**Researcher:** Steven David  
**Research organization:** Sustainable Farming Solutions,  
Perth, Western Australia  
**Location:** Western Australia  
**Varieties:** unknown  
**Planting date:** March 20, 2018, for treatment in flats; unknown for field plantings  
**Experimental design:** Three varieties of lettuce were selected for evaluation of the effects of Vitazyme on growth. One variety received a soil drench treatment at planting, and two varieties were treated at transplanting in the drench water.

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

**Vitazyme applications:**  
- **Flat treatment:** A Vitazyme solution of unspecified concentration was applied to the seeds and soil media at planting on March 20, 2018.  
- **Transplanting treatment:** A 2% Vitazyme solution was applied with the drench water at transplanting.

**Growth results:** Although no data were collected, it is obvious from the photographs which accompany this report, taken about one month after application, that Vitazyme greatly improved root and leaf development. The leaf area of the treated plants in every case is much greater for treated plants, likely by 30 to 50%.

**Conclusions:** This lettuce trial in Western Australia, using three varieties which were treated with a Vitazyme soil drench, either at planting in flats or at transplanting, revealed a great increase in leaf and root growth one month after the trial began. The product is shown to be an excellent supplement for lettuce growers to improve leaf yields.

A red lettuce variety in Australia revealed an excellent leaf yield increase with Vitazyme applied as a 2% soil drench to the growth media.
**Lettuce with Vitazyme application [Vitazyme is called Globaplant in Colombia.]**

**Researcher:** Diana Urrea Ramirez  
**Research organization:** Agroglobal S.A., Bogota, Colombia  
**Location:** Andes Mountains  
**Variety:** head lettuce  
**Planting density:** unknown  
**Planting arrangement:** four rows on raised beds  
**Experimental design:** A lettuce field was treated with Vitazyme two times in a portion of the field, and the growth was compared to untreated plants nearby to evaluate the product’s effects on plant weight and growth parameters.

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

**Fertilization:** unknown  
**Vitazyme application:** (1) transplants were immersed in a 10% Vitazyme solution before planting; (2) a 0.5% solution (5 ml/liter) was sprayed on the plants and soil during growth  
**Yield results:** Several plants were analyzed for each parameter.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Average weight</th>
<th>Total plants</th>
<th>Viable plants</th>
<th>Burst plants</th>
<th>Missing plants</th>
<th>Total weight*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.50</td>
<td>35</td>
<td>32</td>
<td>2</td>
<td>2</td>
<td>48.0</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.71</td>
<td>35</td>
<td>34</td>
<td>0</td>
<td>0</td>
<td>58.1 (+21%)</td>
</tr>
</tbody>
</table>

*Viable plants only.

**Conclusions:** A lettuce study in Colombia, using transplant and foliar applications, revealed several Vitazyme (Globaplant) effects. Head weight increased by 14%, as did total lettuce weight (21%). The Vitazyme treatment produced slightly more plants, and no burst heads, compared to the control which had fewer viable plants and two burst heads. These results show the considerable value of the Vitazyme (Globaplant) program for lettuce in Colombia.

The leaf size and development of Vitazyme (Globaplant) treated lettuce is easily noted in this photo. Enhanced root growth is commensurate with improved leaves.
**Researcher:** Jan Ties Malda  
**Research institution:** Wageningen University, Holland  
**Location:** Lelystad, Holland  
**Variety:** unknown  
**Planting date:** May 12, 2017

**Experimental design:** A small plot replicated trial was established using four replications, and several different products, to determine the relative value of these products in inhibiting downy mildew and botrytis infection and promoting lettuce yield. A reduced fungicide rate with Vitazyme was evaluated as well to determine if this product could replace some of the fungicide during the cropping cycle.

1. **Mancozeb, 100%**  
2. **Mancozeb, 63%**  
3. **Mancozeb, 63% + Vitazyme**

**Fertilization:** on July 4, 130 kg/ha of CAN  
**Vitazyme application:** (1) 1 liter/ha (13 oz/acre) shortly after seeding on May 12; (2) 1 liter/ha (13 oz/acre) at the 3 to 4-leaf stage; (3) 1 liter/ha (13 oz/acre) seven days after T1

**Fungicide applications:** Various fungicides, including CHD, Fandago, Movento, Mancozeb, and others were applied frequently during the growth period. Mancozeb is a popular fungicide from Dow Chemical, sold as Dithane.

**Irrigation:** The plots were irrigated on July 7 and July 10.

**Harvest date:** September 25, 2017

**Yield and growth results:** Only the results with Vitazyme and Mancozeb are shown here, while other products were also evaluated.

---

**Conclusions:** A lettuce trial at Lelystad, The Netherlands, comparing the effects of Mancozeb fungicide at 63% of the normal rate with that same rate plus Vitazyme (three applications at 1 liter/ha), revealed that the yield was increased by 9% when Vitazyme was added to this reduced fungicide rate. All three treatments were not significantly different in yield. This yield improvement with Vitazyme occurred in spite of the fact that leaf diseases were not fully controlled, as noted in the graphs for downy mildew and botrytis. Apparently photosynthetic activity occurred at a higher rate with Vitazyme treatment on the leaves to overcome the leaf death caused by fungi. This trial gives compelling evidence that Vitazyme can allow a reduction in fungicide use for lettuce production without hindering optimum yields.

