[THE ORIGINAL REPORT IS AVAILABLE IN SPANISH]

BIOLOGICAL EFFECTIVENESS STUDY IN ZUCCHINI (CALABACITA) (*CUCURBITA PEPO* L)

FINAL REPORT

"ECOAGRA"

ORGANIC FERTILIZER

COMPANY:
GAXBAR, S.A. DE C.V.

INSTITUTION:
UNIVERSIDAD AUTÓNOMA CHAPINGO

PROFESSOR: ING. OSCAR FERNÁNDEZ FERNÁNDEZ

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INSTITUTION:

UNIVERSIDAD AUTÓNOMA CHAPINGO

TYPE:

ORGANIC FERTILIZER

TITLE:

ECOAGRA BIOLOGICAL EFFECTIVENESS

IN ZUCCHINI

OBJECTIVE:

EVALUATE ECOAGRA'S BIOLOGICAL EFFECTIVENESS

CALABACITA (*CUCURBITA PEPO* L).

SPECIFIC OBJECTIVES:

1. EVALUATE ECOAGRA'S FIELD EFFECTIVENESS IN ZUCCHINI.
2. DETERMINE FITOTOXIC EFECTS.

COMMERCIAL NAME:

ECOAGRA

COMPOSITION

CHART 1. CHARACTERISTICS OF **ECOAGRA**

ELEMENT	%
AMINOÁCIDS	DETERMINED BY LAB

SOURCE: GAXBAR, S.A. DE C.V.

STUDY BEGIN DATE:

17 DECEMBER 2014

STUDY END DATE:

25 FEBRUARY 2015

CROP:

CALABACITA (*CUCURBITA PEPO* L.), VARIEDAD GREY ZUCHINNI

PHENOLOGICAL STATE OF THE PLANT

THE PHENOLOGICAL STATE WAS DURING ALL THE VEGETATIVE DEVELOPMENT, TWO FOLIAR APPLICATIONS WERE MADE, THE FIRST APPLICATION WAS WHEN THE PLANTS PRESENTED FROM TWO TO THREE TRUE LEAVES, AND THE SECOND WAS 20 DAYS AFTER THE FIRST APPLICATION.

TYPE OF SOIL

THE TYPE OF SOIL USED WAS FRANCO, WHICH PRESENTS A BALANCED MIX OF SAND, LIME AND CLAY. ALLOWING A BALANCE BETWEEN PERMEABILITY TO WATER, RETENTION OF THE SAME AND NUTRIENTS.

EXPERIMENTAL DESIGN

THE EXPERIMENTAL DESIGN WAS BLUE BLOCKS WHICH CONSIST OF FOUR TREATMENTS AND 4 REPETITIONS, CONSIDERING AN ABSOLUTE WITNESS WITHOUT ECOAGRA AND THREE TREATMENTS WITH SUCH ORGANIC FERTILIZER AND TWO FOLIAR APPLICATIONS, FOR EACH OF THE TREATMENTS. THEREFORE, 16 EXPERIMENTAL UNITS WERE OBTAINED, WHICH WERE DISTRIBUTED IN A COMPLETELY RANDOMIZED DESIGN (FIGURE 1), WHERE THE TREATMENT IS AND WHEN THE REPETITION IS.

BLOCK I	BLOCK II	BLOCK III	BLOCK IV
T2	T1	T2	T3
T4	T2	T4	T2
T1	T4	T3	T1
T3	T3	T1	T4

FIGURE 1. DISTRIBUTION OF THE TREATMENTS.

DOSIS

CHART 2 SPECIFIES THE TREATMENT AND DOSIS OF ECOAGRA.

CHART 2. TREATMENTS AND DOSIS ECOAGRA

NO.	TREATMENTS	1L IN 300L OF WATER
T1	WITNESS	0
T2	ECOAGRA	0.5
T3	ECOAGRA	0.75
T4	ECOAGRA	1.0

APPLICATION METHOD:

CHART 3

ACTIVITY	DATE
SOWING	DECEMBER 17, 2014
FIRST APPLICATION	JANUARY 15 2015
SECOND APPLICATION	FEBRUARY 04, 2015
DATA AND EVALUATION	FEBRUARY 20, 2015
DATA ANALYSIS AND REPORT	FEBRUARY 25, 2015

OTHER INPUTS USED IN THE EVALUATION

NO OTHER INPUTS WERE USED IN THE DEVELOPMENT OF THE EXPERIMENT IN FIELD OF THE ECOAGRA PRODUCT.

EVALUATION METHOD

TO EVALUATE THE TREATMENTS WITH "ECOAGRA" SEEDS OF CULTIVATION OF CALABACITA (CUCURBITA PEPO L) "VAR" GRAY ZUCCHINI, IN CHARLES OF 200 CAVIDADES, THEN THEY WERE TRANSPLANTED IN LINES OF 1.2 M WIDE, THE TEST WAS CONDUCTED BY APPROXIMATELY TWO MONTHS AND A HALF EVALUATING THE PARAMETERS MENTIONED BELOW, DURING THE WHOLE CROP CYCLE.

