting date:** May 6, 2009  
**Soil:** Bowie fine sandy loam  
**Experimental design:** A greenhouse experiment was set up to evaluate the relation merits of two Vitazyme formulations in stimulating bush bean growth.

1. **Control**  
2. **Vitazyme formula 1**  
3. **Vitazyme formula 2**

**Vitazyme application:** At planting, 100 ml of a 0.05% solution of Vitazyme for each formulation was applied evenly to the soil surface of each pot. Formula 1: lot from September 5, 2008; Formula 2: lot form 2008 - 4. The control received 100 ml of water only.

**Harvest date:** On June 2, 2009, the plant roots were washed free of soil and dried in a drying oven at about 125°F for 48 hours. Then the dried plants were weighed to the nearest 0.01 gram. Plant heights were determined before drying, measuring to the nearest cm.

**Height results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Height change</th>
</tr>
</thead>
<tbody>
<tr>
<td>cm</td>
<td>cm</td>
<td></td>
</tr>
<tr>
<td>3. Vitazyme - 2</td>
<td>34.88 a</td>
<td>3.01 (+9%)</td>
</tr>
<tr>
<td>2. Vitazyme - 1</td>
<td>33.28 ab</td>
<td>1.41 (+4%)</td>
</tr>
<tr>
<td>1. Control</td>
<td>31.87 b</td>
<td>---</td>
</tr>
<tr>
<td>Block P</td>
<td>0.587</td>
<td></td>
</tr>
<tr>
<td>Main effects P</td>
<td>0.227</td>
<td></td>
</tr>
<tr>
<td>Model P</td>
<td>0.488</td>
<td></td>
</tr>
<tr>
<td>CV</td>
<td>10.6%</td>
<td></td>
</tr>
<tr>
<td>LSD_{0.1}</td>
<td>2.90 cm</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion:** In this greenhouse bush bean study, Vitazyme Formula 2 produced plants significantly taller than the control plants (9%), but these were statistically equal to the Formula 1 beans. The dry weights of the three treatments were not significantly different, but the Formula 2 produced plants that were 13% heavier than the control plants, while the Formula 1 plants were 11% greater. Due to the excessively high greenhouse temperatures during the study, there may have been reduced crop response to the two products, but based on these data the Vitazyme Formula 2 performed the best of the two products.

**Bush Bean Dry Weight**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dry weight</th>
<th>Weight change</th>
</tr>
</thead>
<tbody>
<tr>
<td>grams</td>
<td>grams</td>
<td></td>
</tr>
<tr>
<td>3. Vitazyme - 2</td>
<td>3.50 a</td>
<td>0.40 (+13%)</td>
</tr>
<tr>
<td>2. Vitazyme - 1</td>
<td>3.43 a</td>
<td>0.33 (+11%)</td>
</tr>
<tr>
<td>1. Control</td>
<td>3.10 a</td>
<td></td>
</tr>
<tr>
<td>Block P</td>
<td>0.902</td>
<td></td>
</tr>
<tr>
<td>Main effects P</td>
<td>0.531</td>
<td></td>
</tr>
<tr>
<td>Model P</td>
<td>0.896</td>
<td></td>
</tr>
<tr>
<td>CV</td>
<td>23.5%</td>
<td></td>
</tr>
<tr>
<td>LSD_{0.1}</td>
<td>0.60 gram</td>
<td></td>
</tr>
</tbody>
</table>

Both formulations improved root and leaf growth, by 11 and 13% above the control in terms of dry matter weight.

**Bush Bean Height**

<table>
<thead>
<tr>
<th>Plant height, cm</th>
<th>Plant height, cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>25</td>
</tr>
<tr>
<td>Vitazyme 1</td>
<td>30</td>
</tr>
<tr>
<td>Vitazyme 2</td>
<td>35</td>
</tr>
</tbody>
</table>

This greenhouse study revealed that Formula 2 of Vitazyme performed only slightly better than Formula 1.
**Bush Beans**

**Synergism with Twin N and Revive Plus**

**Researcher:** Paul W. Syltie  
**Location:** Vital Earth Resources Research Greenhouse, Gladewater, Texas  
**Variety:** Topcrop  
**Planting date:** January 30, 2009  
**Soil type:** silt loam  
**Pot size:** 1 gallon

**Experimental design:** A greenhouse study was set up to evaluate the effect of Vitazyme, Twin N, and Revive Plus, alone or together, on the growth of bush beans. Five treatments with seven replicates were utilized.

1. **Control**  
2. **Vitazyme (13 oz/acre)**  
3. **Twin N (1.25 grams/ha)**  
4. **Vitazyme + Twin N (2 and 3 combined)**  
5. **Vitazyme + Twin N + Revive Plus (2 and 3 combined, 20 oz/acre)**

**Fertilization:** none

**Vitazyme applications:** A simple application was made on the soil surface at 13 oz/acre (1 liter/ha)

**Twin N application:** Twin N is a formulation of several endophytic and free-living nitrogen fixing organisms that are freeze-dried, and reconstituted before an application of 1.25 grams/ha.

**Revive Plus applications:** Revive Plus is 20% natural carboxylic acids, 8% “other proprietary ingredients”, and 72% inert ingredients, applied at 20 oz/acre.

**Growth results:** Various plant parameters were measured at harvest on March 11, 2009, 41 days after planting. The plants growing under the various treatments are as follows:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant Height</th>
<th>Flower Clusters</th>
<th>Set Beans</th>
<th>Root Color</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Change (%)</td>
<td>Change (%)</td>
<td>Change (%)</td>
<td>Scale</td>
</tr>
<tr>
<td><strong>Increase in plant height</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twin N</td>
<td>+13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Revive Plus</td>
<td>+4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>+4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+4%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Change (%)</th>
<th>Change (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increase in set beans</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+147%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ Revive Plus</td>
<td>+77%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+66%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>+14%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Change (%)</th>
<th>Change (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Root Color</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scale</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Set Beans**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Change (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increase in set beans</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+147%</td>
<td></td>
</tr>
<tr>
<td>+ Revive Plus</td>
<td>+77%</td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>+66%</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>+14%</td>
<td></td>
</tr>
</tbody>
</table>

**Open Flowers**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Change (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Decrease in open flowers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>-11%</td>
<td></td>
</tr>
<tr>
<td>+ Revive Plus</td>
<td>-15%</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>-25%</td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Twin N</td>
<td>-44%</td>
<td></td>
</tr>
</tbody>
</table>
were placed in a drying oven for 24 hours at 130° F. 

**Conclusions:** This greenhouse study of bush beans, using Vitazyme, Twin N, and Revive Plus, revealed that Twin N provided the greatest overall plant growth stimulation (+33%), though this increase was significantly equal to Vitazyme + Twin N (+23%) and Vitazyme + Twin B + Revive Plus (+23%). On the other hand, total flower characters, a good indication of final yield, was highest for all three products combined (+58%), while Vitazyme + Twin N gave a 49% increase. Vitazyme alone gave a 31% flower cluster increase, while Twin N alone provided a 26% increase above the control. The number of set beans was by far the highest for the three combined products (+147%), which was significantly greater than the other treatments. Plant height was greatest with Twin N, as was the root color … a light color indicating aggressive disease-free new roots, although Vitazyme and all three products combined provided significantly equal root conditions. Only Vitazyme treatment gave root nodules in a few of the plants. Ironically, the control treatment had the largest number of open flowers, but characters and set beans were least for this treatment.

This study shows that while Twin N stimulated the greatest overall plant growth in terms of plant height, dry weight, and root condition, but the apparent best treatment related to the highest yield potential in the combination of Vitazyme, Twin N, and Revive plus. the number of flower clusters and set beans was highest for this treatment.
Conclusions: In this greenhouse study with Vitazyme and Revive Plus, Vitazyme proved to be the best material for stimulating dry weight increase (+26%), which was statistically equal to Revive Plus and the two products combined. Vitazyme alone also gave the lightest colored roots (indicating more new root growth), the most open flowers, the most set beans, and also the greatest plant height ... though in most cases the treatment values were not significantly greater than for Revive Plus and the combined products. The study shows that the combined products did not give a synergistic response in this greenhouse growing environment, although Revive Plus by itself oftentimes produced growth responses slightly less than those of Vitazyme.
Researchers: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xino Wenzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute  
Location: Xinzhou, Jinshi, Hunan, China  
Variety: Jingfeng 1  
Planting date: July 25, 2009  
Experimental design: A two treatment design with three replications was placed with a cabbage field, each plot being 0.4 heaters. The purpose of the study was to evaluate the efficacy of this product to promote yield and crop income.

Fertilization: unknown  
Vitazyme application: (1) seeds soaked in a 5% Vitazyme solution for 5 minutes (July 25); (2) transplant roots dipped in a 1% solution for 5 minutes (August 30); (3) 1.0 liter/ha sprayed on the leaves and soil 30 days after transplanting (September 30); (4) 1.0 liter/ha sprayed 60 days after transplanting (November 2).

Harvest date: unknown  
Yield results:  
- Increase in head diameter: 9%  
- Increase in head weight: 11%  
- Increase in cabbage yield: 11%

Conclusions: This cabbage study in China, where Vitazyme was applied on the seeds, transplants, and twice on the leaves and soil, revealed increases in head diameter and head weight, plus an 11% increase in yield. Moreover, the income was increased by 11% with Vitazyme compared to the untreated control. These results show that this product can excellently improve cabbage yield and income in China.

---

Researchers: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists  
Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine  
Variety: Black Giant, super elite  
Seeding rate: 7 kg/ha  
Seeding date: August 30, 2008  
Previous crop: spring barley  
Location: Ukraine central forest-steppe area near Vinnytsia  
Tillage: plowing, cultivation, and harrowing  
Soil type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil "hydrolyzed nitrogen", 15.8 mg/100g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.  
Experimental design: A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha, replicated four times, to discover the effect of the product on the canola yield.  

1. Control  
2. Vitazyme once  
3. Vitazyme twice  
Fertilization: in the fall of 2008, 30 kg/ha N, 60 kg/ha P₂O₅, and 90 kg/ha K₂O; in the spring of 2009, 90 kg/ha of N.

Vitazyme application: Treatment 1 received a fall application at 1.0 liter/ha on October 22, 2008, and Treatment 2 received this treatment plus another in the spring on April 30, 2009, at 1.0 liter/ha.

Yield results:  

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Canola yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>4.46</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>5.15</td>
<td>0.69 (+15%)</td>
</tr>
<tr>
<td>3. Vitazyme, fall</td>
<td>5.64</td>
<td>1.18 (+26%)</td>
</tr>
</tbody>
</table>

Continued on the next page
**Income results:**

- **Increase in income with fall Vitazyme:** 1,663 hrn/ha
- **Increase in income with fall + spring Vitazyme:** 2,786 hrn/ha

**Conclusions:** This winter canola trial at Vinnytsia, Ukraine, revealed that a single Vitazyme application in the fall, at 1 liter/ha, gave a large yield increase of 15%. An additional spring application at 1 liter/ha provided nearly double the fall-only application: 26%. Both treatments resulted in substantial increases in income, of 1,663 and 2,786 hrn/ha. These results prove the great utility of this product to improve winter canola yields under Ukrainian soil and climatic conditions.

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**Celery Cabbage**

**Researcher:** unknown  
**Location:** Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam  
**Variety:** unknown  
**Soil type:** unknown  
**Planting date:** March, 2009  
**Fertilization:** unknown  
**Experimental design:** A field of celery cabbage was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

1. Control  
2. Vitazyme twice

**Vitazyme application:** Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

**Height results:** At harvest time the average plant height was determined for each treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Height change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>31.0</td>
<td>–––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>33.1</td>
<td>2.1 (+7%)</td>
</tr>
</tbody>
</table>

**Yield results:** The crop was harvested in April of 2009.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Crop yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>31.01</td>
<td>–––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>36.60</td>
<td>5.59 (+18%)</td>
</tr>
</tbody>
</table>

**Conclusions:** This study on celery cabbage in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased both plant height (7%) and yield (5.59 tons/ha, or 18%). The product's active agents have been show to greatly stimulate the growth and yield of this vegetable crop in Southeastern Asia.

- **Increase in plant height:** 7%  
- **Increase in yield:** 18%

---

**Corn**

**Agricultural Custom Research Education Services**

**A study on phosphorus availability for corn**

**Researcher:** Bert Schou, Ph.D.  
**Location:** Cedar Falls, Iowa  
**Variety:** Pioneer 34R67 (Roundup Ready, 108-day maturity, BCOR)  
**Tillage:** conventional  
**Planting depth:** 2 inches  
**Seeding rate:** 32,00 seeds/acre  
**Planting date:** May 19, 2009

**Soil type:** Kenyon loam  
**Previous crop:** soybeans  
**Row width:** 30 inches  
**Soil test results:** (composite of all plots, Perry Agricultural Lab, Bowling Green, Missouri). CEC, 17.5; pH, 5.8; organic matter, 2.2%; N, 64 lb/acre; S, 18 lb/acre; P₂O₅, 264 lb/acre; Ca, 4,766 lb/acre; Mg, 504 lb/acre; K, 495 lb/acre; Na, 51 lb/acre; B, 1.94 lb/acre; Fe, 668 lb/acre; Mn, 94 lb/acre; Cu, 1.8 lb/acre; Zn, 8.2 lb/acre  
**Experimental design:** An area of low phosphorus soil was selected and arranged in a six treatment pattern with six replications (Latin Square design), the plots being 15 x 40 feet (0.0138 acre). The center two rows were harvested for yield determinations. The purpose of the study was to determine the ability of Vitazyme to improve corn yields at various levels of phosphorous fertility.

**This Iowa study shows corn treated with Vitazyme on the left. It is taller and more aggressive than the control on the right.**

**The early growth of this corn, at the medium phosphorus level, is much greater with Vitazyme treatment.**

**Increase in canola yield**

<table>
<thead>
<tr>
<th>Season</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall application</td>
<td>+15%</td>
</tr>
<tr>
<td>Fall + Spring</td>
<td>+26%</td>
</tr>
</tbody>
</table>
Fertilization: Nitrogen was applied as 18-46-0 and 46-0-0% N-P2O5-K2O, to achieve 100 lb/acre of N for all plots. Potassium was adequate and none was applied. Phosphorous was applied as 18-46-0, calculated at levels to give 50 and 100% of the soil test recommendations for plots 3 to 6. All nutrients were applied pre-plant dry.

Vitazyme applications: (1) 13 oz/acre in-furrow at planting on May 19, 2009; (2) 13 oz/acre sprayed on the leaves and soil at V6 (20-inch height) on June 23, 2009.

Weed control: excellent, with glyphosate applied three times.

Seasonal weather: The 2009 growing season was cool and wet; rainfall was 45% above normal, and corn harvesting was delayed two to three weeks beyond the norm.

Harvest date: November 4, 2009, using an MF 8 plot combine to harvest a 5-foot width.

Yield results: Plant population was all between 27,117 to 27,572 plants/acre (no significant differences).

Conclusions: This plot study in Iowa, to evaluate the effect of three phosphorous levels on corn yield with and without Vitazyme, revealed no significant yield differences but a solid trend for higher grain yields with Vitazyme at each phosphorous level. These increases ranged from 2 to 6 bu/acre, showing that the known mycorrhizae stimulation by Vitazyme’s active agents was bringing more phosphorus, and other elements, into the plant for improved growth.

Researcher: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists
Organization: Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine
Location: Ukraine central forest-steppe area near Vinnytsia
Variety: Ronaldinio
Planting date: May 22, 2009
Seeding rate: 22 kg/ha
Tillage: plowing, harrowing, and cultivation
Previous crop: winter wheat
Soil type: gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100g of soil phosphorous, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.

Experimental design: A uniform field was divided into plots of 1.0 ha each with two treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either a seed application, or a seed plus foliar application, despite only one application, note the excellent crop response. Adding fish to Vitazyme caused an even better response.
on the yield of corn grain.

1. Control

Fertilization: 60 kg/ha, 30 kg/ha P₂O₅, and 60 kg/ha K₂O

Vitazyme application: Treatment 2 received 1.0 liter applied to the leaves and soil on June 25, 2009, at the 7 to 8 leaf stage

Yield results:

• Increase in corn yield: 8%

Conclusions: Corn grain with and without Vitazyme (1 liter/ha, foliar) in this Ukraine study showed an 8% yield increase. Moreover, the return to the farmer was improved substantially.

Corn

Researcher: Nathan Temples
Variety: 32 D 78
Farm cooperator: Donnie and Chris Wondel, D and C Farms
Location: Arbor, Missouri
Planting rate: 29,000 seeds /acre
Irrigation: furrow, six times
Experimental design: A 55-acre field was treated with Vitazyme on 40 acres, using seed and foliar treatments, to determine if this product would increase the yield of grain.

