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

2013 Crop Results

Vitazyme on Cucumbers

Researcher: Alejandro Reyes
Farmer: Victorino Pacheco
Location: Yecapixtla, Mexico
Variety: unknown

Experimental design: A greenhouse cucumber trial compared a Vitazyme treated area with an untreated area to evaluate effects on crop growth and yield.

1. Control **2. Vitazyme**

Fertilization: unknown

Vitazyme application: (1) Seedling trays were dipped in a 1% solution, (2) 20 days after (1), established transplants received a foliar spray; (3) at flowering a third spray was made; (4) a final spray was made after the first picking.

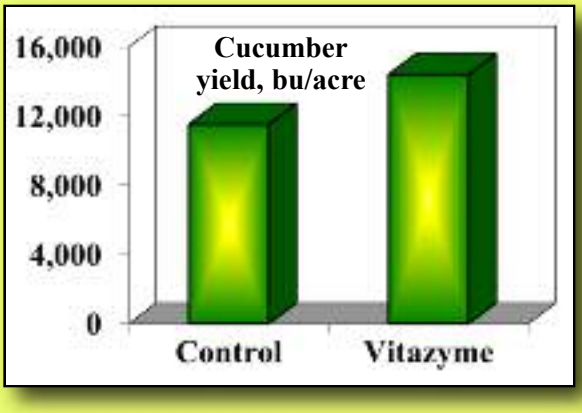
Growth results: An evaluation made in November, 2012, revealed improvements with Vitazyme.

- **Faster overall growth**
- **Better flowering and fruit set**
- **Longer lasting fruit**

Yield results: The Vitazyme treated area yielded 2,880 kg more cucumbers than did the untreated control, a 25% yield increase.

Treatment	Yield	Yield change
	kg	kg
Control	11,520	—
Vitazyme	14,400	2,880 (+25%)

Increase in yield with Vitazyme: 25%



Conclusions: A Mexican greenhouse cucumber study produced 25% greater yield with Vitazyme applied four times, with the first at the seedling stage and the last after the first picking. Such an excellent response proves the great utility of this product for use in cucumber production in Mexico.

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2013 Crop Results

Vitazyme on Cucumbers

Researcher: Hermilo Sanchez Sanchez, Ph.D.
University location: Autonomous University of Puebla, San Juan Acateno, Teziutlan, Puebla, Mexico
Trial location: commercial field at Tepalcingo, Morelos, Mexico
Variety: Centaur
Soil type: Pellic vertisol (clayey, dark, high fertility)
Planting date: August 13, 2013
Row spacing: 1.0 meter
Seeding rate: unknown

Experimental design: A cucumber field was selected for a plot area, in a Latin Square design, having four treatments and four replications. Each plot was five row wide and 5 meters long (25 m^2). The total plot area was 400 m^2 for 16 plots. The purpose of the trial was to determine the effect of a transplant and two foliar Vitazyme treatments on the growth and yield of cucumbers under field conditions.

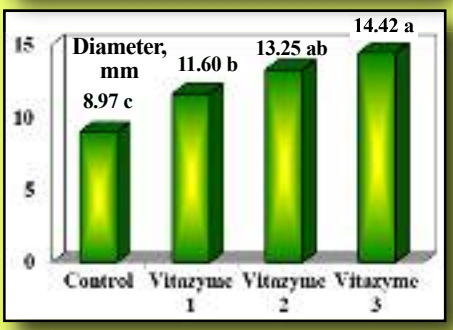
Treatment	Transplant treatment[1]	Foliar treatment 1[2]	Foliar treatment 2[3]
	%	liters/ha	liters/ha
1. Control	0	0	0
2. Vitazyme 1	0.50	0.75	0.75
3. Vitazyme 2	0.75	1.00	1.00
4. Vitazyme 3	1.00	1.25	1.25

[1]Roots were dipped in Vitazyme solutions of these percentages.
[2]Applied 20 to 30 days after transplanting.
[3]Applied at early flowering.

Fertilization: unknown
Vitazyme application: (1) Transplants were dipped in the appropriate Vitazyme dilution just before planting; (2) leaves and soil were sprayed at 1 liter/ha with a backpack sprayer 20 to 30 days after transplanting; (3) leaves were sprayed at 1 liter/ha with a backpack sprayer at early bloom.
White fly control: Confidor 350 SC
Fungi control: *Pseudoperonospora cubensis* was controlled with Manzate 200.
Statistical evaluations: The Statistical Analysis System (SAS) was used, along with Tukey's Test, to evaluate differences among treatment means, at P = 0.05.

