

Report of validation test results

Kyminasi Plant Crop Booster



Con FIRA ¡SÍ es posible!

May 2023



Validation of Kyminasi Plant Crop Booster Microtransmitter in Broccoli

Results

Objective: Determine the effect of the emission of low frequency waves on the productive capacity of crops.

Sowing date: November 15, 2022

Transplant date: December 10, 2022

Harvest date: March 31 – April 16, 2023

Variety: Super Diamante

Treatment	Characteristics
KPCB	Sector with microtransmitter
Control	Sector without microtransmitter

- Area per treatment: 5,000 m²
- Drip irrigation
- Final trial population density: 33,000
- Phytosanitary: # applications



[1] Micro transmitter price: 2,267 dollars (\$46,335) + \$850 installation costs. Shelf life: 2 years (4 production cycles). \$11,796.3/cycle Peso parity: \$17.38/dollar

Results

Sale price: \$ 9.79 / kg

Variaty	Control	KPCB
Yield (kg/5000 m ²)	5,796	6,056
Production cost	\$ 42,831	\$ 48,729
Income	56,746	\$ 59,300
Utility	\$ 13,915	\$ 10,571
Cost per kg	\$ 7.39	\$ 8.05
Rel B/C	1.32	1.22
Balance Point (kg)	4,375	4,977

Conclusions

- In the first trial, KPCB produced an average weight of pellets of 627 grams and the control of 547 grams. The performance was 4.5% higher and its profit margin lower than the control.
- Validation is expected to last 4 production cycles.

Crop: **Broccoli**

Variety: Super diamante

Sowing date: 11/15/2022

Trasplant: 12/11/2022

Growth: 12/30/2022



Crop: **Saladette Tomato**

Variety: Hanna y Seletto

Sowing Date: 10/07/22

Trasplant: 11/24/22

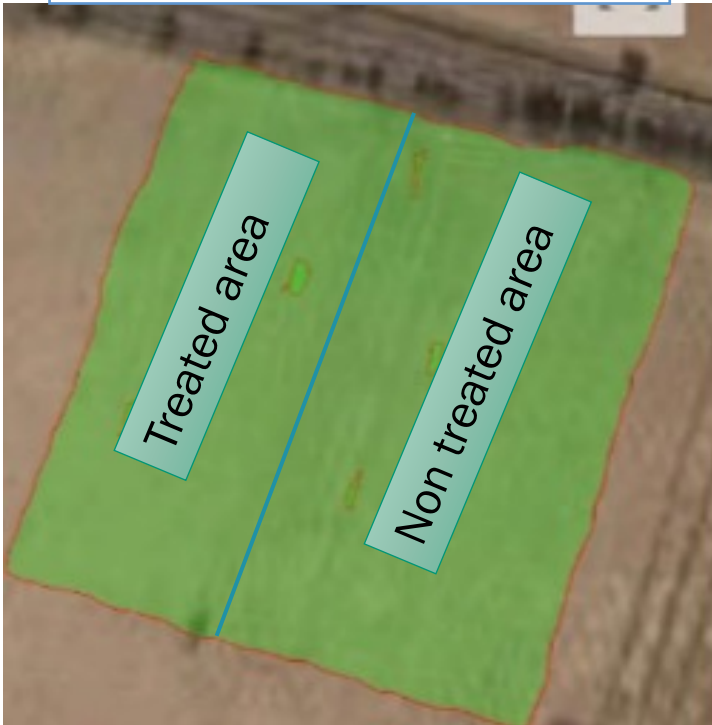
Growth and Blooming: 01/06/23

Blooming and fruit filling: 01/23/23



Phytosanitary sampling

Trial site image



Without tratamiento		
Concept	Total ^[1]	Average
Diamondback worm	22	2.2
Trips	27	2.7
Alternaria brassicicola	0	0
Ladybugs	0	0
Harlequin bug	0	0
Lygus bug	3	0.3
Lacewing	5	0.5
Diabrotic	0	0
Fake meter worm	0	0
Hernia	0	0
Mildew	0	0
Delia fly	0	0
Green aphid	103	10.3

With tratamiento		
Concept	Total ^[1]	Average
Diamondback worm	23	2.3
Trips	45	4.5
Alternaria brassicicola	0	0
Ladybugs	0	0
Harlequin bug	0	0
Lygus bug	1	0.1
Lacewing	9	0.9
Diabrotic	0	0
Fake meter worm	0	0
Hernia	0	0
Mildew	0	0
Delia fly	0	0
Green aphid	138	13.8

[1] Number of plants with findings in the existing population in 3 sampling points of 5 linear meters each.

