Onions with Vitazyme application

Researcher: David Gray  
Research organization: David Gray’s AgroAdvantage, O’Connor, Western Australia  
Location: Myalup, Western Australia  
Variety: Rhinestone  
Soil type: unknown  
Plot size: 25 meters long X 1.5 meter wide (standard bed)  
Planting method: direct seeded  
Planting date: August 3, 2017  
Experimental design: A series of eight beds (one replication per treatment) were prepared for an onion trial, the seeds treated with different biostimulant combinations and zinc, alone and in combination, to determine early growth and final yield and quality effects on the bulbs. Only the Vitazyme and zinc results are shown in this review.

1. Control  
2. Vitazyme  
3. Vitazyme + Zinc

Note the greater leaf and root growth for these onion plants with Vitazyme application (right).

The standard farm practice in this trial produced onion bulbs that yielded 36.2 kg/plot. Compare these to the treated plot.

The only treatment that gave an increase in early growth was Vitazyme; only one other product combination gave an increase, and that was only 1%.

Fertilization: farm practice, equal for all plots  
Vitazyme applications:  
- **Vitazyme only**: Vitazyme at 100 ml/kg of seed was sprayed on the seeds, and the seeds were dried before sowing.  
- **Zinc chelate only**: Zinc at 100 ml/kg of seed was sprayed on the seeds and dried before sowing.  
- **Vitazyme + Zinc**: Vitazyme at 50 ml/kg of seed and zinc chelate (14% actual Zn) at 50 ml/kg of seed were sprayed on the seeds and dried before sowing.

Growth results: On November 2, 2017, 13 weeks after planting, sample plants were dug from each treatment and weighed.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Average Seedling Weight, 13 weeks, grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>16.9</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>21.8</td>
</tr>
<tr>
<td>Zinc</td>
<td>14.1</td>
</tr>
<tr>
<td>Vitazyme + Zinc</td>
<td>15.4</td>
</tr>
</tbody>
</table>

Change in seedling weight vs. control  
Vitazyme ............... +29%  
Zinc ...................... -17%  
Vitazyme + Zinc ........... -9%

When Vitazyme and zinc were applied to the seeds before sowing, the plants responded greatly to produce bigger bulbs, especially in the 80+ mm range, and the yield was 23% higher than the control.
Yield and quality results:

### Plant Population

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Zinc</th>
<th>Vitazyme + Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant number per sample area</td>
<td>213</td>
<td>238</td>
<td>196</td>
<td>215</td>
</tr>
</tbody>
</table>

### Bulb Size, Weight

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Zinc</th>
<th>Vitazyme + Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulb weight, grams</td>
<td>160</td>
<td>168</td>
<td>197</td>
<td>205</td>
</tr>
</tbody>
</table>

### Total Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Zinc</th>
<th>Vitazyme + Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total yield, kg/plot</td>
<td>36.20</td>
<td>40.15</td>
<td>40.02</td>
<td>44.50</td>
</tr>
</tbody>
</table>

#### Population change

- **Vitazyme**: +12%
- **Zinc**: -8%
- **Vitazyme + Zinc**: +1%

#### Bulb weight increase

- **Vitazyme**: +5%
- **Zinc**: +23%
- **Vitazyme + Zinc**: +28%

#### Total yield increase

- **Vitazyme**: +11%
- **Zinc**: +11%
- **Vitazyme + Zinc**: +23%

### Undesirable Bulb Sizes

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Zinc</th>
<th>Vitazyme + Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undesirable bulbs, kg/plot</td>
<td>1.43</td>
<td>0.19</td>
<td>0.40</td>
<td>0.23</td>
</tr>
</tbody>
</table>

#### Undesirable sizes change

- **Vitazyme**: -87%
- **Zinc**: -72%
- **Vitazyme + Zinc**: -84%

### Bulb Size Distribution

- **60-80 mm**
- **50-60 mm**
- **80+ mm**
- **Other**

### Conclusions:

This Australian onion study, using single 1.5 meter wide beds, revealed that both Vitazyme and zinc chelate on the seeds were highly efficacious in increasing onion plant growth, and yield, quality, and income parameters. At 13 weeks after planting, Vitazyme increased plant weight by 29%—no other treatment responded positively—and also improved plant population by 12%, bulb weight by 5%, and yield by 11%; undesirable bulbs were reduced by 87%. Vitazyme also significantly improved the yield of 60-80 mm bulbs above the control. When combined with chelated zinc, Vitazyme revealed a strong syneresis in terms of bulb weight (+28%), total yield (+23%), and the number of extra large onions. Zinc chelate alone did well, but showed less response for all parameters than Vitazyme + Zinc. The return on investment (ROI) was greatly improved when Vitazyme was combined with zinc on the seeds, reaching $11,278.53 above the control; Vitazyme alone returned $5,448.66, about the same as the zinc chelate.

