

## Field Crops

### Helena Tomatoes, California, USA

#### Background

The Helena Chemical Company is a leading provider of crop production and crop protection products to the Agriculture community in the United States and worldwide. Headquartered in Collierville, TN, they have been in the business for more than 50 years and have been working on product development for more than eight years.

#### Objectives

BiOWiSH Technologies engaged Helena Research to test the efficacy of BiOWiSH™-Crop in improving fruit quality and yields at tomato farms. This study was conducted at Helena's farm research facility in California. To evaluate fruit quality and yields, the study introduced BiOWiSH™-Crop into the tomato growers' or control program. The control program is the most commonly used farming practice in the region and includes fertilization and pest management techniques. Costs and yields were evaluated under three conditions: the control program as it is traditionally implemented; the traditional control program with BiOWiSH™-Crop added; and reducing the control program (inorganic fertilizers) by 20% and adding BiOWiSH™-Crop.

#### Solution

BiOWiSH™-Crop is a certified organic fertilizer that helps increase micronutrient uptake in plants, improves plant vigor and stimulates microbial activity in the soil. Growers, distributors and institutions have reported that using BiOWiSH™-Crop improves yields and fruit quality, adding directly to the farmers' bottom lines.

#### Implementation Program

The study was a randomized four replicate farm trial. The control plots were treated with the typical growers' program fertilizers, which contained UAN32 (8% N) at 85 gal/acre plus Nucleus 0-0-15 (15% K2O) at 50.6 gal/acre. The first set of trial plots added one pound/acre of BiOWiSH™-Crop to the growers' program fertilizers. The second set trial plots added one pound/acre of BiOWiSH™-Crop and reduced the growers' program fertilizers by 20%.

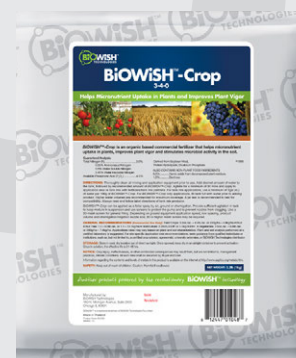
All treatments were applied via drip irrigation.

#### BiOWiSH™-Crop

- Improves yields
- Improves plant vigor
- Increases total number of crops per annum
- Increases nutrient availability to plants
- Stimulates microbial activity in the soil
- Accelerates crop residue decomposition