Broccoli Plant Status



Area without treatment			
Date	Height (cm)	Coverage	Number of Leaves
02/21/2023	35	82.5	19
	30	61	15
	32	68.5	14
Average	32.3	70.7	16

Area with treatment			
Date	Height (cm)	Coverage	Number of Leaves
02/21/2023	36	91	16
	37	77	17
	30	69.5	15
Average	34.3	79.2	16

Chlorophyll level and sap analysis in the broccoli crop

Tissue analysis in broccoli crop **With treatment**

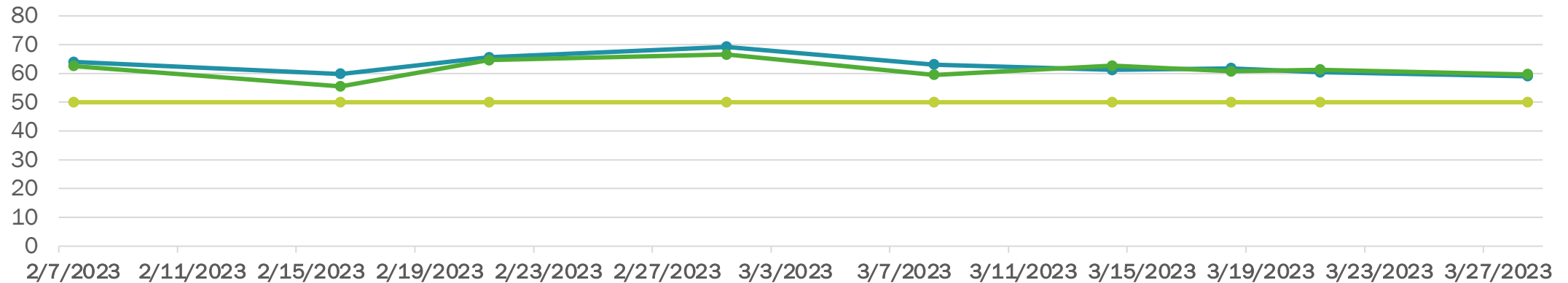
Variables	02/07/2023	02/16/2023	02/21/2023	03/01/2023	03/08/2023	03/14/2023	03/18/2023	03/21/2023	03/28/2023	Average
Nitrates (ppm)	5300	7800	6000	1700	9400	910	4000	4300	3100	4723
Potassium (ppm)	760	840	410	560	420	1900	500	890	1000	808.888889
Calcium (ppm)	480	400	840	480	700	480	660	500	700	582
Sodium (ppm)	77	77	65	56	85	58	79	79	67	71.4444444
Brix degrees	5.5	6	5	4.5	5	5	4	5	5	5
Chlorophyll (U.SPAD)	64	60	65.6	69.2	63.1	61.2	61.8	60.4	59	63

Tissue analysis in broccoli crop **Without treatment**

Variables	02/07/2023	02/16/2023	02/21/2023	03/01/2023	03/08/2023	03/14/2023	03/18/2023	03/21/2023	03/28/2023	Average
Nitrates (ppm)	4800	6900	5100	4800	4000	4000	4000	3500	4000	4567
Potassium (ppm)	830	680	390	790	510	2400	890	900	690	898
Calcium (ppm)	510	580	800	500	330	530	450	540	460	522
Sodium (ppm)	120	100	65	60	71	69	56	65	76	76
Brix degrees	6.5	6	5.5	5.5	4.8	5	5	4	6	5
Chlorophyll (U.SPAD)	63	56	64.6	66.6	59.5	62.7	60.7	61.3	59.7	61