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**Lettuce with Vitazyme application**

**Botrytis Incidence**

**Fallen Leaves**

**Downy Mildew Incidence**

**Green Leaves**

**Yield**

<table>
<thead>
<tr>
<th>Yield, tons/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mancozeb 100%</td>
</tr>
<tr>
<td>Mancozeb 63%</td>
</tr>
<tr>
<td>Mancozeb 63% + Vita 63%</td>
</tr>
<tr>
<td>75.7 d</td>
</tr>
<tr>
<td>67.7 abcd</td>
</tr>
<tr>
<td>74.1 cd</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.05.*
Researcher: Augustin Peralta
Research organization: Quimica Lucava, Mexico
Farmer: Venancio Olayo
Location: La Aventura Farm, Palmarito, Puebla, Mexico
Variety: unknown
Transplanting date: April 28, 2015
Experimental design: A lettuce field was treated with two Vitazyme applications on 0.5 ha, in an effort to evaluate the effect of the product on lettuce growth, yield, and profitability.

Control ✓ Vitazyme

Fertilization: unknown
Vitazyme application: (1) 1 liter/ha sprayed on the leaves and soil on May 13 and June 13 (15 and 46 days) after transplanting.

Growth results: Compared to the untreated control, Vitazyme treated plants displayed the following:
• Bigger root systems
• Greater leaf area and larger plants
• More leaf chlorophyll (deeper green color) and brighter color
• Less damage from Fusarium and other plant diseases
• Reduced sunspot damage

Yield results:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bags/ha</td>
<td>bags/ha</td>
</tr>
<tr>
<td>Control</td>
<td>1,840</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>2,160</td>
<td>320 (+17%)</td>
</tr>
</tbody>
</table>

Increase in lettuce yield with Vitazyme: 17%

Two Vitazyme applications on lettuce in Mexico produced much improved root and leaf growth, plus a 17% yield increase.

Income results: Each bag was worth 2,258 USD. The extra 320 bags were valued at 723 USD/ha, and the Vitazyme cost 64.52 USD/ha, giving an added profit of 658.48 USD/ha. The cost benefit was 10.2 : 1.

Conclusion: A lettuce trial in Puebla, Mexico, using two Vitazyme applications of 1 liter/ha, revealed an excellent yield response of 17%, 658 USD/ha more income, and a cost : benefit of 10.2 : 1. The treated plants were healthier with larger, deeper green leaves and larger root systems, having few disease and sunspot incidence, proving that Vitazyme is an excellent supplement for lettuce production in Mexico.
2014 Crop Results

Vital Earth Resources
706 East Broadway, Gladewater, Texas 75647
(903) 845-2163 FAX: (903) 845-2262

Vitazyme on Lettuce

Researchers: Eng. Lucero Fernandez and Eng. Adrian Zapata
Farmer: Eng. Carlos Buen Rostro, owner of Agricola Amigo Packing Company
Research organization: Quimica Lucava
Trial location: Rancho Jaramillo, Villagran, Guanajuato, Mexico
Variety: green leaf
Experimental design: A lettuce field had 16 rows selected to treat twice with Vitazyme, once on the transplants and once foliar/soil, to evaluate the effect of the product on yield.

1. Control
2. Vitazyme (2x)

Fertilization: unknown

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

Planting date: February 11, 2014

Harvest date: April 7, 2014

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

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plants harvested</th>
<th>Total weight</th>
<th>Weight/Plant</th>
<th>Plants/Ha</th>
<th>Weight/Ha</th>
<th>Weight change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>25</td>
<td>13.5</td>
<td>0.540</td>
<td>80,000</td>
<td>43,200</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>25</td>
<td>14.1</td>
<td>0.564</td>
<td>80,000</td>
<td>46,120</td>
<td>1,920 (+5%)</td>
</tr>
</tbody>
</table>

Increase in lettuce yield with Vitazyme: 5%

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

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

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

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

A shelf-life study revealed improved storability of Vitazyme treated lettuce, making it easier for store managers to utilize the crop.
Farmer: Glen Dobra  
Researcher: Steven David  
Research organization: Organic Farming Systems, Perth, Australia  

Soil type: sand  
Variety: Coral  

Planting date: January, 2009

Experimental design: Adjacent beds of transplanted lettuce were selected to compare Vitazyme application with the conventional program on a production farm. The purpose of the trial was to determine the effect of the product on lettuce growth and yield.

1. Control  
2. Vitazyme

Fertilization: farm standard

Vitazyme application: (1) tray drenching of transplants with a 1% Vitazyme solution; (2) 1 liter/ha sprayed on the leaves and soil 14 days after transplanting

Growth results: Fresh and dry measurements were made 14 days after transplanting.

