

**EVALUATION OF THREE METALOSATE<sup>®</sup>  
TREATMENTS ON TOBACCO (*Nicotiana tabacum*)  
IN THE DOMINICAN REPUBLIC**

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## **ABSTRACT**

In Los Tocones, province of Santiago de los Caballeros, Dominican Republic, a trial was conducted with the objective of evaluating the influence of Metalosates<sup>®</sup> as foliar nutrition sprays on tobacco (*Nicotiana tabacum*) comparing three Metalosate treatments and a control.

Four applications were applied during the crop cycle. The best results came from the recommendation given by T.E.A.M. Analysis of Albion Laboratories (Figures 1, 2 and 3). This treatment also showed, by visual observation, better plant development and leaf uniformity.

Where Metalosates were applied, the tobacco was heavier, had better color, less incidence of disease and a higher return on investment.

Emphasis should be made that the crop was planted late, there was a severe drought and only one soil application of fertilizer was made.

Economic analysis showed that the highest per hectare returns came from the T.E.A.M. recommendation of Albion. The highest rate of return came from the Nutritional Program of J.A. Garcia, S.A. All Metalosate treatments had better than a 50% rate of return on investment.

## **INTRODUCTION**

In the Dominican Republic tobacco (*Nicotiana tabacum*) is of vital importance from an economic, social and political point of view, as much for the dividends it generates through associated industries derived from international commercialization.

This plant was cultivated long before the Spaniards ever arrived to the island “La Espanola.” It was used in rituals, medicine and other uses.

In the country there are 15 thousand farmers dedicated to growing tobacco. There are 12 exporting companies, 2 cigarette factories and nearly 70 cigar factories formally established.

The tobacco economy is based on export. Ninety to 95% of black tobacco is exported abroad as leaf tobacco or manufactured as cigars. The United States, Spain, Morocco, Honduras, Holland, Germany, Tunisia, and Belgium are among the buyers.

Tobacco production provides 65 to 70 thousand jobs directly and 350 thousand people depend upon it indirectly. Tobacco provides an internal circulation of 126 to 189 million dollars annually and 250 to 300 million in associated industries through export.

Due to the importance of this crop in the country we did a trial to observe the behavior of tobacco, variety San Vicente, with applications of 3 different Metalosate treatments and a control: Nutritional Program designed by J.A. Garcia, Nutritional Program following the recommendations of T.E.A.M. Analysis and an adaptation of the T.E.A.M. Nutritional Program in Costa Rica.

## MATERIALS AND METHODS

### A. Location of the trial:

The trial was done in Los Tocones, Santiago de los Caballeros, Dominican Republic at an elevation of 175 meters above sea level, from January 31 to May 6, 1998. The spacing of the plantation was 1 meter between rows and 0.50 meter down the row. The total area of the trial was 661.5 square meters (0.066 hectare).

### 2. Equipment and Materials Used:

#### 1. Equipment

- Diaphragm pump with backpack sprayer.
- Numbered stakes.
- Plastic cube.
- Product measurer.

#### 2. Materials

- Metalosates.
- Granulated fertilizer 15-15-15 sulfate form.
- Insecticides and fungicides.

T <sub>1</sub> (42)	T <sub>2</sub> (39)	T <sub>3</sub> (43)	T <sub>4</sub> (40)
T <sub>1</sub> (46)	T <sub>2</sub> (52)	T <sub>3</sub> (53)	T <sub>4</sub> (53)
T <sub>1</sub> (50)	T <sub>2</sub> (50)	T <sub>3</sub> (62)	T <sub>4</sub> (49)
T <sub>1</sub> (59)	T <sub>2</sub> (65)	T <sub>3</sub> (62)	T <sub>4</sub> (63)
T <sub>1</sub> (65)	T <sub>2</sub> (57)	T <sub>3</sub> (63)	T <sub>4</sub> (59)
T <sub>1</sub> (60)	T <sub>2</sub> (61)	T <sub>3</sub> (65)	T <sub>4</sub> (65)

NOTE: T<sub>1</sub> Nutritional Program for Tobacco from J.A. Garcia, S.A.

T<sub>2</sub> T.E.A.M. Analysis (ALBION)

T<sub>3</sub> Costa Rica (Adaptation)

T<sub>4</sub> Control

( ) Number of plants in each repetition.