### Income results:

Money values are in Australian dollars.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Zinc</th>
<th>Vita + Zinc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield, kg/plot</td>
<td>90.50</td>
<td>100.38</td>
<td>100.05</td>
<td>111.25</td>
</tr>
<tr>
<td>Yield increase</td>
<td>—</td>
<td>11%</td>
<td>11%</td>
<td>23%</td>
</tr>
<tr>
<td>Gross income, $/ha¹</td>
<td>38,625</td>
<td>44,475</td>
<td>44,850</td>
<td>50,000</td>
</tr>
<tr>
<td>Treatment cost, $/ha²</td>
<td>0</td>
<td>401.34</td>
<td>391.59</td>
<td>396.47</td>
</tr>
<tr>
<td>Return on investment, $/ha</td>
<td>0</td>
<td>5,448.66</td>
<td>5,833.41</td>
<td>11,278.53</td>
</tr>
</tbody>
</table>

¹Based on $500/tonne for large onions, and $400/tonne for small and medium onions. ²Treatment costs: 100 ml of Vitazyme costs $9.48 and 100 ml of zinc chelate costs $1.59. Application costs are included in addition.
Onions with Vitazyme application [Vitazyme is called Globaplant in Colombia.]

Researchers: Diana Urrea Ramirez and Luis Acosta
Research organization: Agroglobal S.A., Bogota, Colombia
Location: Municipality of Une, Cundinamarca Department, Colombia
Variety: Okinawa
Planting rate: unknown
Planting date: unknown
Experimental design: An onion field was divided into Vitazyme treated and untreated portions to evaluate the effect of the product on the yield and quality of the bulbs.

1 Control 2 Vitazyme

Fertilization: according to recommendations for soil building
Vitazyme application: three applications of a 0.25% Vitazyme dilution to the leaves and soil, beginning at 8 days after germination; mixed with humic and fulvic acids
Harvest date: unknown
Crop density results: At harvest, the number of bulbs per unit area were counted.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Bulb density bulbs/m²</th>
<th>Density increase bulbs/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>46</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>61</td>
<td>15 (+33%)</td>
</tr>
</tbody>
</table>

Yield results: An estimate of yield was made, using the weight of the three onion sizes per square meter, and extrapolating that to a full hectare.

Conclusions: This onion trial in Colombia, comparing three Vitazyme applications to none on the Okinawa variety, revealed that Vitazyme (Globaplant) increased the total yield by 34%. These results reveal the great utility of Vitazyme as an onion crop input in Colombia.
Onions with Vitazyme application—A Synergistic Study with Bioseed, Compared with Bactiva

Researcher: Lucero Fernandez, Antonio Medina, and Juan Diaz

Research organization: Quimica Lucava S.A., de C.V., Celaya, Guanajuato, Mexico, and AgBiotech, Inc., Lakeville, New York

Location: Los Pinos, Leon, Guanajuato, Mexico

Farmer Manager: Hugo Medina

Variety: Carta Blanca

Soil type: clayey loam

Planting arrangement: double row of seedlings, 10 cm between rows and 10 cm in rows, 80.5 cm between adjacent double rows

Transplanting date: September 13 2017

Experimental design: An onion trial was designed using two replications of plots containing four rows (3.22 m wide) that were 98 m long. The total treated area of each treatment was 630 m² for the two plots, and the two center rows of each plot (157.5 m² per plot, and 315 m² per treatment) were evaluated for data. The purpose of the trial was to determine the effect of these treatments on onion yield and profitability.

1. Control
2. Bio Seed + Vitazyme
3. Bactiva
4. Bio Seed

Fertilization: October 3, 200 kg/ha of MAP (11-52-0% N-P₂O₅-K₂O) + 400 kg/ha of ammonium phosphate + 200 kg/ha of potassium sulfate; October 25, 50 kg/ha of Mg + 50 kg/ha of Ca; November 3, 50 kg/ha of Mg + 50 kg/ha of Ca; November 10, 100 kg/ha of potassium nitrate; November 17, 100 kg/ha of NKS; November 24, 100 kg/ha of NKS

Fungicide applications: Applications were made when the first symptoms of disease appeared.

Control plots: usual farm fungicides

Other plots: Quimica Lucava MM64-P which are rather compatible with fungi in Bio Seed and Bactiva

Bio Seed application: a drench at 125 g/ha after transplanting + three 1 liter/ha Vitazyme sprays for three consecutive months. Bio Seed is a biopesticide and biofertilizer product for seed treatments which contains Paenibacillus azotofixans, Bacillus megaterium, Bacillus mucilaginosus, Bacillus subtilis, and Tricoderma harzianum, each at 1 x 10⁸ CFU/g, and mycorrhizae at 1 x 10² IP/g. The product is registered and developed in the USA by AgBioTech of Lakeville, New York.

Vitazyme application: 1 liter/ha sprays on consecutive months after Bio Seed treatment. Vitazyme is a proprietary fermentation product containing brassinosteroids, 1-triaccontanol, B-vitamins, and other growth promoting agents, produced by Vital Earth Resources, Gladewater, Texas.

Bactiva applications: four drenches, totalling 1.25 kg/ha, beginning with 500 g/ha at transplanting + three monthly 250 g/ha drenches. Bactiva is a biopesticide and biofertilizer containing 1 x 10⁷ CFU/g of Trichoderma harzianum, Trichoderma reesei, Trichoderma viride, Gliocladium virens, Bacillus megaterium. Bacillus subtilis, Bacillus polymyxa, and Pseudomonas fluorescens, gibberellins, cytokinins, seaweed and Yucca schidigera extracts, amino acids, fulvic acid, and several vitamins.

