



Tobacco with Vitazyme application

Researchers: T. Chipeta, J. Matandika, J. B. Mumba, and Neil A. Mphembera

Research organization: Farmers Organization Limited, Malawi

Location: Kandiya Research Station, Lilongue District, and Mwimba Research Station, Kasungu District

Soil types: relatively infertile **Variety:** KRK 26

Plot size: 4.8 m x 7.2 m, with four ridges spaced 1.2m apart

Plant density: 0.6 m in-row spacing, or 12 plants per row and 48 plants per plot

Experimental design: A small-plot replicated design (four replications) was established at two Malawi research stations to determine the root mass, leaf number, plant height, stem diameter, leaf area, yield, color distribution, and grade of cured leaves as influenced by fertilizer and Vitazyme, alone and in combination. (see table to the right)

Fertilization: 100% fertilizer (Treatments 2 and 3) received 32.4 g/plant of Super D and 6.24 g/plant of CAN, broadcast. **75% fertilizer** (Treatments 4 and 5) received 24.3 g/plant of Super D and 4.68 g/plant of CAN. **50% fertilizer** (Treatments 6 and 7) received 16.2 g/plant of Super D and 3.12 g/plant of CAN.

Vitazyme application: Treatments 3, 5, and 7 were treated with Vitazyme in three ways: (1) seedlings to be transplanted were dipped in a 2.3% solution (700 ml of Vitazyme in 30 liters of water); (2) during transplanting, 1.0 liter/ha was added to the transplanting water; (3) at 21 days after transplanting, 1.0 liter/ha was sprayed on the plants and soil.

Sampling method: Ten plants were sampled from the two middle ridges of the plots, except for yield analyses, when 20 plants were sampled.

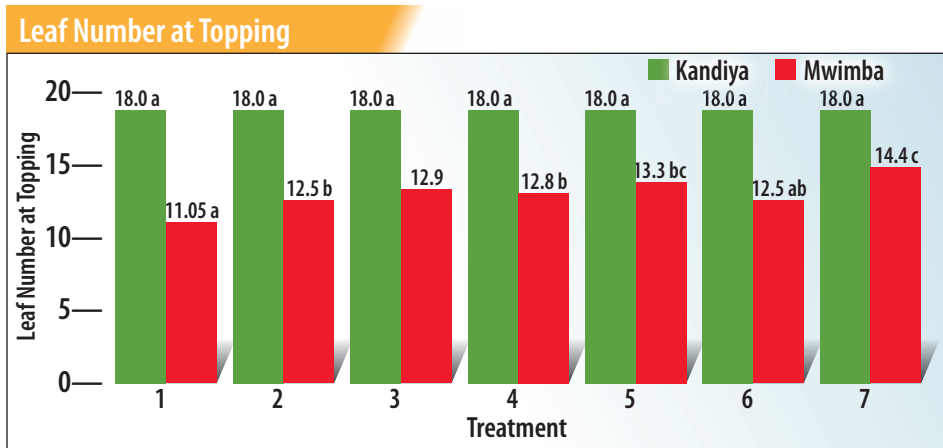
Data analysis: An Analysis of Variance was performed on the data, and means were separated by Fisher's Protected Least Significant Difference Test at P = 0.05.

Growing season weather: Rainfall during the growing season was 895 mm at Kandiya and 739 at Mwimba, within the range of rainfall for tobacco growth of 500 to 1,250 mm.

Stand counts: There was a perfect stand of plants at harvest at the Mwimba station, and 17.5 to 19.5 plants in the two inner rows at the Kandiya station. Differences were not significant.

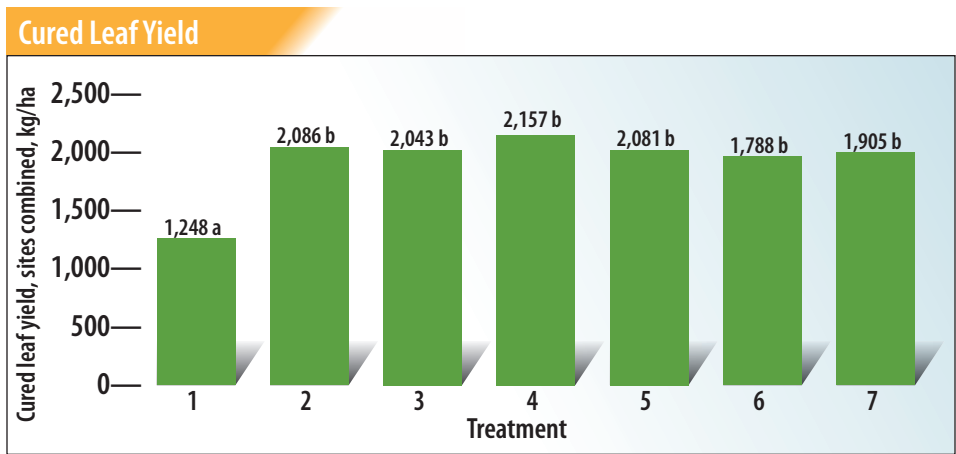
Growth and yield results: Data was taken from 10 plants per plot except for yield, where 20 plants were used.