1. Control

Fertilization: unknown

2. Vitazyme

Vitazyme application: (1) 8 oz/acre on the seeds at planting; (2) 13 oz/acre on the leaves and soil at 7 inches height, with a herbicide

Harvest date: October 6, 2009

Yield results: see graph at left.

Conclusions: In this Missouri corn trial, using seed and foliar/soil applications, the Vitazyme treatments increased grain yield by 9% (15 bu/acre) in this high-yielding field, showing the program's great effectiveness in corn programs, even when yields are high.

• Increase in corn yield: 9%

This Missouri trial also produced excellent root and ear size responses to Vitazyme. The 5 bu/acre increase was very profitable.

• Increase in corn yield: 2.5%

Corn

Researcher: Nathan Temples
Variety: Pioneer 33 N 58
Farm cooperator: Schlosser Farms
Location: Perkins, Missouri
Soil type: silt loam
Planting rate: 25,000 seeds /acre
Planting date: April 20, 2009
Irrigation: none
Experimental design: Five acres of a 90-acre corn field were treated with Vitazyme, applied with the herbicide, to determine the product’s ability to improve crop yields.

1. Control

2. Vitazyme

Fertilization: 160-50-90 lb/acre N-P₂O₅-K₂O preplant

Vitazyme application: 13 oz/acre with the herbicide, 42 days after planting

Yield results: See graph at right.

Conclusions: A Missouri corn study showed that Vitazyme, applied along with a herbicide at 13 oz/acre, increased yield by 5 bu/acre (+2.5%).

Corn

Researcher: Nathan Temples
Soil type: sandy, six times
Farm cooperator: Seyer Farms
Location: Oran, Missouri
Variety: DeKalb
Planting rate: 29,000 seeds /acre
Row-spacing: 30 inches
Irrigation: furrow, six times
Experimental design: An 80-acre irrigated corn field was divided into 60 acres treated with Vitazyme, and 20 acres left untreated.

This Missouri trial also produced excellent root and ear size responses to Vitazyme. The 5 bu/acre increase was very profitable.

• Increase in corn yield: 2.5%
ed, to determine the product's effect on crop yield.

1. Control

2. Vitazyme

Fertilization: unknown

Vitazyme application: 13 oz/acre along with a herbicide

Harvest date: September 14, 2009

Yield results:

- **Increase in corn yield: 3.3%**

**Conclusions:** In this high yielding Missouri irrigated corn trial, Vitazyme increased corn yield by 7 bu/acre (3.3%), showing the utility of this product to improve production even at high yield levels.

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**Corn**

**Researcher:** Nathan Temples  
**Farm cooperators:** Parker Brothers

**Location:** Sikeston, Missouri  
**Variety:** Pioneer 33N58

**Soil type:** sandy loam  
**Planting rate:** 31,500 seeds /acre

**Row-spacing:** 38 inches  
**Irrigation:** unknown

**Planting date:** April 23, 2009

**Experimental design:** A corn field received Vitazyme on the seeds of 24 rows within the field, to determine the effects of this product on corn yield.

1. Control

2. Vitazyme

**Fertilization:** 200-60-90 lb/acre N-P$_2$O$_5$-K$_2$O

**Vitazyme application:** 8 oz/acre on the seeds at planting

**Harvest date:** September 23, 2009

**Yield results:**

- **Increase in corn yield: 3.3%**

**Conclusions:** This high yielding corn study in Missouri revealed that Vitazyme, applied at 8 oz/acre to the seeds at planting, increased yield by 6 bu/acre (+3%). This is a highly profitable additional yield, to reveal the potential of Vitazyme to improve corn yields in the Corn Belt of Missouri.

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**Treatment of the cut corn versus molasses**

**Researcher:** Richard Stonewigg  
**Location:** Gicheha Farm, Brooke Side Dairies, Kenya  
**Variety:** unknown

**Soil type:** unknown  
**Date of silage preparation:** August 15, 2008  
**Age at chopping:** 130 days

**Experimental design:** Corn was cut for silage and prepared in the two environments, one with Vitazyme and the other with molasses. Comparisons of the feeding value were made with typical silage evaluations.

1. Vitazyme

2. Molasses

**Vitazyme treatment:** A silage heap was prepared by layering 10 tons of chopped maize, uniformly sprayed with 200 ml of Vitazyme (20 ml per ton of silage) in 200 liters of water, with another 10 ton layer that received the same Vitazyme treatment. The heap was then covered with a polyethylene tarp, and ensiling continued until August 10, 2009, when samples were collected.

**Molasses treatment:** In a manner similar to Vitazyme treatment, 20 kg of molasses (2 kg per ton of silage) in 200 liters were sprayed uniformly on two 10 ton layers of silage, and covered with a polyethylene tarp.

**Quality analysis of the silage:** On August 10 of 2009 the silage began to be fed to the cattle, at which time samples from each treatment were taken and submitted to an American Breeding Society laboratory for analysis. Results are shown below.

**Comments by the general manager of Gichelon Farm:** “On silage made by using Vitazyme compared with the known value using molasses,

- Very good dry matter; the best we have ever achieved was 30.45 at 123 days past germination [versus 32.00% here].

- Very high crude protein; the average for maize is 8% crude protein [versus 11.3% here].

Recommendation: promote Vitazyme as a product for silage making.”

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**A comparison of two formulations**

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

**Variety:** yellow dent  
**Soil:** Bowie fine sandy loam  
**Pot size:** 1 gallon

**Planting rate:** 10 seeds/pot, thinned to three plants  
**Planting date:** May 6, 2009

**Experimental design:** A greenhouse experiment was set up to evaluate the relation merits of two Vitazyme formulations to stimulate corn growth.

1. Control

2. Vitazyme formula 1

3. Vitazyme formula 2

**Vitazyme application:** At planting, 100 ml of a 0.05% solution of Vitazyme for each formula.

Continued on the next page
tion was applied evenly to the soil surface of each pot. Formula 1: lot from September 5, 2008; Formula 2: lot from 2008 – 4. The control received 100 ml of water only. **Harvest date:** On June 2, 2009, the plant roots were washed free of soil and dried in a drying oven at about 125° F for 48 hours. Then the dried plants were weighed to the nearest 0.01 gram. Plant heights were determined before drying, measuring to the nearest cm.

**Height results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Height change</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Vitazyme - 2</td>
<td>70.14 a</td>
<td>7.98 (+13%)</td>
</tr>
<tr>
<td>2. Vitazyme - 1</td>
<td>65.44 ab</td>
<td>3.28 (+5%)</td>
</tr>
<tr>
<td>1. Control</td>
<td>62.16 b</td>
<td>––</td>
</tr>
<tr>
<td>Block P</td>
<td>0.833</td>
<td>––</td>
</tr>
<tr>
<td>Main effects P</td>
<td>0.043*</td>
<td>––</td>
</tr>
<tr>
<td>Model P</td>
<td>0.371</td>
<td>––</td>
</tr>
<tr>
<td>CV10.6%</td>
<td>9.3%</td>
<td>––</td>
</tr>
<tr>
<td>LSD0.05</td>
<td>6.12 cm</td>
<td>––</td>
</tr>
</tbody>
</table>

**Conclusions:** This greenhouse study with corn, to determine the effects of Vitazyme, Twin N, and Revive Plus on plant height and dry weight, revealed that all three products combined gave

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### Synergism with Twin N and Revive Plus

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

**Variety:** yellow dent  
**Planting date:** January 30, 2009  
**Soil type:** silt loam  
**Pot size:** 1 gallon

**Experimental design:** A greenhouse study was set up to evaluate the effect of Vitazyme, Twin N, and Revive Plus, alone or together, on the growth of corn. Five treatments with seven replicates were utilized.

1. Control  
2. Vitazyme (13 oz/acre)  
3. Twin N (1.25 grams/ha)  
4. Vitazyme + Twin N (same as 2 and 3)  
5. Vitazyme + Twin N + Revive Plus (same as 2 and 3, + 20 oz/acre)

**Fertilization:** none

**Vitazyme applications:** A single application was made on the soil surface at 13 oz/acre (1 liter/ha)

**Twin N application:** Twin N is a formulation of several andophytic and free-living nitrogen fixing nitrogen fixing organisms that are freeze-dried, and reconstituted before an application of 1.25 grams/ha.

**Revive Plus applications:** Revive Plus is 20% natural carboxylic acids, 8% “other proprietary ingredients”, and 72% inert ingredients, applied at 20 oz/acre.

**Growth results:** Various plant parameters were measured at harvest on March 9, 2009, 39 days after planting. The plants were placed in a drying oven for 48 hours at 130° F.

---

**Plant Height**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plant height</th>
<th>Height change</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Vita + Twin N + R+</td>
<td>97.7 a</td>
<td>8.0 (+9%)</td>
</tr>
<tr>
<td>4. Vita + Twin N</td>
<td>93.8 ab</td>
<td>4.1 (+5%)</td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>92.4 ab</td>
<td>2.7 (+3%)</td>
</tr>
<tr>
<td>3. Twin N</td>
<td>91.3 b</td>
<td>1.6 (+2%)</td>
</tr>
<tr>
<td>1. Control</td>
<td>89.7 b</td>
<td>––</td>
</tr>
<tr>
<td>Block P</td>
<td>0.065</td>
<td>––</td>
</tr>
<tr>
<td>Main effects P</td>
<td>0.049*</td>
<td>––</td>
</tr>
<tr>
<td>Model P</td>
<td>0.031*</td>
<td>––</td>
</tr>
<tr>
<td>CV</td>
<td>5.2%</td>
<td>––</td>
</tr>
<tr>
<td>LSD0.05</td>
<td>5.3 cm</td>
<td>––</td>
</tr>
</tbody>
</table>

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

**Conclusions:** Vitazyme Formula 1 in this greenhouse study produced significantly taller plants than did the control (+13%), but a statistically equal height to Formula 2, which was 5% taller than the control. However, all dry plant weights were statistically the same even though Vitazyme Formula 1 increased height by 10% above the control, and Formula 2 by 8% above the control. These results show very close similarities in corn response for both formulations, but excessively high greenhouse temperatures may have reduced the response by both materials.
the highest crop response for both plant height (+9%) and dry weight (18%). These values were significantly greater than Twin N and the control in both cases, while Vitazyme and Vitazyme + Twin N were statistically the same as for the three products combined. Apparently the growth stimulators working together produced an excellent synergism, although Vitazyme alone gave the second highest dry weight increase of all five treatments (14%), only 4 percentage points less than for the three combined products.

**Corn Synergism with Revive Plus**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dry weight*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Vita + Twin N + R+</td>
<td>14.0 a</td>
<td>2.1 (+18%)</td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>13.6 ab</td>
<td>1.7 (+14%)</td>
</tr>
<tr>
<td>4. Vita + Twin N</td>
<td>13.3 ab</td>
<td>1.4 (+12%)</td>
</tr>
<tr>
<td>3. Twin N</td>
<td>12.8 bc</td>
<td>0.9 (+8%)</td>
</tr>
<tr>
<td>1. Control</td>
<td>11.9 c</td>
<td>—</td>
</tr>
<tr>
<td>Block P</td>
<td>0.262</td>
<td>—</td>
</tr>
<tr>
<td>Main effects P</td>
<td>0.018*</td>
<td>—</td>
</tr>
<tr>
<td>Model P</td>
<td>0.045*</td>
<td>—</td>
</tr>
<tr>
<td>CV</td>
<td>8.6%</td>
<td>—</td>
</tr>
<tr>
<td>LSD_{0.05}</td>
<td>1.2</td>
<td>—</td>
</tr>
</tbody>
</table>

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

**Increase in plant height**

- Vitazyme + Twin N + Revive + .......... +9%
- Vitazyme + Twin N + Revive .......... +5%
- Vitazyme + Twin .......... +3%
- Twin N ............... +2%

**Increase in dry weight**

- Vitazyme + Twin N + Revive + ............ +18%
- Vitazyme ................. +14%
- Vitazyme + Twin .......... +12%
- Twin N ............... +8%

**Growth results**: On March 9, 2009, 38 days after planting, the corn roots were washed clean of residual soil, and plant height was measured. Then the plants were placed in a drying oven and dried at 130°F for 48 hours before weighing.

**Conclusions**: In this greenhouse corn trial with Vitazyme and Revive Plus, Revive Plus provided the greatest plant height (4%) and dry weight increases (9%), although none of the changes for any treatments were significant. The degree of experimental error was too high to result in significant differences among treatments, except for Revive Plus exceeding the control for plant dry weight.

**Increase in plant height**

- Revive Plus .......... +4%
- Vitazyme ................. +1%

**Increase in dry weight**

- Revive Plus .......... +9%
- Vitazyme + Revive Plus .......... +5%
- Vitazyme ................. +1%

Location: Xinzhou, Jinshi, Hunan, China  
Variety: Jingfeng 1  
Planting date: April 14, 2009

Experimental design: A two treatment design with three replications was placed with a cotton field, each plot being 0.4 hectares. The purpose of the study was to evaluate the efficacy of this product to promote cotton growth, yield, and income.

1. Control  
2. Vitazyme

Fertilization: unknown

Vitazyme application: (1) a seed soak of 5% Vitazyme for 5 minutes (April 14); 1.0 liter/ha sprayed on the leaves and soil at early flowering (July 10)

Growth results: The researchers observed stronger growth, thicker stems, larger leaves, more bolls, and a larger boll size with Vitazyme than with the control treatment.

Harvest date: unknown  
Yield results:  
Income results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income (RMB/ha)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20,328</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>23,408</td>
<td>3,080 (+15%)</td>
</tr>
</tbody>
</table>

Conclusions: This cotton trial in China revealed that Vitazyme greatly improved cotton growth in terms of stem diameter (11%), leaf length (3%), leaf width (10%), bolls per plant (11%), and boll weight (4%). These improvements led to a yield increase of 15% above the untreated control, and an income increase of 15%. These results show the great utility and profitability of this product for cotton in China.

- Increase in lint yield: 15%  
- Increase in stem diameter: 11%  
- Increase in income: 15%  
- Increase in leaf length: 10%  
- Increase in leaf width: 10%  
- Increase in bolls per plant: 11%  
- Increase in boll weight: 4%

Fish (Tilapia and Catfish)

Researchers: Nana Oti and Emmanuel N. Aryee  
Location: Ministry of Fisheries, Ghana

Experimental design: Few details on the study are available.

Tilapia. A fish pond was treated with Vitazyme (1 liter/ha) on the soil several days before flooding. Another pond received regular additions of Vitazyme to the water, and a third pond received on Vitazyme.

Catfish. One fish pond received food not treated with Vitazyme, whereas another pond received treated food.

Results: Average weights of the fish were taken at frequent intervals, the results displayed on the two figures below.

Increase in weight at the end of the trial: 170 grams (Vitazyme) - 143 grams (control) = 27 grams (19%)
Increase in weight at the end of the trial: 250 grams (Vitazyme) - 200 grams (control)= 50 grams (25%)

Conclusions: This study was plagued by a series of problems, including cloudiness and cold temperatures that slowed food production in the ponds, some female tilapia with what should have been an all-male population, and a resulting reduction in overall growth rates of both species. Nevertheless, Vitazyme added to the water increased the final tilapia weight by 19% (170 grams vs. 143 grams), and the average catfish weight by 25% (250 grams vs. 200 grams). The biggest difference in the growth patterns occurred towards the end of the study for both species, perhaps because more sunlight increased water temperature and growth efficiency at this time. This study has proven a fine potential for Vitazyme use in the Ghana fish industry.

Grapes
Response of plants in a young vineyard

Researcher: Rafael Jordan
Location: Agricola Chacabuco, Chile
Variety: Thompson seedless
Soil type: unknown
Vine spacing: 3.0 x 3.5 meters
Vine age: 3 years (planted in 2007)

Experimental design: A grape vineyard of 3.28 ha was selected to apply Vitazyme on a portion of the young vines. The purpose of the trial was to evaluate the effect of the product on vine growth and development as measured by trunk diameter.

1. Control
2. Vitazyme

Fertilizer application: unknown
Vitazyme treatment: (1) 1.5 liters/ha on the leaves on November 25, 2008; (2) 1.0 liter/ha on the leaves on December 15, 2008

Growth results: Trunk diameter measurements were made on ten representative plants for each treatment at trial initiation (November 24), and also on January 9 and February 10. The results below show the average values for each date and treatment.

<table>
<thead>
<tr>
<th>Trunk diameter increase</th>
<th>Treatment</th>
<th>Initial cm</th>
<th>Final cm</th>
<th>Increase cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>5.50</td>
<td>10.66</td>
<td>5.16 (+94%)</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>5.40</td>
<td>11.00</td>
<td>5.60 (+104%)</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions: This young grape vineyard study in Chile, using Vitazyme to encourage greater plant vigor and growth, showed that the treated vines (1.5 and 1.0 liter/ha applications) grew by 104% from the starting distance, whereas the untreated vines increased by 94%, providing a 10% vine diameter increase for the Vitazyme treated vines. These results show the utility of Vitazyme to stimulate the increase in plant size so that the vineyard can produce more grapes at a younger age.