**Table 2**  
**The Metalosate Treatments**

Date	Treatment	First Application	Rate/ha	Rate/17L Water
12-Jan-98	T <sub>1</sub>	Crop Up Metalosate N-P-K (4-17-17)	800 cc 1000 cc	40 cc 50 cc
	T <sub>2</sub>	Crop Up Metalosate N-P-K (4-17-17)	800 cc 1000 cc	40 cc 50 cc
	T <sub>3</sub>	Albion's Liquid Boron N-P-K (4-17-17)	250 cc 1000 cc	20 cc 50 cc
	T <sub>4</sub>	-	-	-
24-Jan-98		Second Application		
	T <sub>1</sub>	Multimineral Metalosate	800 cc	40 cc
	T <sub>2</sub>	Multimineral Metalosate Zinc Metalosate Iron Metalosate Manganese Metalosate	800 cc 250 cc 300 cc 300 cc	40 cc 15 cc 20 cc 20 cc
	T <sub>3</sub>	Albion's Liquid Boron Multimineral Metalosate	250 cc 800 cc	15 cc 40 cc
	T <sub>4</sub>	-	-	-
9-Feb-98		Third Application		
	T <sub>1</sub>	Multimineral Metalosate Potassium Metalosate	800 cc 1000 cc	40 cc 50 cc
	T <sub>2</sub>	Multimineral Metalosate Potassium Metalosate	800 cc 1000 cc	40 cc 50 cc
	T <sub>3</sub>	Albion's Liquid Boron Multimineral Metalosate Potassium Metalosate	250 cc 800 cc 1000 cc	15 cc 40 cc 50 cc
	T <sub>4</sub>	-	-	-
24-Feb-98		Fourth Application		
	T <sub>1</sub>	Multimineral Metalosate	800 cc	40 cc
	T <sub>2</sub>	Multimineral Metalosate Zinc Metalosate Iron Metalosate Manganese Metalosate	800 cc 250 cc 300 cc 300 cc	40 cc 15 cc 20 cc 20 cc
	T <sub>3</sub>	Crop Up Metalosate Copper Metalosate	800cc 250 cc	40 cc 15 cc
	T <sub>4</sub>	-	-	-

<b>Table 3</b>			
<b>“Sarta” Harvest and Dry Weight</b>			
Date	Treatment	Quantity of “Sartas”	Weight (kg)
6-Apr-98	T <sub>1</sub>	8	7.61
	T <sub>2</sub>	10	9.64
	T <sub>3</sub>	12	12.05
	T <sub>4</sub>	12	11.16
	Treatments	Quantity of “Sartas”	Weight (kg)
6-May-98	T <sub>1</sub>	9	8.73
	T <sub>2</sub>	10	10.00
	T <sub>3</sub>	12	12.78
	T <sub>4</sub>	10	8.89
	Treatments	Quantity of “Sartas”	Weight (kg)
21-May-98	T <sub>1</sub>	25	28.14
	T <sub>2</sub>	28	33.89
	T <sub>3</sub>	27	29.17
	T <sub>4</sub>	25	24.63

Note: “Sarta: is a term used in the Dominican Republic for a tied string of tobacco leaves 1.5 meters long.

<b>Table 5 Cost Analysis</b>					
Treatments	Application Cost	Cost/ha	Production kg/ha	Price/kg	Total Value
T <sub>1</sub>	\$12.96	\$171.43	1332.28	\$3.77	\$5022.69
T <sub>2</sub>	\$13.04	\$269.13	1402.93	\$3.77	\$5289.04
T <sub>3</sub>	\$14.00	\$189.08	1332.00	\$3.77	\$5021.64
T <sub>4</sub>	-	-	1195.90	\$3.77	\$4508.54

Note: Application cost per hectare is \$12.58.