Treatment	Fertilizer	Vitazyme
1	o	o
2	100%	o
3	100%	Yes
4	75%	o
5	75%	Yes
6	50%	o
7	50%	Yes



Statistics	
Overall mean	12.77 %
SED	0.73
LSD	1.534
CV	1.7%
Prob F	0.014

Vitazyme increases	
At 100% fertilizer	3 %
At 75% fertilizer	4%
At 50% fertilizer	15%



Statistics

Overall mean	1901 kg/ha
SED	233 kg/ha
LSD	469 kg/ha
CV	7.1%
Prob F	0.005

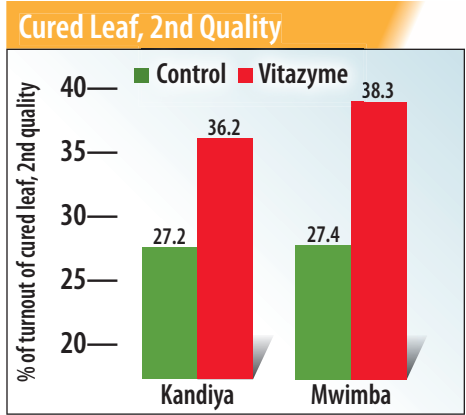
Vitazyme yield change

At 100% fertilizer	-2%
At 75% fertilizer	-4%
At 50% fertilizer	+7%

There were no significant differences among the paired treatments at the same fertilizer level, with and without Vitazyme, for either location for dry root mass, final plant height, stem diameter, lower leaf area, middle leaf area, and upper leaf area. Neither were there significant differences between Vitazyme and control treatments at the same fertilizer level.

Leaf quality results:

- **Leaf color:** There were no significant differences between Vitazyme and untreated treatments at the same fertilizer levels, but there were differences that were almost significant, yet with no consistent pattern across fertilizer levels and locations.
- **Leaf grades:** Only one significant difference appeared between Vitazyme treated and untreated treatments at the same fertilizer level for either location. This difference, for second quality at both locations, is shown graphically below.



Increase in second quality tobacco with Vitazyme, at 100% fertilizer

Kandiya	+33%
Mwimba	+40%

Conclusions: This tobacco study in Malawi, utilizing the same treatments as a study conducted in 2017, revealed fewer responses than noted in 2017. Leaf number and second quality leaf turnout were enhanced with Vitazyme, but most parameters were not significantly improved with Vitazyme at the same fertilizer level. The 2017 study revealed marked improvements with Vitazyme treatment for root volume, plant height, stem diameter, leaf area, leaf quality and color, and yield, especially at the 75% fertilizer level (+26%). Reasons for the reduced response to Vitazyme in 2018 are not known.



Tobacco with Vitazyme application

Researcher: Yaona Mtonga, agronomist, J.B. Mumba, senior technical officer, Neil A. Mphembera, soil chemist, and C. E. D. Mainjeni, plant pathologist
Research organization: Farmers Organization Limited, Malawi
Location: Kandiya Research Station, Lilongwe District, and Kabwafu Research Station, Northern Malawi
Transplanting date: December 6, 2016
Variety: unknown
Soil type: sandy loam



This tobacco comparison reveals the remarkable response expected with Vitazyme application (treated on the right). The photo was taken in Guatemala, with similar results to this Malawi trial.

Soil Properties												
Time of analysis	pH		P		K		Ca		Mg		Organic matter	
	¹ Kand.	² Kab.	¹ Kand.	² Kab.	¹ Kand.	² Kab.	¹ Kand.	² Kab.	¹ Kand.	² Kab.	¹ Kand.	² Kab.
			---ppm---		---meq---		---meq---		---meq---		---%---	
Initial	5.29	5.74	8.93	14.67	0.18	0.15	3.89	3.05	1.37	0.76	3.40	0.86
Final	5.34	5.16	17.10	13.44	0.19	0.16	0.60	0.56	0.86	0.84	3.48	1.26

¹Kand. = Kandiya Station; ²Kab. = Kabwafu Station.

Experimental design: A flue-cured tobacco study was initiated at the two locations in Central Malawi using seven treatments (see right), organized in a randomized complete block design with three replications. Transplants were planted about three weeks before the onset of rains in plots consisting of four ridges spaced 1.2 meters apart, with 12 plants per row spaced 0.6 meter in the rows. Data was collected from the two middle rows, excluding the plants at the end of each row.

Fertilization: 100% fertilizer = 32.4 g/plant of Super D + 6.24 g/plant CAN, broadcast (9 bags of Super D + 1.78 bags of CAN); 75% fertilizer = 24.3 g/plant of Super D + 4.68 g/plant of CAN, broadcast (6.75 bags of Super D + 1.34 bags of CAN); 50% fertilizer = 16.5 g/plant of Super D + 3.12 g/plant of CAN, broadcast (4.5 bags of Super D + 0.89 bag of CAN). Super D fertilizer: 10.5-24-20% N-P₂O₅-K₂O. CAN = calcium ammonium nitrate (27% N).

