

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647
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2009 Crop Results

Vitazyme on Oranges

A Testimonial

We are extremely excited with our navel orange crop this coming year (2009-2010). The navel industry as a whole is up 15% from last season, while *everything* that we farm is up 50-150%!! This is the first time I can remember that all of our acreage as a whole (not just individual blocks), have set such large crops.

What do I attribute it to? This is the first year that we applied Vitazyme on everything in a precise and timely manner. Twice foliar to help set the crop, and twice soil applied for overall health and cell wall strength. Also, in conjunction with Vitazyme I began using a soil applied Root Stimulant four times a year in timely applications from mid-March through mid-October. The root stimulant is made by New Era Farm Services and is derived from composted dairy manure that has gone through a thermophilic controlled biological oxidative process, and also has colloidal minerals, humic acid derivatives, *Ascophyllum Nodosum* seaweed extract, and yucca for antistress.

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

Jody Wollenman
Monte Vista Ranchos
Lindsay, California

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2009 Crop Results

Vitazyme on Mandarin Oranges

Researchers: Wang Zhongyan, Peng Juncal, Cai Jinshu, Yi Chun, Xiao Wanzhong, Peng Fengxiang, Li Qunfeng, and Shen Ying, Hunan Horticultural Research Institute; Tao Dihui, Changsha Agricultural School

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

Variety: Satsuma Mandarin – Miyagawa Wase

Tree age: 17 years

Row spacing: 3 x 3 meters

Trellis: pergola

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

1. Control

2. Vitazyme

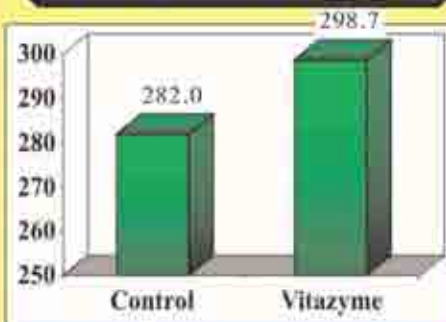
Fertilization: unknown

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

Harvest date: unknown

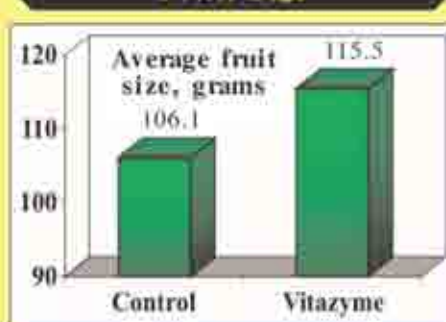
Yield and quality results:

Fruit Number Per Tree



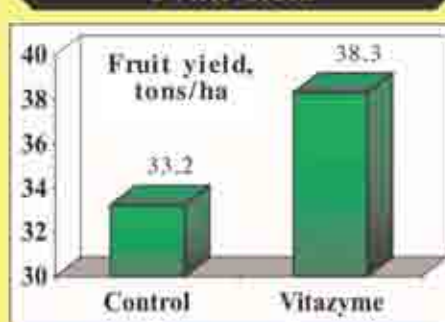
Increase in fruit number per tree with Vitazyme: 6%

Fruit Size



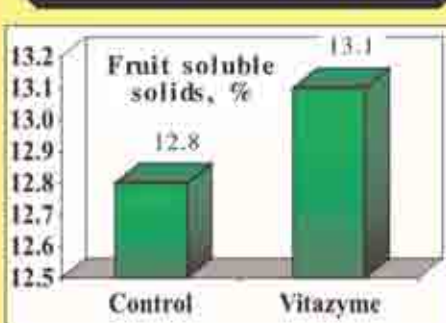
Increase in fruit size with Vitazyme: 9%

Fruit Yield



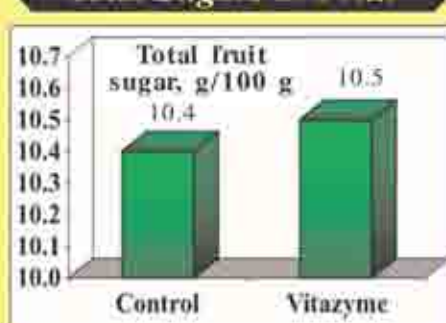
Increase in fruit yield with Vitazyme: 15%