Grapes, table use

Researcher: unknown
Farm cooper: Santa Marta-Paine, Chile
Variety: Crimson Seedless
Soil type: unknown

Experimental design: A vineyard of Crimson Seedless grapes was divided into three areas: a control and two Vitazyme treatments. The objective of the study was to evaluate the product’s effects on fruit maturity, fruit yield, and grape color at harvest.

1. Control
2. Vitazyme, 1.0 liter/ha
3. Vitazyme twice, 1.5 liters/ha

Fertilization: unknown
Vitazyme application: either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before verasion, and again at the same rate after verasion.

Color results: Fruit color was determined at harvest and analyzed statistically. Both Vitazyme treatments improved the development of red color for these Crimson Seedless grapes, increasing the full RG3 values significantly above the control, and reducing the low RG2 levels below the control.

• Improvement in color with Vitazyme (1.5 liters/ha): 10.78% full RG 3

Grape maturity results: Records were kept of the percent of total harvest for three dates to determine the maturity of the grapes.

Continued on the next page
Researcher: Rodrigo Garcia  
Farm cooperator: Viticulture and Fruitculture Association, Chile

Variety: Crimson Seedless  
Soil type: unknown

Experimental design: A vineyard of Crimson Seedless grapes was divided into three sections: a control and two Vitazyme treatments. The objective of the study was to evaluate the product’s effect on grape quality with applications before and after veraison and an elimination of the applications at shoot growth and bloom.

1. Control  
2. Vitazyme, 1.0 liter/ha  
3. Vitazyme twice, 1.5 liters/ha

Vitazyme application: either 1.0 or 1.5 liters/ha for the two Vitazyme treatments before veraison and again at the same rate after veraison.

Quality results: Brix levels and the maturity of the grapes at various times were measured in this study.

Conclusions: In this Chilean table grape trial, using Vitazyme at 1.0 and 1.5 liters/ha twice, the grapes responded favorably in terms of maturity, grape color, and final yield. Both Vitazyme rates did well, but the 1.5 liters/ha rate did a bit better than the 1.0 liter/ha rate, improving red color significantly by 10.78% full RG3, maturity by 5.9%, and yield by 7%. These results show the effectiveness of the product for fresh table grape production in Chile.

Grape, table use
Quality assessments

Grape Maturity

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Harvest date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>March 19</td>
</tr>
<tr>
<td>Control</td>
<td>70.6</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>75.1</td>
</tr>
<tr>
<td>3. Vitazyme, 1.5 liters/ha</td>
<td>82.1</td>
</tr>
</tbody>
</table>

• Increase in harvest by April, 1.5 liters/ha: 5.9%

Percent of Harvest by Apr 8

<table>
<thead>
<tr>
<th>Treatment</th>
<th>March 19</th>
<th>March 24</th>
<th>April 8</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>28.26</td>
<td>3.24</td>
<td>3.78</td>
<td>35.28</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>30.03</td>
<td>1.96</td>
<td>4.42</td>
<td>36.41 (+3%)</td>
</tr>
<tr>
<td>3. Vitazyme, 1.5 liters/ha</td>
<td>32.85</td>
<td>3.14</td>
<td>1.80</td>
<td>37.79 (+7%)</td>
</tr>
</tbody>
</table>

Increase in grape yield
Vitazyme, 1.0 liter/ha ...... +3%
Vitazyme, 1.5 liters/ha ... +7%

Total Grape Yield by Apr 8

Conclusions: These Crimson Seedless table grapes in Chile responded excellently to Vitazyme, especially to the 1.5 liters/ha rate applied before and after veraison. This treatment resulted in a 1.06 points increase in brix, and percent harvested grapes by April 8 of 94.46%. The 1.0 liter/ha Vitazyme rate resulted in a 0.88 point brix increase above the control, and a 91.04% harvest by April 8, versus 88.17% for the control. This product has proven itself in this study to be a powerful adjunct to viticulture in Chile.

Grape Yield

Percent of Total harvest, by Date

<table>
<thead>
<tr>
<th>Treatment</th>
<th>March 19</th>
<th>Mar 24</th>
<th>Apr 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Control</td>
<td>Control</td>
<td>Control</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>Vitazyme 1.0 liter/ha</td>
<td>Vitazyme 1.5 liters/ha</td>
<td></td>
</tr>
</tbody>
</table>

Increase in percent harvest, 1.0 liter/ha: 2.87%  
Increase in percent harvest, 1.5 liters/ha: 6.29%

Conclusions: These Crimson Seedless table grapes in Chile responded excellently to Vitazyme, especially to the 1.5 liters/ha rate applied before and after veraison. This treatment resulted in a 1.06 points increase in brix, and percent harvested grapes by April 8 of 94.46%. The 1.0 liter/ha Vitazyme rate resulted in a 0.88 point brix increase above the control, and a 91.04% harvest by April 8, versus 88.17% for the control. This product has proven itself in this study to be a powerful adjunct to viticulture in Chile.
**Grapes, table use**

**Quality assessments**

**Researcher:** Rodrigo Garcia  
**Farm cooperator:** Viticulture and Fruitculture Association, Chile  
**Variety:** Flame Seedless  
**Soil type:** unknown  

**Experimental design:** A vineyard of Flame Seedless grapes was divided into three sections for a control and two Vitazyme treatments. The objective of the study was to evaluate the product's effect on grape quality with application's before and after varasion, and an elimination of the applications at short growth and bloom.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Brix</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>18.31</td>
<td>—</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>18.16</td>
<td>(-) 0.15</td>
</tr>
<tr>
<td>3. Vitazyme twice, 1.5 liters/ha</td>
<td>18.64</td>
<td>+0.33</td>
</tr>
</tbody>
</table>

- **Increase in brix with Vitazyme (1.5 l/ha): 0.33 percentage points**

**Color results:** At harvest, the color of the grapes were measured in terms of red intensity. The higher treatment level of Vitazyme caused a significant improvement in red coloration versus the untreated control, as evidenced by the higher Full RG3 level and the significantly lower RG2 level. The color improvement with the 1.0 liter/ha Vitazyme rate was midway between the control and 1.5 liter/ha rate. **Conclusions:** This table grape study in Chile revealed that Vitazyme at 1.5 liters/ha, applied twice, once before and once after varasion, substantially increased grape brix (+0.33) and greatly enhanced the early maturation of the fruit. By February 15, 95.29% of the harvest was already collected with this treatment. In contrast, only 22.68% of the control grapes were harvested on January 19. The Vitazyme 1.0 liter/ha rate, applied twice, gave a small reduction in fruit brix, but enhanced maturity of the grapes substantially, to 86.49% of the total harvest by February 15. The 1.5 liter/ha Vitazyme rate significantly colored the grapes better than the control grapes. Vitazyme, especially at 1.5 liters/ha twice, has been shown by this study to be an excellent treatment for table grapes.

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**Grapes, table use**

**Quality assessments**

**Researcher:** Rodrigo Garcia  
**Farm cooperator:** Viticulture and Fruitculture Association, Chile  
**Variety:** Thompson Seedless  
**Soil type:** unknown  

**Experimental design:** A vineyard of Thompson Seedless grapes was divided into three sections for a control and two Vitazyme treatments. The objective of the study was to evaluate the product’s effect on grape quality with application’s before and after varasion, and an elimination of the applications at shoot growth and bloom.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Brix</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>18.31</td>
<td>—</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>18.16</td>
<td>(-) 0.15</td>
</tr>
<tr>
<td>3. Vitazyme, 1.5 liters/ha</td>
<td>18.64</td>
<td>+0.33</td>
</tr>
</tbody>
</table>

- **Increase in percent green grapes, 1.0 l/ha: 17.62%**
- **Increase in percent green grapes, 1.5 l/ha: 26.42%**
- **Improvement in color with Vitazyme (1.5 liters/ha): 11.47% full RG3**

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Continued on the next page
The green-colored grapes are the best quality. Of this color, the changes with Vitazyme are given below:

**Increase in percent green grapes at 1.0 l/ha: 12.99%**

**Increase in percent green grapes at 1.5 l/ha: 19.91%**

**Conclusions:** This Syngenta test of Vitazyme, at 1.0 and 1.5 liters/ha applied twice — once before and once after verasion — revealed that the product did little to alter the sugar (brix) content of the fruit at harvest, but enhanced maturity of the fruit, especially at the 1.5 liters/ha rate. The 1.5 liters/ha rate increased harvestable bunches by 7.76% at the last recorded harvest date. Fruit color was also enhanced with Vitazyme, the desired green color being 19.91% higher at the 1.5 liters/ha rate than for the control; the 1.0 liter/ha rate gave 12.99% increase. The greater percentage of green fruit was likely due to the product’s chlorophyll enhancing effect throughout the plant, including the fruit skins. Vitazyme is shown to be an excellent adjunct to table grape production in Chile, enhancing maturity as well as grape color.

**Fruit Brix**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Brix</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>17.57</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>17.83</td>
<td>0.26</td>
</tr>
<tr>
<td>3. Vitazyme, 1.5 liters/ha</td>
<td>17.33</td>
<td>(-) 0.24</td>
</tr>
</tbody>
</table>

**Increase in brix with Vitazyme (1.0 l/ha): 0.26 percentage points**

**Fruit Color at Harvest**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percent of bunches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lack color</td>
</tr>
<tr>
<td>1. Control</td>
<td>16.34</td>
</tr>
<tr>
<td>2. Vitazyme, 1.0 liter/ha</td>
<td>10.22</td>
</tr>
<tr>
<td>3. Vitazyme, 1.5 liters/ha</td>
<td>11.60</td>
</tr>
</tbody>
</table>

**Increase in percent harvest, 1.5 l/ha: 7.76%**

**Grapes, table use**

**Quality assessments**

**Researcher:** Rodrigo Garcia  
**Varieties:** Thompson Seedless and Crimson Seedless  
**Farm cooperator:** Fdo. San Luis de la Morera, Codegua, Region VI, near Santiago, Chile  
**Plant spacing:** 3.5 x 3.5 meters  
**Irrigation volume:** 800 liters/ha  
**Vineyard age:** mature  
**Plant density:** 816 plants/ha  
**Experimental design:** Two seedless table grape varieties were used to evaluate the effectiveness of Vitazyme, Biozyme TF, and Citogrower for improving table grape quality. A randomized complete block design was used with four replications and six plants per plot. The vineyards were uniform in soil quality and management.

**Fertilizer applications:** unknown

**Vitazyme applications:** See the notes and timing in the above table.

**Biozyme TF application:** This product is 1.0% phytohormones, 0.6% amino aids, and 1.8% oligoelements. It was applied at 2.0 liters/ha three times as shown above.

**Citogrower application:** This is a solution of soluble phosphorus, potassium, and adenine, applied at 2.0 liters/ha, with timing as shown in the table above.

**Harvest quality data:** The Thompson Seedless grapes were harvested February 15, 2009, and the Crimson Seedless grapes were harvested on March 10, 2009. Brix levels and berry size were measured for both varieties.

**Increase in berry size with Vitazyme: 0.66 mm**
These Thompson seedless grapes showed a lower, though nonsignificant, brix reading with all three treatments versus the control. The grape size was increased by all three treatments, though not significantly, but the most by the Vitazyme treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Brix level*</th>
<th>Change</th>
<th>Berry size*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>18.85 a</td>
<td>—</td>
<td>17.14 a</td>
<td>—</td>
</tr>
<tr>
<td>2. Vitazyme 1, 4x</td>
<td>19.50 a</td>
<td>+0.65</td>
<td>17.38 a</td>
<td>0.24 (+1%)</td>
</tr>
<tr>
<td>3. Vitazyme 2, 4x</td>
<td>17.70 a</td>
<td>-1.15</td>
<td>18.08 a</td>
<td>0.94 (+5%)</td>
</tr>
<tr>
<td>4. Biozyme TF, 3x</td>
<td>18.20 a</td>
<td>-0.65</td>
<td>17.34 a</td>
<td>0.20 (+1%)</td>
</tr>
<tr>
<td>5. Citogrower, 3x</td>
<td>18.80 a</td>
<td>-0.05</td>
<td>17.14 a</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

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

The brix levels and berry sizes were not significantly different for the five treatments, although the first Vitazyme regime gave a 0.65 percentage point increase in brix, whereas both Vitazyme regimes. especially the second one, gave the largest berry sizes; the second Vitazyme regime gave a 0.94 mm average berry size increase.

Continued on the next page
With this variety, the control for some reason gave the greatest brix level of the grapes, but this value was statistically the same as all but the first Vitazyme regime. Berry size was significantly greater with the first Vitazyme regime than for all other treatments: an increase of 0.76 mm above the control was 4% greater with Vitazyme.

**Increase in berry size: 0.76 mm**

**Conclusions**: In this Chilean table grape study using Vitazyme (two regimes, applied four times), Biozyme TF, and Citogrower, with two varieties, Vitazyme performed the best by increasing brix by up to 0.65 percentage point above the control (Thompson Seedless), and berry size by 0.94 mm (Thompson Seedless) and 0.76 mm (Crimson seedless) above the control. Vitazyme is shown to be an excellent product for improving both brix and berry size of table grapes in Chile … the only exception being the brix levels of Crimson Seedless, where all four treatments were less than the control.

### New planting assessments

**Researcher**: Chris Becker, Ph.D.

**Location**: Phelps, New York

**Variety**: Niagara

**Soil type**: clay loam

**Planting date**: June 12, 2009

**Experimental design**: Half of a new planting of 100 Niagara rooted grapes were treated with Vitayme to determine the effect of the product on root development and growth of new plantings. They were planted in alternate sections of 25 treated and 25 untreated.

1. **Control**

2. **Vitazyme root soak**

**Vitazyme treatment**: Fifty vines received a 12 hour soaking of their roots in a 1.0% Vitazyme solution before planting; the control vines were soaked in water only.

**Growth results**: Growth differences were noted by two weeks after planting. On July 12, one month after planting, a Vigor rating was given to the vines based on shoot length, leaf size, and shoot number. On August 3, 2009, height measurements were taken of ten plants on either side of the treatment borders, and a statistical analysis of the data was conducted.

#### Visual vigor rating

**Visual vigor**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Visual vigor*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.09</td>
<td>1.95 (+111%)</td>
</tr>
<tr>
<td>Vitazyme soak</td>
<td>6.50</td>
<td>2.27 (+121%)</td>
</tr>
</tbody>
</table>

*10=best, and 1 = poorest, averaged from 50 plants per treatment.

**Increase in vigor: 211%**

At season’s end another growth evaluation was made, of all 100 vines.

#### Shoot Length

**Shoot Length**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Shoot Length</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>26.6</td>
<td>1.61 (+38%)</td>
</tr>
<tr>
<td>Vitazyme soak</td>
<td>36.6</td>
<td>10.0 (+38%)</td>
</tr>
</tbody>
</table>

**Increase in shoot length: 38%**

**Conclusions**: Vitazyme applied to the newly planted Niagara grapes in New York, as a root soak for 12 hours, greatly stimulated early rooting and top growth of the plants, improving vigor by 211%, and increasing plant height by 60% above the control for a selection of 20 plants in August, and by 38% for all plants later on. This product is thus shown to possess great utility for helping quickly established new vineyard plantings.
**Grapes**

**Researcher:** Chris Becker  
**Location:** Hosmer Vineyards, Ovid, New York  
**Variety:** Cayuga  
**Soil type:** unknown  
**Vine age:** mature  

**Experimental design:** In this study, with the purpose of determining Vitazyme effects of grape yield, a 5-acre block of grapes was split into two 2.5-acre parcels, with one parcel treated with Vitazyme.  
1. Control  
2. Vitazyme  

**Fertilization:** unknown  

**Vitazyme applications:** (1) 13 oz/acre sprayed on leaves prebloom (about June 15); (2) 13 oz/acre postbloom (about June 24); (3) 13 oz/acre at veraison  

**Yield results:** A day or two before harvest, (October 7, 2009), 10 clusters from four vines were collected from locations in the four quadrants of the treated and untreated parcels. Data collected were berry number per cluster and berry weight per cluster, and from this the individual berry weight was calculated. Each 10-cluster sample was then crushed, and brix values were determined using a refractometer.

**Conclusions:** This New York grape study, using Vitazyme on the Cayuga variety, revealed that three applications greatly increased berries per cluster (37%) as well as weight per cluster (26%), resulting in a slight reduction in berry weight (4%) versus the control. Brix of the grapes was increased with Vitazyme, by 1.3 percentage points. These results prove that this product is an excellent adjacent to typical vineyard programs intent upon increasing both the yield and quality of grapes.

