

Vital Earth Resources

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

2014 Crop Results

Vitazyme on Cocoa

Farmer: Nguyen Kim Dinh

Tree age: year six of bearing

Experimental design: A cocoa plantation was selected to evaluate the effects of Vitazyme on tree growth and yield. Fifty trees of three varieties were treated with Vitazyme, while an adjoining 100 trees were left untreated to serve as a control.

Location: Ea Po, Dak Nong, Viet Nam

Planting density: 1,100 trees/ha

1. Control

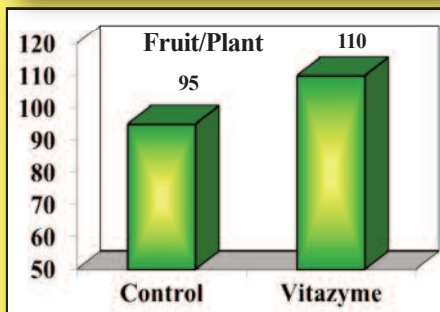
2. Vitazyme

Fertilization: unknown

Vitazyme application: The 50 treated trees received 500 ml of Vitazyme in 200 ml of water five times in a year, applied on April 4, August 22, and October 24 of 2012, and January 24 and March 19 of 2013. The total application was 2.5 liters for the 50 trees, or 50 ml of Vitazyme per tree per year in a 0.5% dilution.

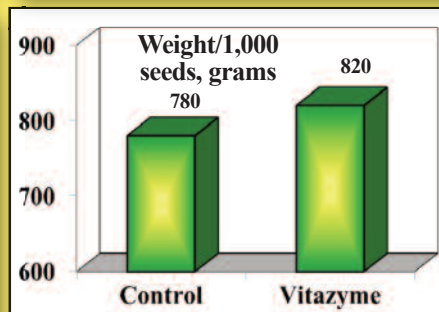
Variety TD3

Fruit Per Tree



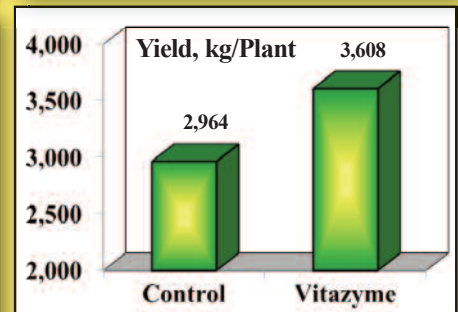
**Increase in
fruit/tree with
Vitazyme: 16%**

Weight Per 1,000 Seeds



**Increase in 1,000-
seed weight with
Vitazyme: 5%**

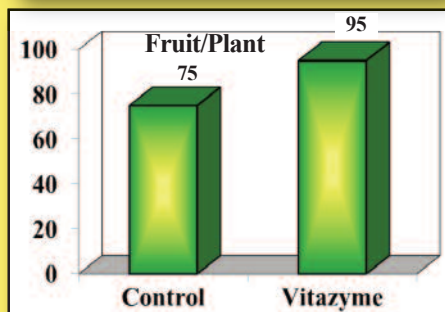
Seed Yield



**Increase in yield
with Vitazyme:
22%**

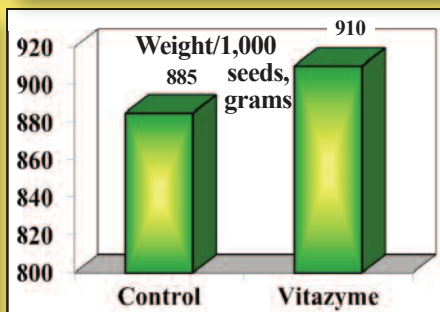
Variety TD5

Fruit Per Tree



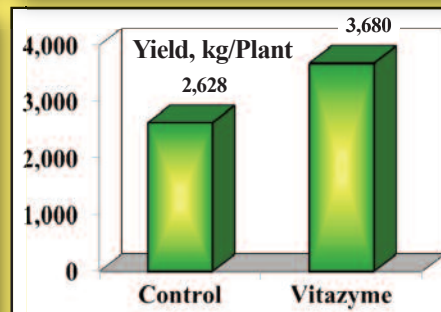
Increase in fruit/tree with Vitazyme: 27%

Weight Per 1,000 Seeds



Increase in 1,000-seed weight with Vitazyme: 3%

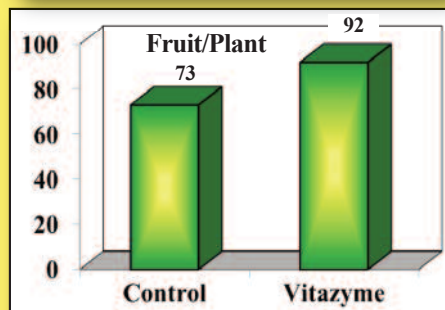
Seed Yield



Increase in yield with Vitazyme: 40%

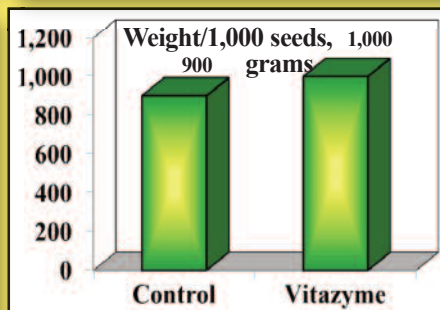
Variety TD9

Fruit Per Tree



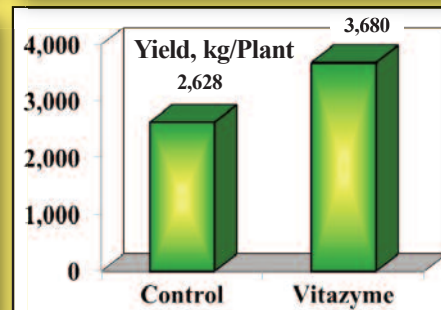
Increase in fruit/tree with Vitazyme: 26%

Weight Per 1,000 Seeds



Increase in 1,000-seed weight with Vitazyme: 11%

Seed Yield



Increase in yield with Vitazyme: 40%

Conclusions: A summary of the results for the three varieties of cocoa, utilized in this Viet Nam Vitazyme trial, is given below.

Treatment	Income with Vitazyme		
	TD3	TD5	TD9
Fruit per tree	16%	27%	26%
Weight per 1,000 seeds	5%	3%	11%
Seed yield	22%	40%	40%

All three varieties of cocoa responded favorably to Vitazyme, the fruit per tree increasing by 16 to 27% over the course of five treatments for a year. Seed weight increased by 3 to 11%, while the all-important yield was improved by 22% to 40%. These yield responses were highly profitable. The cost for 2.5 liters of Vitazyme for 50 trees was 700,000 Vietnamese dollars (VND), and the spraying cost was 20,000 VND. Net income increases were as follows.