First application (September 14, 2017):

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate</th>
<th>Total application for 630m²</th>
<th>Rate per plot (315m²)</th>
<th>Rate per backpack fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio Seed</td>
<td>125 g/ha</td>
<td>8 g</td>
<td>4 g</td>
<td>1 g</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1 liter/ha</td>
<td>64 ml</td>
<td>32 ml</td>
<td>8 ml</td>
</tr>
<tr>
<td>Bactiva</td>
<td>500 g/ha</td>
<td>32 g</td>
<td>16 g</td>
<td>4 g</td>
</tr>
</tbody>
</table>

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield change</th>
<th>Extras + Mediums</th>
<th>Small + Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio Seed</td>
<td>125 g/ha</td>
<td>8 g</td>
<td>4 g</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1 liter/ha</td>
<td>64 ml</td>
<td>32 ml</td>
</tr>
<tr>
<td>Bactiva</td>
<td>500 g/ha</td>
<td>32 g</td>
<td>16 g</td>
</tr>
<tr>
<td>Control</td>
<td>39.0 MT/ha</td>
<td>—</td>
<td>91.6</td>
</tr>
<tr>
<td>Bio Seed + Vitazyme</td>
<td>48.7 MT/ha</td>
<td>9.7 (+25%)</td>
<td>92.2</td>
</tr>
<tr>
<td>Bactiva</td>
<td>41.3 MT/ha</td>
<td>2.3 (+6%)</td>
<td>91.1</td>
</tr>
<tr>
<td>Bio Seed</td>
<td>46.6 MT/ha</td>
<td>7.5 (+19%)</td>
<td>93.6</td>
</tr>
</tbody>
</table>
### Income results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Crop value</th>
<th>Product cost*</th>
<th>Fungicide cost</th>
<th>Total cost</th>
<th>Value less costs</th>
<th>Extra return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>8,210.67</td>
<td>0</td>
<td>235.68</td>
<td>235.68</td>
<td>7,974.99</td>
<td>—</td>
</tr>
<tr>
<td>Bio Seed + Vitazyme</td>
<td>10,300.61</td>
<td>110.95</td>
<td>37.84</td>
<td>148.78</td>
<td>10,151.82</td>
<td>2,176.83</td>
</tr>
<tr>
<td>Bactiva</td>
<td>8,738.97</td>
<td>130.41</td>
<td>0</td>
<td>130.41</td>
<td>8,608.56</td>
<td>633.57</td>
</tr>
<tr>
<td>Bio Seed</td>
<td>9,857.63</td>
<td>25.00</td>
<td>75.68</td>
<td>100.68</td>
<td>9,756.95</td>
<td>1,781.96</td>
</tr>
</tbody>
</table>

*Bio Seed $200.00/kg; Vitazyme $28.65/liter; Bactiva $104.32/kg.

### Conclusions:

The programs of Bio Seed in a 125 g/ha drench at transplanting, plus three monthly 1 L/ha Vitazyme sprays on leaves and soil, and Bio Seed alone, in one 125 g/ha drench show very marked (24.7% and 19.3%, respectively) yield increases, better quality in percent of larger sized bulbs, and a marked reduction of required fungicides for good plant health, resulting in marked increases (2,177 and 1,782 US$/ha, respectively) above the untreated control (with standard fungicide treatments), and also much larger (3-4 times) yield and net profit increases than with Bactiva in four monthly drenches: one at 500 g/ha, and three at 250 g/ha.
Onions with Vitazyme application—A Study with Bio Seed Treatment

**Researcher:** K. Bruce Kirksey, Ph.D.
**Research organization:** AgriCenter International, Memphis, Tennessee
**Location:** Memphis, Tennessee
**Variety:** unknown
**Soil type:** Falaya silt loam; good fertility and drainage; pH = 6.3
**Planting date:** July 5, 2018 (transplants)
**Row spacing:** 48 inches
**In-row spacing:** 12 inches
**Experimental design:** A randomized complete block small-plot design was established with onions to evaluate the effect of Vitazyme and Bio Seed on the yield of these bulbs. The plot size was 10 x 30 ft., with one row per plot of transplants.

1. **Control**
2. **Vitazyme**
3. **Bio Seed + Vitazyme**

**Fertilization:** unknown

**Vitazyme application:** (1) soil/root drench at transplanting at 13 oz/ha (1 liter/ha) on July 5; (2) soil/foliar spray at the 3-leaf stage at 13 oz/acre (1 liter/ha) on July 28; (3) soil/foliar spray at the 6-leaf stage at 13 oz/acre (1 liter/ha) on August 23; (4) soil/foliar spray at E-M bulbing at 13 oz/acre (1 liter/ha) on September 7

**Bio Seed application:** 50 grams/acre (124 grams/ha) at transplanting in the drench water, with Vitazyme, on July 5. Bio Seed is a mixture of various bacteria and fungi for rhizosphere population.

