

BiOWiSH[®] Crop Liquid

BiOWiSH[®] Crop Additive Increases Coffee Yield



Executive Summary

Vietnam's Research Center for Highland Soils, Fertilizer, and Environment conducted a study to test the efficacy of BiOWiSH[®] Crop Liquid for coffee production in Vietnam. The trial used regional farmers' standard practice as the control. It was then compared to two treatments: the control with BiOWiSH[®] as part of the NPK starter program and the control with the full season NPK coated with BiOWiSH[®]. The study determined that adding BiOWiSH[®] increased coffee yield, leading to higher profits for farmers.

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 to illustrate the effectiveness of BiOWiSH[®] Crop Liquid coated onto urea and NPK fertilizers. 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 increases nutrient uptake in plants, improves plant vigor, stimulates native microbial activity in the soil, and promotes root development. 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 for Highland Soils, Fertilizer, and Environment in Vietnam to measure yield of coffee when fertilized with BiOWiSH[®] Crop Liquid coated onto NPK fertilizers in Buon Ma Thuot district and Cu M'Gar district (both in Dak Lak province) in Central Vietnam.

Implementation

This study was conducted in acidic soil in typical field conditions. It compared regional farmers' standard fertilizer management program as the control (Treatment 1), the standard program with the starter NPK fertilizer coated with BiOWiSH[®] (Treatment 2), and the standard program with the full season NPK coated with BiOWiSH[®] (Treatment 3).

Pest and disease management techniques were independent for each location based on farmers' current management practices. Costs and yields were evaluated to determine how the addition of BiOWiSH[®] to the fertilizing program increased yield and revenue. The study had a randomized plot layout with four replications. The rates of fertilizers applied for each treatment are detailed in the table below.

BiOWiSH[®] Crop Liquid



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

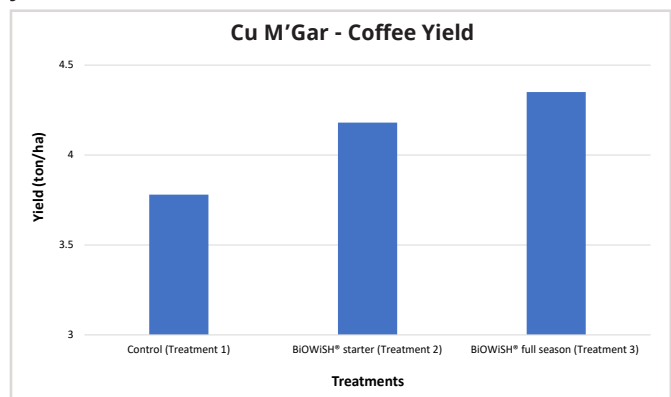
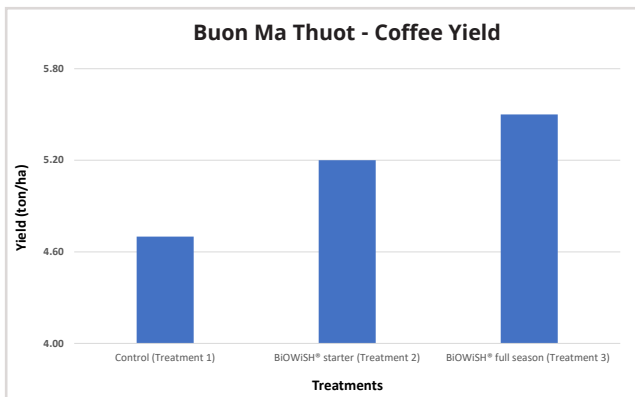
Available Sizes