- Increase in leaf growth at 14 days: +44%
- Increase in root growth at 14 days: +86%


<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield</th>
<th>Yield change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1,400</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>2,130</td>
<td>730 (+52%)</td>
</tr>
</tbody>
</table>

Increase in yield with Vitazyme: 52%

Conclusion: Vitazyme in this Australian study, applied twice to transplants, greatly enhanced leaf (44%) and root (86%) growth at 14 days after transplanting. At harvest, the yield with Vitazyme exceeded the control by 52%, proving the great effectiveness of this product in lettuce production systems.
**Farmer:** Seedling Factory  
**Researcher:** Steven David  
**Research organization:** Organic Farming Systems, Perth, Australia  
**Variety:** Ribai  
**Soil type:** growing media  
**Planting date:** May 24, 2010  
**Irrigation:** overhead sprinkler  
**Tray size:** 144 cells, or 25 ml per cell  

**Experimental design:** A study on lettuce grown in multi-cell growing trays was initiated using Vitazyme and MicroPlus as drench treatments to treat trays, to evaluate the product’s effects – alone and in combination – on the growth of roots and leaves.

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

**Fertilization:** normal nursery fertility  

**Vitazyme application:** 1% solution soil drench at 500 ml/tray, giving 5 ml of product per tray, 7 days after seeding on June 1. For the combined products, this rate was also used.

**MicroPlus application:** 50 grams/100 liters of water at 500 ml/tray, giving 0.25 gram of product per tray, 7 days after seeding on June 1. For the combined products, this rate was also used. MicroPlus is an inoculum of *Streptomyces lydicus WYEC 108* (0.0371%).

**Yield results:** Harvesting of the lettuce plants was completed on June 29, 2010, by washing the roots clean of potting media, separating the roots and leaves, and weighing each. Then the roots and leaves were dried and weighed again.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fresh weight</th>
<th></th>
<th>Dry weight</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shoots</td>
<td>Roots</td>
<td>Total</td>
<td>Shoots</td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------</td>
<td>----------------</td>
<td>-------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Control</td>
<td>86.13</td>
<td>26.37</td>
<td>112.50</td>
<td>6.32 (+0%)</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>88.31 (+3%)</td>
<td>30.60 (+16%)</td>
<td>118.71 (+6%)</td>
<td>6.32 (+0%)</td>
</tr>
<tr>
<td>MicroPlus</td>
<td>91.50 (+6%)</td>
<td>34.96 (+33%)</td>
<td>126.46 (+12%)</td>
<td>6.83 (+8%)</td>
</tr>
<tr>
<td>Vita + Micro</td>
<td>92.78 (+8%)</td>
<td>35.06 (+33%)</td>
<td>127.84 (+14%)</td>
<td>6.99 (+11%)</td>
</tr>
</tbody>
</table>

**Yield results:**

- **Fresh Weight**
  - **Shoots**
    - Control: 86.13 grams/100 plants
    - Vita: 88.31 (+3%) grams/100 plants
    - Micro: 91.50 (+6%) grams/100 plants
    - Vita + Micro: 92.78 (+8%) grams/100 plants
  - **Roots**
    - Control: 26.37 grams/100 plants
    - Vita: 30.60 (+16%) grams/100 plants
    - Micro: 34.96 (+33%) grams/100 plants
    - Vita + Micro: 35.06 (+33%) grams/100 plants

- **Dry Weight**
  - **Shoots**
    - Control: 6.32 grams/100 plants
    - Vita: 6.32 (+0%) grams/100 plants
    - Micro: 6.83 (+8%) grams/100 plants
    - Vita + Micro: 6.99 (+11%) grams/100 plants
  - **Roots**
    - Control: 1.51 grams/100 plants
    - Vita: 1.82 (+20%) grams/100 plants
    - Micro: 1.89 (+24%) grams/100 plants
    - Vita + Micro: 1.92 (+26%) grams/100 plants
Conclusion: A lettuce factory tray study in Australia, using Vitazyme and MicroPlus alone and together, revealed that both products improved both fresh and dry top and root weight. The increases were from 3 to 16% for Vitazyme, and from 6 to 33% for MicroPlus, while the combined products revealed an excellent synergism: increases of 8 and 11% in shoot fresh and dry weight, of 33 and 26% in root fresh and dry weight, and of 14 and 14% of total fresh and total dry weight were noted. Either product alone, but especially the combined products, have been shown in this study to increase lettuce yield, and thus are excellent adjuncts to lettuce production.

<table>
<thead>
<tr>
<th></th>
<th>Fresh weight increases</th>
<th>Dry weight increases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shoots</td>
<td>Roots</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>+3%</td>
<td>+16%</td>
</tr>
<tr>
<td>MicroPlus</td>
<td>+6%</td>
<td>+33%</td>
</tr>
<tr>
<td>Vita + Micro</td>
<td>+8%</td>
<td>+33%</td>
</tr>
</tbody>
</table>
Researcher: Adoracion Torres-Guy  
Institution: Soils and Agro-Ecosystem Division, Agricultural Systems Cluster, College of Agriculture, U.P. Los Banos  
Location: Los Banos, Laguna, The Philippines  
Variety: Grand Rapids  
Planting rate: one seedling per hill  
Growth period: wet season  
Seedling growth: seeds planted in seed boxes, and transplanted at 15 days  
Plot size: 5 m²  
Spacing: 132 plants per plot, at 15 cm between hills and 20 cm between rows  
Experimental design: A small plot replicated study (three reps) was set up to determine the effect of Vitazyme as a foliar treatment for lettuce, and to generate field data to register the product with the Fertilizer and Pesticide Authority in The Philippines. The plots were arranged in a randomized complete block design.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fertilizer</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>100%</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>50%</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>50%</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>100%</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Fertilization: 100% fertilizer: basal application per plot of 25 g of KCl (0-0-60% N-P₂O₅-K₂O), 50 g of 16-20-0, and 60.6 g of 46-0-0, plus 85 g of 46-0-0 side-dressed 10 days after transplanting. 50% fertilizer: half of the foregoing applications.