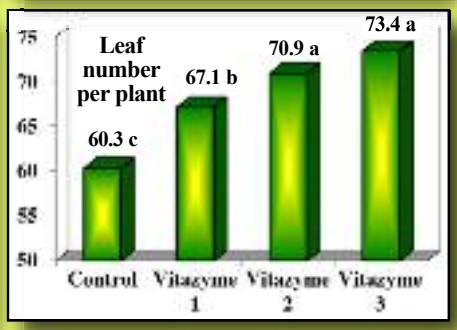
Growth and flowering results:

Stem Diameter[1]



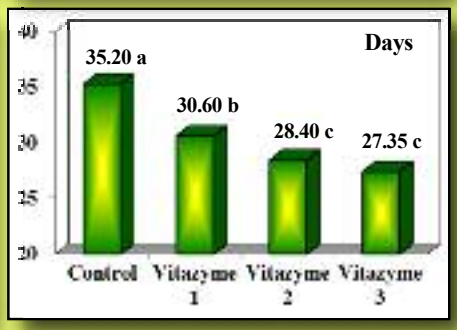
[1]Measured at ground level 45 days after transplanting for 10 random plants per plot; results are averaged.

Leaves Per Plant[1]



[1]Leaves of five typical plants were counted for each plot, and averaged.

Days to Flowering[1]



[1]Days from emergence to flowering of 10% of the plants.

Increase in Stem Diameter

Vitazyme 1 ..... +29%
Vitazyme 2 ..... +48%
Vitazyme 3 ..... +61%

The diameter of the stems increased a remarkable 61% with the highest Vitazyme rate, and all increases were significant.

Increase in Leaves/Plant

Vitazyme 1 ..... +11%
Vitazyme 2 ..... +18%
Vitazyme 3 ..... +22%

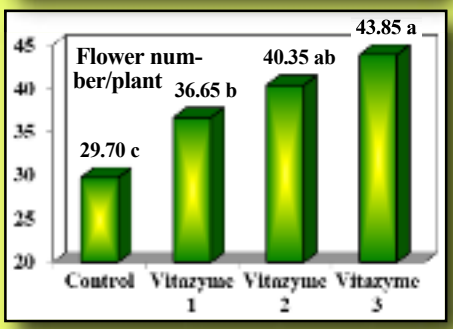
Leaves per plant progressively increased as Vitazyme applications increased, up to 22%.

Decrease in Days to Flowering

Vitazyme 1 ... 4.60 days
Vitazyme 2 ... 6.80 days
Vitazyme 3 ... 7.85 days

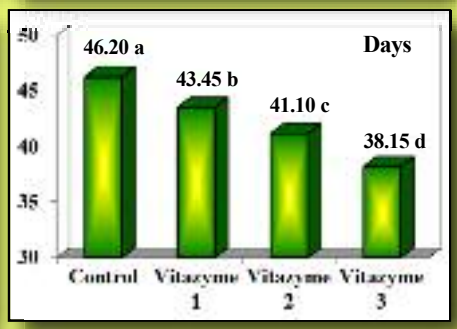
Days to flowering decreased significantly by nearly 8 days with the highest rate of Vitazyme.

Flowers Per Plant[1]



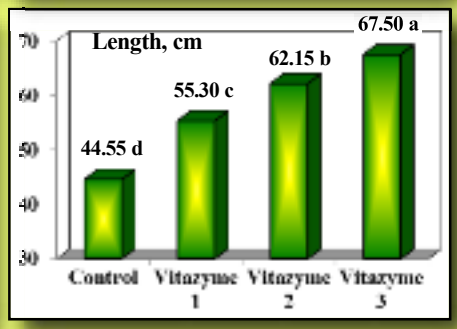
[1]The average of 10 random plants per plot, at 20% of total flowering for 10 randomly selected plants.

Days to Fruit Set[1]



[1]Number of days from emergence to the set of 10% of the crop.

Root Length[1]



[1]Five random plants were dug per plot after yield evaluations, and the root lengths were averaged.