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

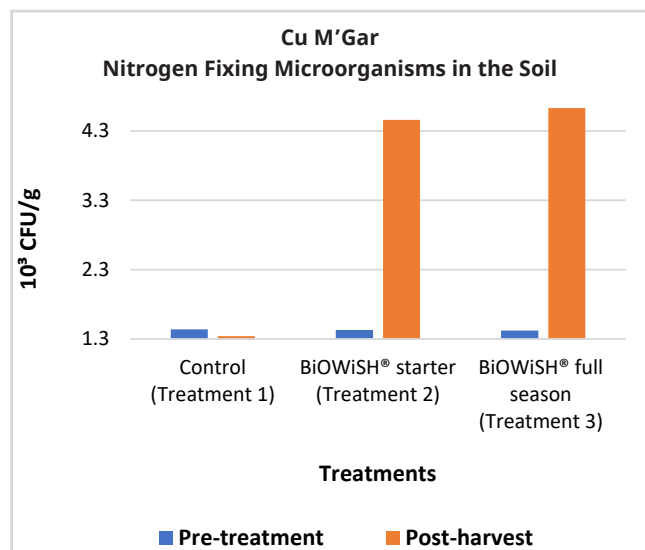
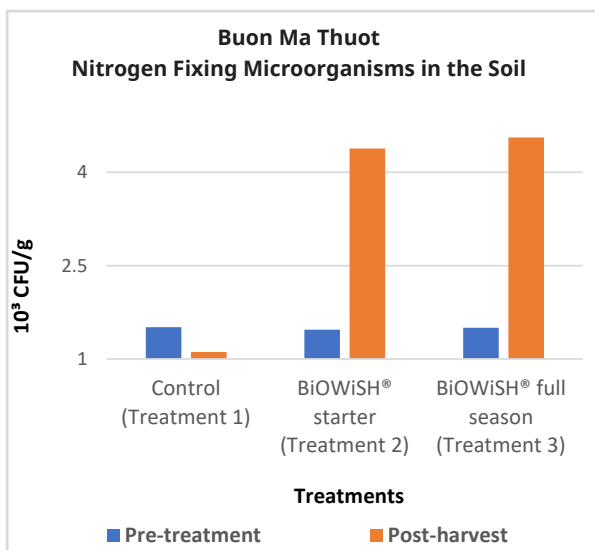
Application	Standard Fertilizer Program as Control (Treatment 1)	Standard Fertilizer Program with BiOWiSH® coated starter NPK (Treatment 2)	Standard Fertilizer Program with BiOWiSH® coated full season NPK (Treatment 3)
1	133.8 lb/ac. [150 kg/ha] NPK 25-5-5 +TE	133.8 lb/ac. [150 kg/ha] NPK 25-5-5+TE+BiOWiSH®	133.8 lb/ac. [150 kg/ha] NPK 25-5-5+TE+BiOWiSH®
2	168.2 lb/ac. [188.5 kg/ha] NPK 16-16-8+13S+TE 84.3 lb/ac [94.5 kg/ha] Urea 78.1 lb/ac [87.5 kg/ha] KCl	168.2 lb/ac. [188.5 kg/ha] NPK 16-16-8+13S+TE 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl	168.2 lb/ac [188.5 kg/ha] NPK16-16-8+13S+TE+BiOWiSH® 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl
3	168.2 lb/ac. [188.5 kg/ha] NPK 15-15-15+TE 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl	168.2 lb/ac. [188.5 kg/ha] NPK 15-15-15+TE 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl	168.2 lb/ac. [188.5 kg/ha] NPK 15-15-15+TE+BiOWiSH® 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl
4	168.2 lb/ac. [188.5 kg/ha] NPK 15-15-15+TE 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl	168.2 lb/ac. [188.5 kg/ha] NPK 16-8-16+TE 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl	168.2 lb/ac. [188.5 kg/ha] NPK 16-8-16+TE+BiOWiSH® 84.3 lb/ac. [94.5 kg/ha] Urea 78.1 lb/ac. [87.5 kg/ha] KCl

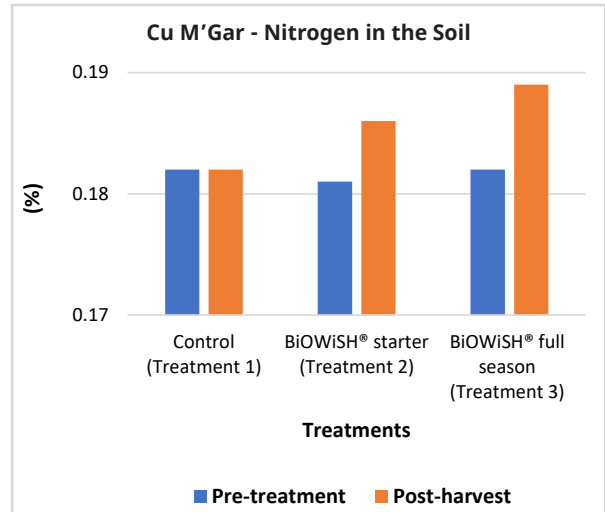
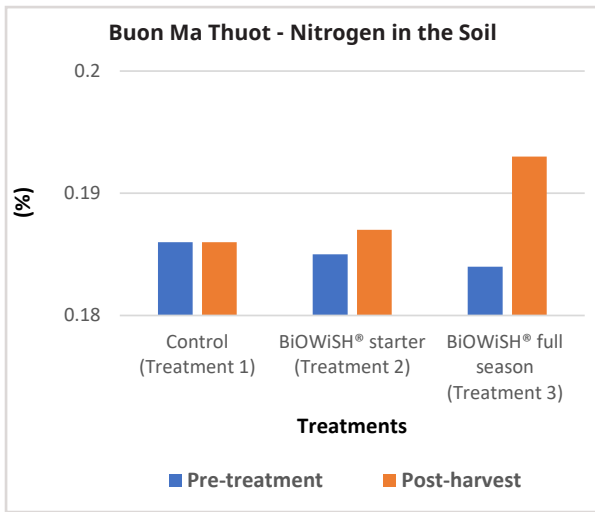
Results

All BiOWiSH® treatments resulted in an increase in coffee yield in both locations.

