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

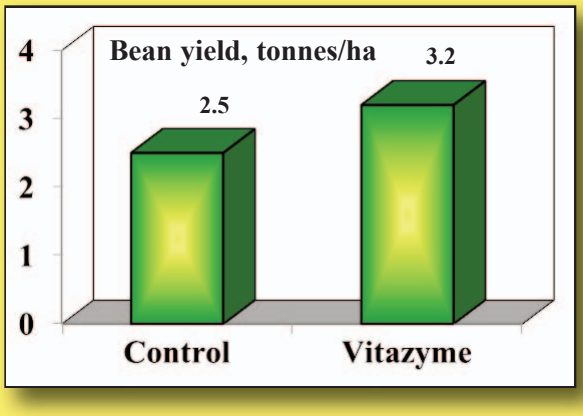
2013 Crop Results

Vitazyme on Coffee

Researcher: unknown *Farmer*: Pham Van Quyen *Location*: Buon Nui, Tam Thang, Viet Nam
Variety: unknown *Age of plants*: 6 years
Experimental design: A coffee plantation was divided into Vitazyme treated (0.6 ha) and untreated (0.4 ha) portions to evaluate the effect of the product on coffee bean production and profits.

1. Control **2. Vitazyme**

Fertilization: unknown
Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) sprayed on the leaves and soil at 3 liters/ha, four times per year
Harvest date: November 5 to 20, 2013
Yield results: The field was harvested on January 20, 2013.



Increase in bean yield with Vitazyme: 28%

The increase in yield with Vitazyme applied four times a year was an excellent 28%.

Income results: Vitazyme costs: 4,560,000 VND/ha
Increase in income with Vitazyme: 16,440,000 VND/ha
Conclusions: This coffee trial in Viet Nam, using four annual applications of Vitazyme at 3 liters/ha each time, revealed that the bean yield was improved by 28%, while net income was raised by 16,440,000 VND/ha. These results prove the great efficacy of Vitazyme for coffee culture in Viet Nam.

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2013 Crop Results

Vitazyme on Coffee

Researcher: unknown *Farmer*: Tran Thi Tuoi *Location*: Tam Thang, Cu Jut, Dak Nong Province, Viet Nam *Variety*: unknown *Age of plants*: 5 years

Experimental design: A coffee plantation was divided into Vitazyme treated (0.8 ha) and untreated (0.4 ha) portions to evaluate the effect of the product on coffee bean production and profits.

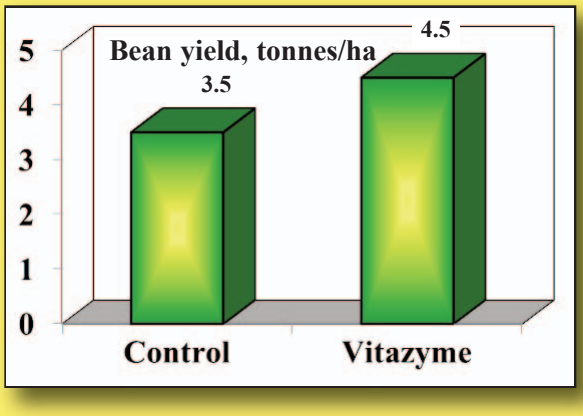
1. Control **2. Vitazyme**

Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water (0.25%) sprayed on the leaves and soil at 3 liters/ha, four times per year

Harvest date: November 9 to 28, 2013

Yield results:



Increase in bean yield with Vitazyme: 29%

Vitazyme greatly improved bean yield with four annual applications of 3 liters/ha each time.

Income results: Vitazyme costs: 6,000,000 VND/ha

Increase in income with Vitazyme: 24,000,000 VND/ha

Conclusions: A plantation coffee trial with Vitazyme, using four annual applications at 3 liters/ha each time, resulted in a 29% yield increases. **Most of this benefit resulted from less premature fruit falling, and the number of fruit per cluster was also higher.** Income was increased by 24,000,000 VND/ha, to prove the great effectiveness of this program for coffee producers in Viet Nam.

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2013 Crop Results

Vitazyme on Coffee (Seedlings)

Researcher: unknown *Greenhouse location*: Bao Anh, Ea Tling, Cu Jut, Dak Nong Province, Viet Nam
Variety: unknown *Seed soaking*: 16 hours *Incubation*: 4 days
Experimental design: A greenhouse with coffee seedlings was divided into plants receiving Vitazyme, and those receiving none to evaluate the product's effect on germination, maturation rate, appearance, and salability. The seeds were grown in flats, and then transferred to bags.