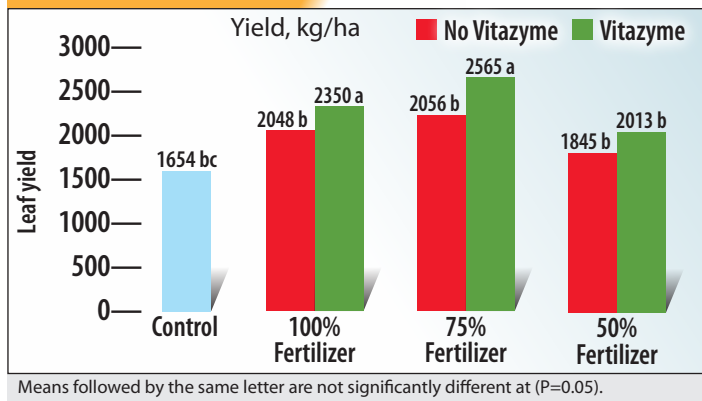
Vitazyme application: (1) seedling dip in a 2.3% Vitazyme solution, which translated to 0.7 liter/ha; (2) 1 liter/ha of Vitazyme in the transplanting water; (3) 1 liter/ha as a foliar spray 21 days after planting using a backpack sprayer

Growing season weather: good, with 101.6 cm of rainfall at Kandiya during January and February, 2017; Kabwafu was much dryer

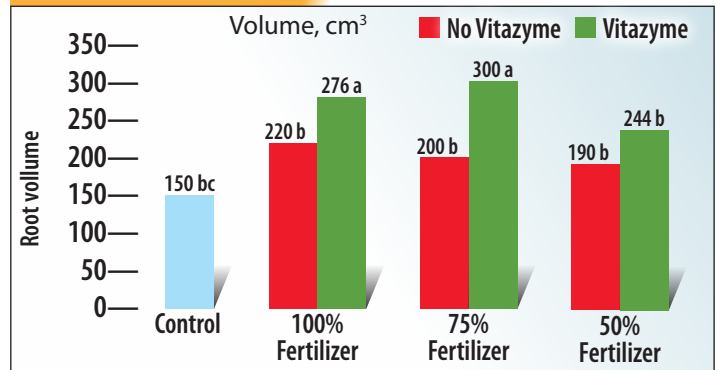
Yield results:

Treatment	Vitazyme	Fertilizer
1. Control	0	0%
2. Fertilizer only	0	100%
3. Vitazyme only	Yes	100%
4. Fertilizer only	0	75%
5. Vitazyme only	Yes	75%
6. Fertilizer only	0	50%
7. Vitazyme only	Yes	50%

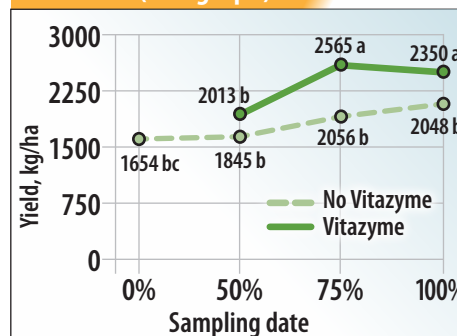
Leaf Yield



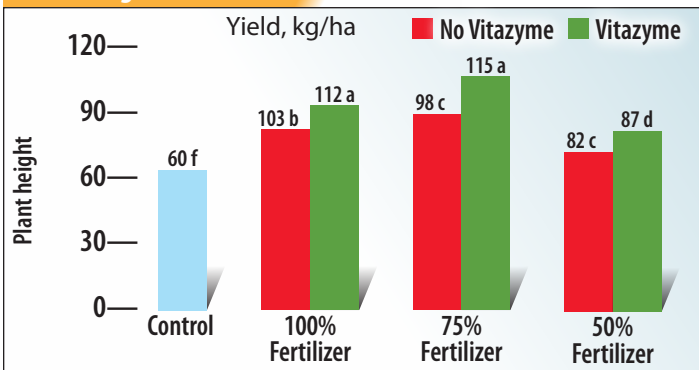
Root Volume



Leaf Yield (line graph)

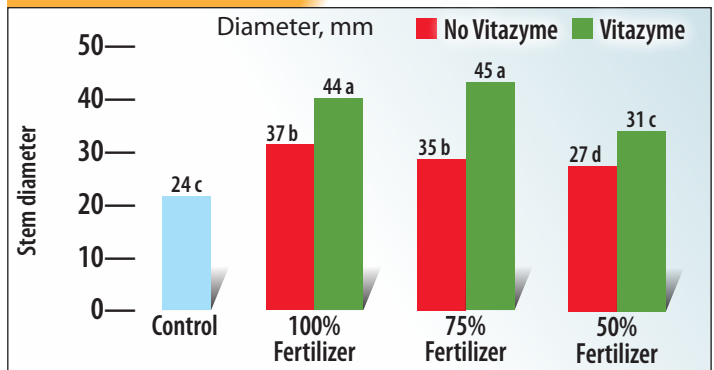


Plant Height



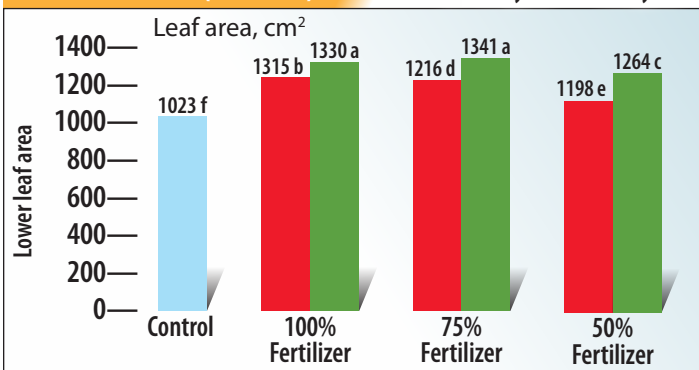
Means followed by the same letter are not significantly different at (P=0.05).