Vitazyme application: 1 liter/ha (13 oz/acre) sprayed on the leaves to the dripping point at 5, 10, and 15 days after transplanting.

Yield and growth results: The lettuce was harvested 26 days after transplanting, at which time marketable yield, plant height, leaf number, and leaf width were determined. Ten representative plants from each plot were used for determining height, leaf number, and leaf width.

Leaf Number

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaves*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>number</td>
<td>number</td>
</tr>
<tr>
<td>1. Control</td>
<td>5.3 d</td>
<td>---</td>
</tr>
<tr>
<td>2. 100% N</td>
<td>8.0 b</td>
<td>2.7 (+51%)</td>
</tr>
<tr>
<td>3. 50% N</td>
<td>7.0 c</td>
<td>1.7 (+32%)</td>
</tr>
<tr>
<td>4. Vitazyme only</td>
<td>7.0 c</td>
<td>1.7 (+32%)</td>
</tr>
<tr>
<td>5. Vitazyme + 50% N</td>
<td>8.0 b</td>
<td>2.7 (+51%)</td>
</tr>
<tr>
<td>6. Vitazyme at 100% N</td>
<td>9.0 a</td>
<td>3.7 (+70%)</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.05. Fully expanded leaves were measured for 10 plants.
### Increase in leaf number

#### No Vitazyme
- **100% Nitrogen**: 51%
- **50% Nitrogen**: 32%

#### With Vitazyme
- **0% Nitrogen**: 32%
- **50% Nitrogen**: 51%
- **100% Nitrogen**: 70%

### Leaf Width

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Leaf width*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>1. Control</td>
<td>3.9 e</td>
<td>---</td>
</tr>
<tr>
<td>2. 100% N</td>
<td>6.8 c</td>
<td>2.9 (+74%)</td>
</tr>
<tr>
<td>3. 50% N</td>
<td>5.8 d</td>
<td>1.9 (+49%)</td>
</tr>
<tr>
<td>4. Vitazyme only</td>
<td>5.8 d</td>
<td>1.9 (+49%)</td>
</tr>
<tr>
<td>5. Vitazyme + 50% N</td>
<td>7.6 b</td>
<td>3.7 (+95%)</td>
</tr>
<tr>
<td>6. Vitazyme at 100% N</td>
<td>8.4 a</td>
<td>4.5 (+115%)</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.05. The width of 10 fully expanded leaves per plot were measured.

### Increase in leaf width

#### No Vitazyme
- **100% Nitrogen**: 74%
- **50% Nitrogen**: 49%

#### With Vitazyme
- **0% Nitrogen**: 49%
- **50% Nitrogen**: 95%
- **100% Nitrogen**: 115%

### Plant Height

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Height*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>cm</td>
<td>cm</td>
</tr>
<tr>
<td>1. Control</td>
<td>7.93 c</td>
<td>---</td>
</tr>
<tr>
<td>2. 100% N</td>
<td>14.43 c</td>
<td>6.50 (+82%)</td>
</tr>
<tr>
<td>3. 50% N</td>
<td>10.70 d</td>
<td>2.77 (+35%)</td>
</tr>
<tr>
<td>4. Vitazyme only</td>
<td>10.93 d</td>
<td>3.00 (+38%)</td>
</tr>
<tr>
<td>5. Vitazyme + 50% N</td>
<td>16.87 b</td>
<td>8.94 (+113%)</td>
</tr>
<tr>
<td>6. Vitazyme at 100% N</td>
<td>19.67 a</td>
<td>11.74 (+148%)</td>
</tr>
</tbody>
</table>

*Means followed by the same letter are not significantly different at P=0.05. The longest leaf was measured from the base to the leaf tip of 10 randomly selected plants of each plot.
Conclusion: According to the official report on the Philippine lettuce study, “The different treatments influenced significantly the plant height, number and width of leaves, weight of plant, and yield of lettuce at harvest. The recommended rate of Vitazyme increased significantly the number of leaves, but the increment was higher with the conventional fertilizer. All treatments increased all parameters significantly over the control. The performance of Vitazyme in combination with 50% of the recommended rate of conventional fertilizer was significantly better than the performance of either Vitazyme alone or 50% of the recommended rate of conventional fertilizer, indicating a positive interaction between Vitazyme and 50% of the recommended rate of conventional fertilizer.