Chlorophyll measurement graph in broccoli

Nivel de Clorofila U.Spad



—●— Nivel de clorofila con Tratamiento

—●— Nivel de clorofila Sin tratamiento

—●— Nivel de clorofila Objetivo

Broccoli Yield

With Treatment			
Number of repetitions	Total of plants[1]	Number of plants with lumps	Number of harvested plants
Row 1	236	62	174
Row 2	292	143	149
Row 3	244	60	184
Row 4	253	80	173
Row 5	330	85	245
Row 6	282	65	217
Row 7	264	102	162
Row 8	248	72	176
Row 9	254	78	176
Row 10	275	84	191
Row 11	286	91	195
Row 12	298	102	196
Row 13	305	121	184
Row 14	270	88	182
Row 15	294	67	227

20.7 Ton/ha

Without Treatment			
Number of repetitions	Total of plants[1]	Number of plants with lumps	Number of harvested plants
Row 1	175	98	77
Row 2	102	78	24
Row 3	385	223	162
Row 4	365	215	150
Row 5	343	165	178
Row 6	387	284	103
Row 7	327	170	157
Row 8	264	200	64
Row 9	390	254	136
Row 10	287	190	97
Row 11	298	178	120
Row 12	304	154	150
Row 13	286	187	99
Row 14	291	190	101
Row 15	320	234	86

18.09 Ton/ha

Inflorescence weight (g)

- With treatment: 626.6
- Without treatment: 546.6

Inflorescence diameter (in)

- With treatment: 7.4
- Without treatment: 7.4

Root length (cm)

- With treatment: 25.4
- Without treatment: 25.2

Coverage diameter (cm)

- With treatment: 79.2
- Without treatment: 70.7

[1] 33.000 plantas en 10.000 m2

Yield Data on Broccoli Crop

Number of repetitions	Weight per Head (g) (With treatment)	Weight per Head (g) (Without treatment)
1	539	498
2	740	460
3	640	300
4	720	440
5	580	680
6	500	420
7	640	600
8	520	520
9	1200	980
10	420	400
11	460	520
12	500	760
13	460	760
14	480	320
15	480	420
16	500	660
17	500	460
18	520	600
19	600	540
20	740	420
21	580	540
22	400	800
23	840	520
24	760	840
25	740	420
26	860	580
27	540	800
28	560	560
29	960	1.02
30	820	580
Average	626.6	546.6



Without treatment



With treatment

Soil moisture and EC data

Humidity comparison with equipment B. L			
Date		With treatment	Without treatment
02/24/2023	EC	2.76	2.44
	Humidity (%)	57	47
	Temp (°F)	59.5	58.3
02/24/2023	EC	2.37	2.39
	Humidity (%)	48	56
	Temp (°F)	59.9	60.4
02/28/2023	EC	2.54	2.71
	Humidity (%)	58	61
	Temp (°F)	61	62.2
03/01/2023	EC	2.3	2.38
	Humidity (%)	49	46
	Temp (°F)	60.4	61.5
03/02/2023	EC	1.95	2.09
	Humidity (%)	46	44
	Temp (°F)	58.8	60.1
03/03/2023	EC	1.57	1.95
	Humidity (%)	48	59
	Temp (°F)	59.4	55.9



Bluelab Pulse Meter

Sap analysis in Saladette Tomato (Hanna)

Tissue analysis in greenhouses 1 (Hanna) With treatment												
Variables	02/07/2023	02/13/2023	02/21/2023	02/27/2023	03/13/2023	03/22/2023	03/28/2023	04/03/2023	04/11/2023	04/19/2023	04/24/2023	Average
Nitrates (NO3)(ppm)	2400	3300	1800	3500	3000	3000	2000	2200	2700	2300	2900	2645
Potassium (ppm)	690	670	780	1700	2600	1900	1800	1100	1550	1200	1700	1426
Calcium (ppm)	770	950	540	960	680	858	1000	1100	1300	890	1200	932
Sodium (ppm)	80	74	80	72	78	59	70	51	42	52	65	66
Brix degrees	9	6	8	9	4.5	5	7	6	7	6	7.5	7
Chlorophyll (U.SPAD)	55	57	55	52.5	48.5	50.7	45.9	52.6	53.2	51.4	51.8	52