	Increase income with Vitazyme		
	TD3	TD5	TD9
Fifty trees	1,147,000	1,608,000	2,330,800
Per hectare, VND	25,247,200	35,391,400	51,277,600
Per hectare, USD¹	1,262.36	1,769.57	2,563.88
¹1 Vietnamese Dong = 0.00005 U.S. dollar.			

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2012 Crop Results

Vitazyme on Cocoa A Nursery and Field Study

Researcher: S. Acquaye, K. Ofori-Frimpong, A.A. Afrifa, and A. Arthur

Location: Ghana

Nursery Study

Experimental design: Cocoa beans were planted in 18 cm x 25 cm polyethylene bags filled with potting soil. Of these seedlings, 20 were selected for each replicate, each treatment having four replicates (80 plants per treatment). Three Vitazyme concentrations were sprayed on the soil of each treatment at 40-day intervals to compare with an untreated control, and determine several growth parameters.

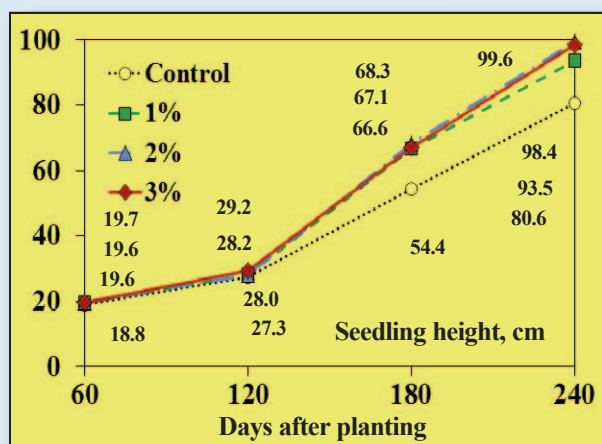
Fertilization: none

Vitazyme application: Treatment 2, 1% Vitazyme (150 ml in 15 liters of water) sprayed on the soil surface of each pot every 40 days using a hand sprayer; Treatment 3, 2% Vitazyme (300 ml in 15 liters of water) every 40 days; Treatment 4, 3% Vitazyme (450 ml in 15 liters of water) every 40 days

Growth results: Evaluations were made 60, 120, 180, and 240 days after planting.

Treatment	Vitazyme concentration
1	0
2	1%
3	2%
4	3%

Seedling Height



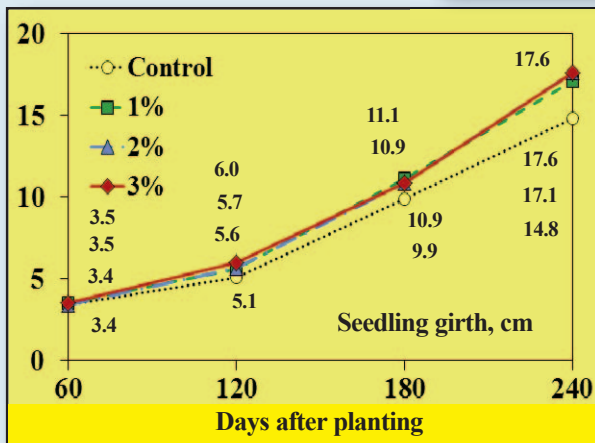
Treatment	Increase over the control			
	60 days	120 days	180 days	240 days
	cm	cm	cm	cm
1. Control	—	—	—	—
2. 1% spray	0.9 (5%)	0.7 (3%)	12.2* (22%)	12.9* (16%)
3. 2% spray	0.8 (4%)	0.9 (3%)	13.9* (26%)	19.0* (24%)
4. 3% spray	0.8 (4%)	1.9 (7%)	12.7* (23%)	17.8* (22%)
LSD _{0.05}	ns	ns	7.1	8.0
*Significantly greater than the control at P = 0.05.				

Vitazyme did not significantly increase plant height at 60 and 120 days after planting (3 to 7% increases), but did at 180 and 240 days after planting.

Increase in plant height at 240 days with Vitazyme

1% spray	16%
2% spray	24%
3% spray	22%

Seedling Girth



Treatment	Increase over the control			
	60 days	120 days	180 days	240 days
	cm	cm	cm	cm
1. Control	—	—	—	—
2. 1% spray	0.1 (3%)	0.5 (10%)	1.2* (12%)	2.3* (16%)
3. 2% spray	0	0.6* (12%)	1.0* (10%)	2.8* (19%)
4. 3% spray	0.1 (3%)	0.9* (18%)	1.0* (10%)	2.8* (19%)
LSD _{0.05}	ns	0.6	0.8	1.0

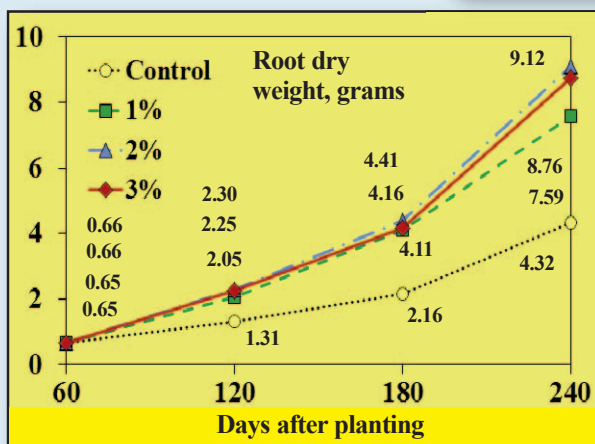
*Significantly greater than the control at P = 0.05.

At 60 days after planting there was no increase in plant girth with any rate of Vitazyme, but at 120, 180, and 240 days after planting there were significant increases in every case except one (1% spray at 120 days).