- **Increase in berries per cluster:** 31%  
- **Increase in weight per cluster:** 26%  
- **Decrease in weight per berry:** 4%  
- **Increase in brix:** 1.3 %-points

---

**Grapes**

**Researcher:** Chris Becker  
**Location:** Anthony Road, New York  
**Variety:** Cabernet Franc  
**Soil type:** unknown  
**Vine age:** mature  
**Fertilization:** unknown  

**Experimental design:** In this study, with the purpose of determining Vitazyme effects of grape yield, a 10-acre block of grapes was split into two five-acre parcels. Five acres were treated with Vitazyme.  
1. Control  
2. Vitazyme  

**Vitazyme applications:** (1) 13 oz/acre sprayed on leaves prebloom (about June 15); (2) 13 oz/acre postbloom (about June 24); (3) 13 oz/acre at veraison  

**Yield results:** A day or two before harvest, 10 clusters from four vines were collected from locations in the four quadrants of the treated and untreated five acres. Data collected were berry number per cluster and berry weight per cluster, and from this the individual berry weight was calculated. Each 10-cluster sample was then crushed, and brix values were determined using a refractometer.

**Conclusions:** This split-vineyard trial in New York revealed that Vitazyme greatly improved berries per cluster (39%) and weight per cluster (38%). Weight per berry was changed little, and brix level was reduced slightly with Vitazyme.

- **Increase in berries per cluster:** 39%  
- **Increase in weight per cluster:** 38%  
- **Decrease in weight per berry:** 1%  
- **Increase in brix:** 0.5 %-point
At Rooster Hill Vineyard, New York, Vitazyme improved berries per cluster, cluster weight, and fruit yield for both Pinot Noir and Riesling grapes. Each 10 cluster sample was then crushed, and brix values were determined using a refractometer.

Conclusions: This series of three grape trials with Vitazyme in New York showed that, in all cases, the yield of grapes was much greater with Vitazyme as measured by berries per cluster and berry weight per cluster: increases were from 28% (Cabernet Franc) to 64% (Riesling) for berries per cluster, and from 6% (Pinot Noir) to 64% (Riesling) for weight per cluster. Berry weight was increased by 28% for Riesling grapes with Vitazyme, but reduced by 7 to 17% for the other varieties. The Pinot Noir and Riesling varieties changed little for brix with Vitazyme, but Cabernet Franc increased 2.1 points. in terms of grape yield, Vitazyme greatly improved production in this study.

### Varity Pinot Noir Riesling Cabernet Franc

<table>
<thead>
<tr>
<th>Berries Per Cluster</th>
<th>+29%</th>
<th>+64%</th>
<th>+28%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Per Cluster</td>
<td>+6%</td>
<td>+64%</td>
<td>+18%</td>
</tr>
<tr>
<td>Weight Per Berry</td>
<td>-17%</td>
<td>+28%</td>
<td>-7%</td>
</tr>
<tr>
<td>Brix</td>
<td>+0.1%-point</td>
<td>-0.5%-point</td>
<td>+2.1%-point</td>
</tr>
</tbody>
</table>
Grapes, for wine

Quality and yield assessments

Researcher: John Broecker
Plants/acre: 605
Vineyard: Mand J Fronty Vineyard
Grafting: none (self-rooted)
Bunch thinning: yes
Pruning: spur
Irrigation: drip
Row spacing: 12 x 6 feet

Location: San Miguel, California
Variety: Cabernet Sauvignon
Yield goal: 3.5 tons/acre
Shoot trimming: yes
Soil type: loam, high-calcium subsoil, low organic matter
Grape plant age: 9 years (sixth harvest)

Experimental design: A vineyard of grapes of equal age was partially treated with Vitazyme during the growing season to evaluate effects on grape yield and winemaking quality; all other treatments were identical. The same rows were treated as in previous years. Both treatments were to be evaluated for overall effects on grape and wine quality by following through the pre-harvest period, and on to the actual wine itself after fermentation and 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: Ca (NO₃)₂ was the main nitrogen source, plus urea (low biuret) added to the foliar spray. A 9-18-9 (+ micronutrients) was applied with urea every two to three weeks at 2 to 3 gallons/acre during much of the growing season, usually with sulfur after veraison; no sulfur was applied after July 1. A blue-green algae solution was applied in the irrigation water periodically
Tillage: cover crop disked in

Vitazyme application: (1) 13 oz/acre with 9-18-9 fertilizer sprayed at bud break; (2) 13 oz/acre at bloom; (3) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at BB-sized fruit; (4) 13 oz/acre with 9-18-9 fertilizer + sulfur sprayed at veraison; (5) 13 oz/acre 8 weeks before harvest (the end of August)

Harvest date: October 10, 2009
Weather conditions: The year was drier than normal, resulting in greater irrigation water needs.

Vine growth: The researchers noted that there was more leaf and vine growth for the Vitazyme treated grapes, perhaps 25% more total leaf mass than for the control plants. An analysis of canes for the plants of the two treatments revealed more cane growth with Vitazyme application as well.

Wine quality: On December 29, 2009, an analysis of wine from the two lots was made by Baker Wine and Grape Analyses, Paso Robles, California.

The two wine lots are very similar except that the Vitazyme treated wine has more alcohol, by 0.9%. This increase is a reflection of the higher sugar (brix) of the treated grapes at harvest. The Vitazyme treated wine also has more malic acid and less lactic acid than the control wine.

- **Increase in alcohol: 0.9 percentage point**

Yield results: Grape yields were recorded for both treatments on the eastern end of the vineyard where soil characteristics were uniform. A border area between the treatments was avoided to remove possible product drift effects. Because of severe frost damage in 2008, the plants did not perform at the optimum levels, especially the Vitazyme treated rows, which were injured more severely in 2008 than the control vines. At the end of the growing season, towards the first frost, there were more total foliage and more actively synthesizing leaves for the Vitazyme treatment.

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

Wine making: On October 10, 2009, a half ton of grapes from both treatments was picked and crushed, and that day the winemaking process began. See the schedule on the next page for details.

Continued on the next page
October 10. The grapes were destemmed and cold soaked for 48 hours. During this time tartaric acid was added to raise the acidity to 0.7.

October 12. Yeast was added to the destemmed grapes, as well as yeast nutrient (diammonium phosphate, yeast cell walls, and other items), and Color Pro (an enzyme material to extract more color from the skins, and stabilize the color).

October 20. After 8 days of fermentation, the juice was pressed from the mash. At this point there was 3% sugar left. Malic acid bacteria were added at this point to convert the malic acid to lactic acid. The fermenting wine was then placed in stainless steel barrels. Each barrel yielded 148 gallons of juice per ton of grapes.

November 24. After 4 more days, half of the wine from each treatment was put in an identical oak barrel; the remaining wine was retained in a stainless steel barrel.

Conclusions for the sixth year: The sixth year of this California wine grape study, using the same treated rows as in previous years, revealed a recovery of the plants to some degree after severe frost damage in 2008. This year the Vitazyme treatment produced 11% more yield than the untreated control, compared to the 29% average increase for the first four years of the study. Even with an 11% yield increase, the results of this program are highly profitable, especially considering that the wine produced with Vitazyme treated grapes has been shown to be equivalent, if not superior to, wine produced from untreated grapes alongside. Of special note is a higher alcohol content of the Vitazyme-treated wine, by 0.9 percentage point; both wine lots for 2009 are very similar.

Grass
A testimonial

I expect to be using Vitazyme for many years to come. Two lawns next door to each other were seeded the same day with the same seed. My lawn was 50% bare after I had killed all undesirable grass and weeds and my neighbors lawn was about 20% bare after killing the undesirables. I applied Vitazyme to my lawn the day after the seedlings began to emerge. Both lawns are about 10% bare now, and my lawn is by far the greener of the two. So far I have gotten one renovation job as a result of the lawn’s progress. I seeded a lawn several weeks ago, and it was making typical progress in regards to germination. I applied Vitazyme last week and the very next day saw improvement in color, and the seedlings seem to be kick-started as well. On my third test site, I seeded and applied Vitazyme at half the recommended rate, plus ICT instant compost tea, kelp, and humic acid. It has been less than two weeks since the seeding, and the homeowner called me a couple of days ago to tell me that he has never been so pleased with money spent on his lawn. I am considering applying Vitazyme at the recommended rate once per month for the entire growing season.

Jerry Cobb, A Touch of Nature
Nicholasville, Kentucky

Kiwi Fruit

Kiwi fruit in China, New Zealand, and the United States have responded very well to Vitazyme, in this study producing an 11% yield increase and 5% more solids.

<table>
<thead>
<tr>
<th>Fruit Per Vine</th>
<th>Fruit Size</th>
<th>Yield Per Vine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Control</td>
<td>Control</td>
</tr>
<tr>
<td>206.6</td>
<td>85.9</td>
<td>17.7</td>
</tr>
<tr>
<td>221.0</td>
<td>88.1</td>
<td>19.5</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>Vitazyme</td>
<td>Vitazyme</td>
</tr>
<tr>
<td>221.0</td>
<td>19.5</td>
<td>19.5</td>
</tr>
</tbody>
</table>

Researchers: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xiao Wanzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute

Location: Hunan Horticulture Research Institute Research Orchard, Mapoling, Changsha, Hunan China

Variety: Cuiyu (green flesh)

Vine age: six years

Row spacing: 3 x 4 meters

Trellis: pergola

Experimental design: An orchard area was selected to provide a Vitazyme and a control treatment, each with 10 plants per plot. Each treatment was replicated three times.

1. Control

Fertilization: unknown

Vitazyme application: (1) 1.5 liters/ha on the soil 10 days before bud burst (March 5); (2) 1.5 liters/ha on the leaves 10 days before flowering (April 8), and (3) 1.5 liters/ha on the leaves 14 days after flowering (May 18)

Harvest date: unknown

Yield and quality results:
Malabar Nightshade

Researchers: unknown  
Location: Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam  
Variety: unknown  
Soil type: unknown  
Planting date: March, 2009  
Experimental design: A field of Malabar Nightshade was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

1. Control  
2. Vitazyme twice

Fertilization: unknown  
Vitazyme application: Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

Height results: At harvest time the average plant height was determined for each treatment.

Yield results: The crop was harvested in April of 2009.

Conclusions: This study on Malabar nightshade in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased both plant height (14%), and yield as well, by 3.06 tons/ha (14%). The product's active agents have shown to greatly stimulate the growth and yield of this widely used specialty vegetable in this Southeastern Asian country.

• Increase in plant height: 15%  
• Increase in yield: 14%

Mandarin Oranges

Researchers: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xiao Wanzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute; Tao Dihui, Changsha Agricultural School  
Location: Hunan Horticultural Research Institute Research Orchard, Mapoling, Changsha, Hunan, China  
Variety: Satsuma Mandarin – Miyagawa Wase  
Tree age: 17 years  
Row spacing: 3 x 3 meters  
Trellis: pergola  
Experimental design: An orchard area was selected to provide a Vitazyme and a control treatment, each with 10 trees per plot. Each treatment was replicated three times.

1. Control  
2. Vitazyme

Fertilization: unknown  
Vitazyme application: 1.5 liters/ha sprayed on the leaves of the trees at (1) early bud burst (March 31), (2) early flowering (April 8), (3) early fruit growth (May 18), and (4) rapid fruit growth (July 9)

Harvest date: unknown

Yield and quality results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>65,500</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>72,150</td>
<td>6,650 (+10%)</td>
</tr>
</tbody>
</table>

• Increase in income: 10%

Conclusions: Vitazyme in this Chinese kiwi fruit study improved the yield, quality, and income of the fruit in every category. The fruit per vine were increased by 7%, fruit size by 3%, yield per vine by 10%, percentage of large fruit by 11%, and percent soluble solids by 5%. Income was improved by 10%. These results prove that Vitazyme substantially improves the quality and yield of kiwi fruit in China.

• Increase in fruit number: 7%  
• Increase in fruit size: 3%  
• Increase in fruit per vine: 10%  
• Increase in percentage of large fruit: 11%  
• Increase in percent of fruit soluble solids: 5%

Continued on the next page
Income results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>33,200</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>38,300</td>
<td>5,100 (+15%)</td>
</tr>
</tbody>
</table>

Conclusions: In this Mandarin orange study in China with Vitazyme, four applications produced excellent yield and quality responses, as shown in this summary chart. Besides substantially improving yield, number, and size of the fruit, the quality of the fruit was also improved with more sugars and much less acidity. Vitamin C, however, was reduced somewhat. The income of the crop was increased by an impressive 15%.

• Increase in income: 15%
• Increase in fruit number: 6%
• Increase in fruit size: 9%
• Increase in fruit yield: 15%
• Increase in total fruit sugar: 1.0%
• Decrease in titratable acid: 18%
• Decrease in fruit Vitamin C: 17%

We are extremely excited with our navel orange crop this coming year (2009-2010). The navel industry as a whole is up 15% from last season, while everything that we farm is up 50-150%!! This is the first time I can remember that all of our acreage as a whole (not just individual blocks), have set such large crops. What do I attribute it to? This is the first year that we applied Vitazyme on everything in a precise and timely manner. Twice foliar to help set the crop, and twice soil applied for overall health and cell wall strength. Also, in conjunction with Vitazyme I began using a soil applied Root Stimulant four times a year in timely applications from mid-March through mid-October. The root stimulant is made by New Era Farm Services and is derived from composted dairy manure that has gone through a thermophilic controlled biological oxidative process, and also has colloidal minerals, humic acid derivatives, Ascophyllum Nodosum seaweed extract, and yucca for antistress.

Together with the use of Vitazyme and New Era’s Root Stimulant, I think I may have found the Holy Grail of citrus production! Hopefully you will be here this coming year for a visit and to see our crop sets. I’m very excited!

Jody Wollenman, Monte Vista Ranches, Lindsay, California

The orange crop set in 2009 at Monte Vista Ranches, Lindsay, California, is one of the best ever, largely due to four Vitazyme applications plus a root stimulant.
Researcher: Jose Luis Cistenas  
Administrator: Alejandro Apara  
Varieties: Arbequina and Arbosana  
Research Organization: Society of Agriculture San Jorge Ltda, Santa Sara, Chile  
Soil type: unknown  
Planting date: 2007

**Experimental design:** A young olive grove of 7.0 hectares was divided into a Vitazyme treated area and a control area to determine the effect of the product on tree growth. This growth was determined by trunk diameter.

1. Control  
2. Vitazyme

**Fertilizer applications:** unknown  
**Vitazyme applications:** (1) 1.0 liter/ha on the leaves and soil on November 6, 2008; (2) 1.0 liter/ha on the leaves and soil on December 15, 2008.

### Trunk Diameter Change - Arbosana Olives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>11.38</td>
<td>12.75</td>
<td>12.99</td>
<td>13.84</td>
<td>2.46 (+22%)</td>
</tr>
<tr>
<td></td>
<td>(+12%)</td>
<td>(+2%)</td>
<td>(+7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>8.68</td>
<td>9.47</td>
<td>10.62</td>
<td>11.12</td>
<td>2.44 (28%)</td>
</tr>
<tr>
<td></td>
<td>(+9%)</td>
<td>(+12%)</td>
<td>(+5%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Trunk Diameter Change - Arbequina Olives

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>11.84</td>
<td>13.26</td>
<td>13.98</td>
<td>2.14</td>
<td>(+18%)</td>
</tr>
<tr>
<td></td>
<td>(+12%)</td>
<td>(-1%)</td>
<td>(+6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>10.56</td>
<td>11.48</td>
<td>12.26</td>
<td>2.26</td>
<td>(+21%)</td>
</tr>
<tr>
<td></td>
<td>(+9%)</td>
<td>(+7%)</td>
<td>(+4%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusions:** When Vitazyme was applied twice to olives at 1 liter/ha each time, the increase in trunk diameter with this product compared to the untreated control was 6% for Arbosana olives and 3% for Arbequina olives. These results show that Vitazyme is able to substantially improve olive growth and maturation in the Chilean environment.

Olives treated with Vitazyme have performed exceptionally well, not only in young orchards as in this Chilian trial, but also in California and New Zealand.

**Improved increase in trunk diameter with Vitazyme**

- **Arbosana olives** ................................................. +6%
- **Arbequina olives** ................................................ +3%
In the San Luis Valley of Colorado, Vitazyme improved root development and growth of potatoes, and tuber size.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Market yield*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>277 a</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>273 a (-4) (-1%)</td>
<td></td>
</tr>
</tbody>
</table>

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

**Conclusions:** This potato trial on Blazer Russets in southern Colorado showed that Vitazyme, while not improving yield, significantly increased the tuber size. The >9 oz tubers were increased by 23% over the untreated control, while the medium-sized tubers (6 to 9 oz) were significantly increased by 12% more than the control. Tuber numbers were not evaluated, but it is presumed that a Vitazyme application at tuber initiation would have increased tuber numbers—an important issue for seed growers—which would make this product an especially valuable product for potato seed production. The drought period, induced when the irrigation well would not operate, also likely affected the results adversely.