Tissue analysis in greenhouses 1 (Hanna) Without treatment												
Variables	02/07/2023	02/13/2023	02/21/2023	02/27/2023	03/13/2023	03/22/2023	03/28/2023	04/03/2023	04/11/2023	04/19/2023	04/24/2023	Average
Nitrates (NO3)(ppm)	2200	2200	2200	2500	2600	3200	2700	1500	2800	1900	5900	2700
Potassium (ppm)	690	530	670	568	2900	2000	2100	1500	1200	2500	2100	1523
Calcium (ppm)	800	990	960	900	1000	970	800	1100	1000	1000	300	893
Sodium (ppm)	67	71	150	110	65	53	66	54	76	78	60	77
Brix degrees	8.5	7	7	8	7	8	7	6	10	7	4	7
Chlorophyll (U.SPAD)	55	54	52.3	51.3	47	49.8	47.8	50.7	50.5	51.8	50.1	51

Sap analysis in Saladette Tomato (Seletto)

Tissue analysis in greenhouses 1 (Hanna) **With treatment**

Variables	02/07/2023	02/13/2023	02/21/2023	02/27/2023	03/13/2023	03/22/2023	03/28/2023	04/03/2023	04/11/2023	04/19/2023	04/24/2023	Average
Nitrates (NO3)(ppm)	2200	1800	2900	2700	4200	2300	3000	3000	4300	2900	2000	2845
Potassium (ppm)	710	640	440	507	2900	1200	2000	1000	1500	1000	1300	1200
Calcium (ppm)	480	1200	780	560	1200	120	1000	890	1100	900	1900	921
Sodium (ppm)	76	45	79	75	91	78	50	45	39	39	46	60
Brix degrees	7	7.5	7	7	5.5	6.7	6	5	6	8	8.5	7
Chlorophyll (U.SPAD)	53	60	53.2	52.5	50.5	56.5	50.3	52.6	49.8	42.9	45.9	52

Tissue analysis in greenhouses 1 (Hanna) **Without treatment**

Variables	02/07/2023	02/13/2023	02/21/2023	02/27/2023	03/13/2023	03/22/2023	03/28/2023	04/03/2023	04/11/2023	04/19/2023	04/24/2023	Average
Nitrates (NO3)(ppm)	1700	3600	4300	4200	2900	1800	3200	4300	2400	2500	5000	3264
Potassium (ppm)	580	550	800	1500	2800	900	1500	1500	1400	1200	1500	1294
Calcium (ppm)	720	1400	770	870	960	850	1500	1100	1500	1000	910	1053
Sodium (ppm)	94	52	82	76	97	66	76	43	45	65	46	67
Brix degrees	7	5	8	9	5.5	7	8	7	10	7.3	7.5	7
Chlorophyll (U.SPAD)	52	58	50.3	53.1	43.3	47.2	45.3	52.3	49.3	51.2	53.9	51

Monitoring morphological parameters tomato var. Hanna

Monitoring of growth gain in Treated Zone (Hanna)

Date	Stem Width (cm)	Growth gain (cm)	Average Stem length (cm)	Chlorophyll I	Health
01/23/2023	1.12	18.75	117.00	52.53	healthy/vigorous
01/30/2023	1.08	20.00	137.00	52.77	healthy/vigorous
02/07/2023	1	22.33	159.00	57.33	healthy/vigorous
02/13/2023	1	20.17	179.80	54.82	healthy/vigorous
02/21/2023	1	25.00	204.00	58.25	healthy/vigorous
02/27/2023	1	18.67	222.67	53.45	healthy/vigorous
03/06/2023	1	20.67	243.33	54.27	healthy/vigorous
03/13/2023	1	18.17	261.50	48.78	mildew
03/20/2023	1	19.92	281.42	50.62	mildew
03/27/2023	1	17.50	298.92	50.68	mildew
04/04/2023	1	14.00	312.92	50.02	mildew