1. Control **2. Vitazyme**

Vitazyme application: Vitazyme was used six times: (1) at seed soaking for 16 hours (controls were soaked in water); (2) 1% spray 10 days after seeding; (3) 1% spray 40 days after seeding; (4) 1% spray at the time of transfer to bags; (5) 1% spray 30 days after bagging; (6) 1% spray 90 days after bagging.

Trial 1

Seed soaking date: November 1, 2012
Seed incubation dates: November 1 to 4, 2012

Parameter	Date	Days after planting	Variety TR9		Variety TR5		Variety TR4	
			Control	Vitazyme	Control	Vitazyme	Control	Vitazyme
Seed germination, %	Nov. 4	4	50	80	50	85	40	75
Seed germination, %	Dec. 3	30	50	90	50	90	45	85
Plants with leaves, %	Jan. 20	50	40	95	40	95	40	90
Live plants bagged, %	Jan. 29	59	97	99	97	99	96	98
Leaf number	May 29	179	4.5	6.0	4.5	6.0	5.0	6.0
Plant height, cm	May 29	179	17.5	27.5	17.5	27.5	17.5	27.5
Selling price, VND			2,500	3,000	2,500	3,00	2,500	3,000
Plants sold, % of total			50	80	50	80	50	80
Vitazyme cost, VND			—	140,000	—	140,000	—	140,000
Extra labor cost[1], VND			150,000	—	150,000	—	150,000	—
Income increase, VND/5,000 plants			—	2,500,000	—	2,500,000	—	2,500,000

[1]Extra cost due to smaller plants.

Trial 2

Seed soaking date: January 28, 2013
Seed incubation dates: January 28 to February 3, 2013

Parameter	Date	Days after planting	Coffee variety (unknown)	
			Control	Vitazyme
Seed germination, %	Feb. 3	6	50	80
Seed germination, %	Mar. 3	34	50	90
Plants with leaves, %	Mar. 20	51	40	95
Live plants bagged, %	Mar. 30	61	97	99
Leaf number	May 30	122	2.0	3.5
Plant height, cm	May 30	122	10.0	17.5
Selling price, VND			2,500	3,000
Plants sold, % of total			50	80
Vitazyme cost, VND			—	140,000
Extra labor cost[1], VND			150,000	—
Income increase, VND/5,000 plants				2,500,000

[1]Extra cost due to smaller plants.

Conclusions: This coffee nursery trial in Viet Nam, using Vitazyme as a seed treatment and five soil and foliar treatments until selling time, revealed that ...

- Vitazyme increased seed germination at 4 to 6 days by 25 to 35%-points for all varieties.
- Vitazyme increased seed germination at 30 to 34 days by 40%-points for all varieties.
- Plants with visible leaves improved by 50 to 55%-points at 50 to 57 days for all varieties.
- Live plants that were bagged increased by 2%-points for all varieties.
- Leaf number was improved by 33 to 75% for all varieties.
- Plant height with Vitazyme increased by 57 to 75% for all varieties.
- Untreated plants required 150,000 VND more labor cost due to a small plant size.
- Extra income generated by Vitazyme was 2,500,000 VND for all varieties.
- Vitazyme treated plants were more salable due to bigger size and better appearance.

This program for coffee nurseries in Viet Nam is an excellent choice.

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2011 Crop Results

Vitazyme on Coffee

An Extensive Study in Cuba in the Nursery and Field

Researcher: Carlos Bustamante Gonzalez, Ph.D., and Maritza I. Rodriguez Castro, M.S.
Research institution: Ministry of Agriculture, Central Coffee and Cocoa Research Station, Santiago de Cuba, Cuba
Location: "The Mandarin" Farm, Cruce de los Baños, Third Front Municipality
Varieties: "Robusta" (*Coffea canephora* Pierre ex Froehner) and *Coffea arabica*, cv. Catuai (ten varieties)
Growing environment: under palm tree shade *Soil types*: Typic Ustropept (U.S. classification), or Orthi-Eutric Cambisol (U.N. classification); pH = 6.24 to 7.63 (water extraction), organic matter = 3.4 to 5.7%, P_2O_5 = 7.2 to 191.9 mg/100g, K_2O = 26.6 to 183.1 mg/100g, K^+ = 0.97 to 6.67 meq/100 g, Ca^{+2} = 36.3 to 53.8 meq/100 g, Mg^{+2} = 9.1 to 38.4 meq/100 g, Na^+ = 1.4 to 2.1 meq/100 g.
Experimental design: Over a four-year period an extensive series of trials on coffee, under nursery conditions to evaluate seedling propagation but also in the field to evaluate yield, was undertaken to quantify the effects of Vitazyme on crop response. All experiments were randomized and replicated. The experiments were as follows:

Nursery Experiments

These were divided into seedling production using grafts (asexual) or seeds (sexual).
1. Effects of application method on the production of coffee seedlings
2. Effects of time for soaking on the growth and development of coffee seedlings from seeds
3. Effects of time for soaking on the growth and development of coffee seedlings from grafts
4. Response of different coffee varieties to Vitazyme, and the relationship of the response to the presence of pergamino (a "parchment" coating) on the coffee seeds

1. Effects of application method on the production of coffee seedlings (using *Coffea canephora* Pierre), conducted from 2004 to 2007
   a. Control: 40 grams of 10-8-4.5% N-P_2O_5-K_2O per 2 kg mixture, plus a foliar application of 1% urea from the third leaf pair
   b. Vitazyme: 30 minute soaking times for cuttings using 5% Vitazyme on cuttings and/or rooted cuttings before transplanting in one treatment a 1% Vitazyme solution was used monthly as well.
   c. In 2007, both a and b plus 75%, 50%, and 25% of the 100% control fertilizer, using the best treatment from the previous years

2. Effects of time of dipping on the growth and development of coffee seedlings produced from seeds (using *Coffea arabica* and *Coffea canephora* Pierre), conducted in 2005 and 2006
   a. Control: foliar water spray only

b. Vitazyme: Seeds were dipped in a 5% Vitazyme solution for 6, 12, 24, and 48 hours; all treatments also received a 1% Vitazyme spray each month from the appearance of the second leaf pair until 80% were ready to transplant.

3. **Effects of application timing on the growth and development of coffee seedlings produced from grafts (using *Coffea canephora* Pierre), conducted from 2005 to 2007**
   a. Control
   b. Vitazyme: (1) 5% Vitazyme soak on grafts for 30 minutes, before planting; (2) 1% Vitazyme foliar spray at the first leaf pair; (3) 1% Vitazyme foliar spray at the second leaf pair; (4) 1% Vitazyme spray at the third leaf pair; (5) all four treatments

4. **Effects of Vitazyme on different coffee variations, and relationships to the presence of "pergamino" (parchment) on the coffee seeds (using 11 different varieties), conducted in 2006 and 2007**
   The seeds were soaked in a 5% Vitazyme solution for 1 hour, and dried in the shade before planting.

Established Plantation Experiments

Trial 1. *Coffee arabica* plantation, spacing 2 m x 1 m, on a Typic Utropept soil, pruned in 2000, an average yield of 1.2 tons/ha, given 80 grams/plant of 15-15-15% N-P_2O_5-K_2O, from 2005 to 2008

a. 0.5 L/ha every 30 days
b. 1.0 L/ha every 30 days
c. 1.0 L/ha every 60 days
d. 1.0 L/ha every 90 days
e. 1.0 L/ha once a year, in Sept. to Dec.
f. 0.5 L/ha in Sept.-Dec. + 0.5 L/ha in April-June
g. Control (mineral fertilizer only)

Trial 2. Isla 5-15 variety, 70 plants per treatment, spacing 2 m x 1 m, shaded by the Carob tree (*Ceratonia siliqua* L.) on Typic Ustropept soil, planted in 1982, pruned of lower branches in 2000 and 2005

a. Vitazyme applied at 1.0 L/ha each month to the soil and leaves
b. Fertilizer only at 80 grams/plant per year of 15-15-15% N-P_2O_5-K_2O, in two applications

<u>*Results*</u>: A considerable volume of data was generated for this study, and only a small portion is included in this report. For the full 89-page translated reported please contact Vital Earth Resources to receive a copy. The researcher's conclusions will be listed here along with some supporting data.