A much better positive interaction was noted between Vitazyme alone and the recommended rate of conventional fertilizer. However, for economic reasons it would be better to recommend to the farmers a combination of the recommended rate of Vitazyme with 50% the recommended rate of conventional fertilizer. This approach will definitely result in much higher cost savings. The new product, Vitazyme, may qualify for provisional registration by the Fertilizer and Pesticide Authority as long as it is applied together with conventional fertilizer at 50% of the recommended rate.”
Note the improvement in nitrogen utilization with Vitazyme.

- **No added fertilizer** plus Vitazyme yielded 3.93 tons/ha (28%) more than no fertilizer alone.
- **With 50% added fertilizer**, Vitazyme increased the yield by 4.12 tons/ha (62%) more than 50% fertilizer alone.
- **With 100% added fertilizer**, Vitazyme increased lettuce yield by 3.79 tons/ha (46%) more than 100% fertilizer alone.

Note also that Vitazyme with no fertilizer added exceeded the 50% fertilizer rate without Vitazyme by 0.32 tons/ha (5%), while the 50% fertilizer rate plus Vitazyme exceeded the 100% fertilizer rate without Vitazyme by 2.64 tons/ha (32%), showing a great nitrogen efficiency improvement with this product.
**Vital Earth Resources**  
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(903) 845-2163    FAX: (903) 845-2262

## 2005 Crop Results

### Vitazyme on Lettuce

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

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

**Fertilizer:** The usual recommended N-P-K fertilizer was applied to the control treatment, but only 60% of that amount of N was applied to the Vitazyme treated parcel.  
**Vitazyme application:** (1) 1 liter/ha at planting; (2) 1 liter/ha to the leaves and soil early in the production cycle; (3) 1 liter/ha to the leaves and soil later in the production cycle

**Yield results:** At harvest the lettuce was packed in boxes containing 24 heads each, and these boxes were counted for both treatments.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lettuce yield</th>
<th>Yield increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control, 100% N</td>
<td>930</td>
<td></td>
</tr>
<tr>
<td>Vitazyme, 60% N</td>
<td>1,144</td>
<td>214 (+23%)</td>
</tr>
</tbody>
</table>

Vitazyme increased lettuce yield considerably despite a greatly reduced rate of nitrogen application.

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

**Economic benefits per hectare**

- Increased income per bin with Vitazyme: 1,571.83 pesos
- Increased income in packing with Vitazyme: 6,474.96 pesos
- Reduced cost of fertilizer with Vitazyme: 874.49 pesos
- Total economic benefit with using Vitazyme: 8,921.28 pesos

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

This study reveals how Vitazyme’s active agents are able to improve the efficiency of nitrogen use through reducing losses from denitrification, leaching, and other means, while enabling a more vigorous rhizosphere microflora to generate more of its own fixed nitrogen, and make better use of applied and native nitrogen.
2004 Crop Results

Vitazyme on Lettuce

**Researcher:** Unknown  
**Location:** Granja MININT Jaguey Grande, Cuba  
**Variety:** unknown  
**Soil type:** Leptic haphestert  
**Experimental design:** An experimental area was divided into control and Vitazyme treated areas to determine the product’s effects on lettuce yield. All other treatments on the test area were the same.

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

**Fertilization:** 20 tons/acre of organic fertilizer  
**Vitazyme application:** 1 lb/ha on the seeds at planting, and again at 15 and 30 days after planting on the plants and soil

**Yield and income results:**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Lettuce yield</th>
<th>Change</th>
<th>Value of production</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kg/m²</td>
<td>kg/m²</td>
<td>pesos</td>
<td>pesos</td>
</tr>
<tr>
<td>Control</td>
<td>1.475</td>
<td>—</td>
<td>31.86</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>2.006</td>
<td>0.531 (+36%)</td>
<td>43.34</td>
<td>+ 11.48</td>
</tr>
</tbody>
</table>

**Increase in lettuce yield:** + 36%

**Conclusions:** Vitazyme applied three times to lettuce in this Cuban study increased yield by 36%, and improved income substantially.
2004 Crop Results

Vital Earth Resources
706 East Broadway, Gladewater, Texas 75647
(903) 845-2163   FAX: (903) 845-2262

Vitazyme on Lettuce

Researcher: Isel Creach Rodriguez, Ph.D.
Location: Santiago de Cuba Experiment Station, Dos Rios, Palma Soriano, Santiago de Cuba
Variety: black-seeded Simpson
Soil type: Leptic haplustert
Transplanting date: February 10, 2004
Experimental design: Two beds were prepared, each 10 m² (1 x 10 m), which were planted to 1,440 lettuce transplants. One bed was treated with Vitazyme to evaluate growth effects of the product compared to the untreated control.