1.02

19.6

219.8

53

Monitoring of growth gain in Non treated Zone (Hanna)

Date	Stem Width (cm)	Growth gain (cm)	Average Stem length (cm)	Chlorophyll II	Health
01/23/2023	1.07	25.67	116.84	51.20	healthy/vigorous
01/30/2023	1.12	21.67	138.50	57.78	healthy/vigorous
02/07/2023	1	21.67	160.00	54.20	healthy/vigorous
02/13/2023	1.01	18.00	178.67	53.15	healthy/vigorous
02/21/2023	1.00	25.33	204.00	53.08	healthy/vigorous
02/27/2023	1.03	18.67	222.67	53.45	healthy/vigorous
03/06/2023	1.05	20.67	243.33	54.27	healthy/vigorous
03/13/2023	1	18.17	261.50	48.78	mildew
03/20/2023	1	19.92	281.42	50.62	mildew
03/27/2023	1	17.50	298.92	50.68	mildew
04/04/2023	1	14.00	312.92	50.02	mildew

1.03

20.1

219.9

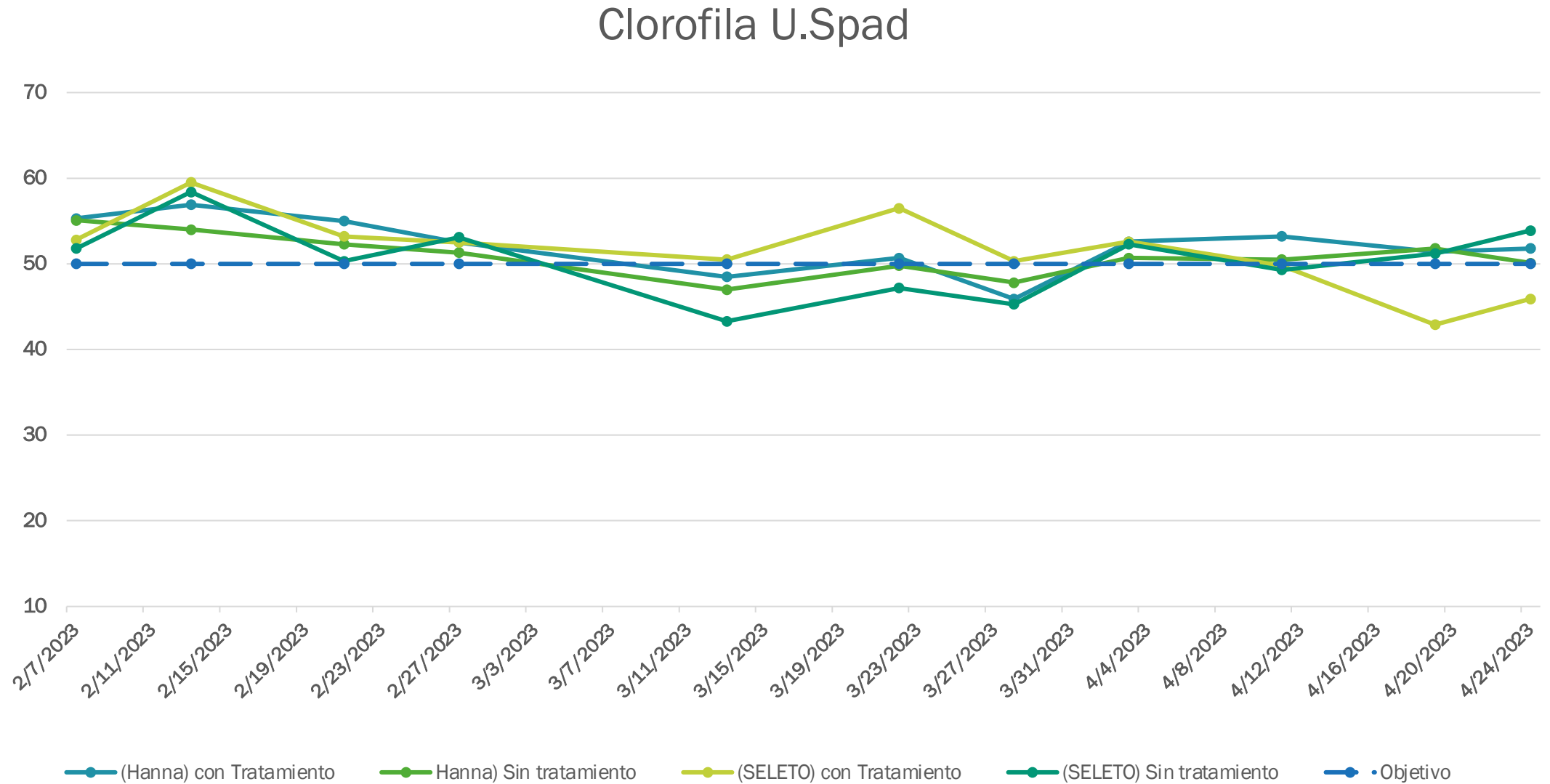
52.5

Monitoring morphological parameters tomato var. Seletto

Area with Treatment (Seletto)					
Date	Stem Width (cm)	Growth gain (cm)	Average Stem length (cm)	Chlorophyll	Health
01/23/2023	1.15	21.00	109.83	50.67	healthy/vigorous
01/30/2023	1.07	19.67	129.50	57.50	healthy/vigorous
02/07/2023	1	21.00	135.00	49.92	healthy/vigorous
02/13/2023	1.00	18.67	168.83	54.43	healthy/vigorous
02/21/2023	1.00	19.83	188.67	55.35	healthy/vigorous
02/27/2023	1.02	17.00	205.67	54.83	healthy/vigorous
03/06/2023	1.21	22.00	227.67	52.22	healthy/vigorous
03/13/2023	0.88	16.67	244.33	49.68	mildew
