

NATURAL BIOESTIMULANT VITAZYME IN ORGANIC BANANA. GUAYUBÍN, MONTE CRISTI, DOMINICAN REPUBLIC, 2019.

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Code	N/A			
Title	Demonstration trial to Assess the Effects of Vitazyme Natural Biostimulant, to confer Weight and Grade to the Banana (<i>Musa spp</i> AAA) Bunch.			
Responsable	Daniel Antonio Peña and Kelvin Contreras			
Country (No. of trials)	Dominican Republic			
Location (Zone, locality)	Guayubín, Monte Cristi. 19°42'38"N 71°18'17"O			
Predominant climatic conditions (rainfall, temperature, time of year)	In Guayubín, Monte Cristi, the average annual temperature is 31 °C and the average annual rainfall is 366 mm.			
Collaborator (Names of manager and farm)	Francisco Javier. Inversiones Gonval.			
Dates of beginning and end	Beginning	05/16/2019	End	09/17/2019
Crop variety	Williams			
Crop stage	Production (Established)			
Project Concept	To demonstrate the effect of the natural biostimulant Vitazyme, to confer weight and grade to the Banana bunch.			
Trial Goals	<div>❖ To demonstrate the effectiveness of Vitazyme natural biostimulant, to confer weight and grade to the bunch.</div> <div>❖ To quantify the weight of the bunch.</div>			
Statistical layout	N/A			
Experimental plot size	One hectare per treatment			
Experimental sample size	Five bunches per treatment in each of three weeks			
No. of repetitions (replicates)	One repetition (replicate)			
Treat. No.	Producto	Rate commercial product./L water	Type of Application	Application timing
1	Vitazyme	5cc/L of water = to 1 L/ha.	Foliar	Two applications were carried out with an interval of one month with flower in the 1st week.
3	Farm control	N/A	N/A	N/A
Number of Applications		2 Applications		

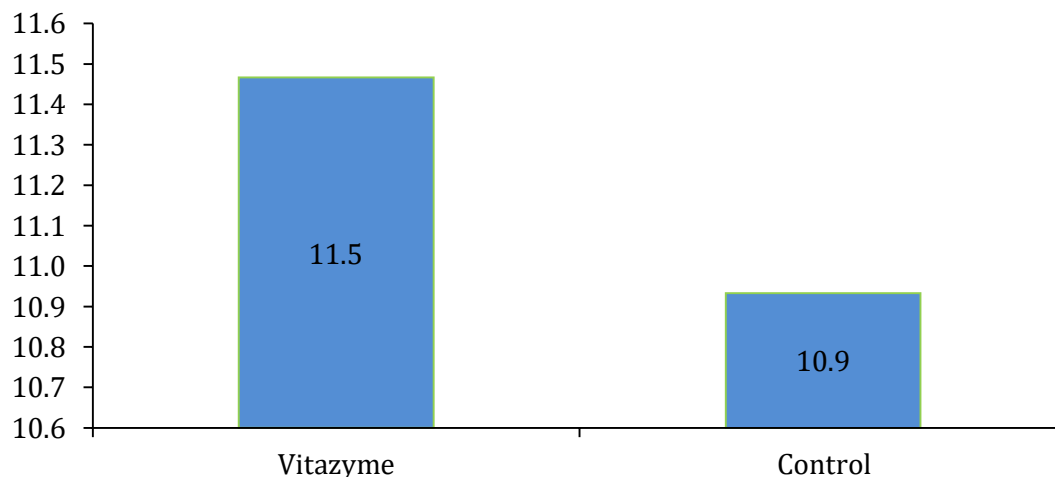
Application Intervals	30 Days
Application Equipment	Motorized Sprayer
Water volume / ha	200 L / ha
Evaluation type	Calibration, Measurement and Weighing.
Number of evaluations	3 evaluations
Assessment interval	10 weeks after Ribboning
Evaluated Variables	No. of leaves at Ribboning
	No. of falses (hands) / bunch
	No. of hands / bunch
	Calibration of the 2nd and last hand
	Length of the 2nd and last hand
	Weight of 5 bunches
Results	Detailed Below
Conclusions	Detailed Below
Recommendations	Detailed Below

Trial Results

In order to carry out a study of the effects of Vitazyme on the development of banana fruit, three different weeks of Ribboning (different color ribbons, which show bunch age for harvest scheduling, while fastening polyethylene bags), established between July 30 and September 17, 2019, were taken into account, considered at weeks 31, 34 and 38 of the banana calendar. The data presented are the average result of these three weeks, in which the following variables were evaluated:

Number of Leaves at Ribboning:

In order to evaluate the conditions of the plantation in terms of health and number of leaves, a total count of the plants to be evaluated was carried out, in which the largest number of leaves was in field 20 (where the Vitazyme treatment was established), while in field 27 (where Farm Control was placed) there was an average of 10.9 leaves per plant (Graph 1).