T<sub>1</sub> Metalosate cost + Application cost = US\$ 184.39

T<sub>2</sub> Metalosate cost + Application cost = US\$ 282.17

T<sub>3</sub> Metalosate cost + Application cost = US\$ 203.08

Production T<sub>1</sub> minus cost = US\$ 4838.30

Production T<sub>2</sub> minus cost = US\$ 5006.87

Production T<sub>3</sub> minus cost = US\$ 4818.56

Production T<sub>4</sub> = US\$ 4508.54

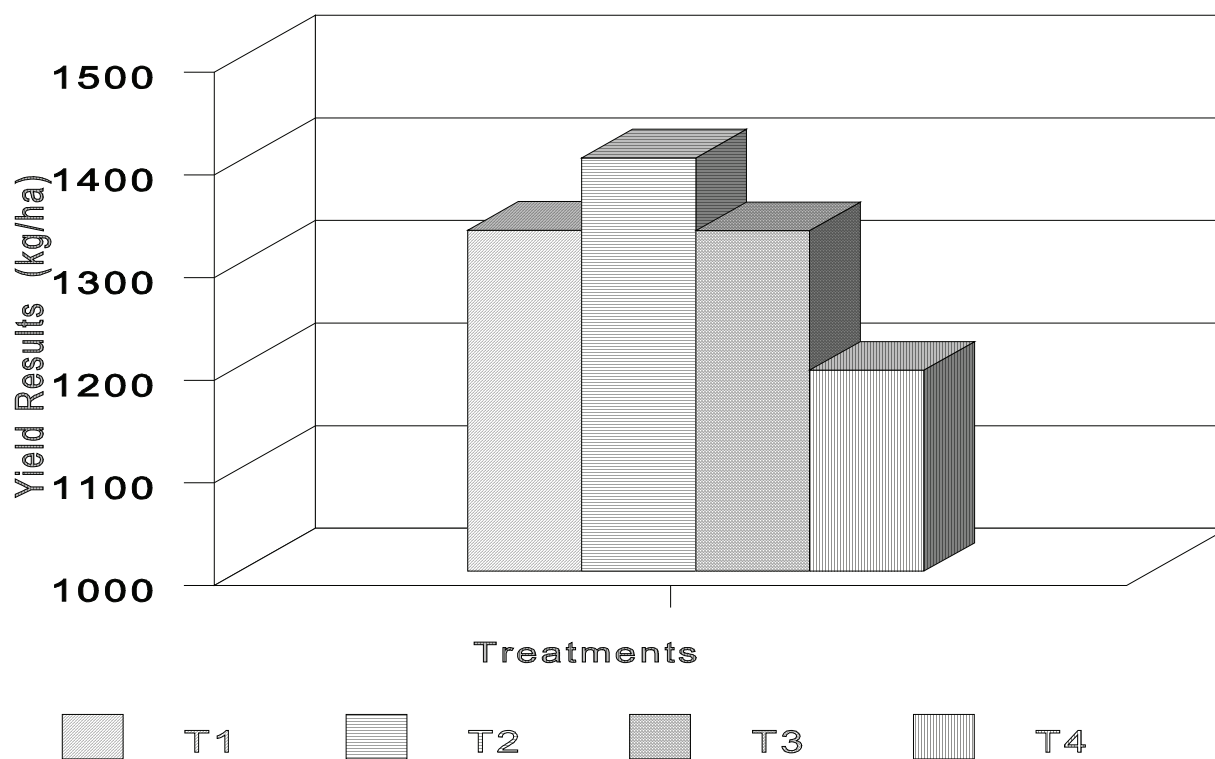


Figure 1. Graph of treatment results.

Table 4 Summary of Crop Weight	
Treatments	Kg/Ha
T1	1332.28
T2	1402.93
T3	1332.00
T4	1195.9