Soluble Solids in Fruit



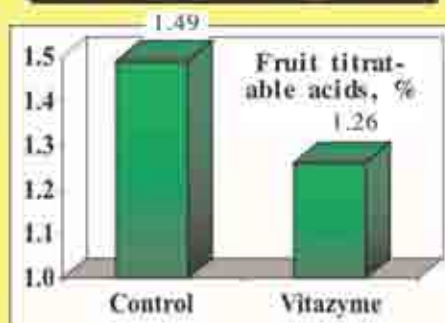
Increase in soluble solids with Vitazyme: 2.3%

Total Sugars in Fruit



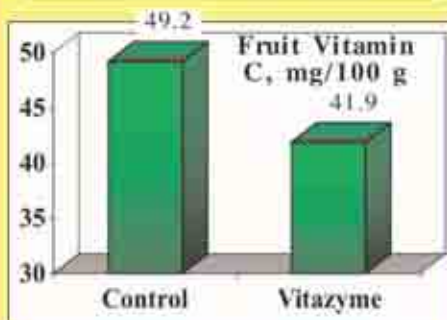
Increase in total fruit sugar with Vitazyme: 1.0%

Titrateable Acids of Fruit



Decrease in fruit titrateable acid with Vitazyme: 18%

Fruit Vitamin C



Decrease in fruit Vitamin C with Vitazyme: 17%

Besides substantially improving yield, number, and size of the fruit, the quality of the fruit was also improved with more sugars and much less acidity. Vitamin C, however, was reduced somewhat. The income of the crop was increased by an impressive 15%.

Income results:

Treatment	Income	Income change
	----- RMB/ha -----	-----
Control	33,200	—
Vitazyme	38,300	5,100 (+15%)

Increase in income with Vitazyme: 15%

Conclusions: In this Mandarin orange study in China with Vitazyme, four applications produced excellent yield and quality responses, as shown in this summary chart.

Parameter Change with Vitazyme

Fruit number per tree	+6%
Fruit size	+9%
Fruit yield	+15%
Soluble solids	+2.3%
Total sugars	+1.0%
Titrateable acids	-18%
Vitamin C	-17%

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2007 Crop Results

Vitazyme on Oranges

Introduction: In 2006 a series of six studies of Vitazyme on oranges was initiated. These were coordinated by Jody Wollenman of Monte Vista Ranches, Lindsay, California, who separated the six blocks into half treated and half untreated; all other treatments and practices of the two halves of each block were the same. The objective of the studies was to determine if Vitazyme could increase the yield, quality, and profitability of oranges.

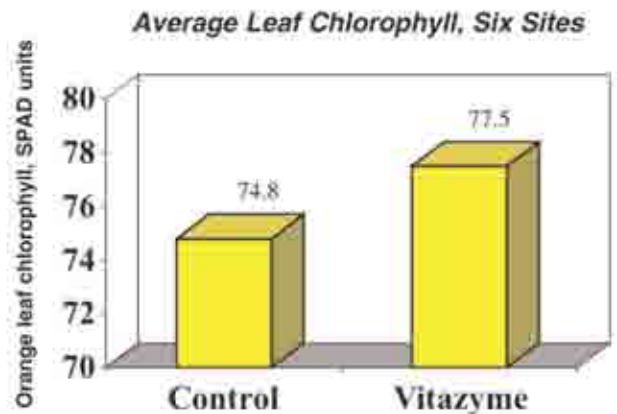
According to the researcher, only two of the six blocks were able to have their yields harvested and recorded separately. Due to the major freeze of 2007, the packing house through which he shipped was required to jump around with many of the treated and control blocks, harvesting the least frost-affected fruit so that the buyers would receive only fruit not affected by the frost. Then, once these areas were harvested, the pickers moved to areas more affected by the frost until finally the most frost-affected areas were picked.

As the researcher said, "Because of this [skipping around during harvest] the packing house could not separate the control from test blocks on three out of our five locations. Of these, I can only report what I visually observed, which was quite encouraging." One of the six blocks, having an early variety called Early Fukumota Naval, was reported in the *Vitazyme 2006 Field Trial Results*.