**Yield results:** An area of 2.5 x 25 ft for each plot was hand harvested, and the bulbs were weighed.

### Bulb Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Bulb Yield, lb/plot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>2.813 b</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>5.050 a</td>
</tr>
<tr>
<td>Vitazyme + Bio Seed</td>
<td>5.375 a</td>
</tr>
</tbody>
</table>

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

**Conclusions:** A small-plot onion study in Tennessee, using Vitazyme alone or with Bio Seed, showed that Vitazyme increased bulb yield by 80%, and with Bio Seed in the soil drench by 91%. These results show that these products are highly effective to improve yields in onion growing programs.

**Increase in yield with Vitazyme: 80%**

**Increase in yield with Vitazyme + Bio Seed: 91%**
Harvest date: October 20 to 22, 2016 (83 to 85 days after transplanting)

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>tons/ha</td>
<td>tons/ha</td>
</tr>
<tr>
<td>Control</td>
<td>56.15</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>62.41</td>
<td>6.26 (+11%)</td>
</tr>
</tbody>
</table>

Yield increase with Vitazyme: 11%

Income results:

| Increased income with Vitazyme: 1,565 USD/ha |
| Increased profit with Vitazyme: 1,493.75 USD/ha |
| Cost : Benefit ratio: 21:1 |

Conclusions: An onion trial in Mexico, using three applications of Vitazyme at 1 liter/ha, revealed that this product produced superior root and leaf growth, chlorophyll development, and bulb size while reducing the incidence of Pink Root disease. The yield was increased by 11%, and the bulb size was moved towards the larger size category with considerably less waste. Profit was increased by 1,493.75 USD/ha, with a 21-times return for each dollar invested in the product. These data validate the great usefulness of Vitazyme for onion growers in Mexico.
Onions with Vitazyme application

**Researcher:** Lucero Fernandez and Ivan Zazueta  
**Farmer:** Gelasio Ramos  
**Research organization:** Quimica Lucava, Mexico  
**Location:** Canta Ranas Farm, Abasolo, Guanajuato, Mexico  
**Variety:** Creole  
**Planting date:** April 1, 2014  
**Experimental design:** A 2 hectare area of an onion field was treated with Vitazyme three times, while the remainder of the field was left untreated, to evaluate the effect of the product on onion yield.

1. Control  
2. Vitazyme

**Fertilization:** unknown  
**Vitazyme application:** May 7, June 11, and July 24, 2014, at 1 liter/ha each time  
**Harvest date:** December 29, 2014  
**Yield results:** The crop was harvested after about 120 days.

---

### Income results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (kg/ha)</th>
<th>Gross Income (USD/ha)</th>
<th>Income change</th>
<th>Vitazyme cost (USD/ha)</th>
<th>Profit (USD/ha)</th>
<th>Cost : Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>41,233</td>
<td>23561,71</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>42,165</td>
<td>24094,29</td>
<td>532,57</td>
<td>101,79</td>
<td>430,79</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Price of onions = 0.5714 USD/kg.

**Increased income with Vitazyme:** 431 USD/ha  
**Greater Cost : Benefit with Vitazyme:** 4.2

### Conclusion:

An onion trial in Mexico revealed that Vitazyme, applied three times, increased the yield by a modest 2.3%, but improved income by 431 USD/ha, giving a cost : benefit of applying the product of 4.2. These results show a good income increase from Vitazyme use on onions.

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### Onion yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield (kg/ha)</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>41,233</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>42,165</td>
<td>932 (+2.3%)</td>
</tr>
</tbody>
</table>

**Yield increase with Vitazyme:** 2.3%
**Researcher:** Waking Novembre  
**Research organization:** Acra Industries, Haiti  
**Location:** Mirebalais, Haiti  
**Variety:** unknown  
**Planting date:** unknown

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

1. Control  
2. Vitazyme

**Fertilization:** unknown

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

**Harvest date:** unknown

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>210</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>375</td>
<td>165 (+79%)</td>
</tr>
</tbody>
</table>

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

Researcher: Steven David  
Research organization: Organic Farming Systems, Perth, Australia

Farmer: LIM Produce  
Location: Wyalup, Western Australia

Soil type: sand  
Irrigation: fixed overhead

Planting date: August 5, 2010  
Experimental design: An onion planting was divided into two treatments with three replicates (six plots), one treatment being the farmer’s program and the other being Vitazyme plus MicroPlus. The purpose of the study was to evaluate the effects of this program on onion number, disease, weight, and yield.

Fertilization: normal farm program  
Vitazyme application: See the table below.  
MicroPlus application: See the table below. MicroPlus is an inoculum of Streptomyces lydicus WYEC 108 (0.0371%).

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Aug. 7</th>
<th>Aug. 26</th>
<th>Sep. 24</th>
<th>Nov. 4</th>
<th>Dec. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>amount on the leaves and soil</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.71 L/ha</td>
<td>—</td>
<td>1.0 L/ha</td>
<td>1.0 L/ha</td>
<td>1.0 L/ha</td>
</tr>
<tr>
<td>MicroPlus</td>
<td>854 g/ha</td>
<td>500 g/ha</td>
<td>500 g/ha</td>
<td>500 g/ha</td>
<td>500 g/ha</td>
</tr>
</tbody>
</table>

Note: MicroPlus was applied at 3.48 g in 6 L of water over the three beds; Vitazyme was applied at 5.25 ml in 6 L of water over the three beds.