VARIABLES OF BIOLOGICAL EFFECTIVENESS

1. FLOWERING DAYS: THE TRANSCURRATED DAYS WERE QUANTIFYED FROM THE TRANSPLANTATION TO THE APPEARANCE OF THE FIRST FLOWER.

2. DAYS TO HARVEST: THE DAYS TRANSCURRED FROM THE TRANSPLANTATION WERE QUANTIFIED UNTIL THE APPEARANCE OF THE FIRST FRUITS.

3. DAYS TO MATURITY OF THE FRUIT: THE DAYS TO MATURITY OF THE FRUIT WAS NOT EVALUATED BECAUSE THEY ARE THE SAME DAYS TO HARVEST SINCE THE FRUIT IS HARVESTED IN THIS STAGE.

4. FRUIT DIAMETER: OF THE 5 PLANTS BY SELECTED TREATMENT, IT WAS MEASURED WITH A DIGITAL VERNIER IN CM.

5. FRUIT LENGTH: OF THE 5 PLANTS BY SELECTED TREATMENT, IT WAS MEASURED WITH A DIGITAL VERNIER IN CM.

6. FRUIT WEIGHT: OF THE 5 PLANTS BY SELECTED TREATMENT, WITH A GRANATARIA BALANCE, THE FRUIT WEIGHT WAS DETERMINED AT THE TIME OF REACHING ITS PHYSIOLOGICAL MATURITY.

7. NUMBER OF FRUITS PER PLANT: OF THE 5 PLANTS BY SELECTED TREATMENT, THE NUMBER OF FRUITS BY PLANT IS QUANTIFY BEFORE THE HARVEST.

8. FRUIT PERFORMANCE: OF THE 5 PLANTS BY SELECTED TREATMENT, IT WAS ESTIMATED IN TON / HA, BASED ON A PLANTATION DENSITY OF 25,000 PLANTS PER HECTARE.

9. IN THE EVENT OF THE PRESENCE FITOTOXIC EFFECTS TO CULTIVATION, THESE WOULD BE EVALUATED THROUGH THE USE OF THE PRE-TRANSFORMED SCALE OF THE EUROPEAN WEED RESEARCH COMPANY (EWRS) SHOWN IN CHART 4.

CHART 4. SCORING SCALE PROPOSED BY THE EUROPEAN WEED RESEARCH SOCIETY (EWRS) TO EVALUATE THE CONTROL OF WEED AND PHYTO-TOXICITY TO CULTIVATION, AND ITS AGRONOMICAL AND PERCENTAGE INTERPRETATION.

CHART 4

VALUE	UNDERGROWTH EFFECT	EFFECT IN CROP
1	COMPLETE DEATH	NO EFFECT
2	VERY GOOD CONTROL	LIGHT SYMPTOMS
3	GOOD ENOUGH	LIGHT SYMPTOMS
4	CONTROL IN THE PRACTICE	SYMPTOMS NOT REFLECTED
5	ACCEPTABLE LIMIT AVERAGE CONTROL	ACCEPTABLE LIMIT
6	REGULAR CONTROL	ELEVATED DAMAGE
7	POOR CONTROL	VERY ELEVATED DAMAGE
8	VERY POOR CONTROL	SEVERE DAMAGE
9	WITHOUT EFFECT	COMPLETE DEATH

CHART 5. TRANSFORMATION TO PERCENT SCALE EWRS

VALOR	% UNDERGROWTH CONTROL	% CROP PHYTOTOXICITY
1	99.0 – 100.0	0.0 – 1.0
2	96.5 – 99.0	1.0 – 3.5
3	93.0 – 96.5	3.5 – 7.0
4	87.5 – 93.0	7.0 – 12.5
5	80.0 – 87.5	12.5 – 20.0
6	70.0 – 80.0	20.0 – 30.0
7	50.0 – 70.0	30.0 – 50.0
8	1.0 – 50.0	50.0 – 99.0
9	0.0 – 1.0	99.0 – 100.0

STATISTIC ANALYSIS

FOR THE STATISTICAL ANALYSIS OF THE RESULTS, AN ANALYSIS OF VARIANCE WAS DONE AND FOR VALUES THAT ARE SIGNIFICANT, A COMPARISON OF STOCKINGS BY TUKEY WAS MADE TO 5% OF PROBABILITY, THROUGH THE SAS V9.0 STATISTICAL PACKAGE.

THE EFFICACY OF THE PRODUCT WAS ALSO CALCULATED IN RELATION TO THE ABSOLUTE WITNESS THROUGH THE ABBOTT FORMULA.