On August 23, 2006, the six orange blocks were evaluated for chlorophyll content and overall responses to Vitazyme. The chlorophyll content of all six blocks, and a statistical analysis, is indicated below.

Location	Variety	Leaf chlorophyll ^a		
		Control	Vitazyme	Change
		SPAD units	SPAD units	SPAD units
Survivor's Trust No. 3	Washington	76.2	76.8	+0.6
Survivor's Trust No. 2	Washington	77.6	80.4	+2.8
Wollenman Farms 41	Late Lane	72.5	76.6	+4.1
McCord Ranch	Fukumoto/Carrizo	79.2	82.0	+2.8
Ruth Wollenman	Frost Nucellar	68.7	71.7	+3.0
Wollenman Farms, Sieta	Washington	74.3	77.5	+3.2
Average		74.8	77.5 ^b	+2.7
— Analysis of Variance using locations as replicates, and the Student-Newman-Keuls Test —				
Block P	0.0005***			
Main effects P	0.0021**			
Model P	0.0005***			
Root Mean Square Error	0.819			
Coefficient of variation	1.08			
LSD (0.05)	1.2 SPAD units			
^a Determined by averaging the Minolta SPAD Meter values on 30 representative leaves from similar positions on several trees from the same sunlight aspect, for each treatment (such as all from the south side for the two treatments, or all from the north side).				
^b Significantly greater than the control at P = 0.05 according to the Student-Newman-Keuls Test.				

**Increase in leaf chlorophyll:
2.7 SPAD units**



Orange Block 1 (03 - GAE)

Researcher: Jody Wollenman, Monte Vista Ranches

Variety: Frost Nucellar

Production history: poor quality fruit

Frost control: wind machines

Experimental design: This 19.5 acre block of oranges was divided into a 10-acre untreated and a 9.5-acre Vitazyme treated area to determine the product's effects on orange yield, quality, and income.

Location: Lindsay, California

Age of trees: 50 years

Soil type: unknown

Rootstock: trifoliolate

Watering: drip irrigation

Tree spacing: 18 ft x 16 ft

1. Control

2. Vitazyme

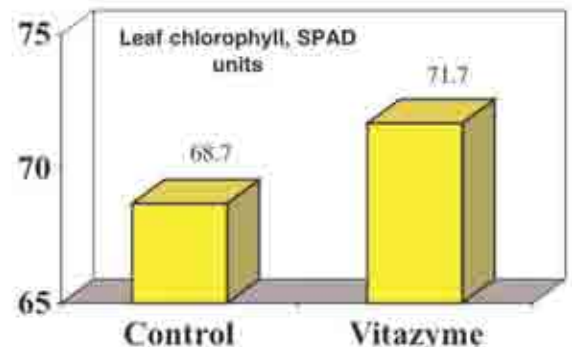
Fertilization: No soil nitrogen was applied in 2006, but potassium and phosphorus were applied by drip irrigation on May 4 (5 gal/acre of a 0-15-15% N-P₂O₅-K₂O) and on July 10 (5 gal/acre of a 0-10-20% N-P₂O₅-K₂O), for a total of about 12 lb/acre of P and 16 lb/acre of K.

Vitazyme application: (1) Foliar at bloom at 16 oz/acre (April 25, 2006); (2) soil applied by drip irrigation at 16 oz/acre (August 25, 2006); (3) soil applied by drip irrigation at 16 oz/acre (October 31, 2006); (4) soil applied by drip irrigation at 16 oz/acre (January 30, 2007)

Growth observations: The Vitazyme treated area of the block showed more vigorous growth and darker green leaves, having more chlorophyll. This chlorophyll difference, recorded in the previous table, is shown below.

Yield results: Both blocks were harvested over the period of February 13 to March 3, 2007.