Increase in plant girth at 240 days with Vitazyme

1% spray	16%
2% spray	19%
3% spray	19%

Root Weight (dry)



Treatment	Increase over the control			
	60 days	120 days	180 days	240 days
	grams	grams	grams	grams
1. Control	—	—	—	—
2. 1% spray	(-) 0.01	0.74* (56%)	1.95* (90%)	3.27* (76%)
3. 2% spray	(-) 0.01	0.99* (76%)	2.25* (104%)	4.89* (113%)
4. 3% spray	0	0.94* (72%)	2.00* (93%)	4.44* (103%)
LSD _{0.05}	ns	0.43	0.56	0.63

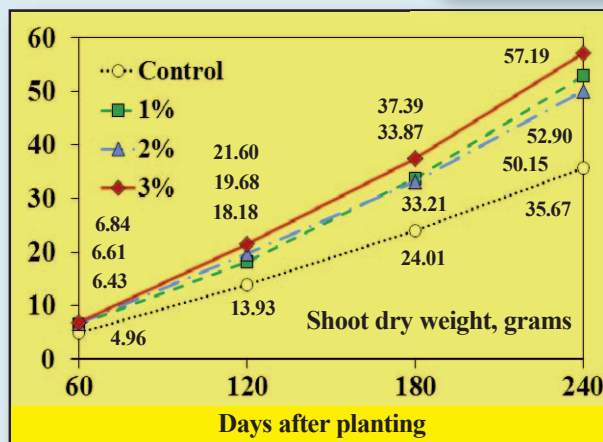
*Significantly greater than the control at P = 0.05.

All root dry weight values were significantly greater with Vitazyme at all concentrations for 120, 180, and 240 days after planting. The 2% spray gave the greatest increase. All increases were massive.

Increase in root dry weight at 240 days with Vitazyme

1% spray	76%
2% spray	113%
3% spray	103%

Shoot Weight (dry)



In all cases, Vitazyme at all concentrations significantly increased the dry shoot weight above the control, especially the 3% spray that produced 60% more shoot weight at 240 days after planting.

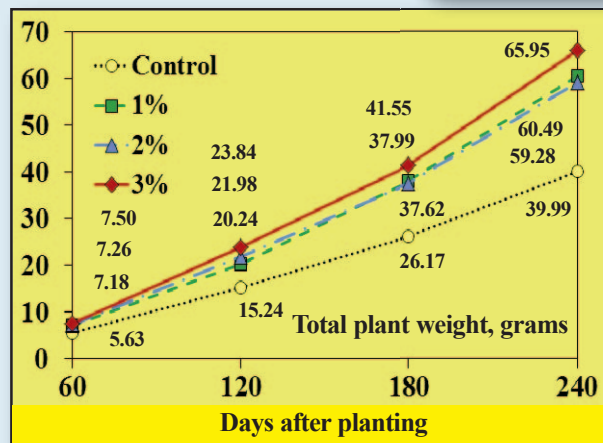
Treatment	Increase over the control			
	60 days	120 days	180 days	240 days
	grams	grams	grams	grams
1. Control	—	—	—	—
2. 1% spray	1.47* (30%)	4.25* (31%)	9.86* (41%)	17.23* (48%)
3. 2% spray	1.65* (33%)	5.75* (41%)	9.20* (38%)	14.48* (41%)
4. 3% spray	1.88* (38%)	7.67* (55%)	13.38* (56%)	21.52* (60%)
LSD _{0.05}	0.63	3.57	3.99	6.08

*Significantly greater than the control at P = 0.05.

Increase in shoot dry weight at 240 days with Vitazyme

1% spray	48%
2% spray	41%
3% spray	60%

Total Plant Weight (dry)



As with the root and shoot weight, total plant and dry weight was improved markedly above the control when Vitazyme at all levels was applied. Increases for all times and percentages were significant at P=0.05, especially at 240 days after planting.

Treatment	Increase over the control			
	60 days	120 days	180 days	240 days
	grams	grams	grams	grams
1. Control	—	—	—	—
2. 1% spray	1.55 (28%)	5.00 (33%)	11.82 (45%)	20.50 (51%)
3. 2% spray	1.63 (29%)	6.74 (44%)	11.45 (44%)	19.29 (48%)
4. 3% spray	1.87 (33%)	8.60 (56%)	15.38 (59%)	25.96 (65%)
LSD _{0.05}	0.62	3.64	4.35	5.84

*Significantly greater than the control at P = 0.05.

Increase in total plant weight at 240 days with Vitazyme

1% spray	51%
2% spray	48%
3% spray	65%

Field Study

Tree age: 10 to 25 years

Variety: hybrid cocoa

Experimental design: Farms were selected for this study at 10 sites in four cocoa regions: Becham and Onwe Nkwanta (Brong Ahafo Region), Wassa Saamang and Wantram (Western Region), Assin Jakai, Awurabo, and Asikuma (Central Region), and Asamankese, Oda Nkwanta, and Kyenkyenku (Eastern Region). Vitazyme was applied with 50% of two major fertilizers used on the farms, and by itself, alongside 100% of the two fertilizers without Vitazyme plus a control, to determine effects on yield parameters. The locations served as replicates, and each plot was 0.2 ha.

Treatment	Fertilizer		Vitazyme
	Type	Rate	
1	0	0	0
2	0	0	1.5
3	A	375 kg/ha (100%)	0
4	B	375 kg/ha (100%)	0
5	A	187.5 kg/ha (50%)	1.5
6	B	187.5 kg/ha (50%)	1.5

Fertilization: Treatments 3 and 4, 375 kg/ha of type A and B broadcast in May of 2010; Treatments 5 and 6, 50% of fertilizers A and B (187.5 kg/ha) applied in May of 2010

Vitazyme application: 1.5 liters/ha sprayed on the leaves and trunks of the trees in May, July, and September

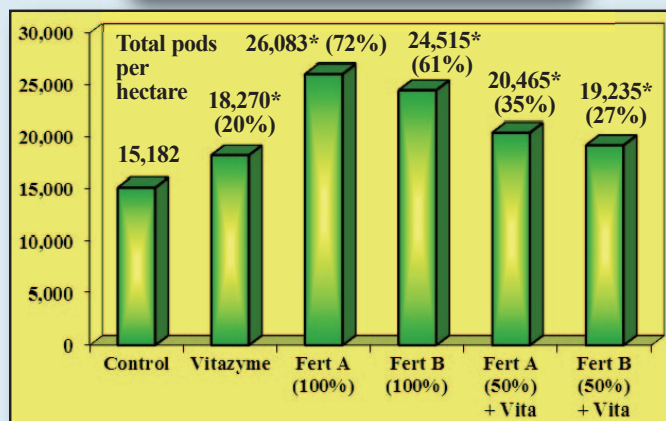
Weed control: standard

Black pod disease control: Ridomil Gold (Mefenoxam + copper) applied five times monthly from June to October, 2010

Mirid control: Confidos (Imidacloprid) applied four times from August to December, 2010

Harvest results:

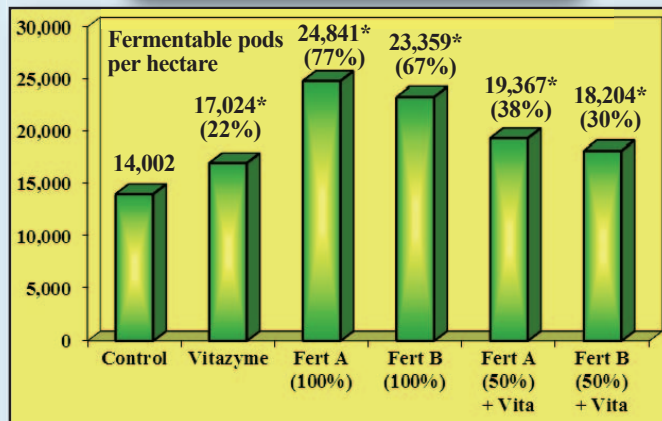
Total Pods



*Significantly greater than the control at $P = 0.05$. $LSD_{0.05} = 2,287$.