03/20/2023	0.86	18.83	263.17	50.53	mildew
03/27/2023	0.91	17.00	280.17	48.70	mildew
04/04/2023	0.75	18.67	298.83	49.85	mildew

Area without Treatment (Seletto)					
Date	Stem Width (cm)	Growth gain (cm)	Average Stem length (cm)	Chlorophyll	Health
01/23/2023	1.22	21.50	109.00	54.88	healthy/vigorous
01/30/2023	1.12	20.67	129.50	53.33	healthy/vigorous
02/07/2023	1	21.67	151.50	55.92	healthy/vigorous
02/13/2023	1.03	19.33	171.17	49.80	healthy/vigorous
02/21/2023	0.86	20.83	192.00	49.65	healthy/vigorous
02/27/2023	0.81	20.00	212.00	50.05	healthy/vigorous
03/06/2023	0.88	21.00	233.00	49.47	healthy/vigorous
03/13/2023	0.79	17.67	250.67	49.47	mildew
03/20/2023	0.91	19.33	270.75	50.85	mildew
03/27/2023	0.91	19.33	290.08	50.85	mildew
04/04/2023	0.82	19.50	300.58	47.08	mildew

Tomato chlorophyll measurement graph



Tomato Yield

Sampling of 256 stems per treatment

Date	Hanna Quality (with treatment)				
	First (Kg)	Second (Kg)	Third (Kg)	Waste (Kg)	Total (kg)
03/09/2023	11.1	11.3	3.7	0	26.1
03/14/2023	24.6	17.8	13.7	15	71.1
03/30/2023	22.7	32.5	17.6	13	85.8
04/06/2023	22.1	27.9	20.8	17.1	87.9
04/14/2023	28.9	30.1	27.5	25.8	112.3
04/19/2023	15	30.1	25.1	28.9	99.1
04/26/2023	18.8	20.2	13.4	31.3	83.7
05/03/2023	10.7	17.2	18.1	20.7	66.7
05/10/2023	7.9	10.1	14.4	23.5	55.9
Total	161.8	197.2	154.3	175.3	688.6
Quality Percentage (%)	24	29	22	25	