1. Control
2. Vitazyme

Fertilization: unknown
Vitazyme application: soil drenching of the transplant roots (rate unknown), and another soil application
Growth results: At a certain date after significant lettuce growth had occurred, 10 randomly selected plants from each treatment were evaluated for plant height, leaf number, and plant weight.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant height (average of 10 plants)</td>
<td>30 cm</td>
<td>38 cm (+27%)</td>
</tr>
<tr>
<td>Leaf number (average of 10 plants)</td>
<td>8.1</td>
<td>9.4 (+16%)</td>
</tr>
<tr>
<td>Plant weight (total of 10 plants)</td>
<td>0.6 kg</td>
<td>1.1 kg (+83%)</td>
</tr>
</tbody>
</table>

Increase in plant height: 27%
Increase in leaf number: 16%
Increase in plant weight: 83%

Yield results: Based on the excellent responses of the plant parameters to Vitazyme, and previous studies with lettuce, the estimated probable yield of this lettuce variety was as follows.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated yield per plot</td>
<td>86.4 kg</td>
<td>158.4 kg (+83%)</td>
</tr>
</tbody>
</table>

Estimated yield increase: 83%

Conclusions: Vitazyme produced excellent growth and yield responses in this Santiago de Cuba lettuce trial. Plant height increased by 27%, leaf number by 16%, and plant weight by 83% in randomly selected plants. Most impressive was the projected lettuce yield, which was 83% greater with Vitazyme than with the untreated control. This product clearly produces an excellent benefit to lettuce production in Cuba.
2003 Crop Results

Vitazyme on Lettuce

Researcher/Grower: Wes Buckler  
Variety: oak leaf lettuce  
Location: Winnsboro, Texas  
Growth system: Nutrient water is cycled through pipes having cut-outs on 6 or 8-inch centers, in which the foam cubes with plants are placed.  
Growth medium: hydroponic, with foam cubes  
Experimental design: A greenhouse with hydroponic tubes was situated with lettuce, and one portion was treated with Vitazyme.

1. Control  
Fertilization: a macro and micronutrient soluble formula in the circulating water  
Vitazyme application: a 1% Vitazyme solution sprayed to the dripping point each week  
Yield results: The same number of mature heads were harvested from an identical set of pipes for both treatments, and the heads were weighed.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Head weight</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>27 total lb</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>37</td>
<td>+10 (+37%)</td>
</tr>
</tbody>
</table>

Increase with Vitazyme: 37%

Conclusions: Vitazyme proved to be a remarkably effective stimulator of growth in this greenhouse hydroponic study when the product was regularly applied to the leaves.
Vital Earth Resources  
706 East Broadway, Gladewater, Texas 75647  
(903) 845-2163  FAX: (903) 845-2262

2003 Crop Results

Vitazyme on Lettuce

Researchers: Juan Carlos Usabiaga and Jorge Gonzalez Duran  
Ranch Manager: Juan Pablo Nieto

Location: Ranch Florencia, San Jose Iturbide, Mexico  
Soil type: unknown

Variety: Iceberg and Romaine  
Planting date: summer, 2003

Experimental design: A production lettuce field was divided into sections having either control (standard) or Vitazyme treatments. Treatments were not replicated.

1. Control  
2. Vitazyme

Fertilization: All areas were treated with the same fertility program.

Vitazyme application: 1 liter/ha (13 oz/acre) on the plants and soil at transplanting, and again 30 days later

Harvest date: summer, 2003

Yield results:

### Iceberg Lettuce

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Area</th>
<th>Yield</th>
<th>Per area yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hectares</td>
<td>kg</td>
<td>kg/ha</td>
<td>kg/ha</td>
</tr>
<tr>
<td>Control</td>
<td>2.5</td>
<td>51,995</td>
<td>20,798</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.0</td>
<td>24,960</td>
<td>24,960</td>
<td>4,162 (+20%)</td>
</tr>
</tbody>
</table>

Increase in yield: 20%

### Romaine Lettuce

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Area</th>
<th>Yield</th>
<th>Per area yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hectares</td>
<td>boxes</td>
<td>boxes/ha</td>
<td>boxes/ha</td>
</tr>
<tr>
<td>Control</td>
<td>1</td>
<td>1,800</td>
<td>1,800</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.0</td>
<td>508</td>
<td>2,540</td>
<td>740 (+41%)</td>
</tr>
</tbody>
</table>

Increase in yield: 41%

Income results:

<table>
<thead>
<tr>
<th>Variety</th>
<th>Treatment</th>
<th>Yield</th>
<th>Year</th>
<th>Yield¹</th>
<th>Price²</th>
<th>Total value</th>
<th>Increase with Vitazyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iceberg lettuce</td>
<td>Control</td>
<td>20,798</td>
<td>kg/ha</td>
<td>1,300</td>
<td>0.7/lb</td>
<td>14,766.58</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Vitazyme</td>
<td>24,960</td>
<td></td>
<td>1,678</td>
<td>84.00/box</td>
<td>140,952.00</td>
<td>126,185.42</td>
</tr>
<tr>
<td>Romaine lettuce</td>
<td>Control</td>
<td>—</td>
<td></td>
<td>1,800</td>
<td>84.00</td>
<td>151,200.00</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Vitazyme</td>
<td>—</td>
<td></td>
<td>2,540</td>
<td>84.00</td>
<td>213,360.00</td>
<td>62,160</td>
</tr>
</tbody>
</table>