Graph 1. Average Number of Leaves at Ribboning of the Three Evaluated Ribbons in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Number of Falses (hands) and of Hands per Bunch:

After applying Vitazyme, the number of false hands of the five bunches to be evaluated per treatment was taken, resulting in an average number of two in both treatments.

Regarding the number of total hands per bunch, a count was made after applying Vitazyme, reaching the highest number of hands in Field 20 (Vitazyme), with an average of 8 hands, while for field 27 (Control) the average was 7 hands per bunch (Table 1).

Table 1. Average Number of Falses (hands) and of Hands of the Three Ribbons Evaluated in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

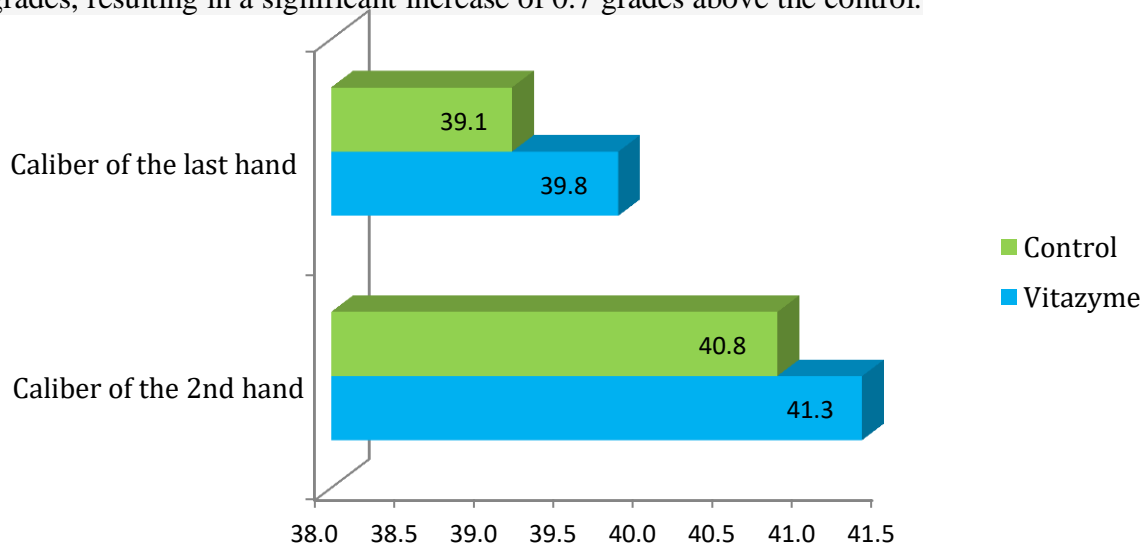
Color of the Ribbon						
Treatment	Dark Blue		Purple		Light Blue	
	Vitazyme	Control	Vitazyme	Control	Vitazyme	Control
No. Falses/Bunch	2	2	2	2	2	2
No. Hands/Bunch	8	8	8	7	8	7

Caliber of Filling of the Second and Last Hands of the Bunch:

In order to harvest the banana fruit, it is necessary to measure the grade of filling of the fingers on the second and last hands of the bunch. The results obtained of the three ribbons treated with the natural biostimulant Vitazyme and the control are shown in Graph 2.

The highest caliber of the second hand was recorded in the Vitazyme treatment, with an average of 41.3 grades, while in the control the average was 40.8 grades, showing a significant increase of 0.5 grades from the effect of Vitazyme over the control.

And in the evaluation of the last hand, the highest caliber was recorded in the treatment with Vitazyme, with an average of 39.8 grades, while in the control the average was 39.1 grades, resulting in a significant increase of 0.7 grades above the control.