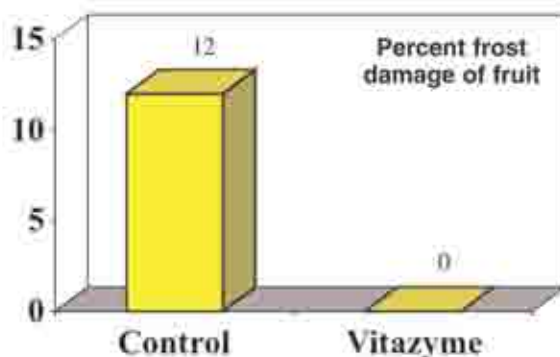
**Increase in leaf chlorophyll:
3.0 SPAD units**



Quality results:

Quality parameter	Control	Vitazyme
"Puff" in fruit skins	some	none
Split fruit	many	few
Dropped fruit	much	little
Fruit size	88/carton	98/carton

Fruit damage: A severe frost hit the orange growing regions of the San Joaquin Valley in January of 2007. The extra sugar content and fruit toughness on the treated side of the block stopped any frost damage, while the untreated control suffered considerable frost damage.



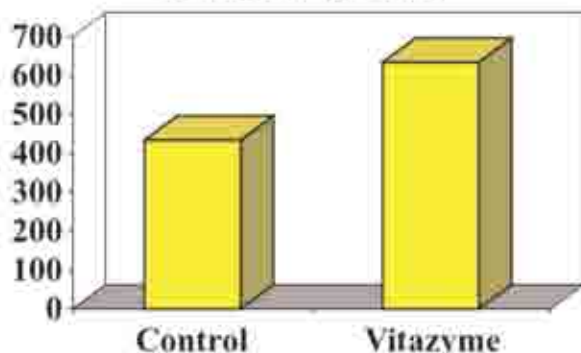
Yield results:

Treatment	Area	Bins	Cartons			Average size	Cartons per tree
			Total	Per acre	Change		
	acres	bins	cartons	----- cartons/tree -----		oranges/carton	cartons/tree
Control	10.0	189	4,347	435	—	88	3.2
Vitazyme	9.5	262	6,028	635	200 (+50%)	98	4.2 (+31%)

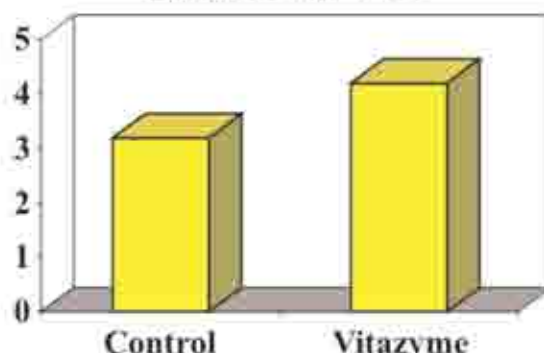
**Increase in cartons per acre:
50%**

**Increase in cartons per tree:
31%**

Cartons Per Acre



Cartons Per Tree

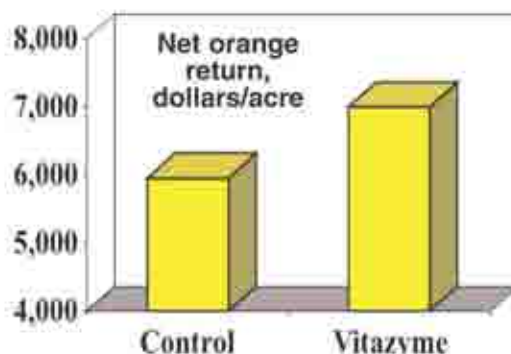


The number of cartons per acre was increased a remarkable 50% by Vitazyme, and even though they were somewhat smaller the much greater number far exceeded the control area production to give an overall high income increase.

Income results: The price for the oranges depended on size, larger fruit being of more value in the market.

Treatment	Yield	Price	Net return	Change
	cartons/acre	\$/carton	\$/acre	\$/acre
Control	435	13.69	5,955	—
Vitazyme	635	11.02	6,998	+1,043

**Increase in income with Vitazyme:
\$1,043/acre**



Conclusions: This orange study with Vitazyme showed the great utility of the product to improve leaf chlorophyll (and thus photosynthesis) and nutrient uptake, increasing the sugar content of the leaves and fruit to reduce the freezing point and eliminate frost damage. This effect was most important for a year when frost damage was common for oranges during a January hard freeze.

Fruit quality was improved greatly by Vitazyme, producing the following effects:

- No "puff"
- Few split fruit
- Few dropped fruit

Production was dramatically increased, by 50% above the untreated area, and though the fruit was smaller — with lower value — there was a dramatic increase in income of \$1,043/acre for the treated area. These results display the great value of Vitazyme for growing oranges in California.

