

Conclusion Report: [REDACTED]—Spinach Trial

Overview:

Crop & Acreage*: Organic Spinach
 Design: Treated (T) Block—9.45 acres, Untreated (U)—9.45 acres
 Lot 36—[REDACTED]
 Specification, with Soil sample analysis, available upon request

Treatments: Two soil (Day 1 & Day 8) and two foliar apps (Days 10 & 17)
 [REDACTED]

Trial Goal: Improve Yield

* Actual T vs U acreage revealed with harvest Yield data.

Results (Yield expressed in lbs/acre):

Treated-CDE vs Untreated-AB 8,882** vs 6,553 **+35.5%** (see Table 1a)

Treated-CDE vs Untreated-FGH 8,882** vs 6,026 **+47.4%** (see Table 1b)

** E.g.: Treated-CDE = (Total lbs CDE) / (Acres CDE) = 87,934 lbs/9.90 Acres.

Table 1a: [REDACTED], Harvest Data: A-E

Date	Ranch	Grower ID	Pounds	RPC/Bin cnt	Crew	Container	Avg. Lbs./Container	Acres	Total Lbs.	Yield	Variety
5-Aug	[REDACTED]	OLA3536A2	630.40	40	11	TOTE	15.76	2.80	18,822.40	6,722	Minkar
6-Aug	[REDACTED]	OLA3536A2	18,192.00	1200	11	TOTE	15.16				
5-Aug	[REDACTED]	OLA3536B2	17,952.00	1200	11	TOTE	14.96	3.10	19,843.20	6,401	Tabit
5-Aug	[REDACTED]	OLA3536B2	1,891.20	120	11	TOTE	15.76				
6-Aug	[REDACTED]	OLA3536C2	6,364.00	400	11	TOTE	15.91	3.40	31,336.08	9,216	Crater
7-Aug	[REDACTED]	OLA3536C2	13,377.90	30	3	BINCC	445.93				
7-Aug	[REDACTED]	OLA3536C2	11,594.18	26	1	BINCC	445.93				
5-Aug	[REDACTED]	OLA3536D2	17,972.08	56	11	BINCC	320.93	3.10	30,140.08	9,723	Kiowa
7-Aug	[REDACTED]	OLA3536D2	12,168.00	800	11	TOTE	15.21				
6-Aug	[REDACTED]	OLA3536E2	20,352.08	56	3	BINCC	363.43	3.40	26,458.08	7,782	Volans
7-Aug	[REDACTED]	OLA3536E2	6,106.00	400	11	TOTE	15.27				

Table 1b: [REDACTED], Harvest Data: F-H

Date	Ranch	Grower ID	Pounds	RPC/Bin cnt	Crew	Container	Avg. Lbs./Container	Acres	Yield	Variety
7-Aug	[REDACTED]	OLA3536F2	3663	240	11	TOTE	15.26	2.45	5,819	
7-Aug	[REDACTED]	OLA3536F2	3489	200	11	TOTE	17.45			
7-Aug	[REDACTED]	OLA3536F2	7104	400	11	TOTE	17.76			
7-Aug	[REDACTED]	OLA3536G2	20432	1200	11	TOTE	17.03	3.60	5,676	
7-Aug	[REDACTED]	OLA3536H2	15208	800	11	TOTE	19.01	3.30	6,563	
7-Aug	[REDACTED]	OLA3536H2	6450	400	11	TOTE	16.125			

Source: [REDACTED]

Supplemental Info

Table 2: Spinach Tissue Analysis

Spinach Tissue Analysis - 8/7/19					
	Logan Labs Target Ranges			Treated	Untreated
	Low - Def	Sufficient	High		
N%	4.2 - 6.0%			3.63	5.72
P%	.30 - .55			0.42	0.47
K%	3.0 - 4.0			2.23	4.24
Ca%	.65 - 1.3			1.31	1.25
Mg%	.85 - 1.2			0.87	1.27
S%				0.25	0.25
Na%					
B ppm	40 - 60			73.91	53.22
Cu ppm	6 - 8			2.74	3.63
Fe ppm	220 - 400			608.3	297.2
Mn ppm	35 - 65			102.8	56.39
Zn ppm	50 - 75			28.62	38.19

One cup of raw spinach contains:

- 7 calories.
- 0.86 grams (g) of protein.
- 30 milligrams (mg) of calcium.
- 0.81 g of iron.
- 24 mg of magnesium.
- 167 mg of potassium.
- 2,813 interational units (IU) of Vitamin A.
- 58 micrograms of folate.

Jun 29, 2018

Spinach: Nutrition, health benefits, and diet - Medical News Today
<https://www.medicalnewstoday.com/articles>

Notes:

- Nutrient values most meaningful in context of *Treated vs Untreated* harvest volume data;
 - Values informative of spinach nutrition and soil nutrient adequacy;
 - Observations of color (N), sweetness (K) and volume data provide late-cycle perspective.
- In future, consider adding a mid-cycle tissue sample for perspective on micro-nutrient trends;
 - Reflective of Spinach ‘quality’;
 - Insights into soil imbalances, especially in combo with post-trial soil sample analysis.
- **Fe** in particular: values easily skewed by leaf tissue contaminated by soil particles
 - Accept high values with skepticism.

Source: UrthAg, multi-variety T vs U samples; Logan Labs analysis; Notes attributed to UrthAg & Logan Labs.

Highlights from Urth Field Notes:

“Plants look healthy from a distance. ... Leaf nutrient testing (see Table 2, above) ... results will be interesting. Pythium present, but no more than other Untreated fields. Our standard practice is to perform trials with three varieties.”

[Redacted], 31 July 2019

“Treated blocks are looking really good in this stage (cleaning crews on site). ... [Compared to] the previous fields [where I’ve] been taking samples, I really like how [the Urth] block is looking. [I]f this shows great results, [Redacted] will most likely roll this out everywhere.”

[Redacted], 1 August 2019

“[Compared] AB and CDE of Block 36... Really dark green color and height is about the same. Full sponge-like fill in Treated blocks, barely any separation/bald spots...”

Urth Field Rep, 3 Aug 2019

“[I like] the size and color of the [Urth Treated] spinach. ... [T]he block and harvest, they’re going great, especially the density in the field.”

[Redacted], 6 Aug 2019