1. Vitazyme increased growth indicators of *Coffea* seedlings from seeds, cuttings, and grafts.

2. The soaking of *Coffea* cuttings in a 5% Vitazyme solution for 30 minutes before planting, complemented by monthly spraying of the leaf canopy and soil with a 1% Vitazyme solution, produced greater seedling growth and foliar area (204%) with the substitution of 75% of the recommended mineral fertilizer rate for this stage of the crop. This rendered savings of 5,495 pecos for every 100,000 cuttings produced ... a reduction in production cost by $0.054 per seedling.

Vitazyme effects on growth parameters of *Coffea canephora* seedlings from cuttings, 2004

Treatment[1]	Height[2]	Stalk diameter[2]	Root length[2]	Leaf area[2]	Dry weight[2]	Quality index[2]
	cm	cm	cm	cm^2	grams	
1. Control	17.63 d	0.15 b	21.63 c	142.8 b	0.66 c	0.06 d
2. 5% soak b.p., 30 min.	21.57 c	0.16 ab	26.48 a	177.7 a	0.97 a	0.08 c
3. 1% on soil leaves in bag	22.73 b	0.15 b	23.60 bc	167.0 a	0.85 b	0.09 b
4. 2 + 5% soak b.t.	24.40 a	0.18 a	25.27 ab	145.0 b	0.84 b	0.10 a
5. 2 + 1% monthly spray	24.53 a	0.16 ab	26.97 a	175.7 a	0.83 b	0.07 c
SEx	0.33***	0.16*	0.71**	6.53*	0.02***	0.004***
CV, %	2.59	7.70	4.96	7.00	4.82	7.70

[1]b.p. = before planting; b.t. = before transplanting.
[2]Means followed by the same letter are not significantly different at P=0.05 (*), 0.01 (**), and 0.001 (***).

3. The application of Vitazyme increased N and P contents in the roots of *Coffea* cuttings and their nutrient absorption. The accumulation of N by the tops was higher by 280% as compared to the untreated control, while in the root system phosphorus (230% of the control) and potassium (927% of the control) absorption prevailed.

Vitazyme effects on leaf nutrients of *Coffea canephora* seedlings from cuttings, 2005

Treatment[1]	Top[2]			Root[2]		
	N	P	K	N	P	K
	%			%		
1. Control	2.19 b	0.34 b	1.53 a	0.60 d	0.17 bc	1.53 a
2. 5% soak b.p., 30 min.	2.40 b	0.24 c	0.77 d	1.52 bc	0.17 bc	0.68 b
3. 5% soak b.t., 30 min	3.16 a	0.49 a	1.60 a	1.67 a	0.31 a	1.44 a
4. 1% monthly spray.	2.43 b	0.44 a	1.32 b	1.56 b	0.25 ab	1.32 a
5. 2 + 3	2.26 b	0.16 d	1.51 ab	1.58 b	0.19 bc	1.59 a
6. 2 + 4	1.28 c	0.16 d	1.04 c	1.50 c	0.13 c	1.04 ab
SEx	0.17***	0.01***	0.06***	0.14*	0.02**	0.16*

[1]b.p. = before planting; b.t. = before transplanting.
[2]Means followed by the same letter are not significantly different at P=0.05 (*), 0.01 (**), and 0.001 (***).

4. The efficiency of N, P, and K use reached their highest statistical values in the treatment with Vitazyme applied before planting, complemented with soil and *Coffea* leaf canopy spraying with a 1% solution.

Efficiency of use [EU] of nutrients as related to method of Vitazyme application in 2005

Treatment[1]	N[2]	P_2O_5[2]	K_2O[2]
	---------- EU, mg of nutrients/g of root dry wt. ----------		
1. Control	0.13 d	0.31 c	0.23 c
2. 5% soak b.p., 30 min.	0.08 c	0.36 c	0.21 c
3. 5% soak b.t., 30 min.	0.12 d	0.32 c	0.21 c
4. 1% monthly spray	0.16 c	0.35 c	0.20 c
5. 2 + 3	0.20 b	1.36 b	0.41 b
6. 2 + 4	0.28 a	1.69 a	0.55 a
SEx	0.009***	0.068***	0.022***
CV, %	9.23	16.10	12.51

[1]b.p. = before planting; b.t. = before transplanting.
[2]Means followed by the same letter are not significantly different at P=0.05 (*), 0.01 (**), and 0.001