Orange Block 2 (02 - SIE)

Researcher: Jody Wollenman, Monte Vista Ranches

Location: Lindsay, California

Variety: Washington Navel

Rootstock: rough lemon

Age of trees: 70 years

Production history: poor fruit quality

Watering: drip irrigation

Soil type: unknown

Frost control: wind machines

Tree spacing: 22 ft x 20 ft

Experimental design: This 38.5-acre block of oranges was divided into 14 acres treated with Vitazyme (south side) and 24.5 acres left untreated (north side). The study was designed to evaluate yield, quality, and profitability of orange production.

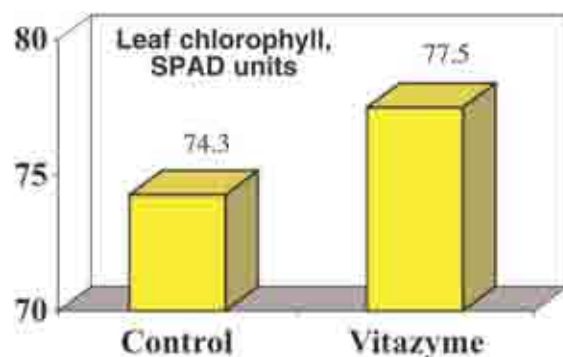
1. Control

2. Vitazyme

Fertilization: No soil nitrogen was applied in 2006, but potassium and phosphorus were applied by drip irrigation on May 4, 2006 (5 gal/acre of a 0-15-15% N-P₂O₅-K₂O), and on July 10 (5 gal/acre of a 0-10-20% N-P₂O₅-K₂O), for a total of about 12 lb/acre of P and K.

Vitazyme application: (1) Foliar at bloom at 16 oz/acre (May 16, 2006); (2) foliar later at 16 oz/acre (August 8, 2006); (3) soil applied by drip irrigation at 16 oz/acre (October 26, 2006); (4) soil applied by drip irrigation at 16 oz/acre (January 30, 2007)

Growth observations: The Vitazyme treated area of the block revealed excellent growth and more leaf chlorophyll, by 3.2 SPAD units. These chlorophyll differences are shown below.



Increase in leaf chlorophyll with Vitazyme: 3.2 SPAD units

Quality results:

Quality parameter	Control	Vitazyme
Color of fruit	Above average	Average
Fruit shape	Very round	Some misshapen

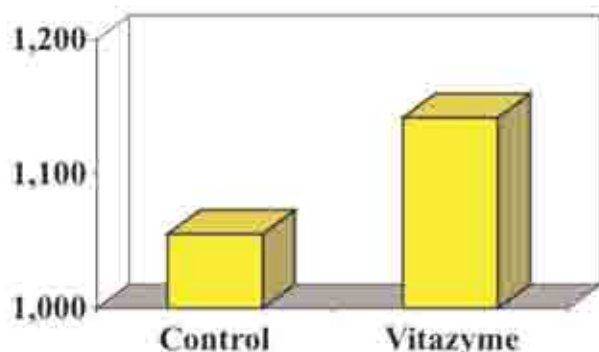
Yield results: Both blocks were harvested over the period of March 12 to March 26, 2007.

Treatment	Area	Bins	Cartons			Average size	Cartons per tree
			Total	Per acre	Change		
	acres	bins	cartons	----- cartons/tree -----		oranges/carton	cartons/tree
Control	24.5	1,124	25,852	1,055	—	80	10.8
Vitazyme	14	695	15,987	1,142	87 (+8%)	88	11.4 (+6%)