Increase in total pods with Vitazyme: 20%

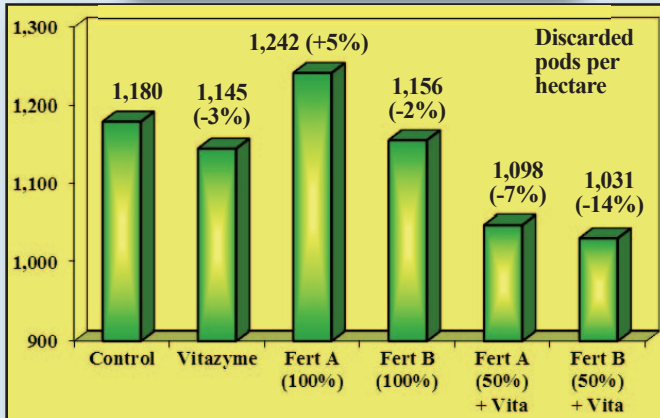
Fermentable Pods



*Significantly greater than the control at $P = 0.05$. $LSD_{0.05} = 2,159$.

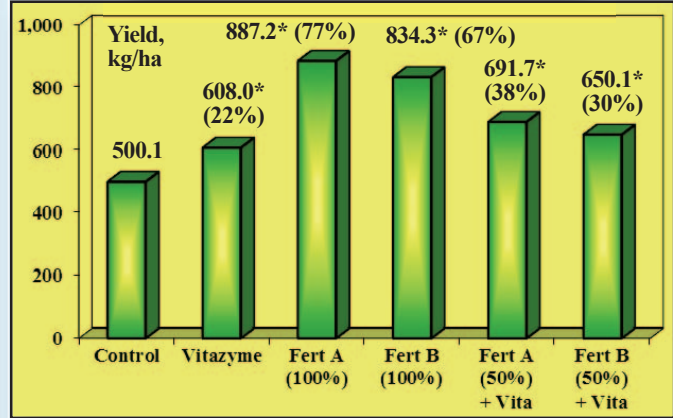
Increase in fermentable pods with Vitazyme: 22%

Discarded Pods



Values are not significantly different at $P = 0.05$.

Cocoa Yield



*Significantly greater than the control at $P = 0.05$. $LSD_{0.05} = 77.1$ kg/ha.

Reduction in discarded pods with Vitazyme: -3%

Increase in cocoa yield with Vitazyme: 22%

All yield parameters displayed a highly positive response to Vitazyme, the total increasing by 20%, fermentable pods by 22%, and discarded pods by -3%. Yield was increased by a full 22%. Fertilizers A and B at 100% both increased pods and yield substantially, and yield was boosted by 77% and 67%, respectively, above the control. However, there was no Fertilizer A or B without Vitazyme to evaluate the effects of this fertilizer level without Vitazyme.

Conclusions: A replicated nursery and field evaluation of cocoa in Ghana revealed that Vitazyme greatly improved the growth of cocoa seedlings when applied to the soil of polyethylene liners as a 1, 2, or 3% spray. Seedling height and girth were significantly increased with all three percentage sprays, especially at 180 and 240 days after planting. The 2% spray did as well as, or better than, the 1% and 3% sprays. Increases were from 16 to 24% at 240 days. Roots were greatly expanded with Vitazyme at 120, 180, and 240 days after planting, up to 113% over the control at 240 days. Shoot weight was significantly improved at all times from 60 to 240 days (41 to 60%), and total plant weight was boosted by 65% with the 3% spray at 240 days, though all Vitazyme percentages did well. These results show how remarkably well Vitazyme improves the growth of young cocoa plants.

The field study likewise proved the efficacy of Vitazyme to increase total and fermentable pods (20 to 22%), reduces discarded pods (by 3%), and increase cocoa yield (22%). Both fertilizers A and B at 100% usage increased pods and yield, by up to 77% for yield; 50% levels of these fertilizers plus Vitazyme improved pod growth (27 to 35%) and fermentable pods (30 to 38%), while reducing discarded pods (-7 to -14%) and increasing yield (30 to 38%). However, interpretations of the study were limited by the absence of a 100% fertilizer plus Vitazyme treatment, as well as a 50% fertilizer treatment without Vitazyme. With such an excellent response from Vitazyme alone, it would be expected – based on previous results with the products – that a synergism would appear at both the 50% and 100% fertilizer levels with Vitazyme application. No such determination could be made by the design of this study.

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2012 Crop Results

Vitazyme on Cocoa

Researcher: Nguyen Kim Dinh

Location: Village 8, Eapo District, Dak Nong Province, Viet Nam

Variety: TD3 (purple), TD5 (light purple), and TD9 (green)

Soil type: greenhouse mix

Experimental design: A cocoa plantation having three varieties was divided into Vitazyme treated and untreated areas for each variety. Five applications were made on a 500 m² area for each type. Observations on plant growth and yield were made over approximately a six month period.