**Tuber weight results:**

- **Increase in > 9 oz tubers:** 23%
- **Decrease in 6 to 9 oz tubers:** 12%

This Black Gold study in Texas proved the ability of Vitazyme to greatly improve tuber yield (28%), while improving uniformity.
Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>12.5</td>
<td>–––</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>16.0</td>
<td>3.5 28</td>
</tr>
</tbody>
</table>

Quality results: The tubers at harvest were more uniform on the Vitazyme treated area, than in the control treatment.

Conclusions: In this south Texas potato trial, Vitazyme triggered a 28% yield increase above the untreated control, and also produced more uniform tubers, which was a beneficial effect for this variety on top of the tuber increase.

- **Increase in tuber yield: 28%**

**Potatoes**

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

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

Planting rate: 2.8 tons/ha

Variety: Agave, elite

Planting date: April 27, 2009

Previous crop: winter wheat

Tillage: plowing, harrowing, and cultivating

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

Experimental design: One-hectare plots were arranged in a randomized complete block design to apply two Vitazyme treatments, in an effort to evaluate the effects of this product on potato yield.

1. Control 2. Vitazyme at emergence 3. Vitazyme at blooming

Fertilization: 90 kg/ha N, 60 kg/ha P₂O₅, and 60 kg/ha K₂O

Vitazyme application: (1) 1 liter/ha to the leaves and soil at emergence, and (2) the first treatment plus 1 liter/ha to the leaves at bloom

Yield results: See table at right.

Income results:

- **Increase in tuber yield: 11 to 18%**

Conclusions: This potato trial in Ukraine, with Vitazyme at emergence, and at emergence and bloom, resulted in excellent increases of tuber yield by 11 and 18%. Income was substantially increased as well. This program is highly viable for Ukrainian conditions.

- **Increase in income with Vitazyme, once: 11%**
- **Increase in income with Vitazyme, twice: 18%**

**Potatoes**

Researchers: Binad Fingh, Ph. D.

Location: Usha Agro Farms, Garh, India

Organization: Merino Industries

Variety: Bahar

Soil type: sandy loam

Planting depth: 10 to 12.5 cm

Previous crop: rice

Planting date: November 3, 2008

Planting depth: 10 to 12.5 cm

Row spacing: 66 cm

In-row spacing: 15 cm

Seed piece size: >55 mm cut in two

Soil analysis: pH, 8.42; electrical conductivity, 0.33 ds/m; organic matter, 0.52%; P, 30 kg/ha; K, 288 kg/ha; Zn, 0.83 ppm; Fe, 6.63 ppm; Mn, 2.68 ppm; Cu, 0.60 ppm.

Experimental design: A field was divided into three portions, two treated with Vitazyme, to evaluate the effect of this product on potato yield, tuber size, and profitability

1. Control 2. Vitazyme in-furrow + 50 DAP 3. Vitazyme on seeds + 50 DAP

Vitazyme application: see table

Fertilizer over all areas: (1) Basal treatment: 12.5 tons/ha vermicompost; 200, 150, and 175 kg/ha of N, P₂O₅, and K₂O as urea, DAP (diammonium phosphate), and MOP (monophosphate), with 40% of urea, 100% of DAP, and 67% of MOP as a basal dose; 25 kg/ha ZnSO₄ was broadcast at planting.

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

Continued on the next page
Side-dressing at 40 days after planting: 30% of the urea.

Foliar during growth: 19-19-19% N-P₂O₅-K₂O at 2.5 kg/ha; 13-0-45% N-P₂O₅-K₂O at 1.25 kg/ha.

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

Harvest date: March 1, 2009, 99 days after planting.

Germination results: Vitazyme treated seed tubers germinated first, followed by the in-furrow treatment, and then the control treatment.

Total Tuber Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Tuber yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>26.75</td>
<td></td>
</tr>
<tr>
<td>Vitazyme in-furrow</td>
<td>28.74</td>
<td>1.99 (+8%)</td>
</tr>
<tr>
<td>Vitazyme on seeds</td>
<td>30.00</td>
<td>3.25 (+12%)</td>
</tr>
</tbody>
</table>

Tuber Yield, by Tuber Size

<table>
<thead>
<tr>
<th>Tuber size, mm</th>
<th>Control</th>
<th>Vitazyme in-furrow</th>
<th>Vitazyme on seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;30</td>
<td>1.54</td>
<td>1.54</td>
<td>1.54</td>
</tr>
<tr>
<td>30-45</td>
<td>4.31</td>
<td>4.31</td>
<td>4.31</td>
</tr>
<tr>
<td>&gt;45</td>
<td>7.01</td>
<td>7.01</td>
<td>7.01</td>
</tr>
<tr>
<td>Total</td>
<td>24.61</td>
<td>21.17</td>
<td>20.19</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income per tuber size, and totals</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Rs./ha</td>
<td>105730</td>
</tr>
<tr>
<td>Vitazyme in-furrow</td>
<td>4620</td>
<td>113420</td>
</tr>
<tr>
<td>Vitazyme on seeds</td>
<td>4620</td>
<td>118460</td>
</tr>
</tbody>
</table>

In-furrow ..................... +3.5%
On seeds ......................... +5.8%

Conclusions: This potato trial in India showed that Vitazyme greatly increased total tuber yield, by 8% for the in-furrow applications and by 12% for the seed application. Both Vitazyme treatments increased the percentage of largest (>45 mm) tubers above the control treatment. Income was increased as well for both Vitazyme treatments above the control, by 7% for the in-furrow treatment and by 12% for the seed treatment. Cost-benefit ratios for these two regimes were highly attractive: 3.5 for in-furrow application and 5.8 for the seed application. Clearly, Vitazyme is a highly effective management tool for improving potato tuber yield and size, and raising profitability in India.

These potato plants show the type of response usually noted with Vitazyme application: more roots and tops.

The tubers removed from the plants on the left display the greater size and uniformity expected with Vitazyme use.
Cymoxanil, and 2.5 ml/liter Metaxyl + Mancozeb.

**Germination results:** Both Vitazyme treatments increased the speed of germination above the control, but the tuber treatments gave the greatest boost.

**Tubers per area results:** The tubers were harvested on March 3, 2009, 92 days after planting.

**Tuber yield results:**

NOTE: The low yield results for Vitazyme in this report do not correlate with the tuber numbers reported above. Since the tuber numbers are much greater for both Vitazyme treatments (52% and 79%), and in both treatments the proportion of the 28 to 55 mm tubers is considerably greater than for the same sized tubers of the control, then the yield of both Vitazyme treatments should be at least 52% and 79% greater than the control yield.

**Tuber size results:**

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

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

**Conclusions:** This potato trial in India, which investigated the effects of Vitazyme on potato growth, yield, and income, showed that the seed and in-furrow treatments, plus a foliar-soil application, hastened emergence and early growth. At harvest, the Vitazyme treatments greatly increased tuber number, by 79% for the seed treatments and by 52% for the in-furrow treatment. The valuable 28 to 55 mm tuber size was much greater for the Vitazyme applications: 24% for the seed treatment and 14% for the in-furrow treatment. The yield increases for Vitazyme treatments presented in the report were small — 5% for the seed treatment — but based upon much greater tuber numbers and considerably higher percentage of 28 to 55 mm tubers for both Vitazyme treatments, these two yields should have been much higher than reported. Likewise, the modest income improvements with Vitazyme should be higher than the above chart shows. It is apparent from this study that Vitazyme does indeed improve potato production and profits in India.

**Rice**


**Variety:** Xiangzaoxian 17

**Location:** Xinzhou, Jinshi, Hunan, China

**Seeding rate:** unknown

**Planting date:** March 26, 2009

**Experimental design:** A rice field was divided into Vitayme treated and untreated plots (0.4 ha each), and the two treatments were replicated three times. The purpose of the study was to determine the effects of Vitazyme, applied twice, on crop growth and yield.

1. Control
2. Vitazyme

**Fertilization:** unknown

**Vitazyme application:** (1) 5% seed soak for 24 hours before planting; (2) 1.0 liter/ha sprayed on the leaves at the early boot stage (June 9); (3) 1.0 liter/ha sprayed on th leaves at early flowering (June 16)
Growth results:

- **Tillers**
  - Control: 3.00
  - Vitazyme: 3.32 (increase of 11%)

- **Length of Last Leaf**
  - Control: 270.2
  - Vitazyme: 301.3 (increase of 12%)

- **Width of Last Leaf**
  - Control: 16.3
  - Vitazyme: 16.5 (increase of 1.2%)

Yield results:

- **Effective Leaves**
  - Control: 2.56
  - Vitazyme: 2.67 (increase of 4.3%)

- **Ear Length**
  - Control: 18.1
  - Vitazyme: 18.8 (increase of 4%)

- **Grains Per Ear**
  - Control: 95.7
  - Vitazyme: 104.5 (increase of 9%)

- **Percent of Solid Grains**
  - Control: 85.7
  - Vitazyme: 86.1 (increase of 0.5%)

- **Weight of 1,000 Grains**
  - Control: 23.0
  - Vitazyme: 23.1 (increase of 0.4%)

- **Grain Yield**
  - Control: 86.1
  - Vitazyme: 95.7 (increase of 14%)

**Income results:** See below.

- **Treatment**
  - Control: 7,704 RMB/ha
  - Vitazyme: 8,820 (increase of 1,116 or 15%)

**Conclusions:** This replicated rice trial in China revealed that Vitazyme improved rice yield by 14% (0.62 tons/ha). Moreover, income was increased by 15%. This improvement was the result of a broad spectrum of improvement of the rice plants, as summarized on the left. Vitazyme is proven to be a most excellent product for the improvement of rice yield and quality in China.

- **Increase in income: 15%**
- **Increase in tillers: 11%**
- **Increase in last leaf length: 12%**
- **Increase in last leaf width: 1.2%**
- **Increase in effective ears per ha: 4.3%**
- **Increase in grains per ear: 9%**
- **Increase in percentage of solid grains: 0.5%**
- **Increase in rice grain yield: 14%**
- **Increase in 1,000 grain weight: 0.4%**

**Parameter**

<table>
<thead>
<tr>
<th>Change with Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>TILLERS .................. +11%</td>
</tr>
<tr>
<td>LENGTH OF LAST LEAF .......... +12%</td>
</tr>
<tr>
<td>WIDTH OF LAST LEAF ........... +1.2%</td>
</tr>
<tr>
<td>EFFECTIVE LEAVES ............ +4.3%</td>
</tr>
<tr>
<td>EAR LENGTH ................... +4%</td>
</tr>
<tr>
<td>GRAINS PER EAR ............... +9%</td>
</tr>
<tr>
<td>PERCENT OF SOLID GRAINS ...... +0.5%</td>
</tr>
<tr>
<td>1,000 GRAIN WEIGHT .......... +0.4%</td>
</tr>
<tr>
<td>GRAIN YIELD ................... +14%</td>
</tr>
</tbody>
</table>

**Researcher:** agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

**Location:** Thu Thua, Long An Province, South Viet Nam

**Soil type:** unknown

**Variety:** OM4625

**Seeding rate:** unknown

**Planting date:** Nov.-Dec., 2008

**Fertilization:** unknown

**Experimental design:** A Vitazyme study was designed in Long An Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m² for each of the following three treatments (on next page).
Researcher: agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

Fertilization: unknown

Soil type: unknown

Location: Tieu Can, Tra Vinh Province, South Viet Nam

Variety: OM 4900

Seeding rate: unknown

Experimental design: An Vitazyme study was designed in Tra Vinh Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m² for each of the following three treatments.

Vitazyme application: Rates were 1.0 or 1.2 liters/ha, applied 20, 40, or 60 days after planting to the soil and leaf surfaces of the plots. “Vitazyme 2” is termed the “Farmer treatment”, likely because it is close to the program a typical farmer would use in the area.

Growth results: During plant growth the height, leaf width, and panicle length of the plants were measured.

Conclusions: This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by 2 to 6%, but panicle length very little. The yield of grain was boosted by 5 to 8%, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

Yield results:

In Viet Nam, rice grown with three Vitazyme applications show much better root development and leaf area, meaning greater yield potential.

In a rice trial in Viet Nam, the superior leaves and roots from Vitazyme are clearly visible in this photograph.

---

Researcher: agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam

Fertilization: unknown

Location: Tieu Can, Tra Vinh Province, South Viet Nam

Planting date: Nov.-Dec., 2008

Experimental design: A Vitazyme study was designed in Tra Vinh Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m² for each of the following three treatments.

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Conclusions: This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by 2 to 6%, but panicle length very little. The yield of grain was boosted by 5 to 8%, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

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Vitazyme Field Tests for 2009

In a rice trial in Viet Nam, the superior leaves and roots from Vitazyme are clearly visible in this photograph.

---

Increase in plant height: 6 to 9%

Increase in leaf width: 2 to 6%

Increase in panicle length: 1%

Increase in plant height: 3%

Increase in leaf width: 1 to 7%
**Rice**

**Researcher:** agronomists at AGPPS, Long Xuyen town, An Giang Province, South Viet Nam  
**Location:** Ba Tri, Ben Tre Province, South Viet Nam  
**Planting date:** Nov.-Dec., 2008  
**Soil type:** unknown  
**Seeding rate:** unknown

**Experimental design:** A Vitazyme study was designed in Ba Tri Province to evaluate the effect of Vitazyme on rice height, leaf width, panicle length, and grain yield, using plots of 1,000 m² for each of the following three treatments.

**Fertilization:** unknown  
**Vitazyme application:** Rates were 1.0 or 1.2 liters/ha, applied 20, 40, or 60 days after planting to the soil and leaf surfaces of the plots. “Vitazyme 2” is termed the “Farmer treatment”, likely because it is close to the program a typical farmer would use in the area.

**Growth results:** During plant growth the height, leaf width, and panicle length of the plants were measured.

**Conclusions:** This Vietnamese rice test, using two different Vitazyme programs, of 1 liter/ha twice or 1.2 liters/ha three times, showed that this product increased plant height by up to 2%, leaf width by from 2 to 6%, but panicle length very little, from 1 to 2%. The yield of grain was boosted very little with the 1.2 liters/ha applications, but by 9% by Vitazyme applied twice at 1.0 liter/ha, showing the considerable efficacy of this biostimulant to improve rice growth and yield.

**Rice Grain Yield**

- **Increase in plant height:** 1 to 2%  
- **Increase in leaf width:** 2 to 6%  
- **Increase in panicle length:** 2%

**Treatment NP₂O₅ K₂O kg/ha kg/ha kg/ha**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>152</td>
<td>82</td>
<td>34</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>106</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Percentage reduction, Vita</td>
<td>30%</td>
<td>27%</td>
<td>12%</td>
</tr>
</tbody>
</table>

**Increase in yield with Vitazyme**

- 1 liter/ha twice .................... +9%

**Time Control Vitazyme kg/ha kg/ha**

<table>
<thead>
<tr>
<th>Time days after sowing</th>
<th>Control 50 urea + 80 DAP*</th>
<th>Vitazyme 50 urea + 80 DAP*</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time days after sowing</th>
<th>Control 50 urea + 50 NPK**</th>
<th>Vitazyme 50 urea + 50 NPK**</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>30</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

- **DAP = diammonium phosphate (18-46-0% N-P₂O₅-K₂O)**  
- **NPK = mixed fertilizer (16-16-8% N-P₂O₅-K₂O)**  
- **KCl = potassium chloride (0-0-60% N-P₂O₅-K₂O)**

**Fertilizer savings with Vitazyme:** Fertilizer was reduced with Vitazyme applications by the following amounts:

- **Conclusions:** This Vietnamese rice study revealed that Vitazyme applied three times — an hour before sowing, 30 days after sowing, and 50 days after sowing, each time at liter/ha — together with reductions in fertilizer from the farmers’ tradition practices of 30% N, 27% P₂O₅, and 12% K₂O, resulted in a 600 kg/ha increase in grain production. Vitazyme contributed to improved nitrogen, phosphorus, and potassium utilization, which resulted in a substantial yield improvement, thus saving the farmer on import costs and improving his total salable crop.
### Rice

**Researcher:** Unknown  
**Location:** Cianjur, West Java, Indonesia  
**Variety:** Cigeulis (local variety)  
**Soil type:** Unknown  
**Population:** Unknown  
**Planting date:** Spring, 2009

**Experimental design:** A replicated plot trial on rice was established in Indonesia to evaluate the effect of Vitazyme on rice yield, with full and reduced fertilizer applications. These replications were used in a randomized complete block design. An additional treatment called “farmer practice” was used to compare with the other three treatments.

1. **Normal fertilizer**  
2. **Normal fertilizer + Vitazyme**  
3. **50% fertilizer + Vitazyme**  
4. **“Farmer practice”**

**Fertilization:** Normal (100%) level: 250 kg/ha urea (45% N), 200 kg/ha superphosphate 36 (48% P₂O₅), and 50 kg/ha KCl (60% K₂O). The 50% application for Treatment 3 received 50% of these levels.