Stem Diameter



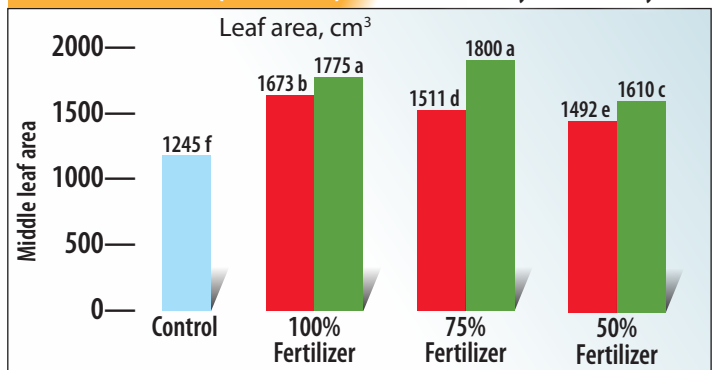
Means followed by the same letter are not significantly different at (P=0.05).

Lower Leaf Area (5th Leaf)



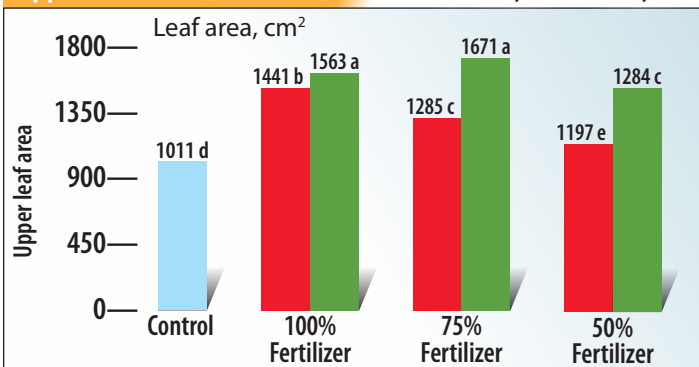
Means followed by the same letter are not significantly different at (P=0.05).

Middle Leaf Area (10th Leaf)



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

Upper Leaf Area (15th Leaf)



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

Increase with Vitazyme [Comparisons with same fertilizer level]			
	100% Fert	75% Fert	50% Fert
Leaf yield	15%	25%	9%
Root volume	25%	50%	28%
Plant height	9%	17%	6%
Stem diameter	19%	29%	15%
Lower leaf area	29%	10%	6%
Middle leaf area	6%	19%	8%
Upper Leaf area	8%	30%	7%

In every comparison between the Vitazyme treatment and control treatment at the same fertilizer level, the Vitazyme treatment outperformed the control, and significantly in all but one case (upper leaf area at 50% fertilizer). These increases were substantial, ranging from 25% for yield at the 75% fertilizer level, to 50% for root volume of the same

fertilizer level, to 29% for stem diameter, again at the 75% fertilizer level. Growth and yield increases were the greatest at the 75% fertilizer level, such that the highest overall yield, root volume, height, stem diameter, and leaf areas all exceeded the values for the 100% fertilizer level.

Leaf quality results:

Treatment	Leaf quality					Color distribution			
	1	2	3	4	5	Lemon	Orange	Mahogany	Green
	----- % -----					----- % -----			
1. Control	7.8 ^d	17.7	27.9	25.6	10.8	22.0	14.8 ^d	10.3	0.0
2. 100% Fert	22.2 ^b	15.1	30.1	29.0	11.3	21.0	26.6 ^c	10.3	1.2
3. 100% Fert + Vita	23.5 ^b (+6%)	17.8	29.1	29.8	11.6	16.9	33.2 ^b (+25%)	11.1	0.0
4. 75% Fert	23.9 ^b	19.6	21.4	25.9	2.6	25.4	25.7 ^c	5.1	0.7
5. 75% Fert + Vita	30.2 ^a (26%)	14.5	23.6	29.1	14.4	17.2	39.1 ^a (+52%)	6.9	0.4
6. 50% Fert	16.0 ^c	19.3	27.2	18.6	13.8	24.2	24.6 ^c	13.7	0.0
7. 50% Fert + Vita	16.1 ^c (+1%)	17.3	30.9	23.9	11.1	24.3	24.4 ^c (-1%)	11.8	1.5
CV, % ^a	10.2	54.3	39.4	32.9	62.9	31.4	24.0	73.3	209.1
F - value	0.029	0.972	0.925	0.317	0.534	0.787	0.024	0.960	0.242
LSD ^b 0.05	5.001	NS	NS	NS	NS	NS	5.620	NS	NS

^aCV = Coefficient of Variability; ^bLSD = Least Significant Difference. Percentage of change is calculated within each fertilizer level for statistically significant parameters.

Leaf quality improvement

Vitazyme + 75% fertilizer: 26%

Leaf color improvement

Vitazyme + 75% fertilizer: 52%
Vitazyme + 100% fertilizer: 25%

Vitazyme improved leaf quality and color significantly at both the 75% and 100% fertilizer levels. This improvement was on top of yield improvements discussed above.

