THE EFFECT OF AgTonik's MLG-50™ ON YIELD AND MINERAL CONTENT WHEN APPLIED TO THE CULIVATION OF CELEBRITY® TOMATOES

Results of a Study Conducted by AgTonik, LLC

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Study Coordinator: *Ralf K. Ostertag*
Analytical Research Laboratory: *Advanced Laboratories*
Analytical Chemist: *Shane Schupe*
Horticultural Management: *Ralf K. Ostertag*
Conducted By: *AgTonik, LLC*

INTRODUCTION

MLG-50™ is from a rare mineral deposit that is rich in minerals and organic acids. Manufactured by AgTonik of Portage, Michigan, MLG-50™ has been found to promote the health and growth of plants increasing crop yields substantially.

A previous study (publication number: M502316) demonstrated that MLG-50™ will increase cannabis yields by 20.9% while also using a typical nutrient program for hydroponic cannabis.

The purpose of this study is to evaluate the effects of MLG-50™ on soil-grown tomatoes in regards to substantial yield increases and improved nutrient profiles.

MATERIAL and METHODS

Twelve Celebrity® tomato plants for the study were purchased from the Tractor Supply Company branch in Portage Michigan.

A soil plot of 10 x 12 feet was tilled by hand; two 50 lb bags of peat moss were mixed in with the tilled soil. Once ready for planting, the growing area was covered with a green tarp that was staked with twelve two-foot long metal spikes. Eight nine-inch wide holes that were four feet apart were cut into the tarp in two columns.

On June 5th, 2016, the plants were separated into two groups. Plants of equal size were chosen for each group, making certain that plant sizes were evenly distributed between the two groups.

Four plants for the control group and four plants for the MLG-50™ group were planted in a well-drained soil containing 20% sand, with 10% peat moss added. The MLG-50™ group plants were numbered 'M1', 'M2', 'M3' and 'M4' and the control group plants were numbered 'C1', 'C2', 'C3' and 'C4'. The two groups were each watered from their respective 15-gallon reservoirs.

The initial feed water mixture prepared for the control group plants was composed of 2 oz. of Grower's Secret Inc.'s *Grow Big 521* per gallon of water. *Grow Big 521* contains a 5-2-1 ratio of NPK that is derived from fish emulsion, bone meal, molasses and phosphoric acid. On June 5th, 2016, 500 mL of this mixture was applied to the base of each control group plant. Following the initial feed water application, plant feed water for the control group consisted of 1 mL *Grow Big 521* per gallon of water on a continuous basis.

The MLG-50™ group was also initially given 2 oz. per gallon of *Grow Big 521* per gallon of feed water, with the addition of one milliliter of MLG-50™ per gallon. On June 5th, 2016, 500 mL of the resulting mixture was applied to the base of each MLG-50™ group plant.

Following the initial, one-time feed water application of 500 mL per plant, each plant in both groups was given 750 mL of feed water during the first week of growth, after which the plants were given 250 mL of feed water daily, except on days with mentionable amounts of rain. Total amount of rainfall for the entire growing period was significant for the summer months of 2016, and considerably above average. Carbon-filtered water was used for the entirety of this study.

On June 6th, tomato cages were installed in such a way that they anchored the flaps of tarp that had been created when the tarp was cut for each plant, which prevented any potential pooling of water around plant bases.

The MLG-50™ product applied in this study contains 12.5% (125,000 ppm) fulvic acid, 0.5% humic acid, 0.5% amino acids, 0.75% gallic acid, 0.02% acetic acid, 0.16% fumaric acid, 0.01 % lactic acid, 0.02% malic acid, 0.02 % succinic acid, 0.08 % benzoic acid, 0.02% phenylacetic acid, 0.16% shikimic acid, 0.12% phthalic acid, 0.09% ferulic acid, 0.27% caffeic acid, 0.03% protocatechuic acid, 0.14% cinnamic acid, 0.80% iron, 1.20% sulfur, 0.06% magnesium, 0.05% calcium, 0.17% sodium, 0.25% carbon and 72 additional trace minerals and trace elements.

The *Grow Big 521* product applied in this study contains 0.50% ammoniacal nitrogen, 3.75% other water soluble nitrogen, 0.75% slowly available nitrogen from fish emulsion, 2.0% available phosphate (P2O5), soluble potash (K2O).