**Vitazyme application:** 1.0 liter/ha applied twice.

**Growth results:** The number of tillers and plant height were measured at eight different times during the growth cycle, but none of the data revealed significant differences; thus, this data is not presented. One-thousand grain weight, the number of productive panicles, and panicle length also showed no significant differences.

**Yield results:** The plots were harvested in June of 2009.

**Grain Yield**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rice yield*</th>
<th>Yield change**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 100% fertilizer</td>
<td>7.63 a</td>
<td>0.73 (+11%)</td>
</tr>
<tr>
<td>2. 100% fert + Vita</td>
<td>7.69 a</td>
<td>0.79 (+11%)</td>
</tr>
<tr>
<td>3. 50% fert + Vita</td>
<td>7.56 a</td>
<td>0.66 (+10%)</td>
</tr>
<tr>
<td>4. Farmer practice</td>
<td>6.90 b</td>
<td>—</td>
</tr>
</tbody>
</table>

* Means followed by the same letter are not significantly different at P=0.05.
** The comparisons here are made with the “farmer practice”.

**Conclusions:** In this Indonesian rice study, using normal (100%) fertilizer, with and without Vitazyme, and 50% fertilizer with Vitazyme, all three treatments were statistically equal in yield, and all significantly exceeded the “farm practice” treatment. This result proved that Vitazyme applied twice, along with a 50% reduction in fertilizer, produced a yield equal to the 100% fertilizer treatment without fertilizer. This result is highly important for Indonesian rice farmers, who need to minimize fertilizer inputs due to high costs.

Vitazyme applied with 100% fertilizer also greatly improved seed number per panicle of rice at harvest, being 46% above the farm practice and 28% greater than none of the data revealed significant differences; thus, this data is not presented. One-thousand grain weight, the number of productive panicles, and panicle length also showed no significant differences.

### Shallots

**Researcher:** Unknown  
**Location:** Kemukten Brebes, Central Java, Indonesia  
**Variety:** Unknown  
**Planting date:** 2009

**Experimental design:** An experiment with shallots was set up in a randomized complete block design, using three treatments and nine replications. Plots were 1.2 m x 5.0 m. The purpose of the trial was to evaluate Vitazyme’s ability to improve shallot yield, quality, and profitability.

1. **Control (normal fertilizer)**  
2. **Normal fertilizer + Vitazyme**  
3. **50% fertilizer + Vitazyme**

**Fertilization:** 300 kg/ha urea, 250 kg/ha 0-46-0 N-P₂O₅-K₂O, and 150 kg/ha 0-0-60 N-P₂O₅-K₂O; 50% of these amounts for Treatments 3.

**Vitazyme application:** four applications at 1.0 liter/ha each time, starting 7 days after planting and every 2 weeks for three more times.

**Quality results:** Samples of shallots were selected to analyze for four quality factors.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Improvement with Vitazyme vs. Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smell</td>
<td>Stronger (preferred by farmers)</td>
</tr>
<tr>
<td>Taste</td>
<td>Hottest (preferred by farmers)</td>
</tr>
<tr>
<td>Crispness</td>
<td>Greater</td>
</tr>
<tr>
<td>Texture</td>
<td>Same as control</td>
</tr>
</tbody>
</table>

**Growth results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield*</th>
<th>Yield change**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 100% fertilizer</td>
<td>14.50 b</td>
<td>—</td>
</tr>
<tr>
<td>2. 100% fert + Vitazyme</td>
<td>16.72 a</td>
<td>2.22 (+15%)</td>
</tr>
<tr>
<td>3. 50% fert + Vitazyme</td>
<td>15.50 ab</td>
<td>1.00 (+7%)</td>
</tr>
</tbody>
</table>

* Means followed by the same letter are not significantly different at P=0.05 according to Duncan’s Multiple Range Test.

Continued on the next page
The number of leaves and plant height were measured six times during the growth cycle. None of the differences were significantly different at P=0.05 according to Duncan's Multiple Range Test.

**Conclusions**: This shallot study in Indonesia showed how Vitazyme will improve both the yield and quality of this important food crop. The smell, taste, and crispness of the bulbs were enhanced by the treatment, and the yield was improved by 15% for the full fertilizer + Vitazyme treatment, and by 7% for the 50% fertilizer + Vitazyme treatment. These data show that this product can increase yield despite a 50% reduction in fertilizer application, an important point when saving on fertilizer costs has become so prominent nowadays.

*Increase in yield with Vitazyme: 7 to 15%*

---

**Soybeans, Organic**

**Researcher**: Dennis Demel  
**Location**: Ogallala, Nebraska  
**Soil type**: Cuma sandy loam  
**Tillage**: conventional  
**Experimental design**: A soybean field was divided into a Vitazyme treated area (treated seeds only), and an untreated control area, with the objective to evaluate the effect of this product on the yield of soybeans grown under organic, irrigated conditions.

1. Control  
2. Vitazyme

**Fertility treatments**: In the fall of 2008 the field was subsoiled, and through drop tubes on the subsoiler were injected 0.5 gal/acre liquid humate, 1 gal/acre nitrogen (Summit), 0.5 gal/acre molasses, and 0.25 gal/acre fish. Also applied over all areas in the fall through the center pivot were 3 gal/acre nitrogen (Summit) with molasses and fish. In the spring, manganese, molasses, 1.4 gal/acre compost extract, and 1 oz/acre SP1 (Agri-Energy) were applied through the center pivot to all areas. At planting, 0.75 gal Dram 1 fish and Chilean nitrate, with Vitazyme, were applied in-furrow.

**Rhizobium application**: liquid, on the seeds at planting  
**Mycorrhizae application**: 4 oz/acre in the seed box  
**Vitazyme application**: 13 oz/acre in the furrow at planting  

**Test weight results**: Both treatments produced soybeans weighing 57 lb/bushel.

**Yield results**: At harvest, eight rows were harvested from each side of the treatment boundary, with a 16-row separation between the strips that were 20 x 2,640 ft (1.212 acre). A weigh wagon was used to measure the yield.

**Conclusions**: This organic soybean study in western Nebraska, under irrigation, revealed that Vitazyme increased bean yield by 25%, a very big increase. This large boost in yield with the product substantiates results with other organic producers, which have shown similar large yield improvements with the program. The grower was surprised with the degree of yield increase, but the weigh wagon had been properly calibrated.

*Increase in yield: 25%*

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**Soybeans**

**Researcher**: Bertel Schou, Ph.D.  
**Research organization**: ACRES (Agricultural Custom Research and Environmental Services), Cedar Falls, Iowa  
**Planting rate**: 62 lb/acre  
**Planting date**: May 21, 2009  
**Tillage**: conventional (field cultivated and harrowed)

**Experimental design**: The same plots from the first year of this long-term study were preserved for the second year. These plots were arranged in a randomized complete block design, with five replicates and two treatments. The study is designed to assess the long-term effects of Vitazyme on the yield and growth of corn and soybeans in rotation, and especially the effects on the physical, chemical, and microbial properties of the soil.

1. Control  
2. Vitazyme

**Fertilization**: none  
**Vitazyme application**: 13 oz/acre (1 liter/ha) in the seed furrow at planting (May 21, 2009), and 13 oz/acre (1 liter/ha) sprayed on the leaves and soil on June 23, 2009, at the V3 stage  
**Weed control**: glyphosate

**Plant analyses**: One sampling of leaves from the two treatments was made and sent to Midwest Laboratories, Omaha, Nebraska. Leaves were received on June 24, 2009, as a composite of the five replicates for each treatment.

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This long-term study in east central Iowa, on the same plots as last year, revealed that soybean yield was significantly increased.
Change in soybean tissue elements with Vitazyme

<table>
<thead>
<tr>
<th>Element</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>N ......</td>
<td>5.82</td>
<td>6.16</td>
<td>+6%</td>
</tr>
<tr>
<td>P ......</td>
<td>0.44</td>
<td>0.43</td>
<td>-2%</td>
</tr>
<tr>
<td>K ......</td>
<td>1.14</td>
<td>1.25</td>
<td>+11%</td>
</tr>
<tr>
<td>Mg ......</td>
<td>0.33</td>
<td>0.32</td>
<td>+10%</td>
</tr>
<tr>
<td>Ca ......</td>
<td>0.62</td>
<td>0.64</td>
<td>+10%</td>
</tr>
<tr>
<td>S ......</td>
<td>0.24</td>
<td>0.25</td>
<td>-3%</td>
</tr>
<tr>
<td>Fe .....</td>
<td>54</td>
<td>59</td>
<td>+54%</td>
</tr>
<tr>
<td>Mn .....</td>
<td>0.56</td>
<td>0.62</td>
<td>+30%</td>
</tr>
<tr>
<td>Cu .....</td>
<td>2.10</td>
<td>2.16</td>
<td>+30%</td>
</tr>
<tr>
<td>B ......</td>
<td>12</td>
<td>17</td>
<td>+8%</td>
</tr>
<tr>
<td>Mg ......</td>
<td>0.32</td>
<td>0.36</td>
<td>+11%</td>
</tr>
<tr>
<td>Cu ......</td>
<td>0.58</td>
<td>0.64</td>
<td>+5%</td>
</tr>
<tr>
<td>B ......</td>
<td>0.33</td>
<td>0.59</td>
<td>+853%</td>
</tr>
<tr>
<td>Zn ......</td>
<td>17</td>
<td>20</td>
<td>+12%</td>
</tr>
<tr>
<td>S ......</td>
<td>0.24</td>
<td>0.26</td>
<td>+18%</td>
</tr>
<tr>
<td>N ......</td>
<td>5.82</td>
<td>6.16</td>
<td>+6%</td>
</tr>
<tr>
<td>P ......</td>
<td>0.44</td>
<td>0.43</td>
<td>-2%</td>
</tr>
<tr>
<td>K ......</td>
<td>1.14</td>
<td>1.25</td>
<td>+11%</td>
</tr>
<tr>
<td>Mg ......</td>
<td>0.33</td>
<td>0.32</td>
<td>+10%</td>
</tr>
<tr>
<td>Ca ......</td>
<td>0.62</td>
<td>0.64</td>
<td>+10%</td>
</tr>
<tr>
<td>S ......</td>
<td>0.24</td>
<td>0.25</td>
<td>-3%</td>
</tr>
</tbody>
</table>

Harvest date: The crop was harvested on September 29, 2009, with a Massey Ferguson 8 plot combine. Two rows 40 feet long were harvested from each plot.

Grain moisture: There was no major difference in the moisture content of the two treatments.

Control moisture: 14.10
Vitazyme moisture: 14.07

Yield results: All soybean yields were adjusted to 13.0% moisture.

Conclusions: This long-term soil and crop study in Iowa, with soybeans grown the second year, revealed that the yield was significantly improved by 2.32 bu/acre (4%) with Vitazyme. Soil and plant analyses results showed improvements in tissue contents of N, Mg, Ca, Fe, Mn, B, and Cu. These values will be monitored each year as the study progresses, as will other physical, chemical, and microbiological parameters.

Soybeans

Farmer: David Herbst
Location: Herbst/Tierney Farms, Chaffee, Missouri, in cooperation with the University of Missouri Extension Service, Cape Girardeau and Jackson, Missouri
Variety: Nashville (Merschman)
Irrigation: furrow, on a leveled field
Soil type: silt loam

Previous crop: wheat, harvested before soybeans were planted (double-cropped)
Population: 140,000 seeds/acre
Planting date: June 7, 2008
Row spacing: 30 inch

Experimental design: A soybean field was divided into plots that were 24 rows wide, and replicated two times, with a check (untreated) plot between each treatment. The purpose of the trial was to evaluate the relative effects of several biostimulants and foliar fertilizers.

1. Vitazyme
2. Foliar Blend
3. Impact
4. Foliar Blend + GroMax
5. GroMax
6. GroMax Plus
7. Headline (fungicide)
8. Control (no treatment)

• Increase in yield: 25%
**Fertilization:** none  
**Product applications:** 13 oz/acre at R4 to R5  
**Yield results:** The data below are from the higher yielding of the two plots from each treatment.  
**Conclusions:** This soybean crop in a wheat-soybean double cropping situation revealed that, of all products used, Vitazyme performed the best, increasing the yield by 15% (7.81 bu/acre) above the control. This increase was 2.27 bu/acre above the next highest yield increase (Foliar Blend). Vitazyme was shown in this trial to be a highly effective soybean yield booster.

### Treatment Summary

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/acre</td>
<td>bu/acre</td>
</tr>
<tr>
<td>1. Vitazyme</td>
<td>59.15</td>
<td>7.81 (+15%)</td>
</tr>
<tr>
<td>2. Foliar Blend</td>
<td>56.88</td>
<td>5.54 (+11%)</td>
</tr>
<tr>
<td>3. Impact</td>
<td>56.79</td>
<td>5.45 (+11%)</td>
</tr>
<tr>
<td>4. Foliar Blend + GroMax</td>
<td>56.70</td>
<td>5.36 (10%)</td>
</tr>
<tr>
<td>5. GroMax</td>
<td>56.45</td>
<td>5.11 (+10%)</td>
</tr>
<tr>
<td>6. GroMax Plus</td>
<td>56.40</td>
<td>5.06 (+10%)</td>
</tr>
<tr>
<td>7. Headline</td>
<td>53.72</td>
<td>2.38 (+5%)</td>
</tr>
<tr>
<td>8. Control</td>
<td>51.34</td>
<td></td>
</tr>
</tbody>
</table>

- **Increase in yield:** 15%

---

**Soybeans**

**Researcher:** Nathan Temples  
**Farm cooperator:** Halford Farms  
**Location:** Bell City, Missouri  
**Variety:** Crows 4817  
**Soil type:** gumbo (high clay)  
**Planting rate:** 150,000 seeds/acre  
**Planting date:** June 3, 2009  
**Row-spacing:** 30 inches  
**Irrigation:** none

**Experimental design:** A 40-acre soybean field had 24 rows in the middle of the field treated with Vitazyme directly in the seed row. The objective was to evaluate the potential of this product to increase bean yields.

1. Control  
2. Vitazyme

**Fertilization:** unknown  
**Vitazyme application:** 8 oz/acre on the seeds at planting  
**Harvest date:** October 15, 2009

**Yield results:** Yields were determined by combining a strip in the 24 treated rows and an adjacent untreated strip.

- **Increase in yield:** 3%

**Conclusions:** This Missouri study proved that Vitazyme, applied at 8 oz/acre to the seeds at planting, increased yield by 3%.

---

**Soybeans**

**Soybean Yield**

- **Increase in yield:** 15%

**In Missouri, early soybean development of roots and leaves is obviously superior with only one Vitazyme treatment.**

**Note the excellent soybean development at harvest time; these beans yielded 65 bu/acre, a good increase.**

**The Vitazyme treated soybeans from this Missouri test have more pods and shorter internodes, yielding 15% more.**

**Note the greater number of pods with Vitazyme treatment from the plant sample shown on the left.**

42/ Vitazyme Field Tests for 2009
**Researcher:** Nathan Temples  
**Farm cooperators:** Donnie and Chris Wondel, D and C Farms  
**Location:** Arbor, Missouri  
**Variety:** Asgrow 4922  
**Soil type:** gumbo (high clay)  
**Planting rate:** 140,000 seeds/acre  
**Row-spacing:** 30 inches  
**Irrigation:** none  
**Planting date:** May 20, 2009  
**Experimental design:** In a 55-acre soybean field, 24 rows were treated with Vitazyme on the seeds at planting, in an effort to evaluate the product's effects on soybean yield.  
**Fertilization:** unknown  
**Vitazyme application:** 8 oz/acre on the seeds at planting  
**Harvest date:** October 20, 2009

**Conclusions:** This Missouri soybean study, with Vitazyme applied to the seeds at planting at 8 oz/acre, resulted in a substantial 8 bu/acre yield increase (+13%). This increase occurred in spite of a very high bean yield, showing that even with maximum yield the product works very well.

![Soybean Yield](image)

- **Increase in yield:** 13%

**Summary:**

- **Control**
  - Yield: 2.53 tons/ha
- **Vitazyme**
  - Yield: 2.94 tons/ha

- The pod number for the plants selected in the left-hand picture show a distinct advantage (13%) for the treated plot.

