



Effect of C-Tech at two different application timings in a surface-banded liquid fertilizers on potatoes (17-106)

Experiment Info:

Planted: 5/12/ 2017
Row width: 36"
Within-row: 12"
Previous crop: Fallow
Plot size: 25 X 90 ft.

Liquids formulations:

1. 27-0-0 + (1 S):
(High NRG-N)
2. 30-0-0 + (1 S):
(PRIMAGRO N)
3. 8-22-2 + (1 S)
(PRIMAGRO P)
4. 1-0-8 + (6 S)
(PRIMAGRO K)
5. 2-1-6:
(Sure-K)
6. 9-24-3:
(Pro-Germinator)
7. Micro- 500
8. Boron, Moly, and Mn
9. 1-0-1+2S with 10%
carbon and
Hydrophobic Fulvic
Acid 3.5%) (C-Tech)

Solid formulations:

10. 0-0-62
(Potash)

Pre-planting soil test values (ppm):

pH:	6.9
CEC:	4.3
%OM	1.5
Bray P1:	101.0
K:	55.0
%K:	3.3
%Mg:	19.4
%Ca:	77.3

Introduction:

Nowadays, microbial enriched mineral fertilizers are the most environmentally compatible forms of innovative agriculture. Effective management of nutrients is critical for potato production, as tuber yield and tuber quality are directly impacted by source, quantity, and timing of nutrient applications. During the 2017 growing season, research efforts were employed to address concerns and validate the value of the new formulations of AgroLiquid to contribute and improve the potato yield. AgroLiquid formulated new PRIMAGRO line including C-Tech. C-Tech combines nutrients with microbes and carbon compounds that improve soil health and increase ecosystem services.

In our experiment, C-Tech was applied at two-timings: at planting and at hilling to Snowden potato, to evaluate the C-Tech impact on potato yield and tuber sizes distribution. C-Tech was tested to evaluate the potato tuber abnormality that has been observed but never documented. In our experiment, other treatments included PRIMAGRO P™, as an extended delivery of carbon-protected polymer of available phosphate throughout the growing season, PRIMAGRO K™, as an advanced, high-efficiency potassium solution containing sulfur, and HIGH NRG-N represented the source of nitrogen for potato.

Figure 1. Overall view of the experimental site for assessing the effect of C-Tech application on potato yield and tuber size distribution, conducted at the North Central Research Station (NCRS) Farm 1, in the summer of 2017.



Figure 1. Potato growth of different treatments as shown on July 5th, 2107 in Farm 1, plot 06, at NCRS

Objective:

The main objective was to assess the effect of C-Tech timing application, at planting and at hilling, on potato yield and tuber size distribution.

Methods:

1. Prior to the planting date of the potato on May 12th, 2017, comprehensive soil sampling, herbicides application, soil tilled by cultivator to a 6-8" depth, and rototilled to prepare the potato seedbeds.
2. Four treatments of surface-banded liquid fertilizers at planting were applied and evaluated in three replicates, as follows:
 - 2.1. Treatment 1: AgroLiquid treatment: HIGH NRG-N + Pro-Germ + Kalibrate (10 + 5 + 5 gal/A).
 - 2.2. Treatment 2: HIGH NRG-N + Pro-Germ + Kalibrate (10 + 5 + 5 gal/A) ; C-tech (0.5 gal/A) at planting
 - 2.3. Treatment 3: HIGH NRG-N + Pro-Germ + Kalibrate (10 + 5 + 5 gal/A) ; C-tech (0.5 gal/A) at hilling.
 - 2.4. Treatment 4: HIGH NRG-N + Primagro P + Primagro K (40 + 5 + 5 gal/A).
3. At hilling (June 15th, 2017), 35 gal /A of HIGH NRG-N mixed with Micro 500 + Boron + Mn + Moly (0.5 + 0.25 + 0.25 + 0.25 gal/A) was surface banded nearby the potato plants and hilled-in in all the treatments. Knowing that 0.5 gal/A of C-tech was applied with the mix in treatment 3 at hilling.
4. Potato growth was ideal. No Petiole samples, soil samples, and no foliar application were carried out.