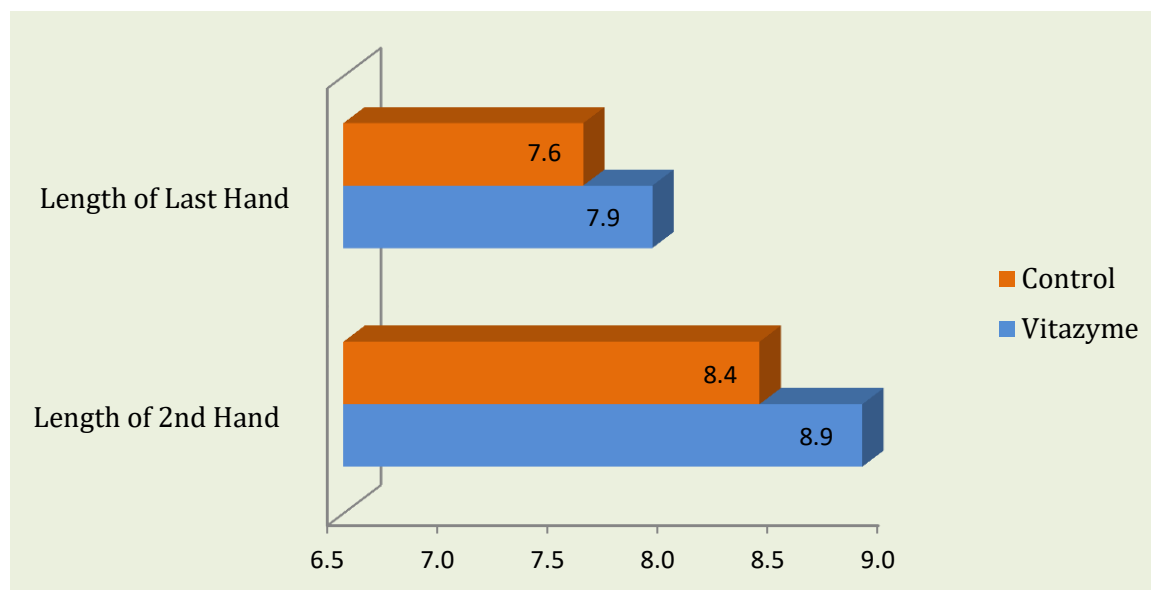
Graph 2. Average Grades of Second and Last Hands of the Three Evaluated Ribbons in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Length of the Second and Last Hands of the Bunch:

Another variable evaluated in the trial was the length of the fingers of the second and last hand of the bunches (Graph 3). The best results of the second hand were obtained in the Vitazyme treatment, with an average of 8.9 cm, while in the Farm Control the average was 8.4 cm, showing an increase with Vitazyme of 0.5 cm over the control.

As for the length of the last hand, the highest value was recorded in the treatment with Vitazyme, with an average of 7.9 cm, while in the Control the average was 7.6 cm long, showing a significant increase of 0.3 cm over the control.

Graph 3. Average Length of Second and Last Hands of the Three Evaluated Ribbons, in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

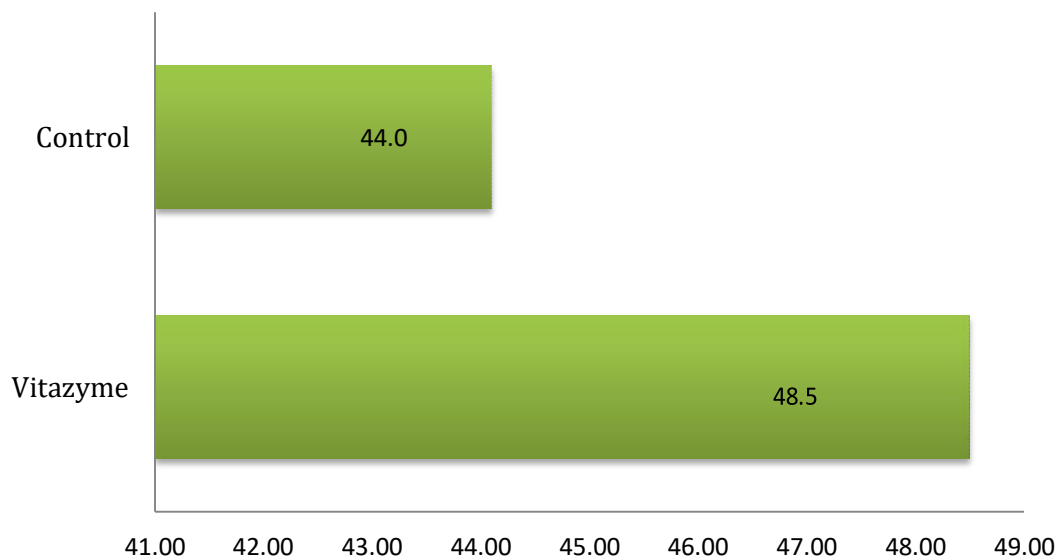


Weight of Banana Bunches:

In order to finalize the data collection on the effect of the application of natural biostimulant Vitazyme in banana, the weight of the bunches was assessed. The highest bunch weight of the Bunches per ribbon evaluated was recorded in the Vitazyme treatment, with an average of 48.5 pounds, while in the farm control the average bunch was 44.0 pounds (Table 2), thus showing a significant increase of 4.5 pounds (10.2%) above Control.

