BiOWiSH® TECHNOLOGIES

Case Study

# BiOWiSH® Crop Technology

## Increasing Hydroponic Tomato Profitability for CropKing in the USA

### Background

BiOWiSH Technologies partnered with distributor CropKing Inc to demonstrate the benefits of BiOWiSH® Crop on tomato crops. Testing was done over 22 weeks at CropKing's research greenhouse in Lodi, Ohio. Previous testing by CropKing has shown successes using BiOWiSH® Crop in lettuce, cucumber, and pepper production. CropKing has been in the controlled environment agriculture and hydroponics businesses for 30 years. They have clients in North America, Europe, Asia, and the Caribbean.

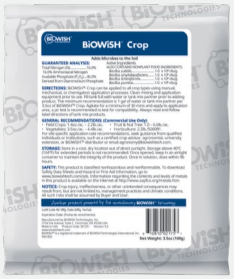
Hydroponic tomato production is a growing industry in the US and around the world as the demand for year-round freshly grown tomatoes increases. Greenhouse tomatoes are a multi-million dollar industry in the US, and account for about 40% of fresh tomatoes sold in grocery stores each year.

With the increasing demand, growers are looking for ways to expand their production. Typically, this would require a large investment in additional growing space. BiOWiSH® Crop offers a low cost alternative to increase production without increasing square footage.

### Objectives

The main goal of this case study was to determine the effectiveness of BiOWiSH® Crop and its ability to increase yields and fruit quality in hydroponically grown tomatoes.

## BiOWiSH® Crop




- Improves crop yields
- Improves nitrogen efficiency
- Increases nutrient availability
- Enhances root development
- Improves plant vigor
- Stimulates microbial activity in the soil

### Available Sizes

- 100g/3.5oz
- 1kg/2.2lbs
- 5kg/11lbs
- 10kg/22lbs

## Solution

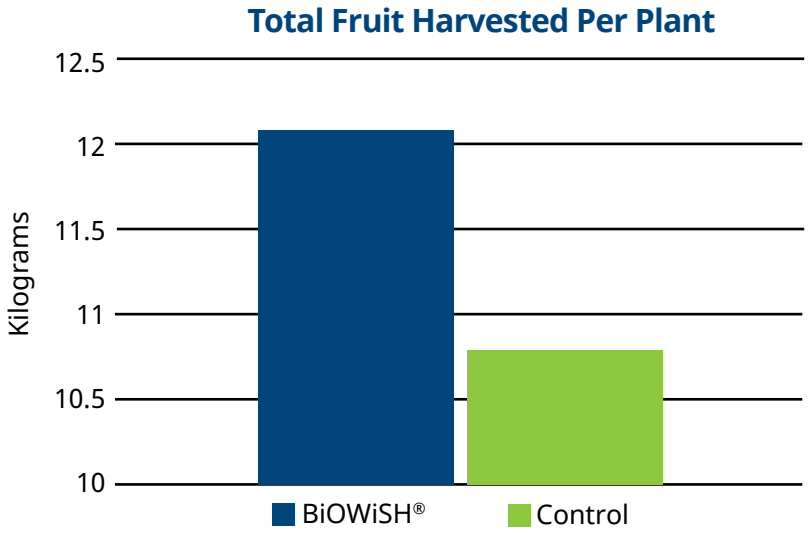
BiOWiSH® Crop  was chosen for the trials because of demonstrated efficacy in CropKing's greenhouse environment. Developed for the hydroponics industry, BiOWiSH® Crop  is a revolutionary water treatment solution that enhances microbial activity in crop production, helping to increase nutrient availability and improve plant vigor. It also prevents sludge build-up and problematic scaling in dripper lines, and Nutrient Film Technique (NFT) channels. 100% natural and non-toxic, BiOWiSH® Crop is safe for everyday use in a very diverse range of hydroponic applications.

## Implementation Program

BiOWiSH® Crop was applied with each irrigation event at 10mg/L for 22 weeks. Every 20 minutes, the plants were irrigated for 2 minutes and 15 seconds. The irrigation cycle starts 30 minutes after sunrise and stops at sunset. BiOWiSH® Crop can be activated in water or nutrient solution allowing for easy delivery with existing systems and fertility programs. CropKing uses a hydroponic Dutch Bucket system with a perlite media. BiOWiSH® Crop can be used with all types of growing media.

## Results

BiOWiSH® treated plants set fruit earlier, appeared healthier, and produced higher yields than plants in the control group. After the 22 weeks, plants treated with BiOWiSH® Crop, on average, had produced more than 12kg of fruit. The control plants had produced less than 11kg of fruit. This resulted in an average increase in the production weight for the BiOWiSH® treated plants of more than 10%.




Additionally, the brix measurements in the BiOWiSH® group were 7.5% higher than the traditional management practice group. Brix is a measurement of sugar content and tied to improved taste in fruits and vegetables.

| BiOWiSH® Program Advantages | | | |
|---|---|---|---|
| Yield Increase | Brix Increase | Non-BiOWiSH® nutrient increase per kg of fruit | Water increase per kg of fruit |
| 10.3% | 7.5% | 0% | 0% |

Since the same nutrients and water are used, the only additional cost associated with implementing BiOWiSH® Crop is the cost of the actual product, which is about $0.42 per plant. The increase in labor costs is negligible because BiOWiSH® is added straight to the system. Using BiOWiSH® doesn't require special equipment and it is compatible with all hydroponic systems.

On average BiOWiSH® increased the amount of fruit each plant produced by 1.24kg. Using an average selling price of $3.22/kg of tomatoes, BiOWiSH® increased the revenue per plant by $3.99, with an increase in net profit of $3.57 per plant or a return on investment of 852% on the addition of BiOWiSH® Crop.

| Economics | |
|---|---|
| **Cost of BiOWiSH® Crop per plant** | $0.42 |
| **Value per kg of tomato** | $3.22 |
| **Amount of fruit increase per plant (kg)** | +$1.24 |
| **Net profit per plant** | $3.57 |
| **Return on Investment** | +852% |

Using an average price of $68/ton for process tomatoes, the above 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.

## Conclusion

BiOWiSH® Crop offers tomato growers the opportunity to produce more high quality fruit, allowing growers to meet growing demand and increase profitability without expanding infrastructure. The low input cost, increased production with current water usage, compatibility with current systems and fertility programs, and extraordinary return on investment are reasons why nearly 100% of growers who have tried BiOWiSH® Crop continue to use the product as part of their daily management practices.

Recent testing using BiOWiSH® on broad acre tomato plants also had impressive results. An independent third party research trial in California performed on irrigated tomatoes compared plants grown with BiOWiSH® verses the most common best management practice. The plants treated with BiOWiSH® showed a yield increase of more than 10%, as well as increased levels of key nutrients and increased brix levels.

For more information, refer to the Helena Tomato Research Study.

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