ABBOTT FORMULA:

CA-TA X 100 TA

WHERE:

TA = VALUES OBTAINED FROM THE WITNESS IN THE EVALUATIONS.

CA = VALUES OBTAINED IN THE TREATMENTS IN THE EVALUATIONS.

RESULTS

DAYS TO FLOWERING

IN CHART 6 IT IS OBSERVED THAT THE APPLICATION OF THE ORGANIC FERTILIZER ECOAGRA, DID NOT PRESENT STATISTICAL DIFFERENCES IN COMPARISON WITH THE WITNESS, PRESENTING THE FLOWERING FOR THE DIFFERENT TREATMENTS EVALUATED IN A RANGE OF 35.00 TO 36.25 DAYS.

CHART 6. DAYS TO FLOWERING

Product/Dosis	TREATMENT	Flowering Days	Tukey Signifcance at 95%
WITNESS	T1	35.75	A
ECOAGRA 0.5 L IN 300 L OF WATER	T2	36.25	A
ECOAGRA 0.75 L IN 300 L OF WATER	T3	35.75	A
ECOAGRA 1.0 L IN 300 L OF WATER	T4	35.00	A

DAYS TO HARVEST

IN THIS TEST, THE STATISTICAL ANALYSIS INDICATES THAT THERE ARE DIFFERENCES BETWEEN THE TREATMENTS WITH THE ORGANIC FERTILIZER ECOAGRA AND THE WITNESS, WHERE A DECREASE MAY BE OBSERVED IN THE NECESSARY DAYS FOR

TO ARRIVE AT THE HARVEST STAGE WHEN THE FRUIT HAS ARRIVED AT ITS POINT OF PHYSIOLOGICAL MATURITY, BEING THE TREATMENTS T3 AND T4 WITH THE HIGHEST DOSE OF THE ORGANIC FERTILIZER WHICH OBTAINED THE LOWEST NUMBER OF DAYS WITH A HALF OF 50.50 AND 50.25 DAYS RESPECTIVELY WHILE THE TREATMENT WITNESS THAT WAS THE ONE PRESENTING THE HIGHEST STOCKINGS WAS OF

56.25 DAYS (CHART 7).

CHART 7. DAYS TO HARVEST

Product/Dosis	TREATMENT	Flowering Days	Tukey Signifcance at 95%
WITNESS	T1	56.25	A
ECOAGRA 0.5 L IN 300 L OF WATER	T2	55.00	A
ECOAGRA 0.75 L IN 300 L OF WATER	T3	50.50	B
ECOAGRA 1.0 L IN 300 L OF WATER	T4	50.25	B

ROOT LENGTH

ACCORDING TO THE STATISTICAL ANALYSIS OF TABLE 8, THERE ARE STATISTICAL DIFFERENCES BETWEEN TREATMENTS WITH ECOAGRA AND THE WITNESS. ON AVERAGE THE TREATMENTS WITH ECOAGRA PRESENTED DESIRABLE RESULTS, INCREASING THE LENGTH OF THE ROOT BETWEEN 45.75 AND 48.00 CM, WHILE THE WITNESS PRESENTS A MEDIUM OF 34 CM IN THE LENGTH OF THE ROOT.

IN THIS CASE, THE DOSE OF ECOAGRA THAT PRESENTS BEST RESULTS IS 1.0 L IN 300 L OF GUA WITH 41.18% OF EFFECTIVENESS SUPERIOR TO THE WITNESS. THE RESULTS ARE OBSERVED IN DETAIL IN CHART 8 AND FIGURE 2.

CHART 8. ROOT LENGTH

Product/Dosis	TREATMENT	Flowering Days	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	34.00	B	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	45.75	A	34.56
ECOAGRA 0.75 L IN 300 L OF WATER	T3	46.75	A	37.50
ECOAGRA 1.0 L IN 300 L OF WATER	T4	48.00	A	41.18