Summary of the performance of treatments during three seasons

Treatment[1]	Dry weight[a]			Leaf area[a]			Quality index[a]		
	2004	2005	2006	2004	2005	2006	2004	2005	2006
1. Control	a	c	bc	b	e	abc	d	bc	d
2. 5% soak b.p., 30 min.		c	c		d	ab		c	c
3. 5% soak b.t., 30 min	a	b	bc	a	c	bc	c	b	bc
4. 1% monthly spray.	b	b	a	a	b	d	b	bc	a
5. Treatments 2 + 3	b	a	b	b	b	cd	a	a	b
6. Treatments 2 + 4	b	a	bc	a	a	a	a	a	bc

[a]The letters for each year indicate significant differences if the letters are different.

5. Dipping of *Coffea arabica* seeds in a Vitazyme solution for 6 hours achieved similar seedling quality indexes as the control, with good efficiency in nitrogen use and in absorption of the existing phosphorus in the substrate. This period can be extended to 24 hours.

6. Dipping of *Coffea* canephora seeds in a Vitazyme solution for 12 hours achieved similar to higher seedling quality indexes compared to the control, with good efficiency in the absorption of phosphorus in the substrate.

7. It is feasible to soak the *Coffea* grafts in a 5% Vitazyme solution and to apply a complementary 1% solution to the leaf canopy from the fourth leaf pair, which produces a considerable increase in stalk height and diameter, top dry weight, and foliage. The monthly applications can cause an inhibitory effect on nutrient absorption.

8. Regardless of the fact that all varieties showed a positive response or increase in growth and quality to Vitazyme application, there were differences in the level of response. Thus, variety Costa Rica showed the greatest response to Vitazyme, followed (in descending order) by Bourbon, Dwarf San Ramón, Isla 6-11, Mundo Novo, Red Caturra, and Isla 6-12. On the other hand, variety Isla 5-15 showed the least

response to the biostimulant, followed (in ascending order) by Villalobos, Guamuhaya, and Red Catuai.

9. Regardless of the variety, the response to Vitazyme was similar in seeds with and without "pergamino" (parchment) at the time of planting.

10. With the application of 0.5 L/ha of Vitazyme in April-June and 0.5 L/ha in September-December to the soil and to the plant, in established plantations, a similar crop yield was reached as by mineral fertilization, but coffee industrial yield and grain size increased and net profits of $1,776.14/ha were attained. [Note: The yields of coffee with Vitazyme were achieved with no mineral fertilization whatsoever, thus greatly inhibiting yield increases with Vitazyme, which would have significantly exceeded the control (mineral fertilizer only) treatment for the years 2005 to 2008.]

11. There was no variations in cup quality by applying Vitazyme to coffee plants, on Orthi-Eutric Cambisol soil.

Conclusions: In this extensive multi-year trial with Vitazyme on coffee in Cuba, using 5% seed and/or rooted plant soakings for 30 minutes, with or without monthly 1% Vitazyme sprays, the treated plants responded exceedingly well to Vitazyme in terms of leaf area, top growth, root growth, nutrient uptake, and improved fertilizer efficiency. The best treatment was 5% before planting + 5% before transplanting + 1% monthly applications. In the plantation, Vitazyme did not increase yield harvested coffee due to a failure of the researchers to add any fertilizer along with Vitazyme to the treated areas. Nevertheless, an economic analysis showed that the Vitazyme treatments nearly always produced the greatest net profit.

Economic effects of Vitazyme in established coffee plantations

Treatment	Yield	Crop income	Fertilizer cost	Vitazyme cost	Total costs	Net revenue	Increase over control
	tons/ha	$/ha	$/ha	$/ha	$/ha	$/ha	$/ha
1. Commercial fertilizer	1.12	34,782.16	4,555.20	0	4,555.27	30,226.89	—
2. 0.5 L/ha monthly	0.85	26,474.81	0	674.94	674.94	25,799.87	4,427.02
3. 1.0 L/ha monthly	0.95	29,502.73	0	1,349.90	1,349.88	28,152.85	2,074.05
4. 1.0 L/ha every 60 days	0.86	26,785.37	0	449.96	449.96	26,335.41	3,891.48
5. 1.0 L/ha every 90 days	0.94	29,269.81	0	112.49	112.49	29,157.32	1,069.57
6. 1.0 L/ha Sept.-Dec.	0.98	30,279.11	0	224.98	224.98	30,054.13	(-) 172.76
7. 0.5 L/ha Apr.-June and Sept.-Dec.	1.04	32,220.08	0	217.05	217.05	32,003.3	1,776.14

Increase in coffee income with Vitazyme applied at 0.5 L/ha every month; $4,427.02/ha
Increase in coffee income with Vitazyme applied at 1.0 L/ha every 60 days; $3,891.48/ha
Increase in coffee income with Vitazyme applied at 1.0 L/ha every month; $2,074.05

These values were achieved without any supplemental fertilization, not the recommended prescription for Vitazyme use. These results reveal the great value of Vitazyme use for coffee in Cuba.