**Soybeans**

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists  
**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine  
**Location:** Ukraine central forest-steppe area near Vinnytsia  
**Planting date:** May 2, 2009  
**Previous crop:** winter wheat  
**Seeding rate:** 800,000 seeds/ha  
**Tillage:** plowing, harrowing, and cultivation  
**Soil type:** gray forest steppe soil; in the 0-30 cm layer, 2.2% organic matter, 8.4 mg/100 g of soil “hydrolyzed nitrogen”, 15.8 mg/100 g of soil phosphorus, 12.4 mg/100 g of soil exchangeable potassium, and pH=5.5.  
**Experimental design:** A uniform field was divided into plots of 1.0 ha each with three treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either a seed application, or a seed plus foliar application, on the yield of soybeans.  
**Fertilization:** 30 kg/ha N, 30 kg/ha P₂O₅, and 60 kg/ha K₂O  
**Vitazyme application:** Treatment 2 received 1.0 liter of Vitazyme per ton of seed on May 1, 2009, and Treatment 3 received this treatment plus a foliar treatment of 1.0/liter/ha on June 20, 2009, at branching.  
**Conclusions:** In Ukraine in 2009, this Vitazyme study with soybeans using either a seed treatment alone, or a seed treatment plus a foliar treatment, proved that this product increased yield by 16% (seed treatment) or 23% (seed and foliar treatment); income was also substantially increased in both cases. These excellent improvements show the great utility of this product in soybean culture in Ukraine.

- **Increase in yield, Vitazyme once:** 16%  
- **Increase in yield, Vitazyme twice:** 23%  
- **Income increase, Vitazyme once:** 1,104 hrn  
- **Income increase, Vitazyme twice:** 1,343 hrn
**Researcher:** unknown  
**Research organization:** Obolon-Agro  
**Location:** Ukraine  
**Variety:** Alexandria  
**Soil type:** unknown  
**Planting date:** unknown

**Experimental design:** A field of sugar beets was divided into a control (untreated) and a Vitazyme treated area, for the purpose of determining the effect of this product on sugar beet yield and sugar yield.

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

**Fertilization:** unknown

**Vitazyme application:** two spray applications at 1.0 liter/ha each time

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Beet yield</th>
<th>Change</th>
<th>Sugar content</th>
<th>Change</th>
<th>Super yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>48</td>
<td>———</td>
<td>20.0</td>
<td>———</td>
<td>9.6</td>
<td>———</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>60</td>
<td>12 (+25%)</td>
<td>21.5</td>
<td>1.5 (+8%)</td>
<td>12.9</td>
<td>3.3 (+34%)</td>
</tr>
</tbody>
</table>

- **Increase in beet yield:** 25%
- **Increase in sugar content:** 8%
- **Increase in sugar yield:** 34%

**Conclusions:** This Ukrainian sugar beet study revealed that two Vitazyme applications increased the beet yield (25%), the sugar content of the beets (1.5 percentage points), and the total sugar yield (34%). This great boost in sugar production reveals the potential of this product to aid Ukraine’s agriculture.

---

**Researcher:** O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists  
**Organization:** Vinnytsia State Agricultural Experiment Station, Ukraine Academy of Agrarian Sciences, Vinnytsia, Ukraine  
**Location:** Ukraine central forest-steppe area near Vinnytsia  
**Planting date:** April 14, 2009  
**Seeding rate:** 100.000 seeds/ha  
**Varieties:** Oleksandria, Karmelita, and Yustina  
**Tillage:** plowing, harrowing, and cultivating  
**Previous crop:** winter wheat  
**Harvest:** unknown

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

**Experimental design:** A series of replicated plots (two reps) at the experiment station was established to grow three varieties of sugar beets, using two applications of Vitazyme on the treated area. The objective was to determine the effect of Vitazyme on the crop’s yield, sugar content, and total sugar production.

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

**Fertilization:** 60 kg/ha N, 30 kg/ha P₂O₅, and 60 kg/ha K₂O; N applied in the spring, P and K in the fall

**Vitazyme application:** (1) 1 liter/ha on the plants and soil on June 20, 2009; (2) 1 liter/ha on the plants and soil on July 10, 2009

**Sugar content results:** At harvest time, the sugar percentage of each variety was determined.

- **Oleksandria**
  - Sugar percentage: 20.3
  - Control: 19.5  
  - Vitazyme: 20.9
  - **Increase in sugar:** 0.6 percentage point

- **Karmelita**
  - Sugar percentage: 20.0
  - Control: 19.5  
  - Vitazyme: 20.5
  - **Increase in sugar:** 0.3 percentage point

- **Yustina**
  - Sugar percentage: 20.8
  - Control: 21.0  
  - Vitazyme: 21.5
  - **Increase in sugar:** 0.4 percentage point

---

This replicated study at Vinnytsia, Ukraine, shows very healthy growth of sugar beets with Vitazyme. For the four treatments shown here, Vitazyme alone produced the greatest root tonnage and the highest sugar level.
Yield results: The crop was harvested the fall of 2009, with the following results.

**Beet yield, tons/ha**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Beet yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oleksandria</td>
<td>50.0</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>62.0</td>
<td>+12.0 (+24%)</td>
</tr>
<tr>
<td>Karmelita</td>
<td>62.0</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>77.0</td>
<td>+15.0 (+24%)</td>
</tr>
<tr>
<td>Yustina</td>
<td>64.0</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>82.0</td>
<td>+18.0 (+28%)</td>
</tr>
</tbody>
</table>

**Increase in beet yield**

- Oleksandria: +24%
- Karmelita: +24%
- Yustina: +28%

**Sugar yield results:**

**Sugar yield, tons/ha**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Sugar yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oleksandria</td>
<td>10.15</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>12.96</td>
<td>+2.81 (+28%)</td>
</tr>
<tr>
<td>Karmelita</td>
<td>12.40</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>15.63</td>
<td>+3.23 (+26%)</td>
</tr>
<tr>
<td>Yustina</td>
<td>13.31</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>17.38</td>
<td>+4.07 (+31%)</td>
</tr>
</tbody>
</table>

**Increase in sugar yield**

- Oleksandria: +26%
- Karmelita: +24%
- Yustina: +31%

Note the excellent size and integrity of the root tissue of the Vitazyme treated sugar beet roots on the right. This improved growth yielded 26 to 31% more sugar.

Conclusions: This Vitazyme study on three sugar beet varieties in Ukraine proved that only two applications of Vitazyme can markedly increase beet yield — from 24 to 28% — while at the same time increase the sugar content of the beets, from 0.3 to 0.6 percentage points. These improvements brought about total sugar yield increases of from 26 to 31%, huge enhancements of total sugar output with these very low application levels of active agents. These highly profitable results show that Vitazyme is a very viable option for sugar beet growers in Ukraine, and in other countries of Eastern Europe.

Sugar Beets

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

Variety: Snizhana

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

Location: Ukraine central forest-steppe area near Vinnytsia

Planting date: April 14, 2009

Seeding rate: 100,000 seeds/ha

Tillage: plowing, harrowing, and cultivation

Previous crop: winter wheat

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

Vitazyme application: (1) 1 liter/ha on the leaves on June 20, 2009; (2) 1 liter/ha on the leaves on July 10, 2009.

Fertilization: See the table on the next page

Experimental design: A sugar beet field was established having two replications, using four fertility levels, to determine the effectiveness of Vitazyme in affecting beet yield, sugar content, and sugar yield. See the table on the next page
**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fertilizer</th>
<th>Nitrogen</th>
<th>P$_2$O$_5$</th>
<th>K$_2$O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No fertilizer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. No fert + Vitaz</td>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3. 50% fertilizer</td>
<td>0</td>
<td>80</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>4. 50% fert + Vita</td>
<td>Yes</td>
<td>80</td>
<td>60</td>
<td>80</td>
</tr>
<tr>
<td>5. 75% fertilizer</td>
<td>0</td>
<td>120</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>6. 75% fert + Vita</td>
<td>Yes</td>
<td>120</td>
<td>90</td>
<td>120</td>
</tr>
<tr>
<td>7. 100% fertilizer</td>
<td>0</td>
<td>160</td>
<td>120</td>
<td>160</td>
</tr>
<tr>
<td>8. 100% fert + Vita</td>
<td>Yes</td>
<td>160</td>
<td>120</td>
<td>160</td>
</tr>
</tbody>
</table>

**Income results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Sugar yield</th>
<th>Change$^1$</th>
<th>Sugar content</th>
<th>Change$^1$</th>
<th>Added income$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No fertilizer</td>
<td>8.0</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>2. No fert + Vitaz</td>
<td>9.3</td>
<td>1.3</td>
<td>(+16%)</td>
<td>975</td>
<td></td>
</tr>
<tr>
<td>3. 50% fertilizer</td>
<td>10.3</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td></td>
</tr>
<tr>
<td>4. 50% fert + Vita</td>
<td>12.7</td>
<td>2.4</td>
<td>(+23%)</td>
<td>2,225</td>
<td></td>
</tr>
<tr>
<td>5. 75% fertilizer</td>
<td>11.1</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td></td>
</tr>
<tr>
<td>6. 75% fert + Vita</td>
<td>13.8</td>
<td>2.7</td>
<td>(+24%)</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td>7. 100% fertilizer</td>
<td>14.1</td>
<td>——</td>
<td>——</td>
<td>——</td>
<td></td>
</tr>
<tr>
<td>8. 100% fert + Vita</td>
<td>16.3</td>
<td>2.2</td>
<td>(+16%)</td>
<td>2,225</td>
<td></td>
</tr>
</tbody>
</table>

$^1$Comparisons at the same fertilizer level.

**Sunflowers**

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

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

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

**Seeding rate:** 5 kg/ha

**Planting date:** May 22, 2009

**Variety:** Gelio 06 AK0324

**Tillage:** plowing, harrowing, cultivation

**Previous crop:** winter wheat

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

**Experimental design:** A uniform field was divided into plots of 1.0 ha each with two treatments and four replications. The objective of the study was to evaluate the effect of Vitazyme as either a seed application, or a seed plus foliar application on the yield of sunflowers.

1. **Control**
   - Fertilization: 45 kg/ha N
   - Vitazyme application: Treatment 2 received 1.0 liter applied to the leaves and soil on June 25, 2009, at “basket” formation.

2. **Vitazyme, once foliar**
   - Increase in seed yield with Vitazyme: 24%
   - Increase in income: 632 hrn/ha

**Income results:**

**Conclusions:** Sunflowers raised with Vitazyme (foliar at 1 liter/ha) in Ukraine produced 24% more seeds, and 632 hrn/ha more income compared to the control treatment. This product has proven itself to greatly improve sunflower production and profits in Ukraine.
Tea


Location: Hunan Tea Research Institute Research Orchard, Gaoqiao, Changsha, Hunan, China

Variety: Zhuyeqi

Tree age: 8 years

Management: standard

Experimental design: A tea orchard was divided into Vitazyme treated and untreated areas, each plot being 0.4 hectare. These treatments were repeated three times. The purpose of the trial was to evaluate the effects of Vitazyme on the growth and production of tea.

1. Control
2. Vitazyme

Fertilization: unknown

Vitazyme applications: (1) 1.5 liters/ha sprayed on the leaves at early spring flush (March 14); (2) 1.0 liter/ha sprayed on the leaves at early summer flush (May 8); (3) 1.0 liter/ha sprayed on the leaves at early autumn flush.

Yield and growth results:

Income results:

- Increase in income: 11%
- Increase in bud density: 10%

Conclusions: This Chinese tea study with Vitazyme revealed that the product caused an excellent improvement in the growth of new buds (+10%), and also of the size (weight) of the buds (+8%). These factors combined to produce an 11% increase in tea leaf yield, an excellent result for the benefit of China's tea industry. This benefit is especially noteworthy considering that Vitazyme improved grower return by 11%.

- Increase in 100-bud weight: 8%
- Increase in tea leaf yield with Vitazyme: 11%

Vetch

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

Variety: Pribuz’ka super elite

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

Location: Ukraine central forest-steppe area near Vinnytsia

Tillage: plowing, harrowing, and cultivation

Planting rate: 1.8 million seeds/ha

Planting date: April 14, 2009

Previous crop: barley

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

Experimental design: A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha, replicated four times, to discover the effect of the product on the vetch cover crop. Both Vitazyme treatments had a seed treatment, while one of them received an additional foliar/soil application.

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

Fertilization: 10 kg/ha N, 10 kg/ha P₂O₅, and 30 kg/ha K₂O.

Vitazyme application: Both Treatments 2 and 3 received a 1.0 liter/ton of seed Vitazyme application at planting (April 4, 2009), while Treatment 3 received an additional 1.0 liter/ha sprayed on the leaves and soil on June 6, 2009, at branching.

Yield results:

Income results: See results at the bottom of this page.

Conclusions: This Ukraine study on vetch revealed that the harvested yield was improved considerably with Vitazyme applied to the seeds (+19%), but especially when an additional 1.0 liter/ha was applied to the leaves and soil (+28%). Income also increased substantially with both Vitazyme treatments. Vitazyme is shown to be an excellent material to add to the usual cultural program for more effective use of soil and fertilizer nutrients, to improve yield and profitability.

- Income increase with Vitazyme, on seeds: 820 hrn/ha
- Income increase with Vitazyme, on seeds + leaves: 1,040 hrn/ha

Increase in vetch yield with Vitazyme

Seed treatment ....................... +19%

Seed + foliar treatment ................ +28%
**Water Morning Glory**

Researcher: unknown  
Location: Tan Phu Trung Commune, Cu Chi District, Ho Chi Minh City, Viet Nam  
Variety: unknown  
Soil type: unknown  
Planting date: March, 2009

**Experimental design:** A field of water morning glory was divided into two parts: an untreated control, and a Vitazyme treated area. The purpose of the trial was to evaluate the efficacy of Vitazyme to improve crop growth and yield.

1. Control  
2. Vitazyme twice

**Fertilization:** unknown  
**Vitazyme application:** Two applications were made of a 0.1% solution, with 500 liters/ha sprayed over the crop (0.5 liter/ha), first at 7 and 14 days after planting, and second at 7 to 10 days before harvest.

**Height results:** At harvest time the average plant height was determined for each treatment.

**Yield results:** The crop was harvested in April of 2009.

**Conclusions:** This study on water morning glory in Viet Nam proved that Vitazyme, applied a week or two after planting and again 7 to 10 days before harvest, increased not only plant height (19%), but yield as well, by 2.87 tons/ha (12%). The product’s active agents have been show to greatly stimulate the growth and yield of this widely used vegetable in this Southeastern Asian country.

- **Increase in plant height:** 19%  
- **Increase in yield:** 12%

---

**Watermelons**

Researcher: Wang Zhongyang, Hunan Horticultural Research Institute, and Tao Chuanhui, Ningxian Xianzikou Watermelon Farm  
Location: Xiangzikou Watermelon Farm, Ningxiang County, Hunan, China  
Variety: Sugar Baby  
Planting rate: unknown  
Planting date: April 15

**Experimental design:** A watermelon field was divided into Vitazyme treated and untreated plots, arranged with three replications. Each plot was 0.4 hectare. The purpose of the study was to evaluate the effects of Vitazyme on watermelon yield and quality.

1. Control  
2. Vitazyme

**Fertilization:** unknown  
**Vitazyme application:** (1) 24-hour seed soak with a 5% solution (April 14); (2) 1.0 liter/ha leaf spray 20 days after transplanting (May 5); (3) 1.0 liter/ha leaf spray 40 days after transplanting (May 25); (4) 1.0 liters/ha leaf spray 60 days after transplanting (June 15).

**Harvest date:** unknown  
**Growth results:**

- **Seed germination:** more rapid and uniform with Vitazyme  
- **Overall plant growth:** healthier with Vitazyme

**Shoot Length**  
**Internode Length**  
**Leaf Length**
Although the shoot length was reduced with Vitazyme, the interlude length was also reduced so that leaf number was not reduced. Besides, the size of the leaves was increased with Vitazyme, with an estimated increase in leaf area of 19% (assuming a round leaf, and 344.5 cm² per leaf for the control, and 409.9 cm² per leaf for the Vitazyme treatment).

**Yield results:**

- **Increase in leaf width: 13%**
- **Increase in fruit per vine: 7%**
- **Increase in fruit size: 6%**
- **Increase in fruit yield: 18%**
- **Increase in fruit soluble solids at fruit center: 8.3%**
- **Increase in fruit soluble solids at fruit edge: 3.5%**

**Conclusions:** This Chinese study on watermelons in 2009 showed that Vitazyme substantially improved crop performance, improving the speed and uniformity of germination, plus increasing leaf size and photosynthetic area; this occurred despite shorter vines with Vitazyme, but shorter internodes meant more leaves per length of vine. More fruit per vine (7%), and a larger fruit size (6%), led to an 18% yield increase with Vitazyme. Moreover, this greater yield was more flavorful, having 8.3% more soluble solids in the center of the melons and 3.5% more solids at the melon edges. Especially important was the income increase of 18%. This program has been shown to be an excellent adjunct to watermelon cultivation in China.