Income results:

Treatment	Input amounts		Tobacco yield	Gross income ¹	Added income ²	Vitazyme cost ³	Vitazyme benefit: cost
	Fertilizer	Vitazyme					
	bags/ha	liters/ha	kg/ha	\$/ha	\$/ha	\$/ha	
2. 100% Fertilizer	10.78	0	2048	5222.40	—	—	
3. 100% Fert + Vita	10.78	27	2350	5992.50	770.10	35.10	21.9
4. 75% Fertilizer	8.09	0	2056	4626.00	—	—	
5. 75% Fert + Vita	8.09	27	2565	6540.75	1914.75	35.10	54.6
6. 50% Fertilizer	5.39	0	1845	4704.75	—	—	
7. 50% Fert + Vita	5.39	27	2013	5133.15	428.40	35.10	12.2

¹Tobacco price = \$2.55/kg. ²Extra income due to Vitazyme effects at the same fertilizer level. ³Cost per liter = \$13.00.

Conclusions: A tobacco study in Malawi, at two research sites, using replicated small plots revealed that Vitazyme applied at planting as a seedling dip, and two foliar/soil spray applications, greatly and significantly improved tobacco yield and quality at the same fertilizer level, but especially at the 75% fertilizer rate. Yield was increased by 25% at the 75% fertilizer rate, 15% at the 100% fertilizer rate, and 9% at the 50% fertilizer rate. Moreover, root volume, plant height, stem diameter, and areas of lower, middle, and upper leaves were significantly increased with 2.7 liters/ha of Vitazyme during the growth period. Leaf quality and color evaluations also favored Vitazyme applications, especially at the 75% fertilizer rate, where the highest leaf quality was increased by 26% over the 75% fertilizer control. The orange leaf color was increased significantly by Vitazyme at this same 75% fertility level, by 52%. The income evaluation revealed that Vitazyme at all three fertility levels greatly improved returns on investment, by 21.9, 54/6, and 12.2 times at the 100%, 75%, and 50% fertilizer levels, respectively. These results show the great benefit of using Vitazyme for tobacco culture in Malawi.

Benefit: Cost Ratio for Vitazyme

At 100% fertilizer21.9
At 75% fertilizer54.6
At 50% fertilizer12.2

Vital Earth Resources

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2012 Crop Results

Vitazyme on Tobacco

Two Sites in Guatemala

Researchers: Roberto Garcia and Eng. Cristhian Mazariegos of Foragro, Guatemala City, Guatemala; Eng. Gustavo Portillo, Head of Plant Protection, Casa Export Tobacco Company, Guatemala

Location: San Jose (km 133), Teculután for the Jose Illescas site; San Augustin Acasaguastlan (km 145.5) for the Carlos Barrientos site

Plant spacing: 1.2 m (38 in) between rows, 3.5 cm (13 in) in rows

Variety: NC7

Soil type: silty clay

Planting date: September 30, 2011

(Illescas site); November 1, 2011 (Barrientos site)

Climate: temperature, 27 to 38°C;

relative humidity, 66% (ave.); meters above sea level, 235 (Illescas site), and 255 (Barrientos site)

Experimental design: For both trials, plots had side-by-side Vitazyme and control areas, each of 1.0 manzana (0.7 ha). The objective of the trial was to determine the yield and quality of tobacco produced by Vitazyme and untreated areas.

1. Control

2. Vitazyme

Fertilization: unknown

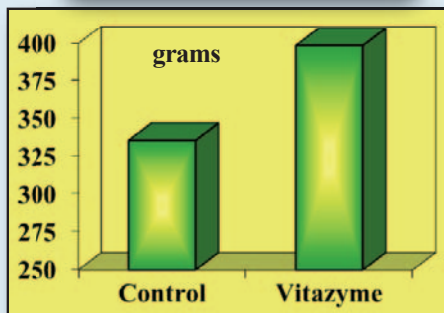
Vitazyme application: (1) transplant drench 2 days before transplanting (700 ml in 30 liters of water, or 2.3%), in a pool having 21,000 tobacco seedlings, with 90 trays to transplant into 1 manzana (0.7 ha); applied with a watering can; (2) foliar spray of 1.0 liter/ha with a backpack sprayer 21 days after transplanting; (3) foliar spray at 1.0 liter/ha 42 days after planting

Plant and yield results: Four samplings were made of five contiguous plants for each plot during the growing season. Harvesting was completed for both trials on february 15, 2012.

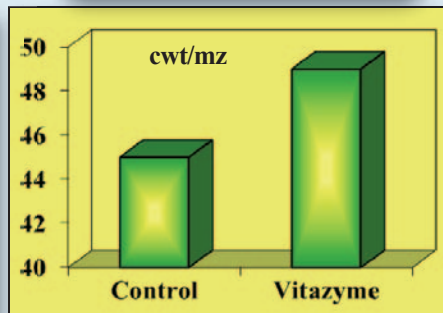
Jose Antonio Illescas Site

Treatment	Leaf chlorophyll	Root weight, fresh	Plant height	Yield
	color	grams	meters	cwt/mz
Control	pale green	335.6	1.94	45
Vitazyme	dark green	398.5 (+19%)	1.95 (+1%)	49 (+9%)

Root Weight



Leaf Yield



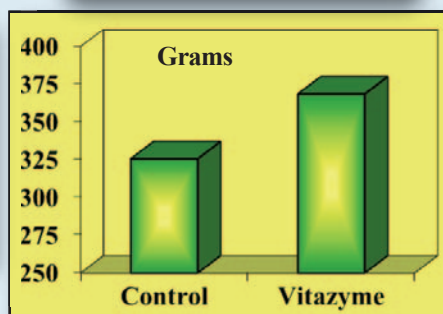
Other data showed increases in leaf area and thickness with Vitazyme.