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2011 Crop Results

Vitazyme on Coffee

Researcher/Farmer: Nguyen Van Hiep *Location*: Dak Ghenh Village, Dak Mil District, Dak Nong Province, Viet Nam
Plant age: 5 years or older

Experimental design: A coffee plantation was divided into a Vitazyme treated area of 0.8 ha, with an untreated control area of 0.2 ha, to determine the effect of the product on coffee yield and profitability.

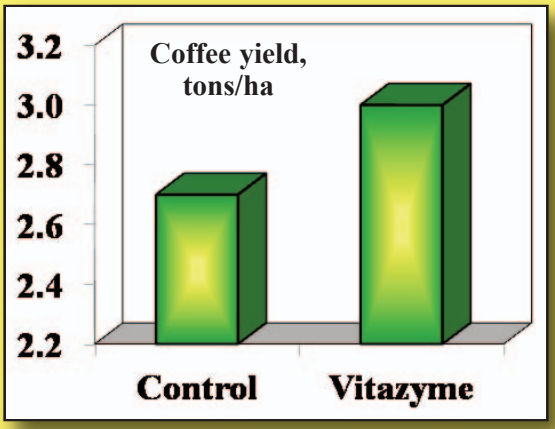
1. Control **2. Vitazyme**

Vitazyme application: 2 liters/ha (as 0.5 liter of Vitazyme in 200 liters of water) on the leaves and soil on June 27, July 28, and August 28, 2011

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	2.7	—
Vitazyme	3.0	0.3 (+11%)

Increase in yield with Vitazyme: 11%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	29,520,000	102,600,000	73,080,000	—
Vitazyme	2,480,000	32,000,000	114,000,000	82,000,000	9,320,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.

Increase in income with Vitazyme: 9,320,000 VND, or $466/ha

Conclusion: This Vietnamese coffee trial, using three Vitazyme applications, increased yield by 11% and income by $466/ha.

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2011 Crop Results

Vitazyme on Coffee

Researcher/Farmer: Ho Le Kim Linh *Location*: Krong Pak District, Dal Lak Province, Viet Nam
Plant age: 5 years or older
Experimental design: A coffee plantation was divided into a Vitazyme treated area of 0.6 ha, with an untreated control area of 0.5 ha, to determine the effect of the product on coffee yield and profitability.

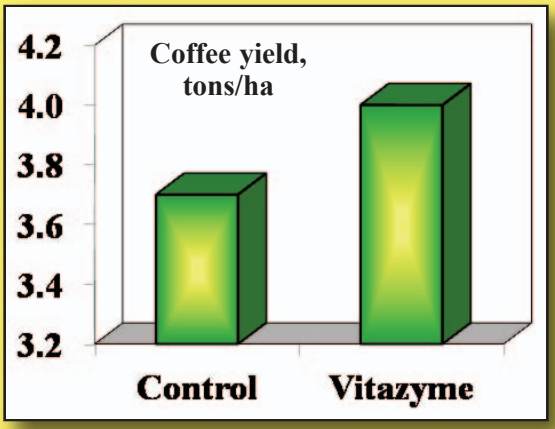
1. Control **2. Vitazyme**

Vitazyme application: 3 liters/ha (as 0.5 liter of Vitazyme in 200 liters of water) on the leaves and soil on June 27 and August 28, 2011

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	3.7	—
Vitazyme	4.0	0.3 (+8%)

Increase in yield with Vitazyme: 8%



Income results:

Treatment	Vitazyme[1]	Total costs[2]	Total income	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	2,100,000	36,500,000	140,600,000	104,600,000	—
Vitazyme	2,680,000	37,000,000	152,000,000	115,000,000	10,820,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.
[2]The control had a Komix foliar treatment.