Photos of the plants were taken biweekly and cataloged for posting in this study. Photos not appearing in this report may be acquired by request by contacting Ralf Ostertag at AgTonik, LLC.

Representative samples from each group were collected and sent to Advanced Laboratories for mineral profile testing once the harvest was complete. Three tomatoes of equal size from each group where pureed, then frozen for several days before shipment via United Parcel Service's *2nd Day Air®* option.

Individual tomato weights, tomato fruit harvest dates and the number of tomatoes harvested was recorded at each instance of the removal of tomatoes from plants. (Please see Chart C1 on page three of this report.)

RESULTS

During the first two weeks of growth, the MLG-50™ group showed a distinct superiority in growth rate and leaf development. The average plant height in the MLG-50™ group was 10.5 inches, as compared to 8.5 inches for the control group. (Please see photo 1a on page four). The blossoming of flowers occurred four days earlier in the MLG-50™ group (beginning on June 27th, 2016, while the control group began to flower on June 31st, 2016).

In Charts C1 and C2 below, the total number of tomatoes harvested is shown, along with the total weight of the harvest for each group. The MLG-50™ group had a 26.2% greater yield in weight as compared to the control group. The number of total tomatoes harvested was 22.4% greater in the MLG-50™ group than in the control group.

Harvest Data - MLG-50™ Group Chart C1

Number	Weight in lbs.	Date Harvested
1.	0.45	8/16
2.	0.31	8/18
3.	0.55	8/22
4.	0.65	8/23
5.	0.20	8/31
6.	0.46	9/02
7.	0.51	9/03
8.	0.46	9/05
9.	0.41	9/06
10.	0.50	9/07
11.	0.46	9/07
12.	0.45	9/07
13.	0.31	9/07
14.	0.40	9/09
15.	0.31	9/10
16.	0.35	9/12
17.	0.45	9/12
18.	0.35	9/12
19.	0.35	9/14
20.	0.29	9/14
21.	0.26	9/14
22.	0.27	9/14
23.	0.42	9/14
24.	0.20	9/15
25.	0.25	9/15
26.	0.26	9/15
27.	0.30	9/15
28.	0.36	9/17
29.	0.41	9/17
30.	0.50	9/17
31.	0.20	9/17
32.	0.21	9/17
33.	0.24	9/17
34.	0.22	9/17
35.	0.36	9/17
36.	0.10	9/19
37.	0.16	9/19
38.	0.30	9/19
39.	0.39	9/19
40.	0.40	9/19
41.	0.35	9/19
42.	0.34	9/19
43.	0.41	9/19
44.	0.45	9/19
45.	0.21	9/21
46.	0.24	9/21
47.	0.31	9/21
48.	0.25	9/22
49.	0.35	9/25
50.	0.32	9/25
51.	0.55	9/25
52.	0.41	9/27
53.	0.19	9/27
54.	0.20	9/27
55.	0.10	9/27
56.	0.22	9/27
57.	0.20	9/27
58.	0.15	9/27
Total Weight	19.28	

Harvest Data - Control Group Chart C2

Number	Weight in lbs.	Date Harvested
1.	0.11	8/22
2.	0.40	9/08
3.	0.35	9/12
4.	0.41	9/12
5.	0.45	9/14
6.	0.51	9/14
7.	0.35	9/14
8.	0.50	9/14
9.	0.15	9/14
10.	0.35	9/14
11.	0.49	9/14
12.	0.39	9/15
13.	0.41	9/15
14.	0.35	9/15
15.	0.32	9/15
16.	0.35	9/16
17.	0.35	9/16
18.	0.51	9/16
19.	0.22	9/18
20.	0.25	9/18
21.	0.24	9/18
22.	0.31	9/18
23.	0.50	9/18
24.	0.45	9/18
25.	0.25	9/20
26.	0.31	9/20
27.	0.34	9/20
28.	0.43	9/20
29.	0.26	9/21
30.	0.29	9/21
31.	0.37	9/21
32.	0.21	9/22
33.	0.44	9/25
34.	0.36	9/28
35.	0.30	9/28
36.	0.28	9/29
37.	0.20	9/29
38.	0.25	9/29
39.	0.19	9/30
40.	0.28	9/30
41.	0.11	9/30
42.	0.20	9/30
43.	0.10	9/30
44.	0.22	9/30
45.	0.11	10/1
Total Weight	14.22	

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The MLG-50™ group maintained a superior growth rate and superior fruit production quantity throughout the life cycles of the tomato plants. Less yellowing of the leaves was observed in the MLG-50™ group as compared to the control group.

