

BiOWiSH® Crop Liquid

Fertilizer Coated with BiOWiSH® Crop Liquid Increases Avocado Production and Profit

Executive Summary

Vietnam's Research Center for Highland Soils, Fertilizer, and Environment conducted trials at two locations in the Dak Lak province to assess the effects of BiOWiSH® Crop Liquid coated fertilizers on avocado production. The trials compared three treatments:

1. Control (farmer's standard fertility program)
2. Control + BiOWiSH® Crop Liquid on starter fertilizer
3. Control + BiOWiSH® Crop Liquid on all four fertilizer applications

In pooled data from both sites, the Control + BiOWiSH® Crop Liquid on all four fertilizer applications resulted in the highest average number of fruits per plant, increased fruit weight, and better overall yield. These benefits positively affected net income.

Background

Vietnam is a highly agrarian country with rich, alluvial deltas and mountainous areas, each with distinct soil types. BiOWiSH Technologies conducted a series of trials on many crops in Vietnam in order to illustrate the effectiveness of coating fertilizers with BiOWiSH® Crop Liquid. This approach is supported by research conducted in other countries that resulted in increased yields and profitability for farmers. More studies can be found online at biowishtech.com.

BiOWiSH® Crop Liquid is a microbial biostimulant that can be added to fertilizer to create an enhanced efficiency fertilizer. BiOWiSH® Crop Liquid Technology stimulates native microbial activity and promotes root development, increasing nutrient uptake and improving plant vigor. BiOWiSH® Crop Technology is proven to enhance the effects of applied fertilizers by increasing yield and soil health.

Objectives

BiOWiSH Technologies engaged the research center to evaluate the effects of BiOWiSH® Crop Liquid coated fertilizers on avocado production in average production conditions in the Lak Dak province of central Vietnam. Data collected included number of effective fruits per plant, fruit weights, and overall yield. Overall yield data, crop value, and treatment costs were then used to calculate changes in net income.

Implementation

Plots were on acidic soils with moderate to low fertility. Three treatments were compared:

1. Control (farmer's standard fertility program consisting of a starter fertilizer plus 3 in-season NPK applications)
2. Control + BiOWiSH® Starter Program (BiOWiSH® Crop Liquid in the NPK starter followed by three untreated NPK applications)
3. Control + BiOWiSH® Full Season Program (BiOWiSH® Crop Liquid coated onto each of four NPK applications)

Starter fertilizer applications occurred on March 15, followed by applications 51, 125, and 172 days after the starter application. See Table 1 for fertilizer and rate details. For BiOWiSH treatments, BiOWiSH® Crop Liquid was coated onto fertilizer at 0.2% w/w. Production parameters were taken from the average of 3 plants from each replicate. Pest and disease management techniques were applied independently for each location based on farmers' current management practices.

BiOWiSH® Crop Liquid



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

Available Sizes

- 50 gal/190 L
- 264 gal/1000 L

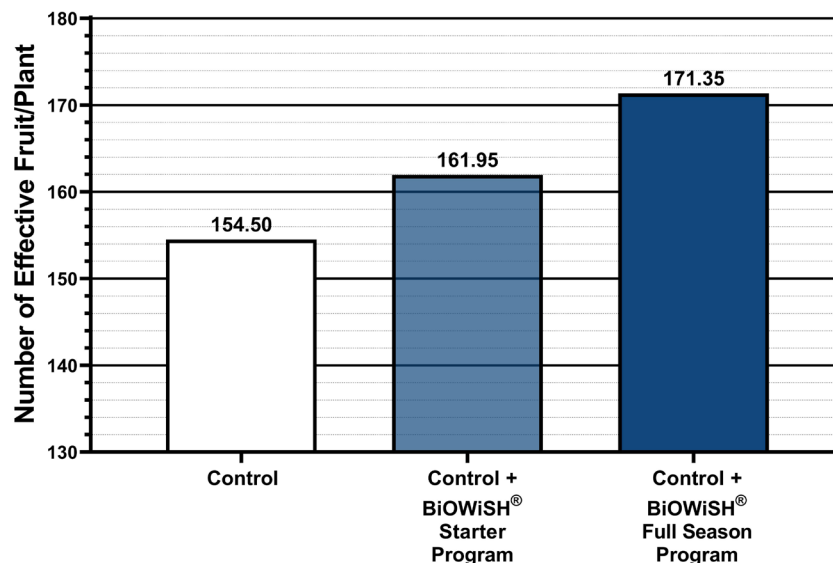
Table 1. Fertilizer Application Rates for Each Treatment