Vitazyme increased both root and leaf weights at this site, by 19% and 9%, respectively. Plant height was not affected, but treated plants were much darker green, indicating more chlorophyll with Vitazyme application.

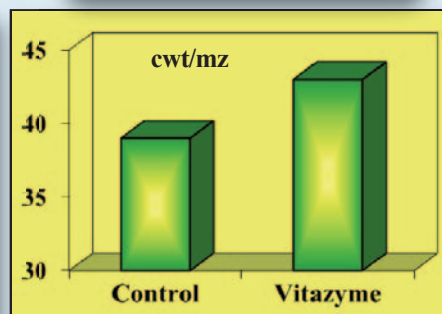
Carlos Rolando Barrientos

Treatment	Leaf chlorophyll color	Root weight, fresh grams	Plant height meters	Yield cwt/mz
Control	pale green	325.6	1.94	39
Vitazyme	dark green	368.5 (+13%)	2.05 (+6%)	43 (+10%)

Root Weight



Leaf Yield



Other data showed increases in leaf area and thickness with Vitazyme.

As at the Jose Illescas site, both the root weight and leaf yield were increased with Vitazyme, by 13% and 10%, respectively. In addition, leaf length was increased by 6%.

Foliar analysis results: Leaves from one of the sites were harvested and analyzed for nutrients.

Treatment	N	P	K	Ca	Mg	S	B	Cu	Fe	Mn	Zn
	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm
Control	3.56	0.42	5.00	3.03	0.57	3075	42.5	20.2	158.5	57.0	64.5
Vitazyme	3.19	0.37	4.37	2.55	0.47	2930	39.1	18.8	219.5	50.5	46.9

The nutrient composition of the control leaves was highest, but this did not improve tobacco quality above the Vitazyme treated leaves.

Conclusions: A study on tobacco at two farms in Guatemala compared Vitazyme treatment with an untreated control. The conclusions of the researchers is as follows:

1. The biological efficacy of Vitazyme in increasing leaf blade size and thickness, as well as coloring of tobacco curing, as compared to the untreated controls, was demonstrated.
2. Tobacco plant root growth was greater, with more weight and volume of secondary and adventitious

roots in the Vitazyme treatments.

3. Leaf analysis did not indicate damage to the quality of the leaves by the use of Vitazyme.
4. Higher yields of tobacco per unit area rendered production increases of 4 cwt (hundred weight) per manzana (0.7 ha), or 0.45 tons/ha (9 to 10%, according to trials) in the Vitazyme treatment compared with the untreated control....

The application of Vitazyme in tobacco crops, by carrying out three applications during the [growth] cycle, the first as a drench at transplanting, and the second and third by foliar sprays at 3 and 6 weeks after planting, all at a rate of 0.7 liter/manzana (1.0 liter/ha), is recommended.”

Vital Earth Resources

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2006 Crop Results

Vitazyme on Tobacco

Researcher: Lisette Monzon Herrera

Research Organization: Tobacco Research Institute (TABACUBA), Cuba

Location: near Havana, Cuba

Experimental design: A tobacco study was designed to test the ability of Vitazyme to improve tobacco production, fertilizer utilization, seed germination, seedling production, and tobacco quality under Cuban technology and growing conditions. The phases of the study are discussed below.

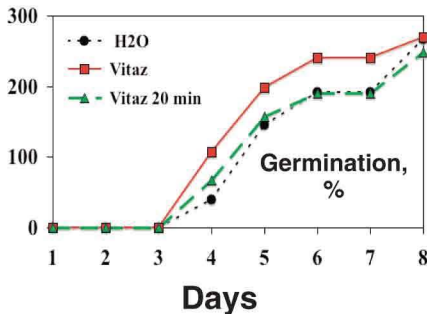
Stimulation of Germination

Seeds of Criollo 98, Habana 2000, GAA-955 cultivars were placed in Petri dishes (100 per dish), with three reps per cultivar. The temperature was maintained at 28°C, and germination was measured at 7 and 14 days.

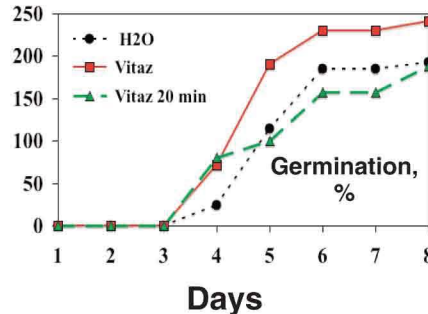
Treatments

- 1 — seeds were soaked in distilled water in the Petri dish
- 2 — seeds were soaked in a 5% Vitazyme solution in the Petri dish
- 3 — seeds were pre-soaked for 20 minutes in a 5% Vitazyme solution, then placed in distilled water in the Petri dish

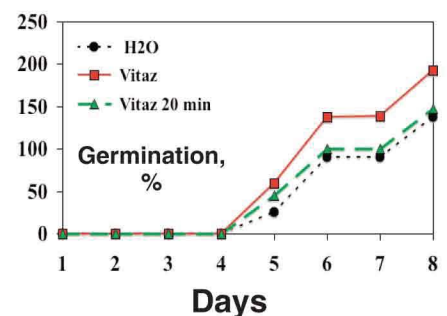
Habana 2000



Criollo 98



GAA-955



Germination increase with Vitazyme at 8 days

Habana 2000	2%
Criollo 98	19%
GAA-955	38%

In all three varieties, 5% Vitazyme added to the Petri dishes increased seed germination, though not significantly. The pre-soaked seeds increased final germination percentage for only the GAA-955 cultivar. The great increase in germination with the poorly germinating GAA-955 cultivar was especially noteworthy.