1. Control

2. Vitazyme

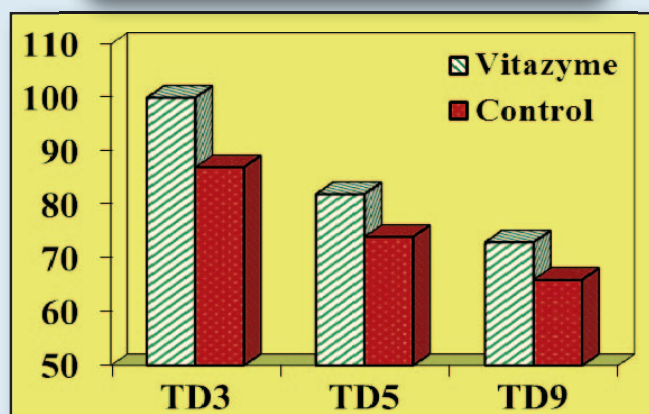
Fertilization: unknown

Vitazyme application: 500 ml of Vitazyme in 200 liters of water for each 500 m² block (1 liter/ha), applied to the leaves on July 24 (flowering), September 24 (small fruit), October 24 of 2011, and January 26 (beginning of harvest) and March 23 of 2012

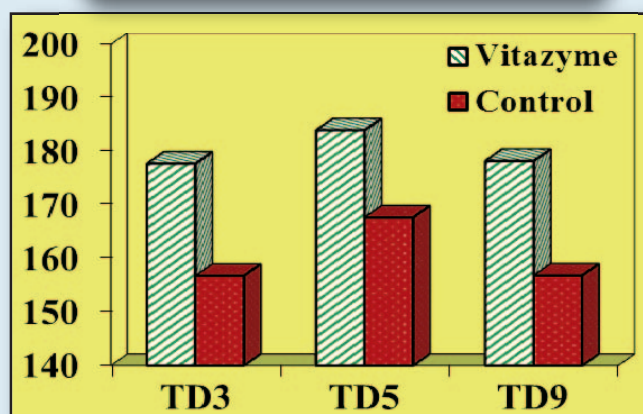
Yield results: Harvests were conducted in January, March, and April of 2012, and totaled for each variety.

Parameter	Vitazyme			Control			Change with Vitazyme		
	TD3	TD5	TD9	TD3	TD5	TD9	TD3	TD5	TD9
Fruit per plant	100	82	73	87	74	66	13 (+15%)	8 (+11%)	7 (+11%)
Dry weight, 1,000 fermented seeds, g	830	105	111	819	103	108	11 (+1%)	2 (+2%)	3 (+3%)
Yield, dry weight of fermented seeds, kg/500 m ²	177.70	183.92	178.20	156.75	167.64	156.81			
Yield increase	20.95 (+13%)	16.28 (+10%)	21.39 (+14%)	—	—	—			

Fruit Per Plant



Yield Per 500 m², kg



Increase in fruit per plant with Vitazyme

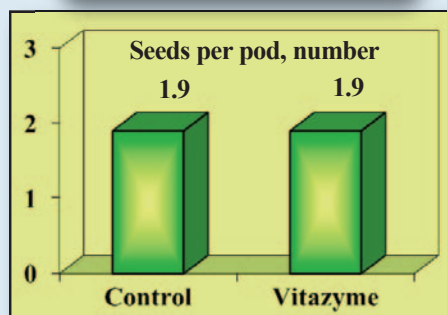
TD3	15%
TD5	11%
TD9	11%

Increase in cocoa yield with Vitazyme

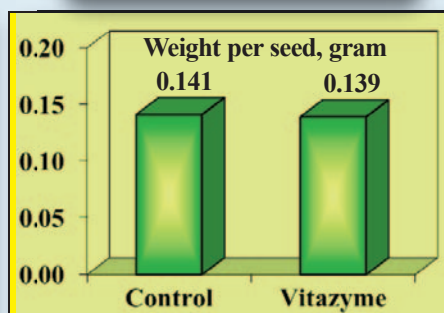
TD3	13%
TD5	10%
TD9	14%

Conclusions: This Vietnamese study on cocoa response to five Vitazyme applications over a six-month period revealed a consistent yield increase for all three varieties, a reflection of more fruit per plant. Fruit number increases ranged from 11 to 15%, and yield increases from 10 to 14%, fine responses for this high-value crop.

Seeds Per Pod



Weight Per Seed



Increase with Vitazyme

Seeds per plant 47%

Pods per plant 48%

Weight per plant 44%

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2012 Crop Results

Vitazyme on Cocoa

Researcher: unknown

Location: Viet Nam

Variety: unknown

Experimental design: In a cocoa preparation facility, cocoa seeds were planted to produce “mother plants”, a number of which were treated with Vitazyme to compare with untreated plants. Then these plants were grafted to the other rootstock to comprise the field-ready plants. Applications of Vitazyme were made to the grafted plants as well to evaluate effects on growth and budding.

1. Control

2. Vitazyme

Fertilization: unknown

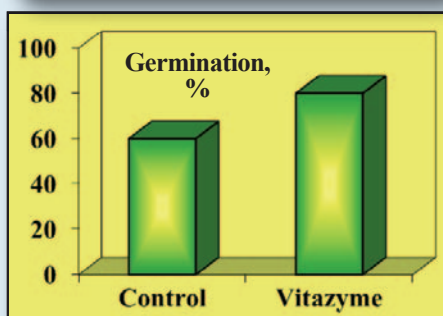
Vitazyme application: “Mother” plants, a 5% seed treatment, and a 1% Vitazyme spray at 10, 30, 60, and 90 days after planting; grafted plants, a 1% spray over the root zone 3 days after planting, and a 1% spray over the entire plants 14 days after planting.

Growth results:

Mother Cocoa Plants

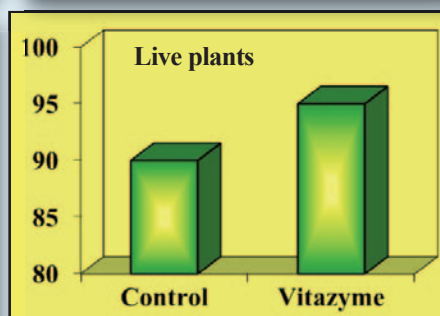
Parameter	Control	Vitazyme	Change with Vitazyme
Germination 7 days after planting	60%	80%	+20 %-points
Live plants 15 days after planting	90%	95%	+5 %-points
Plant height 30 days after planting	10.0 cm	12.5 cm	+2.5 cm (+25%)
Leaf number 30 days after planting	2	4	+2 (+100%)
Plant height 60 days after planting	21.5 cm	24.0 cm	+3.5 cm (+16%)
Plant height 90 days after planting	32.5 cm	42.5 cm	+10.0 cm (+31%)
Grafting date	March 28 to 30	May 1	33 days earlier