Increase in income with Vitazyme: 10,820,000 VND, or $521/ha

Conclusion: This Vietnamese coffee trial, using three Vitazyme applications, increased yield by 8% and income by $521/ha.

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2011 Crop Results

Vitazyme on Coffee

Researcher/Farmer: Pham Van Quyen *Location*: Village Nui, Tam Thang, Dak Nong Province, Viet Nam *Plant age*: 4 years

Experimental design: A coffee plantation was divided into a Vitazyme treated area of 0.6 ha, with an untreated control area of 0.4 ha, to determine the effect of the product on coffee yield and profitability.

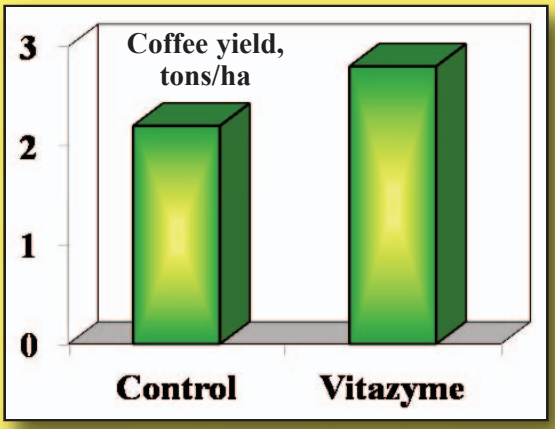
1. Control **2. Vitazyme**

Vitazyme application: 2 liters/ha (as 0.5 liter of Vitazyme in 200 liters of water) on the leaves and soil on June 27, July 28, and September 15, 2011

Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	2.2	—
Vitazyme	2.8	0.6 (+27%)

Increase in yield with Vitazyme: 27%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	32,260,000	83,600,000	51,340,000	—
Vitazyme	2,920,000	35,200,000	106,460,000	71,200,000	20,460,000

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.

Increase in income with Vitazyme: 20,460,000 VND, or $1,023/ha

Conclusion: This Vietnamese coffee trial, using three Vitazyme applications, increased yield by 27% and income by $1,023/ha.

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

2011 Crop Results

Vitazyme on Coffee

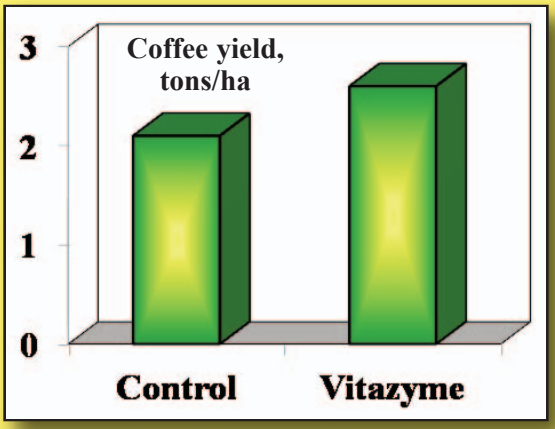
Researcher/Farmer: Tran Thi Tuoi *Location*: Village 15, Tam Thang, Dak Nong Province, Viet Nam
Plant age: 3 years
Experimental design: A coffee plantation was divided into a Vitazyme treated area of 0.8 ha, with an untreated control area of 0.4 ha, to determine the effect of the product on coffee yield and profitability.

1. Control **2. Vitazyme**

Vitazyme application: 2 liters/ha (as 0.5 liter of Vitazyme in 200 liters of water) on the leaves and soil on June 27, July 28, and September 25, 2011
Yield results:

Treatment	Yield	Yield change
	tons/ha	tons/ha
Control	2.1	—
Vitazyme	2.6	0.5 (+24%)

Increase in yield with Vitazyme: 24%



Income results:

Treatment	Vitazyme[1]	Total costs	Total income	Net income	Extra profit
	VND/ha	VND/ha	VND/ha	VND/ha	VND/ha
Control	0	28,440,000	79,800,000	51,360,000	—
Vitazyme	2,060,000	30,500,000	98,800,000	68,300,000	17,440,00

[1]VND = Vietnamese dollar; 1 USD = 20,000 VND.

Increase in income with Vitazyme: 17,440,000 VND, or $872/ha

Conclusion: This Vietnamese coffee trial, using three Vitazyme applications, increased yield by 24% and income by $872/ha.