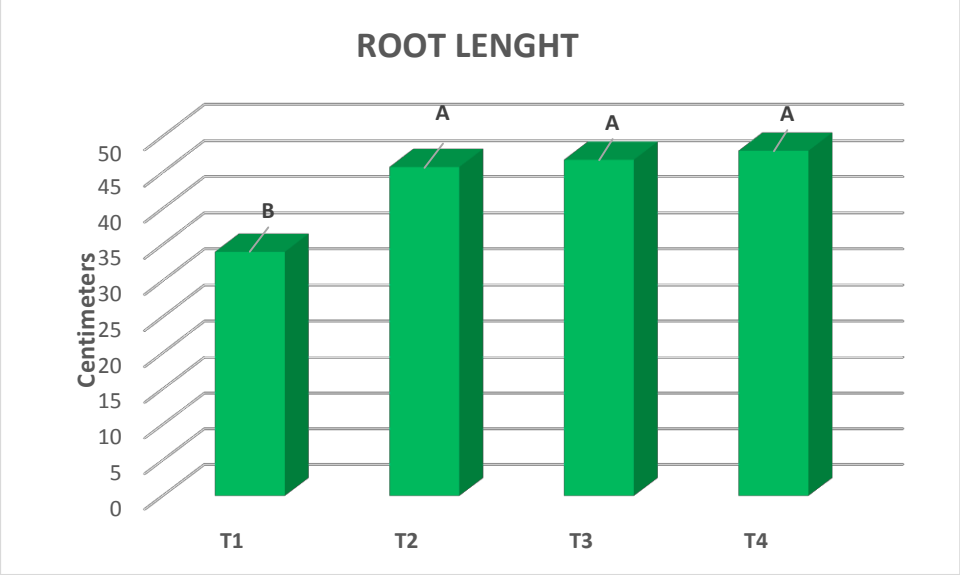

FIGURE 2. ROOT LENGHT

FRUIT DIAMETER

WITH THE APPLICATION OF THE ORGANIC FERTILIZER ECOAGRA, FAVORABLE RESULTS WERE PRESENTED IN THE INCREASE IN THE CALABACITA FRUIT DIAMETER, WHERE, ACCORDING TO THE PROOF OF SEPARATION OF STOCKINGS, STATISTICAL DIFFERENCES WERE PRESENT BETWEEN THE DOSES OF ECOAGRA AND THE WITNESS (TABLE 9 AND FIGURE 3). THE GREATER FRUIT DIAMETER WAS ACHIEVED WITH THE TREATMENT WITH ECOAGRA AT A DOSE OF 1.0 L IN 300 L OF WATER WITH ONE AVERAGE OF 6.05 CM, AS WELL AS THE WITNESS PRESENTS ONLY 5.10 CM. THE TREATMENT WITH THE BEST RESULTS IS NUMBER 4 (ECOAGRA, 1.0 L IN 300 L OF WATER) WITH 18.63% OF BIOLOGICAL EFFECTIVENESS WITH RESPECT TO THE WITNESS (CHART 9).

CHART 9. FRUIT DIAMETER

Product/Dosis	TREATMENT	Fruit Diameter	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	5.10	C	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	5.40	BC	5.88
ECOAGRA 0.75 L IN 300 L OF WATER	T3	5.90	BA	15.69
ECOAGRA 1.0 L IN 300 L OF WATER	T4	6.05	A	18.63

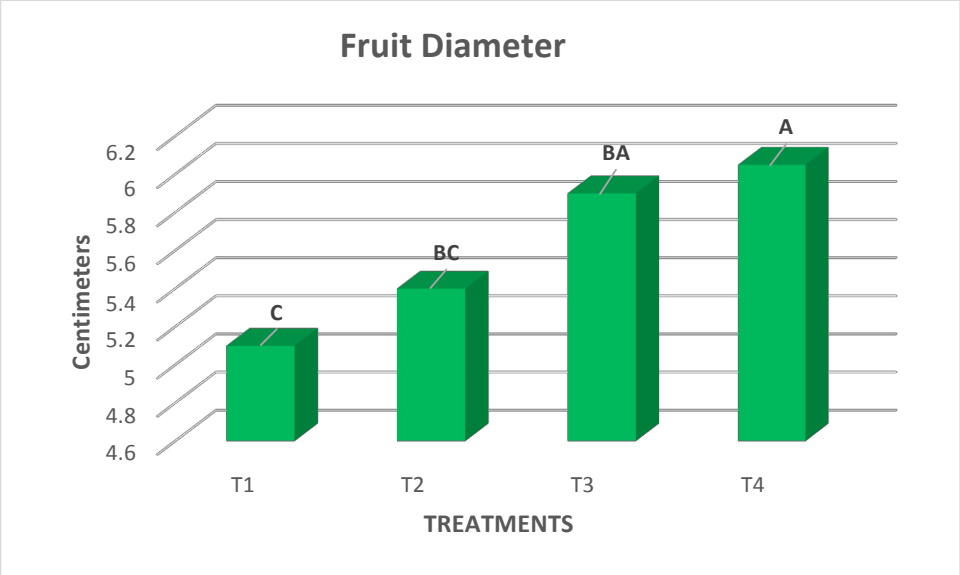

FIGURE 3. FRUIT DIAMETER

FRUIT LENGTH

BASED ON THE VARIANCE ANALYSIS FOR THE VARIABLE LENGTH OF FRUIT PRESENTED IN CHART 10 IT CAN BE OBSERVED THAT THE APPLICATION OF THE ORGANIC FERTILIZER ECOAGRA PRODUCED SIGNIFICANT EFFECTS ON THE VARIABLE LENGTH OF FRUIT BETWEEN THE TREATMENTS WITH SUCH FERTILIZER AND THE WITNESS, AND WHERE THE DOSE OF 1.0 L IN 300 L OF WATER WAS SUPERIOR TO THE REST OF THE TREATMENTS AND TO THE WITNESS WITH A HALF OF 14.32 CM, WHAT

IT REPRESENTS A 22.18% SUPERIOR TO THE WITNESS, SINCE THIS REGISTRATION IS THE LESSER

LENGTH OF FRUITS WITH ONLY 11.72 CM, THIS MEANS THAT THE PRODUCT HELPS INCREASE THE LENGTH OF FRUIT.