Disease incidence: Both treatments were equally infected with a low incidence of pink root.

Yield results: The onions were harvested on January 13, 2011, by digging bulbs from two square meters of each plot.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Onion number</th>
<th>Average weight</th>
<th>Onion yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>grams/bulb</td>
<td>tons/ha</td>
</tr>
<tr>
<td>Control</td>
<td>103.3</td>
<td>—</td>
<td>76.1</td>
</tr>
<tr>
<td>Vitazyme + MicroPlus</td>
<td>104.3 (+1%)</td>
<td>160.2 (+9%)</td>
<td>83.6 (+10%)</td>
</tr>
</tbody>
</table>

Harvested onions in area: Control 105, Vitazyme 104
Average bulb weight, grams: Control 150, Vitazyme 170
Onion yield, tons/ha: Control 80, Vitazyme 85
**Income results:**
- Onion price: $600/ton
- Yield increase with Vitazyme and MicroPlus: 7.5 tons/ha
- Increased gross income with Vitazyme and MicroPlus: $4,500.00/ha
- Cost of Vitazyme and MicroPlus: $500.00/ha
- Increased net income with Vitazyme and MicroPlus: $4,000.00/ha
- Return on investment with Vitazyme and MicroPlus: $8.00 per $1.00 invested

**Conclusion:** This onion trial in Western Australia proved that Vitazyme and MicroPlus, an actinomycete inoculum, produced an excellent increases in onion yield (10%), mostly because of larger bulbs (9%). An increase of 7.5 tons/ha in yield, minus product cost, gave a net income increase of $4,000.00/ha, and a return on investment of $8.00 per $1.00 invested in product.
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2006 Crop Results

Vitazyme on Onions

Researchers: Eng. Wilberto Gonzalez, and Eng. Jorge Gonzalez, Camilo Cienfuegos, Agricultural Enterprise
Location: Villena Farm of Camilo Cienfuegos Agricultural Enterprise, Havana Province, Cuba
Variety: unknown
Soil type: red ferralitic
Planting date: late 2005 to early 2006
Experimental design: A commercial production trial involved a split field area of 0.013 ha treated and 1.0 ha untreated with Vitazyme at Villena Farm.

1. Control
2. Vitazyme

Fertilization: unknown
Vitazyme applications: 1.0 liter/ha on the leaves twice, separated by 30 days

Conclusions: This commercial onion trial in Cuba revealed the remarkable ability of Vitazyme to increase onion production, with a 227% yield increase.
2004 Crop Results

Vitazyme on Onions

Researchers: Isel Creach Rodriguez, Ph.D.
Location: Santiago de Cuba Experiment Station, Dos Rios, Palma Soriana, Santiago de Cuba
Variety: red bulb multiplying onion
Soil type: Leptic haplustert
Transplanting Date: January 13, 2004
Experimental design: Two areas of onions were used in two studies, one area in each study treated with Vitazyme and the other area left untreated. All other treatments were identical for both areas.

1. Control
2. Vitazyme

Fertilization: unknown
Vitazyme application: 13 oz/acre on the leaves and soil on January 1, and again on February 17, 2004

**Trial 1**

<table>
<thead>
<tr>
<th>Height, cm</th>
<th>Leaves Per Stool</th>
<th>Plants Per Stool</th>
<th>Leaves Per Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>32</td>
<td>58</td>
<td>5.1</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>33</td>
<td>45</td>
<td>5.6</td>
</tr>
<tr>
<td>Height increase: 3%</td>
<td>Leaves/stool increase: 29%</td>
<td>Plants/stool increase: 0%</td>
<td>Leaves/plant increase: 10%</td>
</tr>
</tbody>
</table>

**Trial 2**

<table>
<thead>
<tr>
<th>Height, cm</th>
<th>Leaves Per Stool</th>
<th>Plants Per Stool</th>
<th>Leaves Per Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>37</td>
<td>53</td>
<td>4.9</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>48</td>
<td>53</td>
<td>5.5</td>
</tr>
<tr>
<td>Height increase: 30%</td>
<td>Leaves/stool increase: 26%</td>
<td>Plants/stool increase: 12%</td>
<td>Leaves/plant increase: 12%</td>
</tr>
</tbody>
</table>

Conclusions: In this Cuban onion study, both trials showed a clear advantage for Vitazyme on growth and yield potential in terms of plant height, leaves per stool, and leaves per plant.
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2004 Crop Results

Vitazyme on Onions

**Researcher:** unknown  
**Location:** Granja MININT Jaguey Grande, Cuba  
**Variety:** J-5  
**Soil type:** Leptic haplustert  
**Planting date:** unknown  
**Experimental design:** An experimental area was divided into a Vitazyme treated and an untreated area to determine the product’s effects on onion yield.