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2005 Crop Results

Vitazyme on Coffee

A coffee study was conducted in Cuba on newly grafted plants. Little information is available on study details, but parameters measured are given below, showing a notable benefit of Vitazyme in the growth of the young coffee plants. The dosage rate was 15 ml per plant of an 8 ml/liter (0.8%) Vitazyme solution.

Treatment	Plant height	Stalk diameter	Pairs of leaves	Top dry weight	Root dry weight	Root length
	cm	cm	pairs	grams	grams	cm
1. Control	13.66	0.190	5.75	0.57	0.15	19.96
2. Graft soak (20 min.)	13.40	0.157	5.65	0.54	0.12	20.35
3. Foliar spray in the first leaf pair	14.66	0.176	5.95	0.61	0.14	22.73
4. Foliar spray in the second leaf pair	15.24	0.168	6.20	0.80	0.16	22.91
5. Foliar spray in the third leaf pair	15.34	0.190	6.15	0.68	0.14	21.55
6. Graft soak + foliar spray in the third leaf pair	17.78	0.229	6.35	1.00	0.22	22.43

Conclusions: Vitazyme improved young grafted coffee plant growth for all applications, except for the graft soak only (Treatment 2). Plant height was greatest for the graft soak and monthly foliar sprayer (third leaf pair), and stalk diameter, leaf growth, and top and root dry weights were also greatest for this treatment. Root length was similar for all foliar Vitazyme applications. It appears that Vitazyme application to the third leaf pair was most effective – especially when coupled with a graft soak — although the second leaf pair application did about as well. The πfirst leaf pair application gave a slightly lower growth response for several parameters.

Growth responses to graft soaking + monthly third leaf pair applications

Height increase: 4.12 cm (+30%)
Stalk diameter increase: 0.039 cm (+21%)
Leaf pair increase: 0.60 (+10%)
Top dry weight increase: 0.43 g (+75%)
Root dry weight increase: 0.07 g (+47%)
Root length increase: 2.47 cm (+12%)

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2001 Crop Results

Vitazyme on Coffee

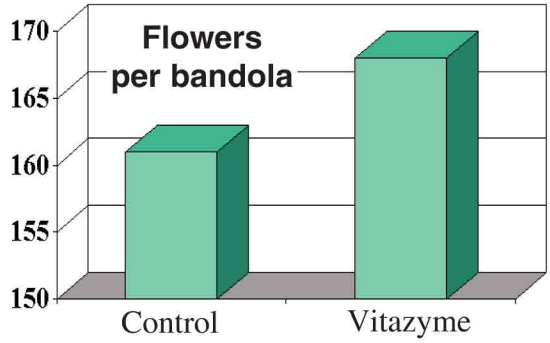
Research farm: El Rodeo farm *Location*: Costa Rica
Variety: unknown *Soil type*: unknown
Experimental design: A small part of a coffee plantation was treated with Vitazyme, and an adjoining area was left as a control.

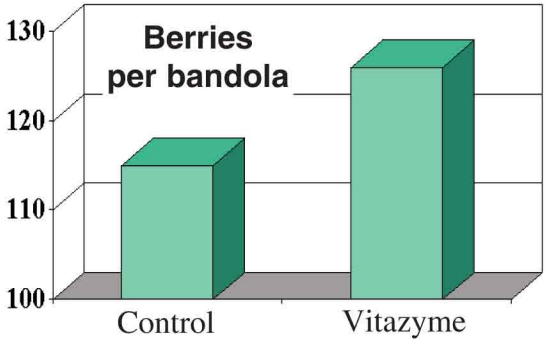
1. Control **2. Vitazyme**

Fertilization : unknown
Vitazyme treatment: Vitazyme at 13 oz/acre (1 litre/ha) at midseason on the foliage and soil
Growth results:

Number of Flowers per Bandola (April, 2001)

	Control	Vitazyme	Change
		ave. of four reps	
Flowers/bandola	161	168	7 (+4%)





Number of Coffee Berries per Bandola

	Control	Vitazyme	Change
		ave. of four reps	
Berries/bandola	115	126	11 (+10%)

Yield increase: 15%

Yield increase: A yield increase of 15% was determined although the actual harvested weight was not available.

Conclusions:: The improvements in coffee plant characteristics as a result of only one Vitazyme application — 4% more flowers and 11% more berries — resulted in a pronounced yield increase of 15%.