Table 2. Average Bunch Weight of the Three Evaluated Ribbons in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Average weight of 5 evaluated bunches per field (lb)		
Treatment	Vitazyme	Control
Dark Blue Ribbon	46	45
Purple Ribbon	52	45
Light Blue Ribbon	47	42
Overall Average per Ribbon	48.5	44.0



Graph 4. Average Bunch Weight of the Three Evaluated Ribbons in the Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Profit/Cost Ratio

Table 3 shows the cost-benefit ratio, where you can see the increase per hectare of 221 cases (10.1%) in the Vitazyme Treatment over the Control, representing an increase of 1730 US dollars per hectare of net revenues.

Table 3. Cost Benefit Ratio of the Three Evaluated Ribbons in the t h e Study of Effects of Natural Biostimulant Vitazyme to confer weight and grade to Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

	Treatments	
	Vitazyme	Control
Average weight per bunch (lb)	48.5	44
Total lb/hectare	100,880	91,589
Total # cases per hectare by Treatment	2401.9	2180.7
Increase # cases/ha over the Control	221.21	
Price organic banana case \$US	8	8
Total income by treatment \$US/ha	19,215	17,446
Increase income over the Control \$US/ha	1,770	
Overall treatment cost \$US / hectare	40	
Net revenue Vitazyme Treatment \$US/ha	1,730	

Conclusions

- By making two Vitazyme applications at 1 L/ha each, with a one-month interval, an average increase of bunch weight of 4.5 lb (10.2%) above the farm control was achieved.
- Applying Vitazyme, increases in fruit finger caliber of filling, from 0.5 to 0.7 grades above the control, were achieved.
- As for the length of the banana hands, with Vitazyme, increases from 0.3 to 0.5 cm over the Control, were achieved.
- The overall cost per hectare of the Vitazyme program was US \$40 (US \$20 per application), to produce 221 cases per hectare (10.1%) above the farm Control. This represents net revenues above the control of US \$1,730 per hectare, from the increase in number of cases.
- The area treated with the natural biostimulant Vitazyme showed very good vigor of the organic banana plantation.

Recommendation

To implement programs of two Vitazyme applications, with a one-month interval, to produce plants with greater vigor, better caliber, length and weight of bananas, at any time of the year.

ANNEXES

Annex 1. Averages of Evaluated Variables at Bunch Ribboning, in the Demonstration Plot to Determine the Effect of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Averages of the Evaluated Variables at Time of Bunch Ribboning.						
Color of Ribbon	Dark Blue		Purple		Light Blue	
Treatment	Vitazyme	Control	Vitazyme	Control	Vitazyme	Control
No. Leaves at ribboning	11.4	11	11.8	11.2	11.2	10.6
No. Falses/Bunch	2	2	2	2	2	2
No. Hands/Bunch	8	8	8	7	8	7

Annex 2. Averages by Color of Ribbons, # of Weeks & Treatments of Hands Evaluated with & Without Vitazyme, in the Demonstration Plot to Determine the Effect of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp* AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Averages by Ribbon color, week # and Treatments of the Evaluated Hands.						
Color of Ribbon	Dark Blue Week10		Purple Week 9		Light Blue Week10	
Treatment	Vitazyme	Control	Vitazyme	Control	Vitazyme	Control
Caliber of 2nd hand	41	41	42	41	41	40
Caliber of Last Hand	40	39	40	40	40	38
Length of 2nd hand (cm)	9	8	9	8	9	8
Length of Last Hand (cm)	8	8	8	8	8	8

Annex 3. Field Data from Application to Harvest in the Three Ribbons, # of Week, with and without Vitazyme, in the Demonstration Plot to Determine the Effect of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa* spp AAA) bunch. Guayubín, Monte Cristi, Dominican Republic, 2019.