Increase in Flowers/Plant

Vitazyme 1 ..... +23%
Vitazyme 2 ..... +36%
Vitazyme 3 ..... +48%

Flowers per plant at 20% bloom increased significantly with the rate of application, reaching up to 48%.

Decrease in Days to Fruit Set

Vitazyme 1 ... 2.75 days
Vitazyme 2 ... 5.10 days
Vitazyme 3 ... 8.05 days

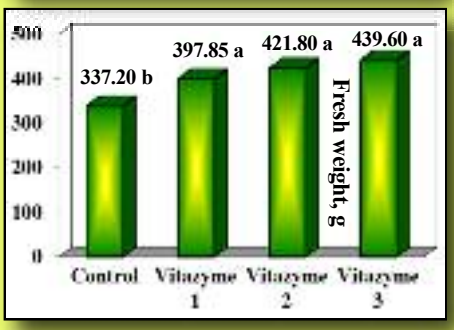
Vitazyme improved the rate of maturity, the highest rate significantly reducing the time to fruit set by over 8 days!

Increase in Root Length

Vitazyme 1 ..... +24%
Vitazyme 2 ..... +40%
Vitazyme 3 ..... +52%

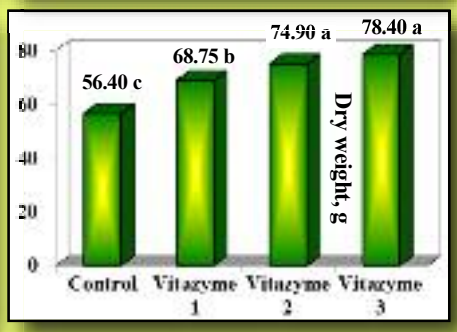
Root length increased proportionally and significantly with increasing Vitazyme rate, reaching 52% greater root length.

Plant Fresh Weight[1]



[1]Five typical plants were selected for each plot, cut off at the base, and weighed, then averaged.

Plant Dry Weight[1]



[1]The five plants for each plot were dried in a drying oven, and the plants were then weighed and averaged.

Increase in Fresh Weight

Vitazyme 1 ..... +18%
Vitazyme 2 ..... +25%
Vitazyme 3 ..... +30%

With increasing Vitazyme rate, the plant fresh weight increased significantly, reaching 30% more mass at the high rate.

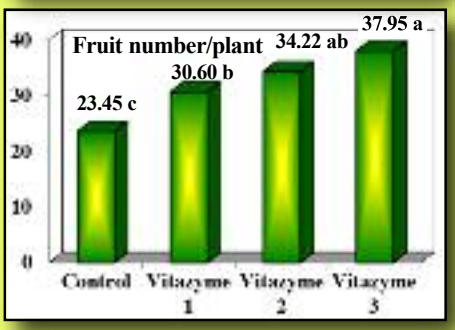
Increase in Dry Weight

Vitazyme 1 ..... +22%
Vitazyme 2 ..... +33%
Vitazyme 3 ..... +39%

Plant dry weight reflected the fresh weight, the highest Vitazyme rate increasing dry mass by 39%.

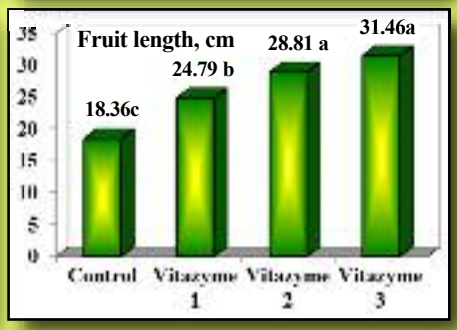
Fruit results:

Fruits Per Plant[1]



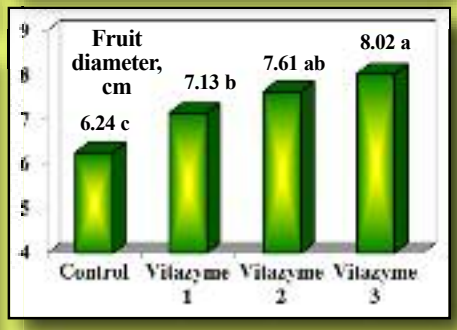
[1]The total fruit number of five randomly selected plants from each plot were counted, and then averaged.

Fruit Length[1]



[1]Five fruits of the first floral internodes of five plants were selected, and the lengths were measured and averaged.