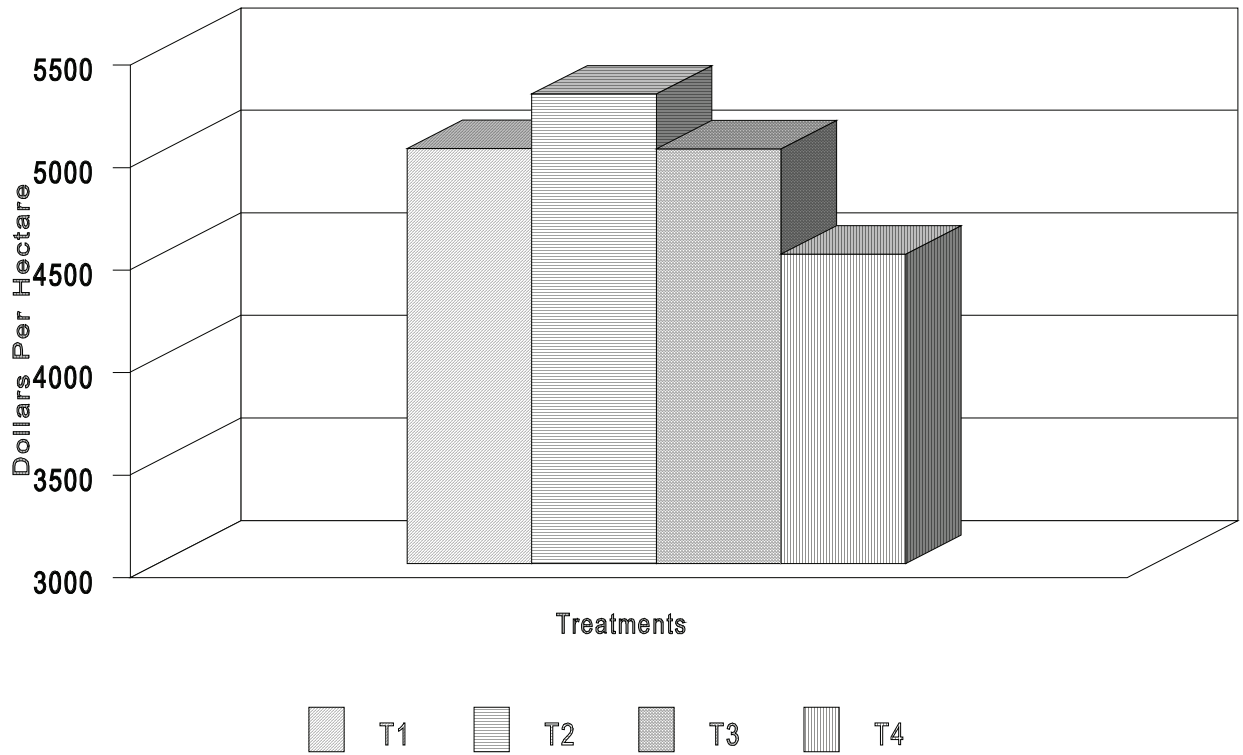


Figure 2. Total crop value in U.S. dollars per hectare.

Table 6 Total Crop Value per Hectare	
T <sub>1</sub>	\$5022.69
T <sub>2</sub>	\$5289.04
T <sub>3</sub>	\$5021.64
T <sub>4</sub>	\$4508.54

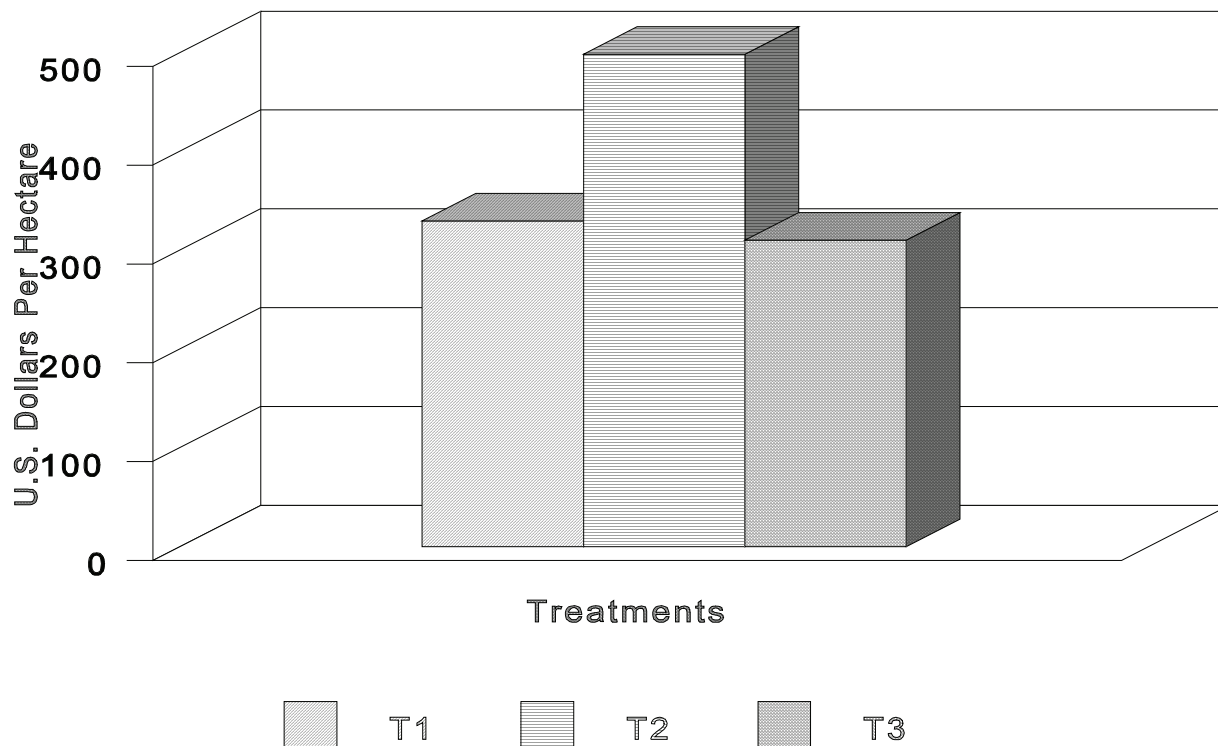


Figure 3. Dollar return per hectare.