CHART 10. FRUIT LENGTH

Product/Dosis	TREATMENT	Fruit Length (cm)	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	11.72	B	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	13.57	A	15.78
ECOAGRA 0.75 L IN 300 L OF WATER	T3	14.35	A	22.44
ECOAGRA 1.0 L IN 300 L OF WATER	T4	14.32	A	22.18

FRUIT WEIGHT

ACCORDING TO THE PROOF OF SEPARATION OF STOCKINGS, THERE ARE STATISTICAL DIFFERENCES BETWEEN THE DOSES OF THE ORGANIC FERTILIZER ECOAGRA AND THE WITNESS AS APPROVED IN CHART 11 AND FIGURE 4, WHERE IT CAN BE SEEN THAT THE HIGHEST DOSE THAT REPRESENT THE TREATMENTS 3 AND 4 (0.75 AND 1.0 L IN 300 L OF WATER) ACHIEVED THE HIGHEST WEIGHT OF FRUIT WITH STOCKINGS OF 169.10 AND 173.53 RESPECTIVELY, REPRESENTING A 20.56 AND 23.72% SUPERIOR TO THE WITNESS WHICH ONLY OBTAINED A MEDIA OF 140.26 GRAMS.

CHART 11. FRUIT WEIGHT

Product/Dosis	TREATMENT	Fruit Weigth (g)	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	140.26	C	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	157.34	B	12.18
ECOAGRA 0.75 L IN 300 L OF WATER	T3	169.10	A	20.56
ECOAGRA 1.0 L IN 300 L OF WATER	T4	173.53	A	23.72

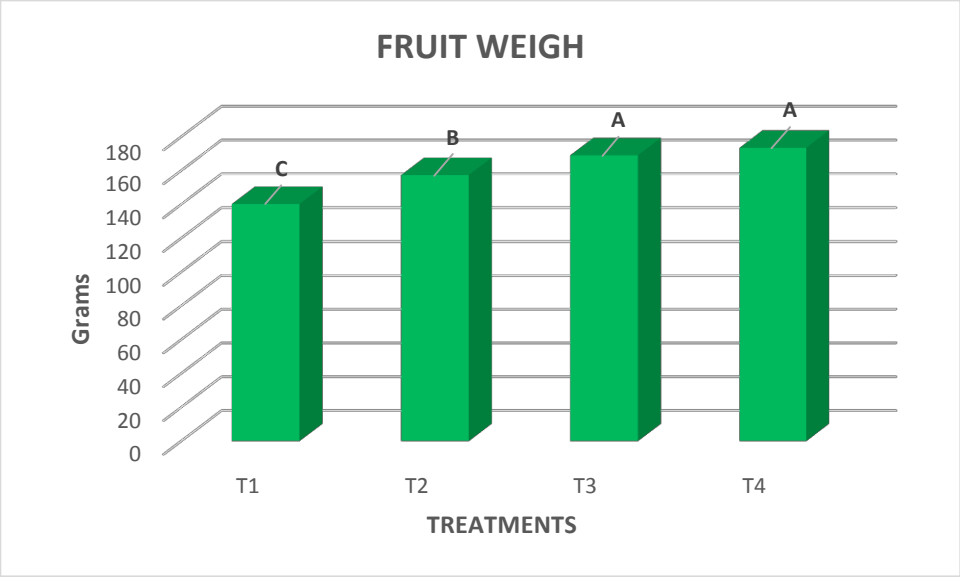

FIGURA 4. FRUIT WEIGHT

FRUITS PER PLANT

BASED ON THE VARIANCE ANALYSIS FOR THE VARIABLE FRUIT BY PLANT THAT IS PRESENTED IN CHART 12 AND FIGURE 5, IT CAN BE OBSERVED THAT THE APPLICATION OF THE ORGANIC FERTILIZER ECOAGRA IN ITS DIFFERENT APPROVED DOSE WAS STATISTICALLY SUPERIOR TO THE WITNESS, AND WHERE THE GREATEST AMOUNT OF FRUITS PER PLANT WAS ACHIEVED WITH THE DOSAGE OF 1.0 L IN 300 L OF WATER BEING SUPERIOR TO THE WITCH IN A 51.85%, SINCE THIS RECORD THE LOWER NUMBER OF FRUITS PER PLANT WITH A MEDIA OF 6.75, THIS MEANS THAT THE PRODUCT HELPS TO INCREASE THE PRODUCTION OF FRUIT BY PLANT.