**Wheat**

**Treatment Income Change**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income 1</th>
<th>Product cost 2</th>
<th>Net income 3</th>
<th>Income change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quilt</td>
<td>225.00</td>
<td>150.00</td>
<td>24.61</td>
<td>200.39</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>300.00</td>
<td>60.00</td>
<td>9.38</td>
<td>290.62 (+90.23)</td>
</tr>
</tbody>
</table>

1Based on $5.00/bushel; 2Vitazyme cost of $60.00/gal ($0.469/oz), and Quilt cost of $150.00/gal ($1.172/oz); 3Net income of crop income – product cost.

**Conclusions:** This Missouri wheat vs. fungicide study showed that Vitazyme did a much better job of controlling yield-limiting fungi, and boosting grain yield, than did Quilt fungicide. This income was 33% higher with Vitazyme than with the standard fungicides, and the net return was $90.23/acre higher, or $9.62 per dollar invested for Vitazyme.
**Researcher**: O.V. Kornijchuk, V.V. Plotnikov, and agronomic scientists

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

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

**Planting rate**: 6 million seeds/h

**Previous crop**: winter canola

**Variety**: Pecheryanka, super elite

**Planting date**: April 13, 2009

**Tillage**: plowing, harrowing, cultivating

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

**Experimental design**: A uniform field was divided into Vitazyme treated and untreated plots of 1.0 ha plots, replicated four times, to discover the effect of the product on spring wheat yield and quality factors. Both Vitazyme treatments received product on the seed, and one of these had Vitazyme applied to the leaves as well.

1. Control
2. Vitazyme once
3. Vitazyme twice

**Fertilization**: 60 kg/ha N, 30 kg/ha P₂O₅, and 60 kg/ha K₂O.

**Vitazyme application**: Both treatments received a seed treatment at planting, at 1.0 liter/ha, on April 12, 2009. Treatment 3 received an additional 1.0 liter/ha foliar and soil application on June 4, 2009.

**Yield results**:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Wheat yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>4.33</td>
<td>––</td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>4.76</td>
<td>0.43 (+10%)</td>
</tr>
<tr>
<td>3. Vitazyme, seed + leaves</td>
<td>4.94</td>
<td>0.61 (+14%)</td>
</tr>
</tbody>
</table>

**Quality results**:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Gluten</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>25.6</td>
<td>––</td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>27.6</td>
<td>2.0 (+8%)</td>
</tr>
<tr>
<td>3. Vitazyme, seed + leaves</td>
<td>28.3</td>
<td>2.7 (+11%)</td>
</tr>
</tbody>
</table>

**Grain structure results**:

<table>
<thead>
<tr>
<th>Grain number Per Head</th>
<th>Weight per head grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>0.82</td>
</tr>
<tr>
<td>2. Vitazyme once</td>
<td>0.89</td>
</tr>
<tr>
<td>3. Vitazyme twice</td>
<td>0.91</td>
</tr>
</tbody>
</table>

In Vinnytsia, Ukraine, wheat treated with Vitazyme shows stronger early growth than the control treatment. Young plants dug from the control treatment (right) and the Vitazyme treatment (left) show how the product benefits roots.

**In Vitazyme Field Tests for 2009**
Disease results:

**Farinaceous Mildew**

<table>
<thead>
<tr>
<th>Disease Spread %</th>
<th>Disease Development %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>10</td>
</tr>
<tr>
<td>Vitazyme once</td>
<td>8</td>
</tr>
<tr>
<td>Vitazyme twice</td>
<td>6</td>
</tr>
</tbody>
</table>

**Septoria Fungus**

<table>
<thead>
<tr>
<th>Disease Spread %</th>
<th>Disease Development %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>15</td>
</tr>
<tr>
<td>Vitazyme once</td>
<td>12</td>
</tr>
<tr>
<td>Vitazyme twice</td>
<td>10</td>
</tr>
</tbody>
</table>

Conclusions: This Ukrainian spring wheat trial proved that Vitazyme on the seeds at planting increased the yield by 10%, whereas an additional 1.0 liter/ha application added 4% more yield. Grain quality was also enhanced with Vitazyme in terms of gluten (+8 to 11%), crude protein (+5 to 9%), grain weight per liter (+1 to 3%), and 1,000 grain weight (+3 to 6%). Stem density, grain number per head, grain weight per head, and disease susceptibility were also increased with Vitazyme.

**Farinaceous Mildew**

- Income increase with Vitazyme on the seeds: 367 hryvnia/ha
- Income increase with Vitazyme, on seeds + leaves: 342 hryvnia/ha

Wheat, winter

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

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

Location: Ukraine central forest-steppe area near Vinnytsia

Sowing rate: 6 million seeds/ha

Planting date: September 30, 2008

Tillage: plowing and cultivating

Previous crop: spring vetch

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

Experimental design: A field was divided into four fertility levels, replicated four times, and each regime had either Vitazyme or no Vitazyme. Yields were evaluated in response to Vitazyme.

### Treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Vitazyme</th>
<th>Nitrogen</th>
<th>Phosphorus</th>
<th>Potassium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Fertilizer</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. 50% fertilizer</td>
<td>0</td>
<td>65</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>3. 75% fertilizer</td>
<td>0</td>
<td>100</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>4. 100% fertilizer</td>
<td>0</td>
<td>130</td>
<td>60</td>
<td>90</td>
</tr>
<tr>
<td>5. No fert + Vita</td>
<td>x</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. 50% fert + Vita</td>
<td>x</td>
<td>65</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>7. 75% fert + Vita</td>
<td>x</td>
<td>100</td>
<td>45</td>
<td>70</td>
</tr>
<tr>
<td>8. 100% fert + Vita</td>
<td>x</td>
<td>130</td>
<td>60</td>
<td>90</td>
</tr>
</tbody>
</table>

Fertilization: See the amounts applied in the table above.

Vitazyme application: Two spring applications of Vitazyme were made at 1 liter/ha each time, on the leaves and soil.

Yield results:

**Increase in grain yield with fertilizer**

- No fertilizer ...... 3.53 tons/ha
- 50% fertilizer ..... 5.91 tons/ha (+67%)
- 75% fertilizer ..... 6.46 tons/ha (+83%)
- 100% fertilizer ... 6.88 tons/ha (+95%)

**Increase in grain yield with Vitazyme**

- With no fertilizer ...... +13%
- With 50% fertilizer .... +12%
- With 75% fertilizer .... +12%
- With 100% fertilizer ...... +12%

*Values are averaged for Vitazyme treated and untreated treatments,

Grain Weight

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>815</td>
<td>834</td>
<td>19 (+2%)</td>
</tr>
<tr>
<td>50%</td>
<td>826</td>
<td>844</td>
<td>18 (+2%)</td>
</tr>
<tr>
<td>75%</td>
<td>832</td>
<td>850</td>
<td>18 (+2%)</td>
</tr>
<tr>
<td>100%</td>
<td>832</td>
<td>852</td>
<td>20 (+2%)</td>
</tr>
</tbody>
</table>

1,000 Grain Weight

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>44.5</td>
<td>46.0</td>
<td>1.5 (+3%)</td>
</tr>
<tr>
<td>50%</td>
<td>45.0</td>
<td>47.5</td>
<td>2.0 (+4%)</td>
</tr>
<tr>
<td>75%</td>
<td>46.0</td>
<td>48.0</td>
<td>2.0 (+4%)</td>
</tr>
<tr>
<td>100%</td>
<td>46.0</td>
<td>48.1</td>
<td>2.1 (+5%)</td>
</tr>
</tbody>
</table>

*Comparisons are made between Vitazyme treated and untreated treatments at the same fertility level. Thus, 1 and 5, 2 and 6, 3 and 7, and 4 and 8 were compared.
**Septoria disease effects**

**Grain structure results:**

**Conclusions:** This winter wheat study in Ukraine, using Vitazyme at four fertility levels with and without Vitazyme, revealed that this product gave a remarkable yield increase of 12 to 13% above the untreated control for each treatment comparison. This yield increase with Vitazyme was similar to the increase in yield with fertilizer: 12 to 13% increase at each fertility increment. Quality analyses revealed that grain weight, 1,000 grain weight, gluten, and crude protein all increased with Vitazyme, and disease incidence and spread were reduced as well. Stem density, grain number per load, and weight per head were all improved with Vitazyme, as was income: by 120 hrn/ha (no fertilizer) to 507 hrn/ha (100% fertilizer). These data clearly show that Vitazyme works together with fertilizer elements to improve wheat yield in a significant way, and this program is highly effective for improving the productivity and income of wheat growers in Ukraine.

- **Income increase at 0% fertilizer with Vitazyme:** 120 hrn/ha
- **Income increase at 50% fertilizer with Vitazyme:** 410 hrn/ha
- **Income increase at 75% fertilizer with Vitazyme:** 477 hrn/ha
- **Income increase at 100% fertilizer with Vitazyme:** 507 hrn/ha

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

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

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

**Variety:** Bilosnizhka, super elite

**Planting rate:** 6 million seeds/ha

**Tillage:** plowing and cultivation

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

**Experimental design:** A uniform field was divided into Vitazyme treated and untreated plots of 1.0 plots, replicated four times, to discover the effect of the product on winter wheat yield.

1. Control
2. Vitazyme twice

**Fertilization**: 60 kg/ha N

**Vitazyme application:** The Vitazyme treatment received a foliar/soil application at 1.0 liter/ha on April 30, 2009, and a second application on May 15, 2009.

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>14.0</td>
<td>17.6</td>
<td>3.6 (+26%)</td>
</tr>
<tr>
<td>50%</td>
<td>23.6</td>
<td>27.6</td>
<td>4.0 (+17%)</td>
</tr>
<tr>
<td>75%</td>
<td>24.8</td>
<td>28.8</td>
<td>4.0 (+16%)</td>
</tr>
<tr>
<td>100%</td>
<td>27.1</td>
<td>30.0</td>
<td>2.9 (+11%)</td>
</tr>
</tbody>
</table>

**Income results:** see results below.

**Wheat, winter**

**Wheat Yield**

- **Increase in wheat yield:** **18%**
- **Increase in gluten:** **21%**
- **Increase in liter weight:** **2.4%**
- **Increase in crude protein:** **12%**

**Treatment** | Wheat yield | Yield change |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons/ha</td>
<td>tons/ha</td>
</tr>
<tr>
<td>1. Control</td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme</td>
<td>5.8</td>
<td>0.9 (+18%)</td>
</tr>
</tbody>
</table>

- **Increase in 1,000 kernel weight:** **5%**

**Grain Weight Per Head**

**Disease Spread**

**Grain Number Per Head**

**Disease Development**

**Grain Structure**

**Stem Density**

**Crude Protein**

**Gluten**

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>None</th>
<th>8.3</th>
<th>9.8</th>
<th>1.5 (+18%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50%</td>
<td>9.9</td>
<td>11.4</td>
<td>1.5 (+15%)</td>
<td></td>
</tr>
<tr>
<td>75%</td>
<td>10.3</td>
<td>11.5</td>
<td>1.2 (+12%)</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td>11.4</td>
<td>12.0</td>
<td>0.6 (+5%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>18</td>
<td>19</td>
<td>1 (+6%)</td>
</tr>
<tr>
<td>50%</td>
<td>20</td>
<td>22</td>
<td>2 (+10%)</td>
</tr>
<tr>
<td>75%</td>
<td>22</td>
<td>23</td>
<td>1 (+5%)</td>
</tr>
<tr>
<td>100%</td>
<td>23</td>
<td>24</td>
<td>1 (+4%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fertilization</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0.80</td>
<td>0.87</td>
<td>0.07 (+9%)</td>
</tr>
<tr>
<td>50%</td>
<td>0.91</td>
<td>1.04</td>
<td>0.13 (+14%)</td>
</tr>
<tr>
<td>75%</td>
<td>1.00</td>
<td>1.10</td>
<td>0.10 (+10%)</td>
</tr>
<tr>
<td>100%</td>
<td>1.06</td>
<td>1.15</td>
<td>0.09 (+18%)</td>
</tr>
</tbody>
</table>

**Spread of Disease, %**

**Development of Disease, %**

52/ Vitazyme Field Tests for 2009
Grain quality results:

Income results:

Conclusions: This winter wheat trial at Vinnitsia, Ukraine, revealed that two spring applications of Vitazyme, at 1 liter/ha each time, gave a large yield increase of 18%. The grain was improved in gluten (+21%), protein (+12%), liter weight (+2.4%), and weight per 1,000 kernels (+5%), and the crop income was improved by 473 hrn/ha. Such large yield, quality, and income increases with two simple product application show that this program is a very good production practice for Ukrainian farmers.

• Income increase with Vitazyme: 473 hrn/ha

Researcher: unknown
Organization: Ukerzernoprom
Location: Berdichiv Raion, Zhitomerski Oblast, Ukraine (central forest-steppe area)

Variety: Olecya
Tillage: tilled to 4-5cm

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

Planting date: September 7, 2008

Experimental design: This winter wheat trial was established to evaluate the effect of Vitazyme, as a seed or foliar treatment, to enhance grain yield.

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

Fertilization: none

Vitazyme treatment: Treatment 2: 1.0 liter/ha at planting (September 7) with the seeds; Treatment 3: 1.0 liter/ha sprayed on the leaves and soil on October 22, 2008.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Wheat yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons/ha</td>
<td>tons/ha</td>
</tr>
<tr>
<td>1. Control</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme, on seeds</td>
<td>3.1</td>
<td>0.3 (+11%)</td>
</tr>
<tr>
<td>3. Vitazyme, on leaves (fall)</td>
<td>3.2</td>
<td>0.4 (+14%)</td>
</tr>
</tbody>
</table>

Increase in wheat yield with Vitazyme

Fall, on seeds ................. +11% 
Fall, on leaves and soil ...... +14%

Wheat, winter

Grain Yield

Yield results:

Conclusions: This Ukraine winter wheat demonstration trial, using Vitazyme without fertilizer additions on the seeds only, or the leaves and soil only, revealed that the seed treatment produced an excellent 11% yield increase. A fall foliar/soil application alone increased the grain yield even more: 14%. Use of Vitazyme on either the seeds, or applied to the foliage, is shown to be an excellent practice in Ukraine.

Early spring growth of these winter wheat samples show a decided advantage for Vitazyme treatment, and 14% more yield.

Grain yield, tons/ha

3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0

Control
Vitazyme seeds
Vitazyme leaves

Continued on the next page
on October 22, 2008, when the plants were a few inches tall.

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Wheat yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Control</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>2. Vitazyme, on seeds</td>
<td>3.1</td>
<td>0.3 (+11%)</td>
</tr>
<tr>
<td>3. Vitazyme, on leaves (fall)</td>
<td>3.2</td>
<td>0.4 (+14%)</td>
</tr>
</tbody>
</table>

**Conclusions:** This Ukraine winter wheat study revealed that Vitazyme, applied to the seeds at 1 liter/ton of seeds, increased grain yield by 11%. A foliar application in the fall increased yield by 14%. These results prove the great utility of this product to improve wheat yields in Ukraine.

- *Increase in wheat yield with Vitazyme: 11 to 14%*

**Left:** New plantings were more vigorous, having greater girth after just one season compared to the untreated trees in the foreground.

**Above:** Honeycrisp apples, which are difficult to grow, responded excellently to Vitazyme with greater new shoot growth and more fruit (see on the left). The Vitazyme treated trees also had more chlorophyll than did leaves from untreated trees.

**Replicated trials in western Michigan revealed how Vitazyme can help give apple growers greater success!**
Vitazyme®

SAVE ON NITROGEN COSTS!
INCREASE PROFITS!

VITAZYME® can benefit your operation by reducing fertilizer nitrogen loss through leaching and denitrification. VITAZYME is...

- Inexpensive, Very Cost-Effective
- Easy to Use
- Safe and Nontoxic
- Versatile: Can be applied to leaves, soil, or seeds, or mixed with fertilizers and pesticides
- For use with all crops

VITAZYME® improves fertilizer utilization by plants through rhizosphere (root zone) stimulation. Note this Iowa study.

In 2007 at Texas A&M University, at 60 lb/acre of nitrogen VITAZYME produced 1,140 lb/acre of lint, while the 120 lb/acre, no Vitazyme treatment produced 1,050 lb/acre of lint ... 90 lb/acre more lint. With a savings of 60 lb/acre of nitrogen—at $0.70/lb of nitrogen—this represents a savings of $42.00/acre on fertilizer alone. If cotton is sold for $0.60/lb of lint, there was a $72.00/acre more income.

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vitaearth.com

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See what **VitaZyme®** did in Canada to improve nitrogen utilization!

At Branchton, Ontario, in 2007 **VitaZyme** produced significant yield increases of 16% at both 60 and 120 kg/ha of nitrogen.

- Increase with VitaZyme at 60 kg/ha: $74.40/acre!
- Increase with VitaZyme at 120 kg/ha: $90.00/acre!

The yield with VitaZyme at 60 kg/ha of nitrogen was statistically the same as the yield at 120 kg/ha of nitrogen without VitaZyme!

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