Table 7 Dollar Return Per Hectare	
T <sub>1</sub>	\$329.76
T <sub>2</sub>	\$498.33
T <sub>3</sub>	\$310.33

Economic Analysis:

T<sub>1</sub> 4838.30 Minus 4508.54 = US\$ 329.76

T<sub>2</sub> 5006.87 minus 4508.54 = US\$ 498.33

T<sub>3</sub> 4818.56 minus 4508.54 = US\$ 310.33



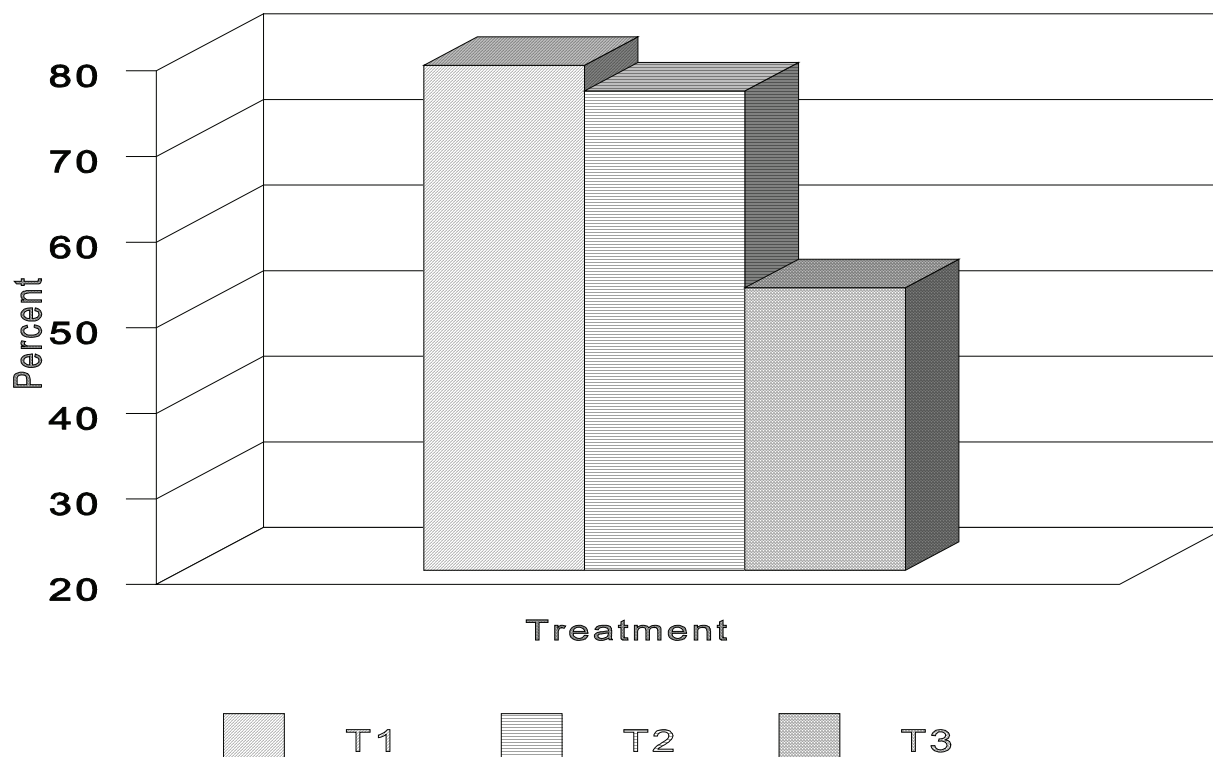


Figure 4. Rate of return on investment.

T <sub>1</sub>	79%
T <sub>2</sub>	76%
T <sub>3</sub>	53%

T1  $\$329.76 / \$184.39 = 1.79$  or 79%  
 T2  $\$498.33 / \$282.17 = 1.76$  or 76%  
 T3  $\$310.33 / \$203.08 = 1.53$  or 53%