- Potash (0-0-62) broadcast pre-planting at a rate of 300 lb./ acre in all the treatments.
- Surface drip irrigation provided supplementary and sufficient water requirements to the potato.
- A protective and proactive program of pesticides and herbicides was carried out during the course of this experiment to maintain a healthy growth of the potato which showed excellent vigorous growth.
- A **Snowden** potato variety was planted precisely at a spacing of 12" between seeds and 36" between rows, in 3 rows with 25 ft. length. Treatments randomly distributed in three replications.
- The potato harvested on September 21st and graded on September 22nd, 2017.

Results:

Potatoes grades of A, B, and C and aggregated bulk yield is shown in Table 1. The treatment that showed the least yield (462.3 Cwt./ acre) was treatment (1). The highest yield (506.2 Cwt./ acre) resulted by the same treatment of AgroLiquid + application of 0.5 Gal/A of C-Tech at side-dressing or at hilling, compared with slight yield decreases (483.9 Cwt./ acre) when the same amount of C-Tech applied at planting in treatment 2. PRIMAGRO P and K component in treatment (4) increased the yield up to (474.2 Cwt./ acre) when compared with treatment (1), but continued to show lower yield when compared with the added C-Tech, either at planting or at hilling.

Table 1. Potato yield as affected by C-Tech application at planting and/ or at side dressing.

Treatments		Grades (Cwt. /acre)			Total yield CWT./acre
		Grade A	Grade B	Grade C	
1	HIGH NRG-N + Pro-Germinator + Kalibrate (AgroLiquid)	109.7	174.2	178.3	462.3
2	HIGH NRG-N + Pro-Germinator + Kalibrate + C-Tech (at planting)	145.6	200.8	137.6	483.9
3	HIGH NRG-N + Pro-Germinator + Kalibrate + C-Tech (side-dressing)	160.6	202.1	143.5	506.2
4	HIGH NRG-N + PRIMAGRO (P & K)	126.6	183.7	163.8	474.2

Despite the high variability of potato grades in the replications, the consistency of yield increases/ decreases followed the same pattern of potato yield between treatments. The potato Grade-B represented the highest yield compared to Grad-A and Grade-C. Likely, the fallow period in 2016, the continuous drip irrigation, and soil ploughs by the cultivator and rototill helped to maximize the potato yield.

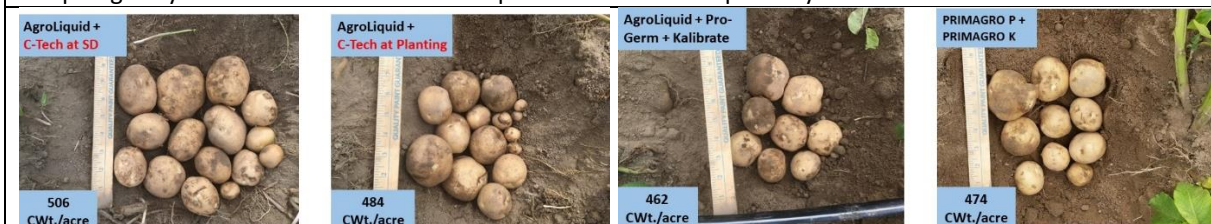


Figure 2. Tuber sizes sampled from a four studied treatments.

Conclusion:

- NCRS researchers and interns at AgroLiquid's North Central Research Station (NCRS) witnessed a remarkable growth of "Snowden" potato this summer due to the application of new technologies of AgroLiquid, C-Tech and PRIMAGRO.
- The C-Tech application, which is a specialized formulation of carbon and biological agents, proved to be an added value to increase the potato yield at side dressing or at hilling.
- PRIMAGRO P and K helped to increase the potato yield, but not to the level of application of C-Tech.
- Treatment 1 reported the lowest yield.
- The results proved that potato, which has a relatively shallow root system, often requires substantial nutrient input and can be productive when managed properly to maintain tuber productivity and quality.