Fruit Diameter[1]



[1]The same five fruits from the first floral internodes of five plants were measured for diameter, and the results were averaged.

Increase in Fruits/Plant

Vitazyme 1 ..... +30%
Vitazyme 2 ..... +46%
Vitazyme 3 ..... +62%

There was a great and significant increase in fruits per plant, the highest Vitazyme rate increasing the number by an amazing 62%.

Increase in Fruit Length

Vitazyme 1 ..... +35%
Vitazyme 2 ..... +60%
Vitazyme 3 ..... +71%

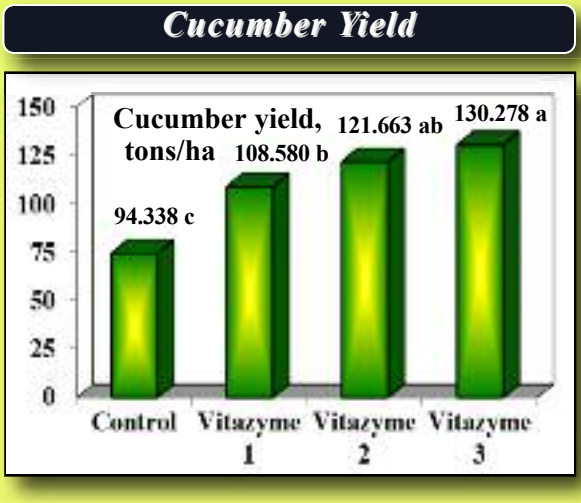
Fruit length was improved proportionally and significantly as the Vitazyme rate increased, the length improved by 35 to 71%

Increase in Fruit Diameter

Vitazyme 1 ..... +14%
Vitazyme 2 ..... +22%
Vitazyme 3 ..... +29%

Fruit diameter increased significantly at all levels of Vitazyme application, but not as greatly as the length. The highest level improved the diameter by 29%.

Cucumber yield results: Yields were compiled 20 days after the first ripe fruits were detected, by counting fruit numbers and weights. Values were converted to yields per hectare.



Yield Increase with Vitazyme

Vitazyme 1	15%
Vitazyme 2	29%
Vitazyme 3	38%

All yield increases were significant at P = 0.05, with the yield increasing from 15% of the control at the low Vitazyme rate to 38% above the control at the high rate.

Fruit quality results:

Treatment	Soluble solids	N	P	K	Ca	Mg	Mn	Zn	S
	Brix	%	%	%	%	%	ppm	ppm	ppm
Control	2.75 c	3.75 c	0.27 c	1.70 c	0.33 c	0.16 c	25.5 b	44.75 c	275.5 b
Vitazyme 1	3.36 b	4.62 b	0.34 b	2.22 b	0.42 b	0.25 b	29.7 ab	56.25 b	323.7 ab
Vitazyme 2	3.72 a	5.02 ab	0.38 ab	2.62 ab	0.49 ab	0.29 ab	33.0 ab	62.00 ab	367.2 ab
Vitazyme 3	2.94 a	5.30 a	0.40 a	2.95 a	0.56 a	0.31 a	36.0 a	65.25 a	394.5 a

In all cases, the quality parameters were significantly increased with Vitazyme application at the highest level (Vitazyme 3). Sugars increased up to 43%, and the increases were significant at all three application levels. Manganese and sulfur increased the least, but even they showed substantial improvements. Crop quality was markedly enhanced by Vitazyme application.

Conclusions: The following conclusions are from the original Mexican report.

1. After applying Vitazyme at rates of 0.5, 0.75, and 1.0% as a pre-transplanting root dip, and 0.75, 1.0, and 1.25 L/ha, respectively, as two foliar sprays, treated cucumber plants showed significant effects on variables of growth and development, It positively influences the number of flowers per plant, there is shortening in the number of days to flowering and to fruit set, as well as higher yields.

2. With regards to the variables of quality of fruits, the rates of Vitazyme at 0.5, 0.75, and 1.0% in pre-transplanting root dip and 0.75, 1.0, and 1.25 L/ha, respectively, in two foliar sprays produced in treated plants a larger size of fruits, as well as an increase in the total concentration of soluble solids.

3. Likewise, when Vitazyme is applied, a greater concentration of macro and micronutrients is detected both in the plant and in the fruit, registering a greater effect with higher dosages of Vitazyme.