1. Control  
2. Vitazyme

**Fertilization:** unknown  
**Vitazyme application:** 1 liter/ha on the seedlings at transplanting, and 1 liter/ha on the plants and soil at 35 and at 79 days after transplanting (total application = 2.4 liters/ha, or 0.0068 cc/plant)

**Yield results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Onion yield kg/m²</th>
<th>Change kg/m²</th>
<th>Weight/plant g/plant</th>
<th>Change g/plant</th>
<th>Value of production pecos</th>
<th>Change pecos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.92</td>
<td>—</td>
<td>55.26</td>
<td>—</td>
<td>180.32</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>3.35</td>
<td>1.43 (+74%)</td>
<td>94.70</td>
<td>39.44 (+71%)</td>
<td>315.56</td>
<td>+135.24</td>
</tr>
</tbody>
</table>

*Increase in onion yield: +74%*

*Increase in weight per onion: +71%*

**Conclusions:** Onions in this Cuban study responded very well to Vitazyme by increasing yield 74%, and average onion weight by 71%. The increase in value of this production was 135.24 pecos; the field area for this increase was not defined in the study report.
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2001 Crop Results

Vitazyme on Onions

Research coordinator: H.W. Chung
Researcher: unknown
Variety: Manina
Location: Kunwe-Kun, Kyungbuk, Korea
Soil type: clay loam
Transplanting date: unknown
Experimental design: A field area for the onions was selected in an established plot to evaluate growth parameters. The areas were divided into treatments using the following:

1. Control
2. Vitazyme
3. Product A
4. Product B
5. Product D

Vitazyme application: A 1:1,000 dilution (0.1%) solution was sprayed on the leaves and soil on April 19, April 26, and May 3, 2001.
Fertilization: unknown
Data collection: Results on growth and bulb weight were collected on May 30 and June 7, 2001.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fresh weight, Change</th>
<th>Fresh weight, Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 30</td>
<td>June 7</td>
<td></td>
</tr>
<tr>
<td>1. (Control)</td>
<td>236.0</td>
<td>276.7</td>
</tr>
<tr>
<td>2. (Vitazyme)</td>
<td>291.8 (+55.8 (+24%))</td>
<td>383.3 (+106 (+39%))</td>
</tr>
<tr>
<td>3. (Product A)</td>
<td>252.5 (+16.5 (+7%))</td>
<td>301.6 (+24.9 (+9%))</td>
</tr>
<tr>
<td>4. (Product B)</td>
<td>276.1 (+40.1 (+17%))</td>
<td>338.0 (+61.3 (+22%))</td>
</tr>
<tr>
<td>5. (Product D)</td>
<td>286.1 (+50.1 (+21%))</td>
<td>320.7 (+44.0 (+16%))</td>
</tr>
</tbody>
</table>

Increase in plant weight with Vitazyme:
First evaluation: 24% Second evaluation: 39%

Bulb weight

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Bulb weight, Change</th>
<th>Bulb weight, Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 30</td>
<td>June 7</td>
<td></td>
</tr>
<tr>
<td>1. (Control)</td>
<td>167.7</td>
<td>201.6</td>
</tr>
<tr>
<td>2. (Vitazyme)</td>
<td>198.6 (+30.9 (+18%))</td>
<td>261.5 (+59.9 (+30%))</td>
</tr>
<tr>
<td>3. (Product A)</td>
<td>176.1 (+8.4 (+5%))</td>
<td>215.7 (+14.1 (+7%))</td>
</tr>
<tr>
<td>4. (Product B)</td>
<td>192.3 (+24.6 (+15%))</td>
<td>240.2 (+38.6 (+19%))</td>
</tr>
<tr>
<td>5. (Product D)</td>
<td>193.9 (+26.2 (+16%))</td>
<td>236.9 (+35.3 (+18%))</td>
</tr>
</tbody>
</table>

Increase in bulb weight with Vitazyme:
First evaluation: 18% Second evaluation: 39%

Conclusions: Vitazyme gave excellent growth stimulation to these onions, increasing total plant weight by 24% on May 30, and by 39% on June 7. The increase in growth was accelerating above the control as time passed. The same was true with bulb weight, where an 18% yield increase on May 30 gave way to a 30% bulb increase on June 7. Vitazyme outperformed the other three products in all situations.
2001 Crop Results

Vitazyme on Onions

Farmer: Larry Karas, Wm. Karas and Sons
Location: Elba, New York
Variety: Benchmark
Soil type: muck (organic)
Planting date: April 30 and May 1, 2001
Watering: sprinkler irrigated
Experimental design: Six side-by-side fields of 3.33 acres each, with very uniform muck soils across all fields, were divided into two parts: three fields treated with Vitazyme and three fields left untreated.

1. Control
2. Vitazyme

Fertilization: the same for all six fields: 1,000 lb/acre 10-8-28 at planting, and 100 lb/acre of urea (46-0-0) midseason.

Vitazyme treatment: 13 oz/acre on the seeds at planting; 13 oz/acre on the leaves and soil at the 6 to 7 leaf stage.

Growing season observations: On August 14, 2001, shortly before harvest, the Vitazyme treated onions were noticeably larger on average, and the leaves were much greener compared to the senescing control leaves. Thus, the treated plants were continuing to photosynthesize later and add more bulk to the bulbs.

Harvest date: late August, 2001

Yield results: All six fields were harvested at the same time, and the onions were placed in 1,000 lb boxes in the field. These boxes were counted for the different fields and totaled for each treatment.