Date	Seletto Quality (with treatment)				
	First (Kg)	Second (Kg)	Third (Kg)	Waste (Kg)	Total (kg)
03/09/2023	10.18	11.34	3.74	0	25.26
03/14/2023	16.8	18.8	17.8	17.5	70.9
03/30/2023	33.2	35.7	28.6	23	120.5
04/06/2023	23.7	30.5	21.8	19	95
04/14/2023	22.7	28.4	19.2	25.8	96.1
04/19/2023	20.6	27.5	21.1	30.1	99.3
04/26/2023	18.6	24.7	29.4	22.7	95.4
05/03/2023	10	18.3	22.5	26.5	77.3
05/10/2023	6.9	12.6	17.8	19.7	57
Total	162.68	207.84	181.94	184.3	736.76
Quality Percentage (%)	22	28	25	25	

Date	Hanna Quality (without treatment)				
	First (Kg)	Second (Kg)	Third (Kg)	Waste (Kg)	Total (kg)
03/09/2023	12.18	7.64	4.48	0	24.3
03/14/2023	21.7	19.7	13.7	8.86	63.96
03/30/2023	28.1	27.1	16.1	10.4	81.7
04/06/2023	21.6	30.4	21.3	19.3	92.6
04/14/2023	31	33.4	28.38	28.62	121.4
04/19/2023	16.8	21.9	19.3	27.2	85.2
04/26/2023	19.2	23.7	12.8	30.6	86.3
05/03/2023	9.7	21.1	16.4	22.5	69.7
05/10/2023	6.9	15.5	11.8	17.7	51.9
Total	167.18	200.44	144.26	165.18	677.06
Quality Percentage (%)	25	30	21	24	

Date	Seletto Quality (without treatment)				
	First (Kg)	Second (Kg)	Third (Kg)	Waste (Kg)	Total (kg)
03/09/2023	13.12	4.58	1.76	0	19.46
03/14/2023	29.8	27.6	16.6	10.5	84.5
03/30/2023	34.3	26.7	17.1	14.1	92.2
04/06/2023	21	29.3	18.3	21	89.6
04/14/2023	24.1	30.1	24.4	27.2	105.8
04/19/2023	19.5	20.4	27.6	28.3	95.8
04/26/2023	20.4	21.6	23.5	26.3	91.8
05/03/2023	13.6	17.6	21.3	21.5	74
05/10/2023	9.2	15.5	16.3	21.4	62.4
Total	185.02	193.38	166.86	170.3	715.56
Quality Percentage (%)	26	27	23	24	

Kyminasi:
24,251 kg/ha
7.3 Kg/m2

Control:
24,805 kg/ha
7.5 kg/m2

Comparison of water consumption in tomato

Area without treatment ^[1]		
Variable	Input (lts)	Output (lts)
Collected / Bag	553.78	182.39
Greenhouse volumes	1,346,793	443,564
Difference (lts)	903,229	
% recovery	33	
Water footprint (lt/kg)	36.4	

[1] 2432 issuers-bags

Area with treatment ^[2]		
Variable	Input (lts)	Output (lts)
Collected / Bag	414.63	131.29
Greenhouse volumes	1,061,453	336,102.4
Difference (lts)	725,350.6	
% recovery	32	
Water footprint (lt/kg)	30	

[1] 2560 issuers-bags

Conclusions

- In the first trial with broccoli, the treatment with KPCB showed greater plant development, expressed in height and degree of foliage coverage. The yield potential was 20.7 tons/ha, 14% higher than the control, where the average weight of pellets in KPCB was 627 grams, 15% higher than the control. From the point of view of commercialized production, it was 4.5% higher and with a lower profit margin due to the investment in the microtransmitter.
- In greenhouse tomatoes, no significant differences in vigor and health were identified. Regarding performance, the control surpassed the treatment with KPCB by 3%. In water productivity, a lower volume of water used for harvested production was observed, obtaining a water footprint of 30 liters per kilogram produced with KPCB, while the control averaged 36 liters.

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Con FIRA ¡Sí es posible!