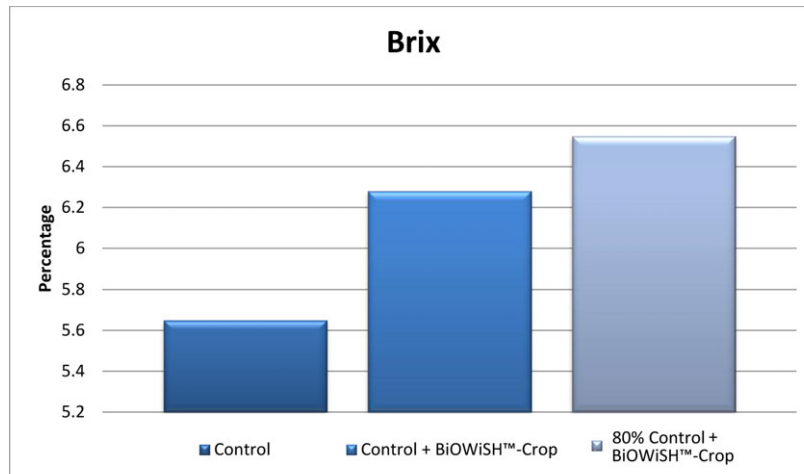
#### Available Sizes

- 3.5oz
- 2.2lb
- 11lb

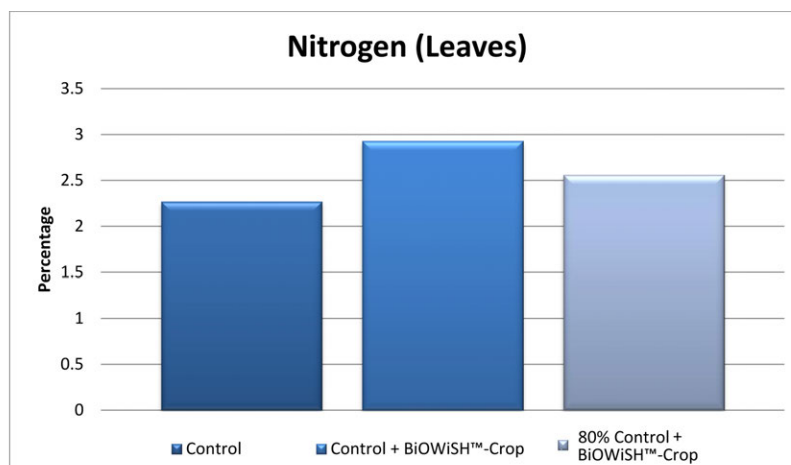
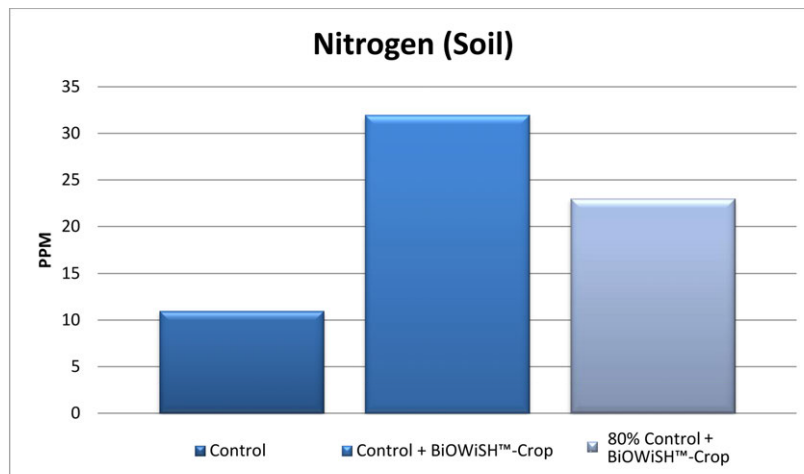


## Results

Phytotoxicity, or the degree of toxicity in plants due to chemicals, was evaluated seven days after application of each treatment. In this study, no phytotoxicity was observed from any of the three programs. All programs exhibited good plant vigor and color. Fruit quality and yield measurements were taken at harvest. Plants treated with BiOWiSH™-Crop showed increased brix levels, which is tied to better tasting fruits and vegetables.



Without increasing chemical inputs, BiOWiSH™ treated plots also showed improved levels of key nutrients, including nitrogen.



In addition to the attributes above, the BiOWiSH™ programs had higher yields than the most common best management practice in the area.

Yield Increase		
	Control Program + BiOWiSH™-Crop	80% Control Program + BiOWiSH™-Crop
Red Fruit	15.6%	4.1%
Green Fruit	30.1%	26.2%

	Fertility Cost (per acre)	Fertility Cost Difference (per acre)
Control Program	\$652.29	n/a
Control Program + BiOWiSH™-Crop	\$696.63	(\$44.34)
80% Control Program + BiOWiSH™-Crop	\$566.17	\$86.12

Using an average price of \$68/ton for process tomatoes, the following calculations show the potential net profit increase in using BiOWiSH™. Plots treated with BiOWiSH™-Crop showed increases in yields for red and green fruit. The red to green tomatoes ratio was similar for all treatments and therefore did not impact the economic value calculations or on farm economics. Based on a net average per hectare cost, the use of BiOWiSH™ provided a return on investment of five to nearly seven times the cost to implement.

Cost Benefit Analysis: Red + Green Tomatoes (per acre)				
	Total Profit Increase Red	Total Financial Benefit Profit Increase Green	Total Profit Increase	ROI
Control Program + BiOWiSH™-Crop	\$200.70	\$38.56	\$239.26	530%
80% Control Program + BiOWiSH™-Crop	\$150.52	\$158.27	\$308.79	690%

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## Conclusion

As illustrated in this independent study, BiOWiSH™-Crop offers tomato growers significant opportunity to increase their profitability. Adding the organic product supplement to the current program overwhelmingly demonstrated the ability to outcompete the traditional best management practice in the region. Continued independent third party testing is planned to illustrate the feedback that soil structure and overall fertility improves with each year of consecutive BiOWiSH™ treatments.

According to the USDA, in 2011, there were about 258,000 acres of land dedicated to growing processing tomatoes in California alone<sup>1</sup>. In a period of intense competition and rising costs, the increased yields, along with the reduced use of inorganic fertilizers, have the potential to save the California tomato industry millions of dollars per year. Reducing chemical fertilizers is also better for humans and the environment.

Adding BiOWiSH™-Crop to the Growers' program also increased available nutrients in the soil and resulting plant nutrient uptake, and Brix (sugar) levels in the fruit. Anecdotal evidence also reported that all programs exhibited good plant vigor and color.

## Contacts

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<sup>1</sup> <http://www.ers.usda.gov/Publications/vgs/2011/06Jun/VGS345.pdf>