Farm: Inversiones Gonval		Grower: Francisco Javier			Field: 20 (Vitazyme)			Area: 1 Ha	
Weeks & Evaluation dates	Treatment	Vitazyme 1Lt/Ha					C. Dark Blue Week#10		
	No. of Bunches	1	2	3	4	5	Totals	Averages	
Week#31 07/30/2019	No. of Leaves at Ribboning	12	12	10	11	12	57	11.4	
	No. of Falses/Bunch	2	2	2	2	2	10	2	
	No. of Hands/Bunch	8	8	8	9	7	40	8	
	Caliber of 2nd & last Hands	41	40	41	42	42	206	41	
		40	39	40	41	40	200	40	
	Length of 2nd & last Hands	8.7	8.6	9.1	9	9.2	44.6	9	
		8.1	7.5	8	7.9	8.1	39.6	8	
Weight of 5 Bunches lb)	44.5	46	45.5	62	33.5	231.5	46.30		
Weeks & Evaluation dates	Treatment	Vitazyme 1Lt/Ha					C. Purple Week#9		
	No. of Bunches	1	2	3	4	5	Totals	Averages	
Week #34 08/20/2019	No. of Leaves at Ribboning	12	11	12	12	12	59	11.8	
	No. of Falses/Bunch	2	2	2	2	2	10	2	
	No. of Hands/Bunch	8	8	9	7	8	40	8	
	Caliber of 2nd & last Hands	41	42	43	42	41	209	42	
		39	40	40	40	39	198	40	
	Length of 2nd & last Hands	8.9	9.2	8.8	9.1	8.7	44.7	9	
		8.2	8.1	7.5	8.4	8.1	40.3	8	
Weight of 5 Bunches lb)	55	56.5	57.5	44	47.5	260.5	52.10		
Weeks & Evaluation dates	Treatment	Vitazyme 1Lt/Ha					C. Light Blue Week#10		
	No. of Bunches	1	2	3	4	5	Totals	Averages	
Week #38 09/17/2019	No. of Leaves at Ribboning	10	13	11	10	12	56	11.2	
	No. of Falses/Bunch	2	2	3	2	2	11	2	
	No. of Hands/Bunch	8	10	7	9	8	42	8	
	Caliber of 2nd & last Hands	40	42	42	41	40	205	41	
		39	41	40	40	39	199	40	
	Length of 2nd & last Hands	8.7	8.4	9	8.5	8.9	43.5	9	
		7.5	7.3	8.2	7.6	8.0	38.6	8	
Weight of 5 Bunches lb)	43.5	53	41	51.5	46.5	235.5	47.10		

Farm: Inversiones Gonval		Grower: Francisco Javier			Field: 27 (Control)		Area: 1 Ha	
Weeks & Evaluation dates	Treatment	Control					C. Dark Blue Week#10	
	No. of Bunches	1	2	3	4	5	Totals	Averages
Week #31 07/30/2019	No. of Leaves at Ribboning	12	11	10	12	10	55	11
	No. of Falses/Bunch	2	2	2	2	2	10	2
	No. of Hands/Bunch	10	7	9	8	7	41	8
	Caliber of 2nd & last Hands	41	43	40	40	41	205	41
		39	41	39	38	40	197	39
	Length of 2nd & last Hands	8.1	8.7	8.2	8.5	8.8	42.3	8
		7.6	8.0	7.5	7.5	7.7	38.3	8
Weight of 5 Bunches lb)	56.5	48	49.5	39	33	226	45	
Weeks & Evaluation dates	Treatment	Control					C. Purple Week#9	
	No. of Bunches	1	2	3	4	5	Totals	Averages
Week #34 08/20/2019	No. of Leaves at Ribboning	12	12	10	10	12	56	11.2
	No. of Falses/Bunch	2	2	2	2	2	10	2
	No. of Hands/Bunch	6	7	5	8	8	34	7
	Caliber of 2nd & last Hands	41	40	42	42	41	206	41
		39	39	41	40	39	198	40
	Length of 2nd & last Hands	7.7	8.5	8.9	9	8	42.1	8
		6.8	7.6	7.9	7.8	7.8	37.9	8
Weight of 5 Bunches lb)	38	50	31.5	52.5	51.5	223.50	45	
Weeks & Evaluation dates	Treatment	Control					C. Light Blue Week#10	
	No. of Bunches	1	2	3	4	5	Totals	Averages
Week #38 09/17/2019	No. of Leaves at Ribboning	11	11	10	10	11	53	10.6
	No. of Falses/Bunch	2	2	2	2	2	10	2
	No. of Hands/Bunch	7	8	6	8	7	36	7
	Caliber of 2nd & last Hands	40	40	40	40	41	201	40
		38	38	39	37	40	192	38
	Length of 2nd & last Hands	9	8.1	8	8	8.3	41.4	8
		7.5	7.2	7.5	7.6	7.8	37.6	8
Weight of 5 Bunches lb)	37	51.5	34	50	38.5	211	42.20	

Annex 4. Photos of Field Spraying with Vitazyme and Harvest of Each Evaluated Ribbon in the Demonstration Plot to Determine the Effect of Natural Biostimulant Vitazyme to confer weight and grade to the Banana (*Musa spp AAA*) bunch. Guayubín, Monte Cristi, D. R. 2019.