Seedling Production Floating Trays

A floating tray seedbed area was devised with the Criollo 98 cultivar, using four replications. The substrate was composed of 70% black peat, 25% rice hulls, and 5% zeolite plus a 20-8-20% N-P₂O₅-K₂O fertilizer. Vitazyme was sprayed on the seedlings and mats as a 2% solution at planting.

Treatments

- 1 – 100% fertilizer
- 2 – 100% fertilizer + Vitazyme
- 3 – 50% fertilizer
- 4 – 50% fertilizer + Vitazyme

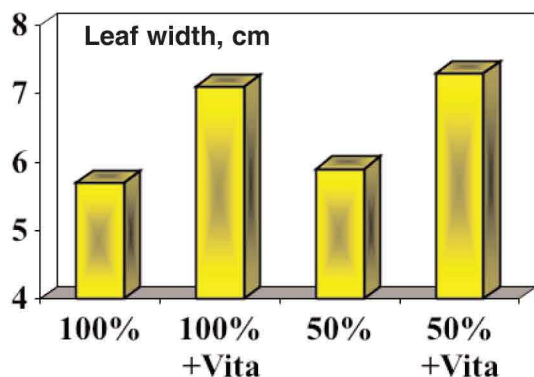
Treatment	Leaf length ¹	Change	Leaf width ²	Change	Height	Change	Chlorophyll ³	Change	Transplant quality
	cm	cm	cm	cm	cm	cm	SPAD units	SPAD units	
1 (100% fert)	5.7 b	—	3.79 b	—	14.28 a	—	26.81 b	—	4.5 a
2 (100% fert + Vita)	7.1 a	1.4 (+25%)	4.18 a	0.39 (+10%)	14.56 a	0.28 (+2%)	28.04 a	(+) 1.23	4.4 a
3 (50% fert)	5.9 b	—	3.85 b	—	14.22 a	—	25.96 b	—	3.8 b
4 (50% fert + Vita)	7.3 a	1.4 (+24%)	4.28 a	0.43 (+11%)	13.89 a	0.33 (-2%)	27.12 a	(+) 1.16	4.1 a

¹Measurement from the largest leaf.

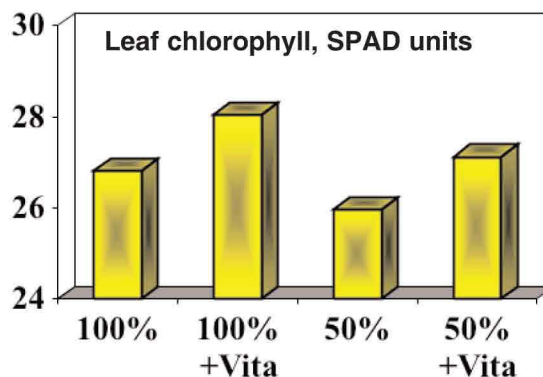
²Measurement of width from the longest leaf.

³A Minolta SPAD chlorophyll meter was used.

Leaf Length



Leaf Chlorophyll



Increase in leaf length with Vitazyme (100% fertilizer): 25%
Increase in leaf length with Vitazyme (50% fertilizer): 24%

**Increase in leaf chlorophyll with Vitazyme:
1.16 to 1.23 SPAD units**

Vitazyme increased overall leaf growth and photosynthesis in the floating trays at both the 100% and 50% fertilizer levels. These changes were especially helpful to produce higher quality transplants at the 50% fertilizer rate.

Covered Tobacco Production

Two large plots under greenhouse plastic cover, one with 100% fertilizer and the other with 50% fertilizer, were divided into four treatments and three replications in a randomized complete block design. Vitazyme was applied by dipping seedling roots (variety Criollo 98) in a 2% solution at transplanting, and by spraying the plants 25 days later.