Treatment	Application 1 (Starter Fertilizer)	Application 2	Application 3	Application 4
Control (Standard Fertilizer Program)	92.5 kg/ha [82.5 lb/ac] NPK 25-5-5+TE*	111.0 kg/ha [99.0 lb/ac] NPK 16-16-8+13S+TE	129.5 kg/ha [115.5 lb/ac] NPK 16-8-16+TE	129.5 kg/ha [115.5 lb/ac] NPK 15-15-15+TE
Control + BiOWiSH® Starter Program	92.5 kg/ha [82.5 lb/ac] NPK 25-5-5 +TE+BiOWiSH®	111.0 kg/ha [99.0 lb/ac] NPK 16-16-8+13S+TE	129.5 kg/ha [115.5 lb/ac] NPK 16-8-16+TE	129.5 kg/ha [115.5 lb/ac] NPK 15-15-15+TE
Control + BiOWiSH® Full Season Program	92.5 kg/ha [82.5 lb/ac] NPK 25-5-5 +TE+BiOWiSH®	111.0 kg/ha [99.0 lb/ac] NPK 16-16-8 +13S+TE+BiOWiSH®	129.5 kg/ha [115.5 lb/ac] NPK 16-8-16 +TE+BiOWiSH®	129.5 kg/ha [115.5 lb/ac] NPK 15-15-15 +TE+BiOWiSH®

*TE = Trace Elements

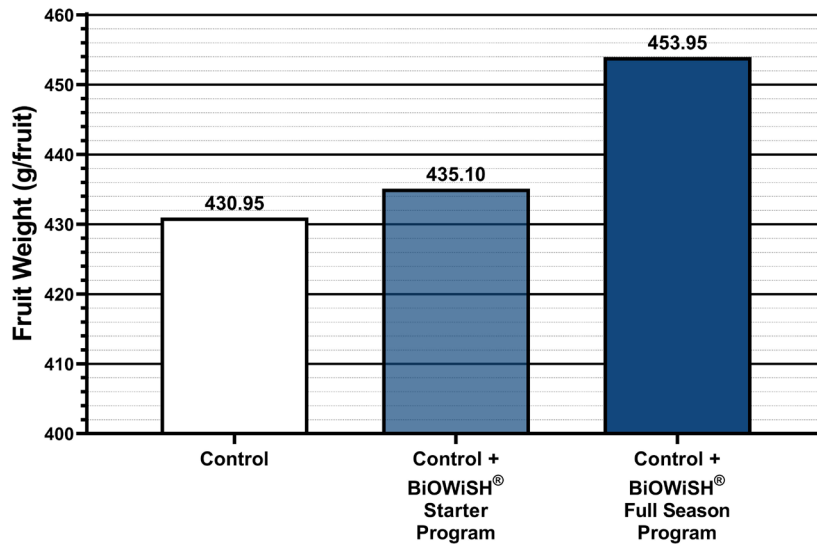
Results

Both treatments that included BiOWiSH® Crop Liquid coated fertilizer had more effective fruit per plant, heavier fruit, and higher overall yield. The production parameter graphs below represent pooled data from both locations.