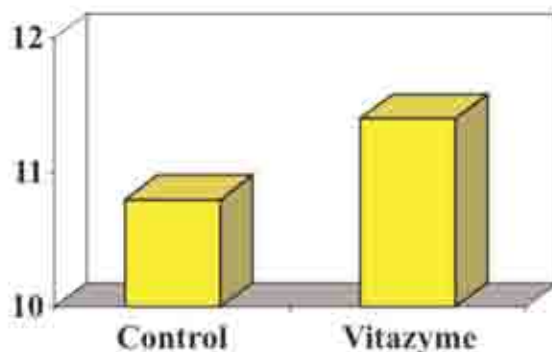
Increase in cartons per acre: 8%

Increase in cartons per tree: 6%

Cartons Per Acre



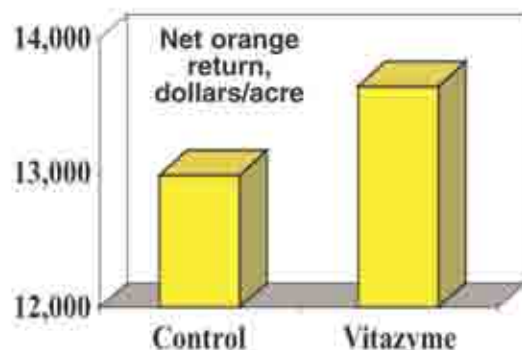
Cartons Per Tree



The number of cartons per acre was increased by a sizable 8% with Vitazyme, and the increase in cartons per tree by 6% due to more fruit produced per tree.

Income results: The price for the fruit depends on its size, so the larger control fruit netted more per carton in the market.

Treatment	Yield	Price	Net return	Change
	cartons/acre	\$/carton	\$/acre	\$/acre
Control	1,055	12.31	12,987	—
Vitazyme	1,142	11.95	13,647	660



**Increase in income with Vitazyme:
\$660/acre**

Conclusions: This orange grove near Lindsay, California, showed how Vitazyme can increase the fruit quality (better color and rounder) and numbers versus the untreated color. With more photosynthesis and nutrient uptake capacity the trees were able to support a larger fruit load (1,142 versus 1,055 cartons/acre), giving an overall increased income of \$660/acre.

Orange Block 3 (01 - 41)

Researcher: Jody Wollenman, Monte Vista Ranches

Variety: "Late Lane" Navels

Watering: drip irrigation

Tree spacing: 10 ft x 16 ft

Rootstock: Carrizo

Soil type: unknown

Location: Lindsay, California

Age of trees: 10 years

Frost control: wind machines

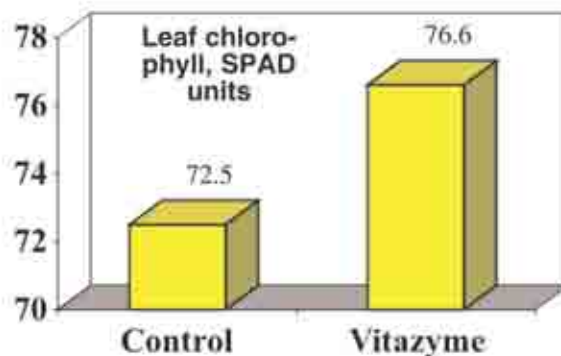
Experimental design: This orange block of 10 acres was divided into equal portions, half treated with Vitazyme and half left untreated. The objective of the study was to evaluate the product's effects on orange quality, yield, and profits..

Fertilization: No soil nitrogen was applied in 2006, but potassium and phosphorus were applied by drip irrigation on May 4, 2006 (5 gal/acre of a 0-15-15% N-P₂O₅-K₂O), and on July 10, 2006 (5 gal/acre of a 0-10-20% N-P₂O₅-K₂O), for a total of about 12 lb/acre of P and 16 lb/acre of K.

Vitazyme application: (1) Foliar at bloom at 16 oz/acre (May 16, 2006); (2) foliar at bloom at 16 oz/acre (July 12, 2007); (3) soil applied by drip irrigation at 16 oz/acre (October 11, 2006); (4) soil applied by drip irrigation at 16 oz/acre (January 31, 2007)

Growth observations: The Vitazyme treated area had superior growth, including more leaf chlorophyll, as shown below.

Increase in leaf chlorophyll with Vitazyme: 4.1 SPAD units



Yield results: Both blocks were harvested from March 20 to May 4, 2007.

Yield and conclusions:

“Due to the freeze of 2007, our packing company was unable to keep the picking separate. However, what I did observe was that **the Vitazyme applied block had an obvious increase in production which was noticeable up to the exact row of application. With this variety of 'late' navels this is extremely exciting since it tends to alternate bear, with sizes that grow too large. The larger the crop, the smaller the orange.**”