Treatments

100% fertilizer

- 1 – Control
- 2 – Vitazyme at transplanting and 25 days
- 3 – Vitazyme at transplanting
- 4 – Vitazyme at 25 days

50% fertilizer

- 1 – Control
- 2 – Vitazyme at transplanting and 25 days
- 3 – Vitazyme at transplanting
- 4 – Vitazyme at 25 days

Leaf Wifth, cm

Treatment	Leaf grade				
	CG	CF	CL	UM	LP
50% fertilizer:					
1 (Control)	22 c	25 c	25 c	29 b	24 c
2 (Vita 2x)	24 ab	25 c	28 ab	30 ab	27 b
3 (Vita planting)	25 ab	25 c	26 bc	28.5 b	25.5 c
4 (Vita 25 days)	25 ab	27 bc	27 b	31 a	26 bc
100% fertilizer:					
1 (Control)	26 a	28 ab	27 b	29 b	27 b
2 (Vita 2x)	23.5	27 bc	27 b	29 b	29 a
3 (Vita planting)	26.5 a	30 a	29 a	30 ab	27 b
4 (Vita 25 days)	25.5 ab	27 bc	27 b	30 ab	26 bc

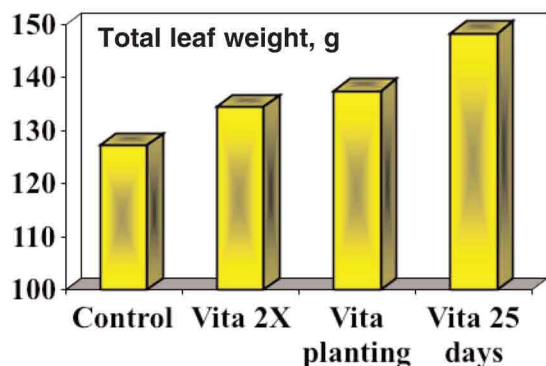
Leaf Length, cm

Treatment	Leaf grade				
	CG	CF	CL	UM	LP
50% fertilizer:					
1 (Control)	42 bc	46 c	48 c	50 a	46 a
2 (Vita 2x)	43 ab	48 bc	51.5 ab	51.5 a	47 a
3 (Vita planting)	43.5 ab	47 c	51 bc	49.0 a	44.5 a
4 (Vita 25 days)	44 ab	49 b	51 bc	52.5 a	44.5 a
100% fertilizer:					
1 (Control)	46 a	51 a	50.5 bc	51.5 a	47 a
2 (Vita 2x)	39 c	49 b	50 bc	52 a	56 a
3 (Vita planting)	47 a	52 a	54 a	51.5 a	45 a
4 (Vita 25 days)	46 a	49 b	49 bc	50.5 a	45.5 a

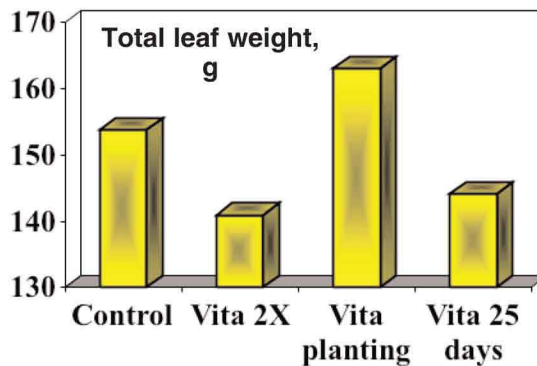
Fresh Leaf Weight, grams

Treatment	Leaf grade					Total weight
	CG	CF	CL	UM	LP	
50% fertilizer:						
1 (Control)	17.3 c	21.15 e	25.8 c	30.9 b	32.2 ab	127.35
2 (Vita 2x)	20.9 bc	23.2 cde	25.8 c	32.2 ab	32.4 a	134.5
3 (Vita planting)	22.95 b	21.45 de	29.3 bc	31.4 b	32.4 a	137.5
4 (Vita 25 days)	21.25 b	25.85 bcd	31.35 abc	38.7 a	31.25 ab	148.4
100% fertilizer:						
1 (Control)	27.05 ab	28.55 ab	33.25 ab	34.45 ab	30.45 ab	153.75
2 (Vita 2x)	21.05 ab	25.9 bcde	29.85 abc	35.55 ab	28.6 b	140.95
3 (Vita planting)	28.10 a	32.25 a	33.90 a	35.45 ab	33.35 a	163.05
4 (Vita 25 days)	22.65 b	26.5 bc	28.05 bc	37.55 ab	29.4 ab	144.15

50% Fertilizer



100% Fertilizer



**Increase in leaf weight
(25 days): +17%**

**Increase in leaf weight
(planting): +6%**

For plant height and stalk diameter only one significant difference appeared, so that data is not included in this report. However, heights were slightly greater for the 50% fertilizer treatments than for the 100% treatments. Stalk diameters were about the same for both fertilizer levels and for all treatments within each level.

Tobacco Smoking Qualities

Parameter	Effect of the three Vitazyme treatments
Leaf elasticity	Maintained between good and acceptable for all treatments
Color	Acceptable for all treatments
Ash quality	Acceptable for all treatments
Combusion quality	Normal for all treatments

In general, the best tobacco quality was noted with the 50% fertilizer level plus Vitazyme, and in particular with Vitazyme applied 25 days after transplanting.

Conclusions from the Cuban researcher:

- The product Vitazyme can be used as a germination booster in seeds of low germination percentage.
- With the use of Vitazyme mineral fertilization can be reduced up to 50%, in tobacco seedling production, without affecting seedling quality. The 50% mineral fertilization reduction represents a saving of \$548.00 USD for each 1.9 ha, using 1 liter of Vitazyme.
- The performance of the variables after a 50% reduction in fertilization was quite close to that of 100% fertilization, and consequently we consider that a reduction to 75% of normal fertilization combined with Vitazyme application could yield the best results.
- The results of the leaf quality analyses were excellent for the 50% fertilization combined with Vitazyme application at 25 days after transplanting treatment, in covered tobacco production.