4. The evaluated dosages of Vitazyme demonstrated significant statistical differences in comparison with the untreated control, in the variables evaluated in this study.

5. There were no toxic effects to the crop of cucumber, after applying rates of Vitazyme of 0.5, 0.75, and 1.0% as a pre-transplant root dip, and 0.75, 1.0, and 1.25 L/ha as foliar sprays, respectively.

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2006 Crop Results

Vitazyme on Cucumbers

Researcher: unknown *Location*: Ukraine *Variety*: unknown
Planting date: unknown *Planting rate*: unknown

Experimental design: A cucumber area ("Area 10") was divided into two parts, each 1 hectare, one treated with Vitazyme and the other left untreated. The objective was to evaluate the effects of the product on cucumber yield.

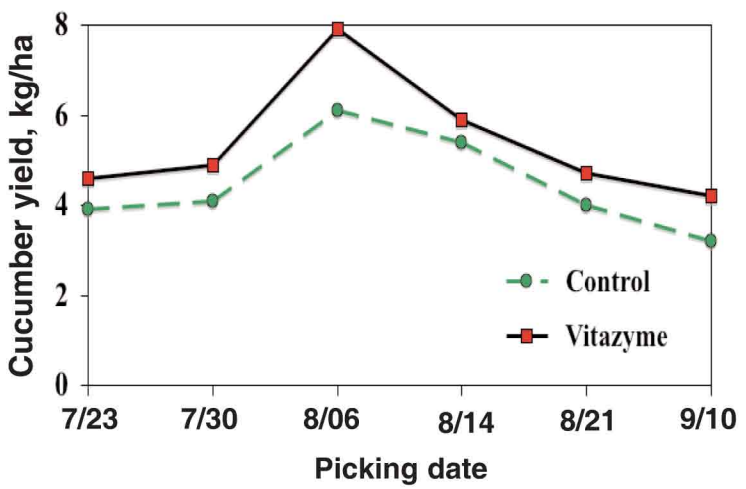
1. Control **2. Vitazyme**

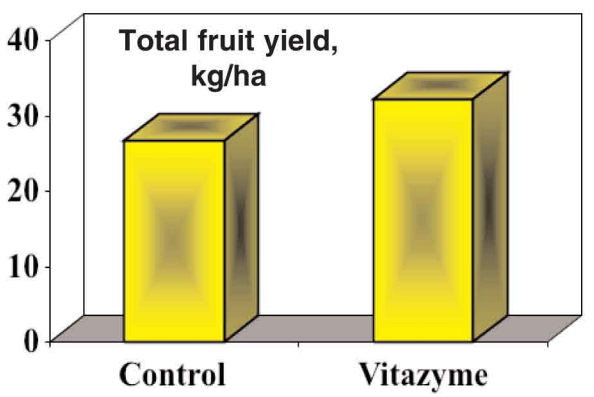
Fertilization: unknown

Vitazyme application: 1 liter/ha on the leaves and soil, at unknown dates

Yield results:

Treatment	7/23	7/30	8/06	8/14	8/21	9/10	Total	Change
	kg/ha							
Control	3.9	4.1	6.1	5.4	4.0	3.2	26.7	—
Vitazyme	4.6	4.9	7.9	5.9	4.7	4.2	32.2	5.5 (+21%)





increase in cucumber yield with Vitazyme: 21%

Conclusions: In this Vitazyme test in the Ukraine, cucumber yield was improved uniformly throughout the 48-day harvest period, to give a total yield enhancement of 21%.

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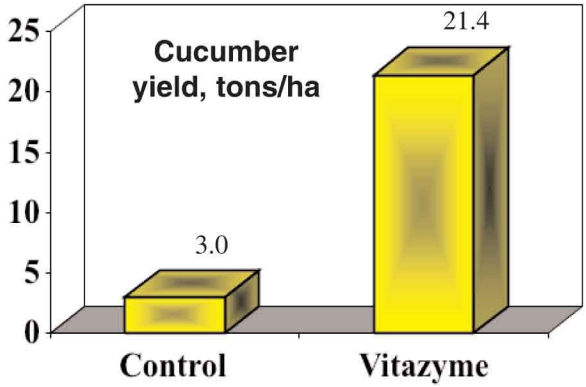
2006 Crop Results

Vitazyme on Cucumbers

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 and soil twice, separated by 30 days



Increase in cucumber yield: 613%

Conclusions: This commercial cucumber trial in Cuba revealed the great ability of Vitazyme to increase cucumber production, with a more than six-fold yield increase.