¹Each box had 24 heads, and averaged 14.87 lb/box  
²For Iceberg lettuce, the price was much less for the control crop which was damaged by hail and did not recover well, while the Vitazyme treated crop recovered very well. The control lettuce was sold for processed lettuce, and the Vitazyme treated lettuce for fresh packed lettuce.
Conclusions: In this lettuce field trial in central Mexico, Vitazyme produced excellent yield and income responses for both Iceberg and Romaine lettuce. Yield increases were 20 and 41%, respectively, for the two varieties, using two applications (at planting, and 30 days later), but most impressive was the substantial increase in net income with Vitazyme. This increase was over 126,000 pesos/ha for Iceberg lettuce, in part due to a higher grade head from rapid plant recovery after a hail storm. The Romaine lettuce income increase was over 62,000 pesos/ha due to Vitazyme use.
2003 Crop Results

Vital Earth Resources
706 East Broadway, Gladewater, Texas 75647
(903) 845-2163 FAX: (903) 845-2262

Vitazyme on Lettuce

Researchers: Juan Carlos Usabiaga and Jorge Gonzalez Duran
Location: Ranch Florecia, San Jose Iturbide, Mexico
Variety: Iceberg and Romaine
Experimental design: A production lettuce field was divided into sections having either control (standard) or Vitazyme treatments. Treatments were not replicated.

1. Control
2. Vitazyme

Fertilization: All areas were were treated with the same fertility program.

Vitazyme application: 1 liter/ha (13 oz/acre) on the plants and soil at transplanting, and again 30 days later
Harvest date: summer, 2003

Yield results:

### Iceberg Lettuce

<table>
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<th>Area</th>
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<th>Per area yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hectares</td>
<td>kg</td>
<td>kg/ha</td>
<td>kg/ha</td>
</tr>
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<td>24,960</td>
<td>24,960</td>
<td>4,162 (+20%)</td>
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</tbody>
</table>

**Increase in yield: 20%**

### Romaine Lettuce

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Area</th>
<th>Yield</th>
<th>Per area yield</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hectares</td>
<td>boxes</td>
<td>boxes/ha</td>
<td>boxes/ha</td>
</tr>
<tr>
<td>Control</td>
<td>1</td>
<td>1,800</td>
<td>1,800</td>
<td>—</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1.0</td>
<td>508</td>
<td>2,540</td>
<td>740 (+41%)</td>
</tr>
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</table>

**Increase in yield: 41%**

Income results:

<table>
<thead>
<tr>
<th>Variety</th>
<th>Treatment</th>
<th>Yield</th>
<th>Yield¹</th>
<th>Price²</th>
<th>Total value</th>
<th>Increase with Vitazyme</th>
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<tbody>
<tr>
<td>Iceberg lettuce</td>
<td>Control</td>
<td>20,798</td>
<td>1,300</td>
<td>0.7/lb</td>
<td>14,766.58</td>
<td>—</td>
</tr>
<tr>
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</tr>
<tr>
<td>Romaine lettuce</td>
<td>Control</td>
<td>—</td>
<td>1,800</td>
<td>84.00</td>
<td>151,200.00</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Vitazyme</td>
<td>—</td>
<td>2,540</td>
<td>84.00</td>
<td>213,360.00</td>
<td>62,160</td>
</tr>
</tbody>
</table>

¹Each box had 24 heads, and averaged 14.87 lb/box
²For Iceberg lettuce, the price was much less for the control crop which was damaged by hail and did not recover well, while the Vitazyme treated crop recovered very well. The control lettuce was sold for processed lettuce, and the Vitazyme treated lettuce for fresh packed lettuce.
Conclusions: In this lettuce field trial in central Mexico, Vitazyme produced excellent yield and income responses for both Iceberg and Romaine lettuce. Yield increases were 20 and 41%, respectively, for the two varieties, using two applications (at planting, and 30 days later), but most impressive was the substantial increase in net income with Vitazyme. This increase was over 126,000 pesos/ha for Iceberg lettuce, in part due to a higher grade head from rapid plant recovery after a hail storm. The Romaine lettuce income increase was over 62,000 pesos/ha due to Vitazyme use.
Vitazyme on Lettuce

Research coordinator: H.W. Chung  
Researcher: unknown

Location: greenhouse at Daegu University, Hayang Eup, Kyungan City, Kyungbuk, Korea

Soil type: “market bed” soil  
Pot number: 48  
Variety: Kohyang

Transplanting date: January 6, 2001  
Seeding date: December 22, 2000

Experimental design: The pots were arranged in a randomized design, with three treatments and four replicates (4 plants per pot). The treatments were as follows:

1. Control  
2. Vitazyme  
3. Product A

Fertilization: unknown

Vitazyme application: A 1:2,000 solution (0.05%) was used for a foliar spray on February 16 and 26, and March 6.

Data collection: Evaluations were made on March 8, 2001.