<table>
<thead>
<tr>
<th>Onion yield</th>
<th>Vitazyme</th>
<th>Control</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>284</td>
<td>259</td>
<td>25</td>
<td>(+10%)</td>
</tr>
<tr>
<td>284,000</td>
<td>259,000</td>
<td>25,000</td>
<td>(+10%)</td>
</tr>
<tr>
<td>28,400</td>
<td>25,900</td>
<td>2,500</td>
<td>(+10%)</td>
</tr>
</tbody>
</table>

Onion yield increase: 10%

Onion packout results: The onions were graded and packed into 50-lb bags. Only the bulbs that were 2 inches in diameter and larger were packed, and are included in these figures.

<table>
<thead>
<tr>
<th>Bags per acre</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bags per acre</td>
<td>362.6 bags/acre</td>
<td>454.4 bags/acre</td>
<td>91.8 (+25%)</td>
</tr>
<tr>
<td>Total weight</td>
<td>18,130 lb/acre</td>
<td>22,720 lb/acre</td>
<td>4,590 (+25%)</td>
</tr>
</tbody>
</table>

 Marketable onion yield increase: 25%
Percent marketable yield of total harvest:

<table>
<thead>
<tr>
<th></th>
<th>Total yield</th>
<th>Marketable yield</th>
<th>Percent of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>25,900</td>
<td>18,130</td>
<td>70%</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>28,400</td>
<td>22,720</td>
<td>80%</td>
</tr>
</tbody>
</table>

Control % of marketable: 70%
Vitazyme % of marketable: 80%

Income results: Average market price of onions: $0.10/lb.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onion income</td>
<td>1,813</td>
<td>2,272</td>
<td>+459</td>
</tr>
</tbody>
</table>

Income increase: $459/acre

Return per dollar invested with Vitazyme: $51.00

Conclusions: Vitazyme substantially improved the yield and size of onions in this New York muck soil field trial. While Vitazyme improved the overall yield by 10%, it increased the packout (onions > 2” in diameter) by an additional amount over the control so that the overall marketable weight was 25% greater than for the control. This extra weight amounted to $459/acre more income, as Vitazyme returned $51 for every dollar invested in the product.
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2000 Crop Results

Vitazyme on Onions
A testimonial

Farmer: Troy Shuknecht, Lee Shuknecht and Sons
Location: Elba, New York

Fertility program: a balanced program with regular use of cover sprays and foliar sprays

Vitazyme application: (1) 13 oz/acre in the furrow at planting, with starter fertilizer and fungicide; (2) 13 oz/acre over the leaves and soil at the 3 to 4-leaf stage; (3) 13 oz/acre over the leaves and soil at bulb initiation.

Time of Vitazyme use: 5 years
Troy: “We’re very satisfied with Vitazyme. We farm mostly mineral soils, and they are easier to work and have better drainage than when we first started the program. We have had good crops in two difficult years when others didn’t. We grow mostly jumbo-sized onions and Vitazyme really helps them obtain that size. It’s a big benefit.”
2000 Crop Results

Vitazyme on Onions

Farmer: John Dunsmoor  Location: Fulton, New York  Variety: New York Early
Soil type: muck  In-row spacing: 9 plants/foot (seeded)  Planting date: May 5, 2000
Row spacing: 15.5 inches between double rows
Experimental design: Four small onion fields in muck were selected for this study. Three of the fields received Vitazyme and one (the control) was left untreated.

<table>
<thead>
<tr>
<th>Field 1</th>
<th>Field 2</th>
<th>Field 3</th>
<th>Field 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.06 acres</td>
<td>1.40 acres</td>
<td>1.15 acres</td>
<td>1.27 acres</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>Vitazyme</td>
<td>Vitazyme</td>
<td>Control</td>
</tr>
</tbody>
</table>

1. Control  2. Vitazyme

Fertility treatments: 100 lb/acre N, 80 lb/acre P₂O₅, 120 lb/acre K₂O, plus micronutrients pre-plant; 34 lb/acre N topdressed during growth
Vitazyme treatment: 13 oz/acre in the furrow at planting, along with a fungicide and insecticide
Harvest date: September 8, 2000

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Field 1</th>
<th>Field 2</th>
<th>Field 3</th>
<th>Average</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield, bags*/acre</td>
<td>905.70</td>
<td>714.29</td>
<td>973.91</td>
<td>864.63</td>
<td>519.67</td>
</tr>
<tr>
<td>Yield, lb/acre</td>
<td>45,285</td>
<td>35,715</td>
<td>48,696</td>
<td>43,232</td>
<td>25,984(+66%)</td>
</tr>
</tbody>
</table>
* One bag = 50 lb.

Onion yield increase: 66%

Income results: The onion value is about $4.00/50lb bag, or $0.08/lb.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Vitazyme</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross income</td>
<td>2,078.72</td>
<td>3,458.56</td>
<td>(+)1,379.84</td>
</tr>
</tbody>
</table>

Income increase: $1,379.84/acre

Conclusions and observations: During the growing season in other fields it was noted that Vitazyme, when applied with other fertility products at planting in the seed row, improved emergence and the resulting plant population. These fields, however, averaged 746.56 cwt/acre, somewhat less than when Vitazyme was used alone.