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2000 Crop Results

Vitazyme on Cucumbers

Caribbean Chemicals International

Agronomist: Fayaz Shah
Location: Aranguez, Trinidad, West Indies
Variety: Atlantis
Planting date: February 15, 2000
Harvest date: March 21, 2000
Experimental design: Two plots were prepared for this study, each 100 x 20 feet, one untreated and the other Vitazyme treated.

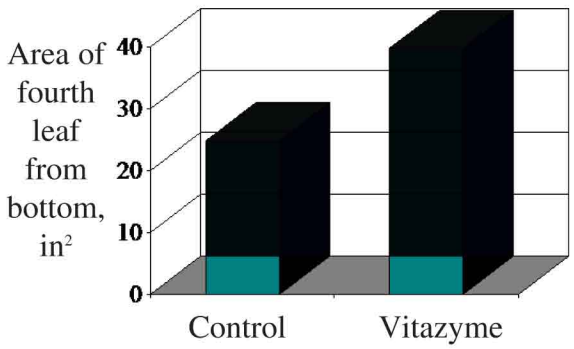
1. Control **2. Vitazyme**

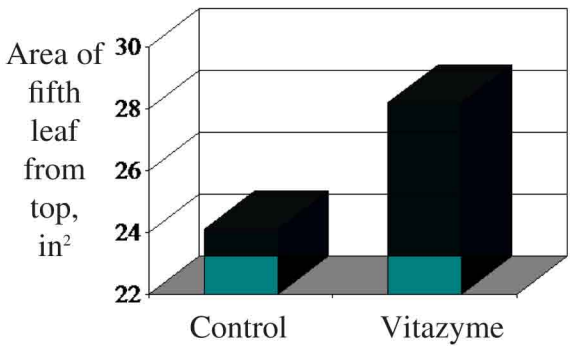
Fertility treatments: unknown
Vitazyme treatments: Three treatments were applied, at 30 ml/gallon (1%, or 3.22 liters/ha), spaced 2 to 3 weeks apart.
Growth results: Two sets of leaves were chosen from each treatment, one set from 10 randomly selected plants which was the fourth leaf from the root, and another set which was the fifth leaf from the growing point. Then the area of each leaf was calculated.

Treatment	Leaf area, fourth from bottom	Increase	Leaf area, fifth from top	Increase
	----------in²/leaf----------		----------in²/leaf----------	
Control	**24.8 b**	**--**	**24.1 b**	**--**
Vitazyme	**39.8 a**	**15.0 (+60%)**	**28.2 a**	**4.1 (+17%)**

Means followed by the same letters are not significantly different at P = 0.05. $LSD_{0.05}$ = 9.7.

Means followed by the same letter are not different at P = 0.07. $LSD_{0.05}$ = 5.1.

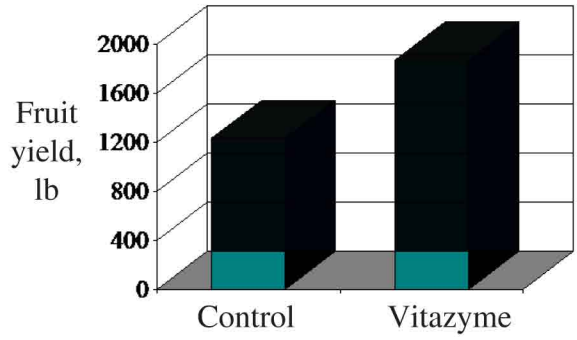




Yield results: Cucumbers were harvested and tabulated from the respective plots on March 21, 23, 25, 27, 29, and 31, and April 2 and 4, 2000. **The treated cucumbers ...**

(a) ... were more uniform in size than the untreated ones.
(b) ... had less rejected fruit than the untreated plot.

Treatment	Cucumber yield, lb	Increase, lb
Control	1,232	--
Vitazyme	1,868	636 (+52%)



Yield increase: 52%

Conclusions: Vitazyme produced much greater leaf size (60%) in this cucumber test than did the control treatment. This larger leaf size translated into greater yield later during this study, when Vitazyme displayed a 52% increase of higher quality fruit.