CHART 12. FRUITS PER PLANT

Product/Dosis	TREATMENT	Fruits Per Plant	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	6.75	B	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	9.00	A	33.33
ECOAGRA 0.75 L IN 300 L OF WATER	T3	9.75	A	44.44
ECOAGRA 1.0 L IN 300 L OF WATER	T4	10.25	A	51.85

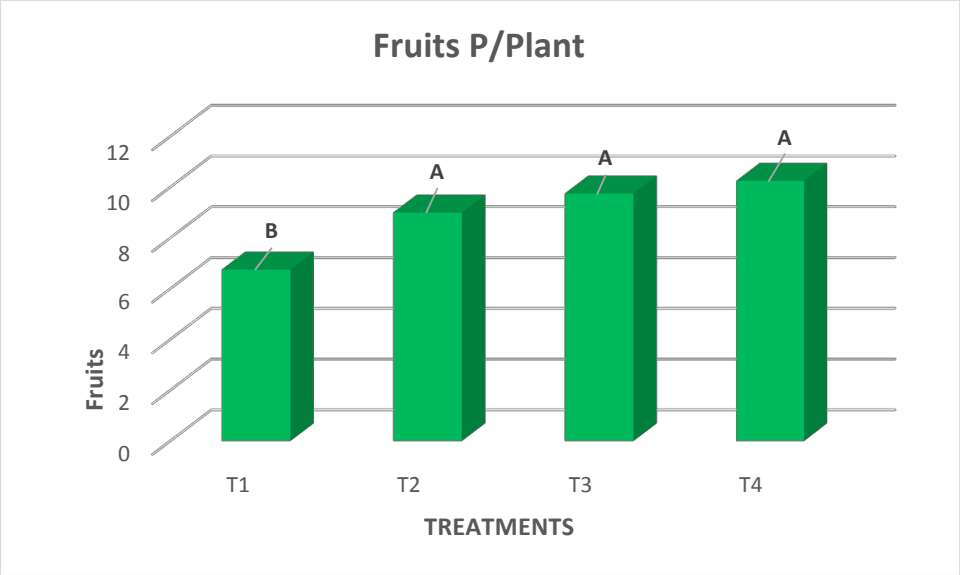

FIGURE 5. FRUITS PER PLANT

PERFORMANCE

ACCORDING TO THE ANALYSIS OF STOCKINGS PRESENTED IN CHART 13 AND FIGURE 6, THERE ARE SIGNIFICANT STATISTICAL DIFFERENCES AMONG THE EVALUATED TREATMENTS. THE TREATMENT THAT PRESENTED THE BEST RESULT AND THEREFORE THE GREATEST PERFORMANCE WAS T4 (ECOAGRA, 1.0 L IN 300 L OF WATER) WITH A HALF OF 44.56 TON / HA AND A BIOLOGICAL EFFECTIVENESS OF 88.41% SUPERIOR WITH RESPECT TO THE WITNESS THAT PRESENTED A AVERAGE OF 23.65 TON / HA AS APPROACHED IN CHART 13.

CHART 13. PERFORMANCE

Product/Dosis	TREATMENT	Performance Tons/Hectares	Tukey Signifcance at 95%	Biological Effectiveness
WITNESS	T1	23.65	C	0.00
ECOAGRA 0.5 L IN 300 L OF WATER	T2	35.39	B	49.64
ECOAGRA 0.75 L IN 300 L OF WATER	T3	41.22	BA	74.29
ECOAGRA 1.0 L IN 300 L OF WATER	T4	44.56	A	88.41