Germination at 7 Days



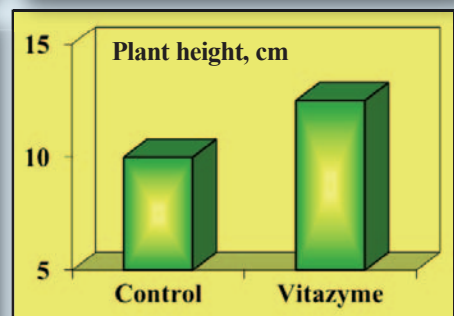
**Increase with
Vitazyme: 20 %-points**

Live Plants at 15 Days



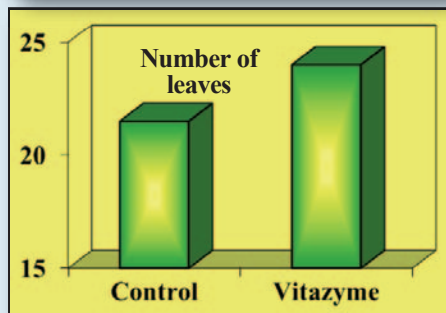
**Increase with
Vitazyme: 5 %-points**

Plant Height at 30 Days



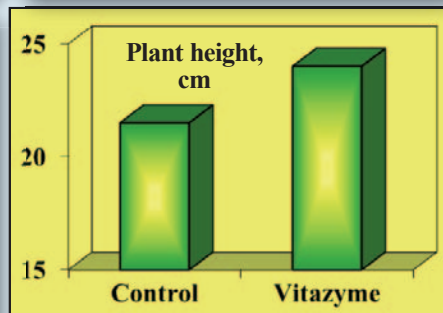
**Increase with
Vitazyme: 25%**

Leaf Number at 30 Days



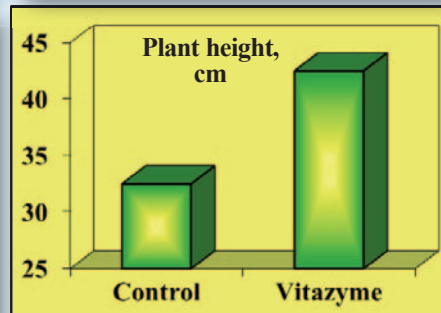
**Increase with
Vitazyme: 100%**

Plant Height at 60 Days



**Increase with
Vitazyme: 16%**

Plant Height at 90 Days



**Increase with
Vitazyme: 31%**

Days reduced to grafting: 33 days

It is clear that a Vitazyme seed treatment, and 1% spray at 10, 30, 60, and 90 days after planting greatly stimulated plant development in all cases, including with germination, rate of growth, and time to grafting size.

Plants After Grafting

All plants were grafted on the dates at which grafting size was reached, which was March 28 to 30 for the Vitazyme treatment, and May 1 for the untreated control. Each treatment utilized 2,000 plants.

Parameter	Control	Vitazyme
Emerging shoots	none	April 8 to 10
Live shoots	none	97%
Shoot length	none	11 cm

Because of a 33-day later time to grafting, the control plants had no shoots yet at the time these data were collected.

Conclusions: In a Viet Nam cocoa nursery study, Vitazyme produced a remarkably good result by improving early seed germination (+20%), plant height (+31% at 90 days after planting), and rate of maturity of the developing plants. Treated plants were ready for grafting 33 days before the untreated control “mother” plants. After grafting, the treated plants were growing very well on the measurement date, but no values could be determined for the control plants because they were far behind the Vitazyme treated plants. These results prove the great value of this product to improve the growth, maturity, and early development of cocoa plants in the nursery environment.

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2011 Crop Results

Vitazyme on Cocoa

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: unknown

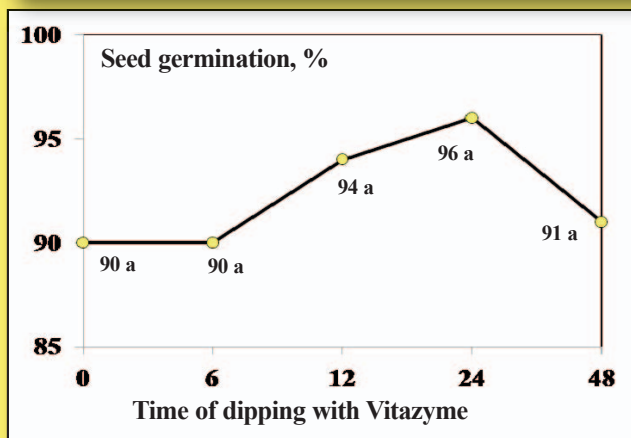
Soil types: Typic Ustropept (U.S. classification), or Orthi-Eutric Cambisol (U.N. classification); pH = 6.24 to 7.63 (water extraction), organic matter = 3.4 to 5.7%, P_2O_5 = 7.2 to 191.9 mg/100g, K_2O = 26.6 to 183.1 mg/100g, K^+ = 0.97 to 6.67 meq/100 g, Ca^{+2} = 36.3 to 53.8 meq/100 g, Mg^{+2} = 9.1 to 38.4 meq/100 g, Na^+ = 1.4 to 2.1 meq/100 g.

Experimental design: A series of trials with cocoa was undertaken to evaluate the effects of Vitazyme on the germination and growth of cocoa seeds, the production of cocoa cuttings, the growth of the plants during their developmental stage, and the production and quality of fruit on mature trees. Replicated plots were used for these studies, and the data were statistically analyzed.

Trial on Cocoa Seedlings Originating from Seeds

- Treatments:
1. Control (water only)
 2. Seed dipping, 5% Vitazyme for 6 hours
 3. Seed dipping, 5% Vitazyme for 12 hours
 4. Seed dipping, 5% Vitazyme for 24 hours
 5. Seed dipping, 5% Vitazyme for 48 hours

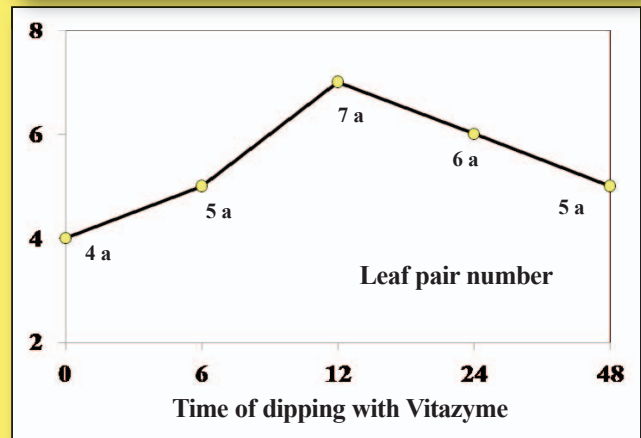
Germination



Means followed by the same letter are not significantly different at $P=0.05$.

No differences are significant, but all but the 6 hour dip increased seed germination.