Fresh weight, above ground portion

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fresh weight, above-ground portion</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Control)</td>
<td>46.9</td>
<td></td>
</tr>
<tr>
<td>2. (Vitazyme)</td>
<td>64.3</td>
<td>+17.4 (+37%)</td>
</tr>
<tr>
<td>3. (Product A)</td>
<td>50.1</td>
<td>+3.2 (+7%)</td>
</tr>
</tbody>
</table>

Fresh weight increase with Vitazyme: 37%

Dry weight, above ground portion

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dry weight, above-ground portion, g</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Control)</td>
<td>2.91</td>
<td></td>
</tr>
<tr>
<td>2. (Vitazyme)</td>
<td>3.69</td>
<td>+0.78 (+27%)</td>
</tr>
<tr>
<td>3. (Product A)</td>
<td>3.02</td>
<td>+0.11 (+4%)</td>
</tr>
</tbody>
</table>

Dry weight increase with Vitazyme: 27%
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Fresh weight, above-ground</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (Control)</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>2. (Vitazyme)</td>
<td>0.45</td>
<td>+0.02 (+5%)</td>
</tr>
<tr>
<td>3. (Product A)</td>
<td>0.44</td>
<td>+0.01 (+2%)</td>
</tr>
</tbody>
</table>

**Conclusions:** In this replicated study at a South Korean University, Vitazyme greatly stimulated fresh lettuce leaf growth — by 37% over the control — and leaf dry weight by 27% above the control. Root weight increases were not similarly stimulated, but are not necessary for the production of lettuce, whose value is in the leaves. A mere 0.05% solution of Vitazyme sprayed three times during the growth period evoked this response.
2000 Crop Results
Vitatzyme on Lettuce (Romaine)

Grower: Gene Jackson Farms (Duda Farms), Jerry Benson, agronomist
Location: Maxwell Ranch, Ventura County, CA
Variety: unknown
Planting date: January 12, 2000 (seeds)
Planting rate: one seed every 10 inches with two rows per bed, on 40-inch spaced beds
Experimental design: A 20-foot section of row of a broccoli field was treated with Vitazyme three times during the growing season. Near that was a 20-foot section of Vitazyme plus liquid fish. Untreated plants alongside the treated rows served as controls.


Fertilizer treatments: proprietary
Fish treatment: 10 gal/acre of actual fish, diluted 10:1, applied three times with Vitazyme (see below)
Vitatzyme application: Vitazyme was applied three times to the leaves and soil at 13 oz/acre: January 12 (the same day as planting), February 29 (46 days after planting), and March 23 (69 days after planting).
Pesticide treatments: proprietary
Harvest date: April 19 (92 days after planting).
Results: Five representative heads were cut for weighing in each treated and control row. The heads were not trimmed as usually done during harvest.

Head Weight

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Weight, grams</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>975.6</td>
<td>--</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>1,127.6</td>
<td>152.0 (+16%)</td>
</tr>
<tr>
<td>Vitazyme + Fish</td>
<td>1,022.6</td>
<td>47.0 (+5%)</td>
</tr>
</tbody>
</table>

Head weight increase: 16%

Total Yield

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Yield, lb/acre*</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>67,405</td>
<td>-</td>
</tr>
<tr>
<td>Vitazyme</td>
<td>77,907</td>
<td>10,502</td>
</tr>
<tr>
<td>Vitazyme + Fish</td>
<td>70,653</td>
<td>3,248</td>
</tr>
</tbody>
</table>

Total yield increase: 16%

* Harvested area per treatment: 0.00015942 acre.
# Income

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Income, $/acre*</th>
<th>Change</th>
<th>Income, $/acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20,221.50</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Vitazyme</td>
<td>23,372.10</td>
<td>(+) 3,150.60</td>
<td></td>
</tr>
<tr>
<td>Vitazyme + Fish</td>
<td>21,195.90</td>
<td>(+) 974.40</td>
<td></td>
</tr>
</tbody>
</table>

* Based on the average value of Romaine lettuce as received by the farmer in early May, 2000: about $0.30/lb.

**Income increase: $3,150.60/acre**

**Conclusions:** Vitazyme alone increased yield over the control by 16%, which was a bigger increase than the fish plus Vitazyme. The increased income from the three Vitazyme applications was $3,150.60/acre, a very high return from a very small investment.
1999 Crop Results

Vitazyme on Lettuce

Observations -- Caribbean Chemical International

**Researcher:** Saleem Shah, agronomist  
**Farmer:** Rishi Pretran  
**Location:** Trinidad, West Indies

**Variety:** unknown  
**Planting date:** Spring, 1999  
**Planting date:** unknown

**Experimental design:** Two grow boxes were planted with lettuce transplants. One box was sprayed with Vitazyme four days after transplanting, and again 14 days after the first spray.

1. **Control**
2. **Vitazyme sprayed on the leaves and soil**

**Vitazyme treatments:** Vitazyme at 30 ml/gal (about 1 oz/gal, or 1%), was sprayed over the plants and soil of the appropriate grow box at four and 18 days after transplanting.

**Growth results:** No yield data were collected, but observations of lettuce growth were made weekly. The Vitazyme treated lettuce showed the following improvements over the control:

1. **Many more root hairs**
2. **Thicker leaves**

**Conclusion:** The farmer on whose land the test was done was very pleased with the results, and desires to purchase product for future use.
Fruit per cluster graph

Average fruit weight, g graph

Increase in fruit weight (30 ml/gal): 36%