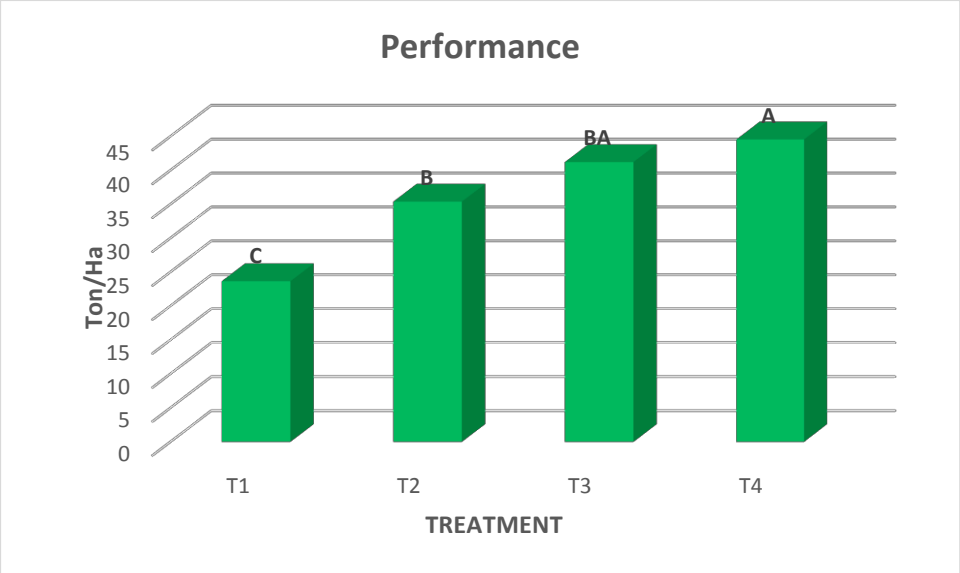

FIGURE 6. PERFORMANCE (TONS/HECTARES)

PHYTOTOXICITY

NONE OF THE TREATMENTS PRESENTED PHYTOTOXICITY BY THE APPLICATION OF ECOAGRA, AT DOSES 0.5, 0.75 AND 1.0 L IN 300 L OF WATER.

CONCLUSIONS

UNDER THE CONDITIONS IN WHICH THIS STUDY WAS CARRIED OUT, THE FOLLOWING IS CONCLUDED:

1. ACCORDING TO THE RESULTS OBTAINED FOR THE VARIABLES EVALUATED IN THIS STUDY, THE USE OF THE ORGANIC FERTILIZER ECOAGRA AT THE DOSE OF 0.5, 0.75 AND 1.0 L IN 300 L OF WATER IS RECOMMENDED, AS IT SHOWED GREATER EFFECTIVENESS WITH RESPECT TO THE WITNESS.

2. THE TREATMENTS WITH APPLICATION OF ECOAGRA, PRODUCED A REDUCTION IN DAYS FOR THE VARIABLES, DAYS TO FLOWERING, AND DAYS TO FRUCTIFICATION.

3. THE APPLICATION OF ECOAGRA PRODUCED POSITIVE RESULTS FOR THE VARIABLES OF, ROOT LENGTH, FRUIT BY PLANT AND FRUIT YIELD.

4. THE TREATMENTS APPLIED WERE SIGNIFICANT AND DETERMINING THE QUALITY OF THE FRUITS, SINCE THE APPLICATION OF THE ORGANIC FERTILIZER ECOAGRA INCREASED THE WEIGHT OF FRUIT, AS WELL AS THE DIAMETER AND LENGTH OF FRUIT.

5. BASED ON THE RESULTS OBTAINED, THE DOSE OF ECOAGRA AT DOSES OF 1.0 L IN 300 L OF WATER IS RECOMMENDED, SO THAT THE USE OF THIS ORGANIC FERTILIZER IN THE PRODUCTION OF THE CULTIVATION OF CALABACITA IS RECOMMENDED.

6. THE USE OF THE ORGANIC FERTILIZER ECOAGRA AT THE DOSE EVALUATED IN THIS STUDY DID NOT CAUSE FITOTOXIC EFFECTS IN THE PLANTS OF CALABACITA, QUALIFYING AS 1 (WITHOUT EFFECT ON THE CULTIVATION) ACCORDING TO THE SCALE OF THE EWRS.

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Signature

APPENDIX
FIELD TESTS AND ANALYSIS
(WORDS IN SPANISH)

Sistema SAS

Procedimiento ANOVA

Información del nivel de clase

Clase	Niveles	Valores
TRA	4	1 2 3 4

Número de observaciones 16

Sistema SAS

Procedimiento ANOVA

Variable dependiente: DFLOR

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	3.18750000	1.06250000	1.24	0.3371
Error	12	10.25000000	0.85416667		
Total correcto	15	13.43750000			

R-cuadrado	Coef Var	Raiz MSE	DFLOR Media
0.237209	2.589734	0.924211	35.68750

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	3.18750000	1.06250000	1.24	0.3371

Sistema SAS

Procedimiento ANOVA

Variable dependiente: DCOS

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F

Modelo	3	113.5000000	37.8333333	13.16	0.0004
Error	12	34.5000000	2.8750000		
Total correcto	15	148.0000000			

R-cuadrado	Coef Var	Raiz MSE	DCOS Media
0.766892	3.199212	1.695582	53.00000

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	113.5000000	37.8333333	13.16	0.0004

Sistema SAS

Procedimiento ANOVA

Variable dependiente: LONGRA

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	504.2500000	168.0833333	53.79	<.0001
Error	12	37.5000000	3.1250000		
Total correcto	15	541.7500000			

R-cuadrado	Coef Var	Raiz MSE	LONGRA Media
0.930780	4.052188	1.767767	43.62500

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	504.2500000	168.0833333	53.79	<.0001