Vitazyme in the onion test, used one time at planting on the seeds, produced an average yield increase that was 66% above the control fields. This increase translated into a very large income increase of nearly $1,380/acre.
1999 Crop Results

Vitazyme on Onions

**Farmer:** Fred Strano  
**Location:** Fulton, New York  
**Variety:** Prince (yellow)

**Seeding rate:** 8 plants/foot (seed)  
**Planting date:** May 5, 1999  
**Harvest date:** October 15, 1999

**Soil type:** organic (muck)  
**Previous crop:** onions

**Row spacing:** two rows 6 inches apart, spaced every 15 inches

**Experimental design:** An onion field was treated with Vitazyme on several rows the length of the field.

1. Control  
2. Vitazyme

**Fertilizer treatments:** Preplant: 100-60-250 lb/acre actual N-P-K, plus 75 lb/acre Ca-Mg-micronutrients  
Sidedressed in July: 70 lb/acre 34-0-0 (NH₄NO₃)

**Vitazyme applications:** 13 oz/acre at planting on the seeds

**Chlorophyll results:** On August 16, 1999, evaluations were made with a Minolta SPAD meter of several Vitazyme treated and untreated onion leaves from adjoining rows at the treatment boundary.

<table>
<thead>
<tr>
<th>Chlorophyll, SPAD values</th>
<th>Control</th>
<th>Vitazyme</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>56.2</td>
<td>70.6</td>
<td>14.4 (+26%)</td>
</tr>
</tbody>
</table>

**Chlorophyll increase:** 26%

**Yield results:** Although evaluations of the field on August 16 revealed a decided advantage for the Vitazyme treatment (see the chlorophyll data above), the final harvest weights did not reveal a significant yield difference. There was a decided difference in onion quality, however, which is shown on the next page.

The yield was 72,500 lb/acre for this field. Samples of onions for the two treatments were sized, and the various sizes were multiplied by the price for those sizes to give a total value for the crop. As size increases, so does the price.
### Income increase: $321.35/acre (from quality improvement only)

Vitazyme clearly increases onion size, resulting in greater income per acre.
1997 Crop Results

Vitazyme on Onions

Researchers: Williams Farms (Douglas, Steve, and John Williams)
Location: Marion, New York  Variety: Hamlet (a white onion)
Planting arrangement: wide beds  Planting date: May 2, 1997  Soil type: muck
Experimental design: Two field areas of an onion field were selected that were similar in soils and past treat-
ment. One area received Vitazyme, and the other area nothing besides normal fertilizer.

1. Control
2. Vitazyme

Fertility treatments: The control area received 1,300 lb/acre 10-10-15 dry fertilizer before planting. The
Vitazyme area received 750 lb/acre 10-10-15 dry fertilizer before planting, plus 250 lb/acre high-calcium pel-
leted lime. One gallon/acre of liquid-Ca was applied with a herbicide near planting time, and then six foliar
applications of liquid-Ca were applied with a fungicide spray. At planting, 5 gal/acre of 9-18-9 and Nutrapathic
Soil Conditioner were applied.

Vitazyme treatments: (1) 13 oz/acre with the starter fertilizer; (2) 13 oz/acre with the second fungicide spray
(about the third leaf); (3) 13 oz/acre at bulb initiation.

Harvest date: early October

Yield results:

<table>
<thead>
<tr>
<th></th>
<th>Boxes/acre*</th>
<th>Weight (lb)/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>41</td>
<td>45,100</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>50</td>
<td>55,000 (+22%)</td>
</tr>
</tbody>
</table>

*Each box weighed about 1,100 lb.

Yield increase: 22%

Income results: Onions are valued at about $10.00/cut (100 lb)

<table>
<thead>
<tr>
<th></th>
<th>Income</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>$4,510/acre</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>$5,500/acre</td>
<td>$990/acre</td>
</tr>
</tbody>
</table>

Income increase: $990/acre
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1997 Crop Results

Vitazyme on Onions

Researchers: Williams Farms (Douglas, Steve, and John Williams)

Location: Marion, New York  Variety: Hamlet (a white onion)

Planting arrangement: wide beds  Planting date: May 2, 1997  Soil type: muck

Experimental design: Two field areas of an onion field were selected that were similar in soils and past treatment. One area received Vitazyme, and the other area nothing besides normal fertilizer.

1. Control
2. Vitazyme

Fertility treatments: The control area received 1,300 lb/acre 10-10-15 dry fertilizer before planting. The Vitazyme area received 750 lb/acre 10-10-15 dry fertilizer before planting, plus 250 lb/acre high-calcium pelletized lime. One gallon/acre of liquid-Ca was applied with a herbicide near planting time, and then six foliar applications of liquid-Ca were applied with a fungicide spray. At planting, 5 gal/acre of 9-18-9 and Nutrapathic Soil Conditioner were applied.

Vitazyme treatments: (1) 13 oz/acre with the starter fertilizer; (2) 13 oz/acre with the second fungicide spray (about the third leaf); (3) 13 oz/acre at bulb initiation.

Harvest date: early October

Yield results:

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</table>

*Each box weighed about 1,100 lb.

Yield increase: 22%

Income results: Onions are valued at about $10.00/cut (100 lb)

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<tr>
<th></th>
<th>Income</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>$4,510/acre</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>$5,500/acre</td>
<td>$990/acre</td>
</tr>
</tbody>
</table>

Income increase: $990/acre