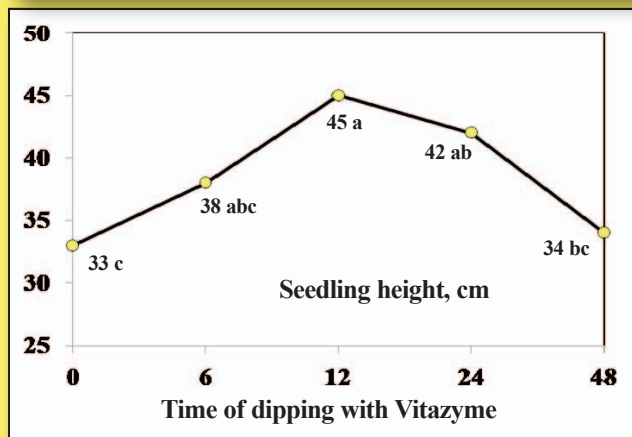
Pairs of Leaves



Means followed by the same letter are not significantly different at $P=0.05$.

Though differences are not significant from the control, all Vitazyme treatments increased the number of leaf pairs.

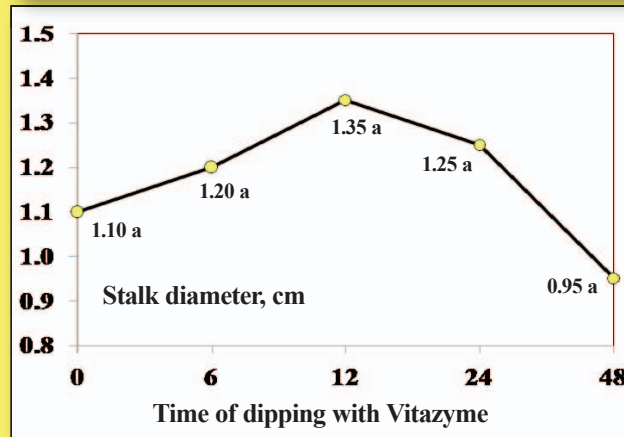
Seedling Height



CV=23.4%, SE=1.23, P=0.05

Means followed by the same letter are not significantly different at P=0.05

Stalk Diameter



Means followed by the same letter are not significantly different at P=0.05.

All but the 48 hour dip increased stalk diameter, though no increases were significant.

Increase in plant height with Vitazyme

Dipping 6 hours	+15%
Dipping 12 hours	+36%
Dipping 24 hours	+27%
Dipping 48 hours	+3%

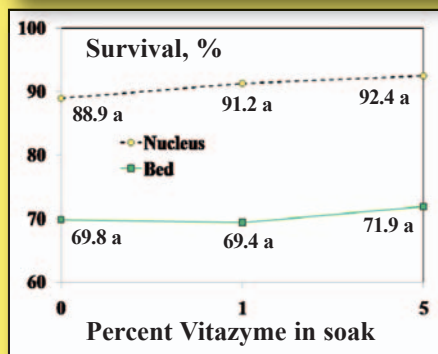
Both the 12 and 24 hour dips significantly increased plant height.

Trial on the Production of Cocoa Cuttings

Treatments: The “bed” and “nucleus” methods (different bag types) were used, with the three treatments below.

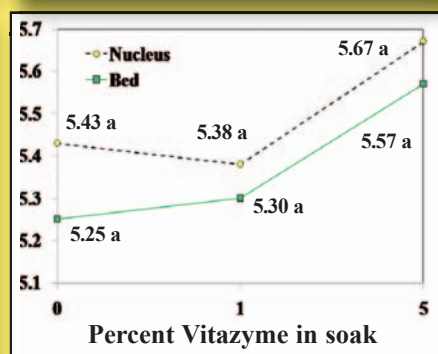
1. Control
2. Cutting soak, 1% Vitazyme
3. Cutting soak, 5% Vitazyme

Survival



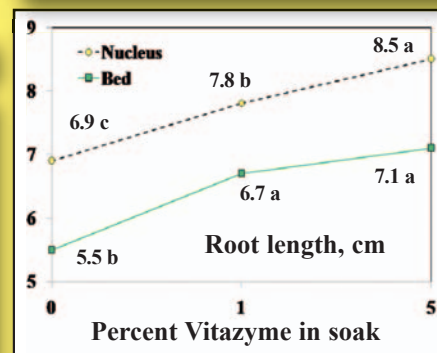
Means followed by the same letter are not significantly different at P=0.05
There was a slight trend of better survival for the nucleus system.

Root Number



Means followed by the same letter are not significantly different at P=0.05
For both methods of growing there was a non-significant spike in root numbers with the 5% Vitazyme soak.

Root Length



Nucleus: CV=9.36%, SE=0.874, P=0.05
Bed: CV=12.09%, SE=0.918, P=0.05
Means followed by the same letter are not significantly different at P=0.05
Both methods of growing cutting responded significantly to Vitazyme at both the 1% and 5% soak concentrations, especially at 5%.

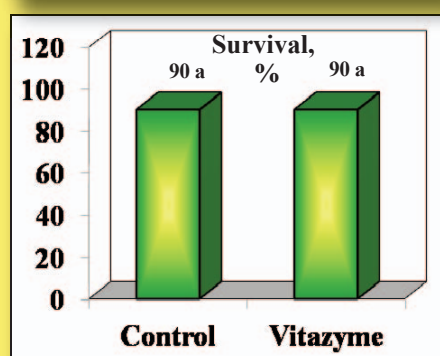
Root length increases with Vitazyme

	<u>Nucleus</u>	<u>Bed</u>
1% soak	+ 13%	+22%
5% soak	+23%	+29%

Trial on the Survival of Cocoa Grafts

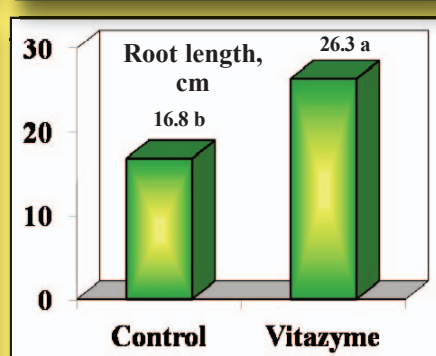
Treatments: 1. Control
2. 1% Vitazyme on the soil and plant

Bud Survival, %



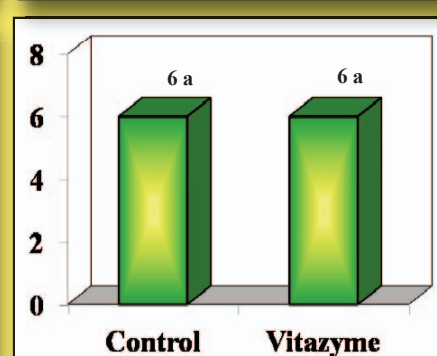
Means followed by the same letter are not significantly different at $P=0.05$.