Sistema SAS

Procedimiento ANOVA

Variable dependiente: DIAFRU

		Suma de	Cuadrado de

Fuente	DF	cuadrados	la media	F-Valor	Pr > F
Modelo	3	2.32750000	0.77583333	9.40	0.0018
Error	12	0.99000000	0.08250000		
Total correcto	15	3.31750000			

R-cuadrado	Coef Var	Raiz MSE	DIAFRU Media
0.701583	5.117650	0.287228	5.612500

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	2.32750000	0.77583333	9.40	0.0018

Sistema SAS

Procedimiento ANOVA

Variable dependiente: LONFRU

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	18.23687500	6.07895833	34.86	<.0001
Error	12	2.09250000	0.17437500		
Total correcto	15	20.32937500			

R-cuadrado	Coef Var	Raiz MSE	LONFRU Media
0.897070	3.094635	0.417582	13.49375

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	18.23687500	6.07895833	34.86	<.0001

Sistema SAS

Procedimiento ANOVA

Variable dependiente: PESFRU

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	2650.980350	883.660117	54.45	<.0001
Error	12	194.762450	16.230204		
Total correcto	15	2845.742800			

R-cuadrado	Coef Var	Raiz MSE	PESFRU Media
0.931560	2.516977	4.028673	160.0600

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	2650.980350	883.660117	54.45	<.0001

Sistema SAS

Procedimiento ANOVA

Variable dependiente: FRUPLAN

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	28.68750000	9.56250000	11.20	0.0009
Error	12	10.25000000	0.85416667		
Total correcto	15	38.93750000			

R-cuadrado	Coef Var	Raiz MSE	FRUPLAN Media
0.736758	10.34083	0.924211	8.937500

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	28.68750000	9.56250000	11.20	0.0009

Sistema SAS

Procedimiento ANOVA

Variable dependiente: REND

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	1012.545472	337.515157	18.71	<.0001
Error	12	216.515513	18.042959		
Total correcto	15	1229.060986			

R-cuadrado	Coef Var	Raiz MSE	REND Media
0.823837	11.73156	4.247700	36.20745

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	1012.545472	337.515157	18.71	<.0001

Sistema SAS

Procedimiento ANOVA

Variable dependiente: FITO

Fuente	DF	Suma de cuadrados	Cuadrado de la media	F-Valor	Pr > F
Modelo	3	0	0	.	.
Error	12	0	0		
Total correcto	15	0			

R-cuadrado	Coef Var	Raiz MSE	FITO Media
0.000000	.	0	0

Fuente	DF	Anova SS	Cuadrado de la media	F-Valor	Pr > F
TRA	3	0	0	.	.

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para DFLOR

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	0.854167
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	1.9402

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	36.2500	4	2
A			

A	35.7500	4	1
A			
A	35.7500	4	3
A			
A	35.0000	4	4

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para DCOS

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	2.875
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	3.5595

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	56.250	4	1
A			
A	55.000	4	2
B	50.500	4	3
B			
B	50.250	4	4

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para LONGRA

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12

Error de cuadrado medio	3.125
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	3.711

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	48.000	4	4
A			
A	46.750	4	3
A			
A	45.750	4	2
B	34.000	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para DIAFRU

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	0.0825
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	0.603

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento		Media	N	TRA
	A	6.0500	4	4
	A			
B	A	5.9000	4	3
B				
B	C	5.4000	4	2
	C			
	C	5.1000	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para LONFRU

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	0.174375
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	0.8766

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	14.3500	4	3
A			
A	14.3250	4	4
A			
A	13.5750	4	2
B	11.7250	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para PESFRU

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	16.2302
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	8.4572

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	173.533	4	4
A			
A	169.105	4	3
B	157.343	4	2
C	140.260	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para FRUPLAN

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	0.854167
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	1.9402

Medias con la misma letra no son significativamente diferentes.

Tukey Agrupamiento	Media	N	TRA
A	10.2500	4	4
A			
A	9.7500	4	3
A			
A	9.0000	4	2
B	6.7500	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para REND

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	18.04296
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	8.917

Medias con la misma letra no son significativamente diferentes.

Tukey	Agrupamiento		Media	N	TRA
		A	44.560	4	4
		A			
	B	A	41.220	4	3
	B				
	B		35.397	4	2
		C	23.654	4	1

Sistema SAS

Procedimiento ANOVA

Prueba del rango estudentizado de Tukey (HSD) para FITO

NOTA: Este test controla el índice de error experimentwise de tipo I, pero normalmente tiene un índice de error de tipo II más elevado que REGWQ.

Alfa	0.05
Error de grados de libertad	12
Error de cuadrado medio	0
Valor crítico del rango estudentizado	4.19852
Diferencia significativa mínima	0

Medias con la misma letra no son significativamente diferentes.

Tukey	Agrupamiento	Media	N	TRA
	A	0	4	1
	A			
	A	0	4	2
	A			
	A	0	4	3
	A			
	A	0	4	4