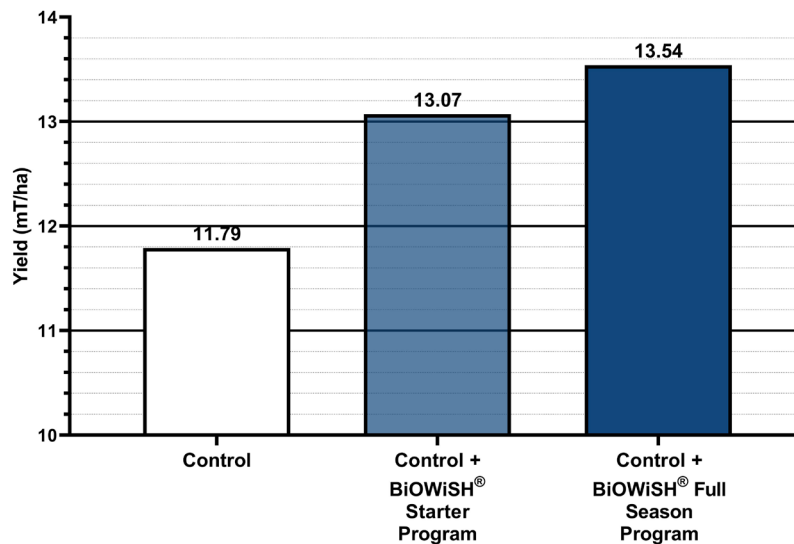
Effects of BiOWiSH® Crop Liquid Coated Fertilizer on Number of Fruits in Avocado

Across locations, the Control + BiOWiSH® Full Season Program resulted in the highest number of effective fruit per plant, with an average of 16.85 more effective fruit per plant (10.90%) compared to the Control. The Control + BiOWiSH® Starter Program showed an average of 7.45 more effective fruit per plant (4.82%) compared to the Control.



Effects of BiOWiSH[®] Crop Liquid Coated Fertilizer on Fruit Weight in Avocado

Across locations, the Control + BiOWiSH[®] Full Season Program resulted in an average increased fruit weight of 23.00 g/fruit (5.34%) compared to the Control. The Control + BiOWiSH[®] Starter Program showed an increased fruit weight of 4.15 g/fruit (0.96%) compared to the Control.



Effects of BiOWiSH[®] Crop Liquid Coated Fertilizer on Overall Yield in Avocado

Across locations, the Control + BiOWiSH[®] Full Season Program resulted in an average yield increase of 1.75 mT/ha (14.84%) compared to the Control. The Control + BiOWiSH[®] Starter Program showed a yield increase of 1.28 mT/ha (10.86%) compared to the Control.

Economic Results Across Locations

Treatment	Yield mT/ha [t/acre]	Yield Increase mT/ha [t/acre]	Yield Increase %	Crop Value USD/ha [USD/acre]	Net Income Gain %	Profit Change USD/ha [USD/acre]
Control	11.79 [5.26]	-	-	\$21,222 [\$9,468]	-	-
Control + BiOWiSH® Starter Program	13.07 [5.83]	1.28 [0.57]	10.86	\$23,572 [\$10,492]	11.24	\$2,350 [\$1,024]
Control + BiOWiSH® Full Season Program	13.54 [6.04]	1.75 [0.78]	14.84	\$24,665 [\$10,906]	15.31	\$3,443 [\$1,438]

*Calculations for conversions between imperial and metric units are based upon the original source data. Slight rounding differences may occur within reported values.

Conclusions

Trial data reported by the independent 3rd party researcher showed that coating NPK fertilizer with BiOWiSH® Crop Liquid improved avocado production. The Control + BiOWiSH® Full Season Program, which included four applications of BiOWiSH® Crop Liquid coated NPK, had an average yield increase of 14.84%. As a result, the average net income gain increased by 15.31%. These increases are likely related to the higher number of effective fruits per plant and the increased average weight of fruit documented. Although smaller in magnitude, such increases in avocado production were also noted in the Control + BiOWiSH® Starter Program (10.86% increase in yield and 11.24% increase in net income gain, respectively).

Taken together, these results support other field and laboratory studies that have shown how increased crop yield and quality associated with BiOWiSH® Crop Liquid treated fertilizers are related to improved fertilizer efficiency and better interactions among the soil, roots, and microbes.



BiOWiSH® is a registered trademark of BiOWiSH Technologies International, Inc.

Contact us:
agronomy@biowishtech.com
+1 312 572 6700
biowishtech.com

1482-01-EN