EVOFACTOR®

CASE STUDY

NUTRIENT MANAGEMENT

FIELD TRIAL RESULTS ON HEAD LETTUCE POINT TO OUTDOOR CROP PRODUCTION IMPROVEMENTS WITH FIRST-OF-ITS-KIND NUTRIENT ADJUVANT

Executive Summary

A third-party contract researcher recently utilized Verano365's nutrient adjuvant, Evofactor, to study the product's ability to enhance nutrient management in outdoor, field-grown head lettuce. The goal of the trial was to compare how Evofactor performed under fertigation in field conditions; determine how much fertilizer could be reduced from the grower standard without sacrificing yield and marketability of the crop when using Evofactor; and to see if Evofactor had an impact on harvestability after the first and second cuts of head lettuce.

The trial was conducted by Holden Research and Consulting in Camarillo, California. Evofactor is powered by Verano365's proprietary additive, OpusMAX, which forms supramolecular structures from nutrients allowing for improved stability and nutrient uptake.

In California and Arizona, nearly 270,000 acres are utilized annually to grow lettuce.[1] At trial conclusion, the research showed that Evofactor allows growers to reduce nitrogen fertilizer by 25% and increase yields by 29%. The contract researcher found that utilizing the Verano365 product resulted in a 29% increase in net return to the farm versus the standard harvest. The recommended application rate of Evofactor is 1 quart for every 10 pounds of applied Nitrogen per acre.

[1] USDA Vegetables 2020 Summary: https://downloads.usda.library.cornell.edu/usda-esmis/files/02870v86p/j6731x86f/9306tr664/vegean21.pdf

Trial Protocol & Results

The six-replicate trial in California was based on the grower's standard practice of utilizing a CAN17 (Calcium Ammonium Nitrate) fertilizer as the nutrient source for the head lettuce crop. Four different treatments were tested using 3.5 oz of Evofactor per pound of N per acre, varying the N application rate from 30 pounds, 60 pounds, 90 pounds, and 120 pounds. The trial also included an untreated control group that received neither fertilizer nor Evofactor to measure fertilizer rate impact on the crop as a stand-alone treatment at the 30-60-90-120 rate structures of CAN17.

The researcher gathered quantitative data on:

- Percent of crop ready to cut on first harvest date
- Head lettuce yields after two cuts
- Net dollars back to the farm

OPUSMAX EXPLAINED

OpusMAX is a first-of-its-kind delivery system that is anchored by a charged particle. This particle has an attraction force that acts as a host or carrier, which facilitates the self-assembly of supramolecular structures. When OpusMAX localizes active chemical or biological molecules into these structures, the impacts are gains in efficiency and increased probability of uptake and/or usage.

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FIELD FINDINGS

From the third-party research, key themes emerged:

- Evofactor can significantly improve nutrient management for outdoor field production of specialty crops.
- Evofactor improves harvestability and yields when incorporated into nutrient management programs.
- When Evofactor is utilized with standard application rates of nitrogen, growers can see +20% improvements in yield and correlating financial returns.
- It's important to note that all yield data separated four ways statistically when analyzed at P=.05, Duncan's new multiple range test (MRT).

RESULTS | First Harvest

At first harvest, 18% of the untreated control crop was ready to harvest. The group receiving various rates of CAN17 fertilizer showed readiness that varied from 15% to 44% based on fertilizer rate. The group receiving Evofactor plus the CAN17 fertilizer rates ranged from 33% to 54% harvestable.

TABLE 1.0 | PERCENT READY TO CUT AT FIRST HARVEST

GROWER STANDARD		EVOFACTOR TREATED		VARIANCE
30 pounds/A CAN17	15%	30 pounds/A CAN17 + Evofactor	33%	+18%
60 pounds/A CAN17	25%	60 pounds/A CAN17 + Evofactor	38%	+13%
90 pounds/A CAN17	35%	90 pounds/A CAN17 + Evofactor	51%	+16%
120 pounds/A CAN17	44%	120 pounds/A CAN17 + Evofactor	54%	+10%

While cutting fertilization rates down to 30 or 60 pounds per acre would be out of the norm, the stair-stepped results show a correlation to the impact Evofactor can have on crop readiness when utilized with varying fertilizer rates.

RESULTS | Yield After Two Cuts

To level-set the quantitative data for yields after two cuts, the researcher documented that the untreated control crop produced 393 cartons of marketable head lettuce per acre. The fertilizer treatments at the varying rates of CAN17 produced between 412 and 603 marketable cartons per acre. The crop that received Evofactor as a supplement to the fertilizer treatment produced between 459 and 729 cartons of marketable lettuce per acre. It should be noted that all of the fertilizer treatments were intentionally reduced below common practices to better identify impact and separation of the fertility and product use rates.

TABLE 2.0 | MARKETABLE CARTONS HARVESTED PER ACRE

GROWER STANDARD		EVOFACTOR TREATED		VARIANCE
30 pounds/A CAN17	412	30 pounds/A CAN17 + Evofactor	459	+47 cartons
60 pounds/A CAN17	519	60 pounds/A CAN17 + Evofactor	563	+44 cartons
90 pounds/A CAN17	603	90 pounds/A CAN17 + Evofactor	729	+126 cartons
120 pounds/A CAN17	563	120 pounds/A CAN17 + Evofactor	644	+81 cartons

In Table 2.0 we can see that the Evofactor treatments produced more marketable cartons of lettuce per acre regardless of the fertilizer rate. However, the most significant improvement was when the crop received 90 pounds of CAN17 plus Evofactor. At 24 heads of lettuce per carton, that's 3,024 heads per acre more than the fertilizer by itself produced.

This result indicates that Evofactor can not only improve fertilizer efficiency, but it also can be a resource to help specialty ag farmers reduce the overall amount of applied nitrogen. Extrapolated further, this would improve an operation's sustainability without sacrificing soil health.

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RESULTS | Net Dollars Back to the Farm

With the climbing cost of fertilizer in 2021 and 2022, the Evofactor trial on field grown head lettuce also evaluated the return-on-investment for the product. The trial took place in Fall 2021, and the ROI calculations were based on CAN17 and wholesale lettuce prices at the time.

Based on the data from this trial, the most economically beneficial and realistic scenario for the grower was utilizing 90 pounds/A CAN17 + Evofactor, resulting in $2,407/acre net dollars increase back to the farm. The average return on investment in this scenario is 21:1; so for every $1 spent to incorporate Evofactor, the grower would realize $21 in return.

TABLE 3.0 | NET DOLLARS PER ACRE BACK TO THE FARM

GROWER STANDARD GROSS DOLLARS		GROWER STANDARD + EVOFACTOR GROSS DOLLARS		VARIANCE IN NET DOLLARS	RETURN ON INVESTMENT*
30 pounds/A CAN17	$8,240	30 pounds/A CAN17 + Evofactor	$9,142	$902	24:1
60 pounds/A CAN17	$10,380	60 pounds/A CAN17 + Evofactor	$11,185	$805	11:1
90 pounds/A CAN17	$12,060	90 pounds/A CAN17 + Evofactor	$14,467	$2,407	21:1
120 pounds/A CAN17	$11,260	120 pounds/A CAN17 + Evofactor	$12,730	$1,470	10:1

**Return on Investment calculated based on an average of $20 per carton sale price, minus the treatment cost of Evofactor.*

Based on the size of the operation, these per acre figures can quickly add up to significant returns. This opens up a number of economic and sustainability levers for growers to consider—reduced fertilizer application and associated costs, plus increased yields would amplify value.

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