The laboratory samples were analyzed by lead chemist Shane Schupe of Advanced Laboratories, Inc. Below are the results of that analysis. "ND" indicates the analyte was not detected. Actual laboratory reports are available by contacting Ralf Ostertag at AgTonik, LLC.

Mineral Analyte	MLG-50™ Group	Control Group
Calcium	178 ppm	196 ppm
Chloride	109.3 ppm	137.8 ppm
Chromium	ND	ND
Copper	339.6 ppm	9.43 ppm
Iodine	0.00002 ppm	0.000031 ppm
Iron	3.66 ppm	3.23 ppm
Magnesium	101 ppm	99.9 ppm
Manganese	1.10 ppm	1.11 ppm
Molybdenum	ND	ND
Phosphorus	166 ppm	217 ppm
Potassium	2.277 ppm	2.419 ppm
Selenium	1.57 ppm	ND
Sodium	33.3 ppm	23.6 ppm
Vanadium	ND	ND
Zinc	3.09 ppm	3.08 ppm

When factoring in the margin of error, the results are virtually identical, with the exceptions of copper and selenium. The copper was significantly higher in the MLG-50™ group, while the control group showed very little copper content. The selenium content was detected, although at a low level in the MLG-50™ group, while the control group showed no selenium being detected. There was also no mentionable difference in the overall taste, color and quality of the tomatoes.

DISCUSSION

Results of this study show conclusively that MLG-50™ can increase the number of Celebrity tomato fruits per four plants by more than 20% and can increase the yield (total harvest weight) by more than 25%. Previous test plot results were further validated by this study, in which soy bean fields showed an impressive yield increase of more than 20%. Additionally, field winter wheat grown with MLG-50™ produced an extra eleven bushels per acre and showed a 13% increase in yield, while test plots in Europe revealed a 10% increase in sugar beet production.

We hypothesize that the primary mode of action of MLG-50™ within the plant is as a nutrient vehicle, transporting nutrients into the cells at accelerated and more efficient rates. MLG-50™ supplies plants with organic acids and rare trace elements that are otherwise missing from most soil types and growing mediums.

Another notable point of discussion is the large increase of copper content in the MLG-50™ group, at 339.6 ppm as compared to the control group which showed a very low copper content, at 9.43 ppm. The difference is still impressive even when the margin of error is factored in. This seems to indicate that the MLG-50™ group plants were able to take up far greater amounts of copper from the soil. The copper content of the MLG-50™ used in this study was only 1.5 ppm, so it is logical to surmise that the copper was not being supplied by the MLG-50™.

It is also interesting to note that the control group plants showed no selenium content, while the MLG-50™ group plants showed a small but detectable amount of selenium.

The greater number of tomatoes per plant in the MLG-50™ group as compared to the control group was impressive. The MLG-50™ group also produced heavier tomatoes overall. The largest tomato in the MLG-50™ group weighed 0.65 pounds, while the largest tomato produced by the control group was 0.50 pounds.

The fact that the MLG-50™ plants began to flower four days earlier than those of the control group also has significance. The earlier flowering plants in the MLG-50™ group produced harvestable fruit at least six days before the control group, as shown in Charts C1 and C2 (on page three of this report).

The findings in this study are highly valuable for tomato and vegetable crop growers. Industry growers are currently facing considerable increases in expenses and competition, while crop production costs continue to increase. The ability to consistently boost yields with MLG-50™ without sacrificing product nutrient profiles or quality translates into greater profitability for the grower.

Studies conducted with MLG-50™ on hydroponically grown medical cannabis showed similar results, with a minimum increase in yield of 20%. It can be deduced that hydroponically grown tomatoes would show similar increases in yield.

The cardinal finding of this study is that MLG-50™ will substantially increase tomato yields without sacrificing desirable nutrient profiles, taste, color or overall quality of the tomatoes, despite the accelerated growth rates resulting from its application.

AgTonik will soon conduct further studies with hydroponically-grown vegetable crop plants, including tomatoes.

At the end of two (2) weeks of vegetative growth the MLG-50™ group showed superior growth rates as compared to the control group. Compare plant heights in relationship tomato cages.

Photo 1a