Graft Length



CV=13.83%, SE=0.84, $P=0.05$
Means followed by the same letter are not significantly different at $P=0.05$.

Pairs of Leaves



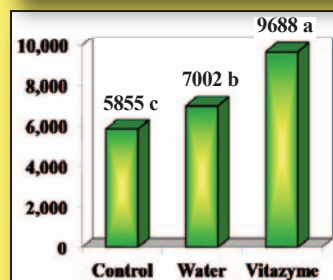
Means followed by the same letter are not significantly different at $P=0.05$.

**Increase in graft length
with Vitazyme: 57%**

Trial on Cocoa Growth During the Developmental Stage

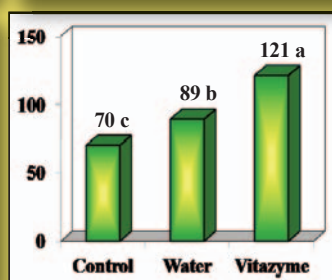
Treatments: 1. Control 2. Water every 60 days 3. Vitazyme (1 liter/ha) every 60 days

Flowers Per Plant



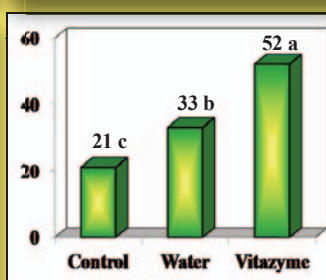
CV=11.84%, SE=0.902, $P=0.05$
Means followed by the same letter are not significantly different at $P=0.05$

Pod Set Per Plant



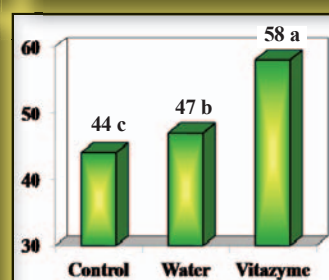
CV=10.00, SE=0.892, $P=0.05$
Means followed by the same letter are not significantly different at $P=0.05$

Harvested Pods/Plant



CV=13.83, SE=0.980, $P=0.05$
Means followed by the same letter are not significantly different at $P=0.05$

Vigor (Diameter)



CV=10.16, SE=0.770, $P=0.05$
Means followed by the same letter are not significantly different at $P=0.05$

**Increase in flow-
ers/plant with
Vitazyme: 65%**

**Increase in
pods/plant with
Vitazyme: 73%**

**Increase in har-
vested pods/plant
with Vitazyme: 148%**

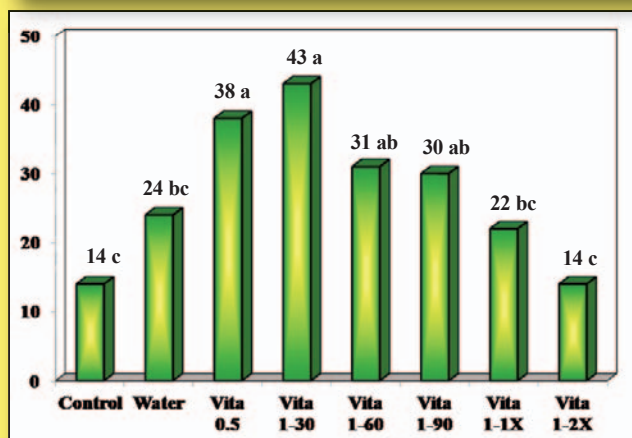
**Increase in
diameter with
Vitazyme: 32%**

Vitazyme significantly increased flowers per plant, pod set per plant, harvested pods per plant, and plant diameter. Interestingly, water sprayed on the plants also increased each parameter, but only by a fraction of the Vitazyme increase.

Trial on Yield and Quality of Cocoa

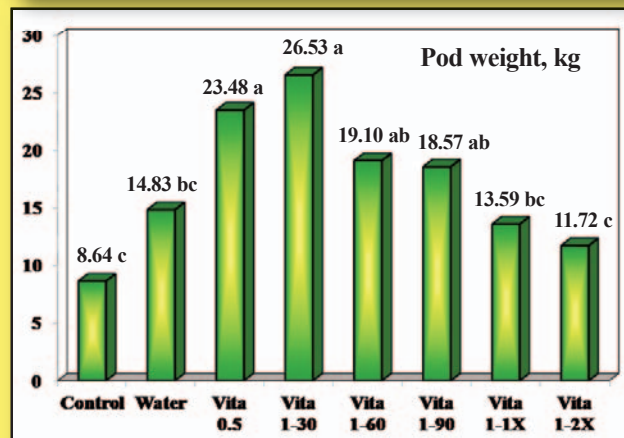
- Treatments:
1. Control
 2. Water only
 3. Vitazyme, 0.5 liter/ha every 30 days
 4. Vitazyme, 1.0 liter/ha every 30 days
 5. Vitazyme, 1.0 liter/ha every 60 days
 6. Vitazyme, 1.0 liter/ha every 90 days
 7. Vitazyme, 1.0 liter/ha Sept.-Dec.
 8. Vitazyme, 0.5 liter/ha Sept.-Dec. and April-June

Pod Number Per Tree



Means followed by the same letter are not significantly different at P=0.05.

Pod Weight Per Tree



Means followed by the same letter are not significantly different at P=0.05.

The best results on yield and pod number were for Vitazyme at 1 liter/ha applied every 30 days, with the 0.5 liter/ha rate nearly as high; both were significantly greater than for the control and for Vitazyme applied only twice during the season. All Vitazyme treatments applied monthly were statistically equal. Water sprayed on the trees by itself gave a nonsignificant increase above the untreated control.

Increase in pod weight/tree with Vitazyme

0.5 liter/ha every 30 days	+172%
1.0 liter/ha every 30 days	+207%
1.0 liter/ha every 60 days	+121%
1.0 liter/ha every 90 days	+115%

Conclusions: According to the researchers ...

1. Seeds dipped for 12 and 24 hours in a Vitazyme solution increased by 44% the height of cocoa seedlings.
2. Vitazyme increased root length of cocoa cuttings produced in litter beds and in bags with nucleus.
3. Vitazyme increased the length of cocoa grafts, which shortened the nursery period.
4. Vitazyme increased the number of flowers, fruit set, harvested pods, and stalk diameter in various stages of growth of cocoa plants.
5. The use of Vitazyme in established cocoa plantations doubled the number of pods per plant and consequently yields.