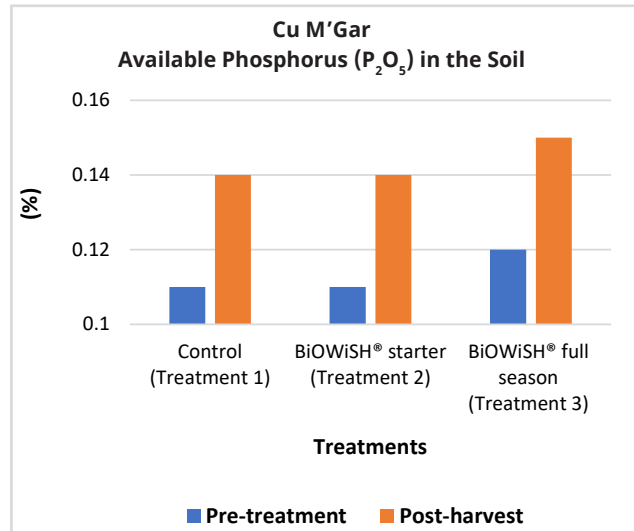
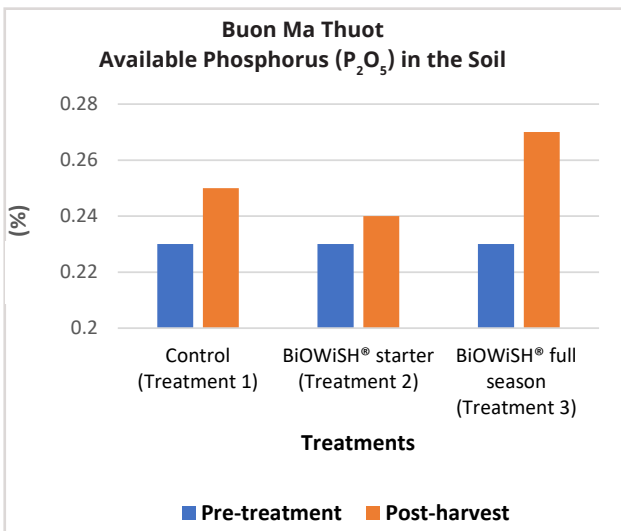
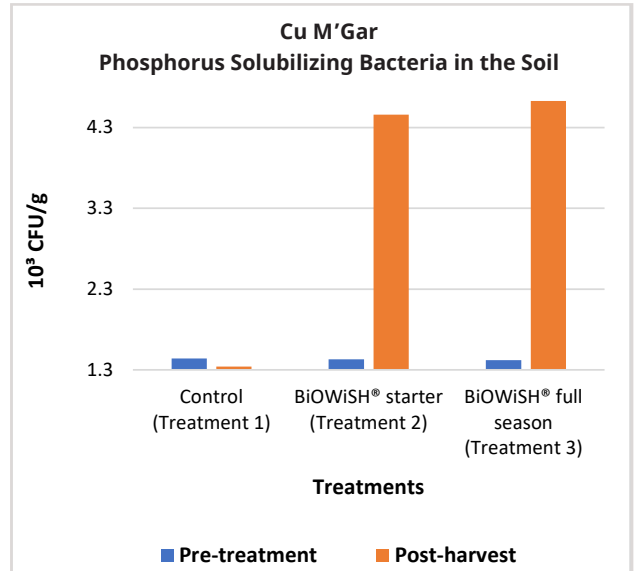
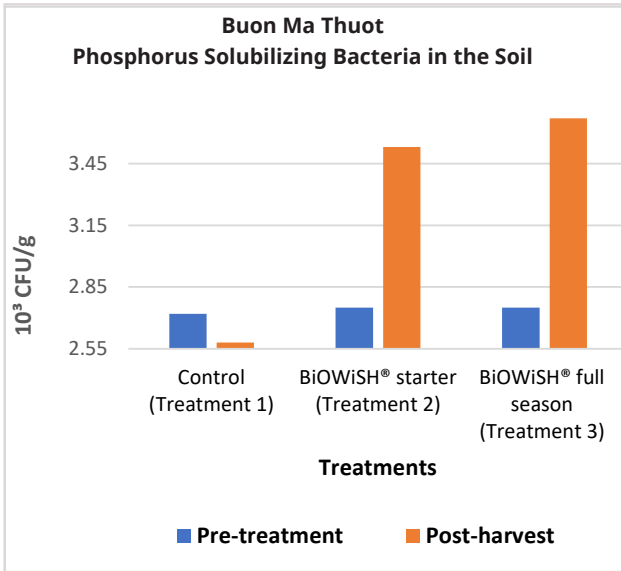


BiOWiSH® treatments increased available nitrogen and the population of nitrogen fixing microorganisms in the soil. Increased nitrogen is also illustrated by the mass balance equation: similar baseline nutrients and fertilizer inputs, more crop nutrient offtake (from increased yield), and the same or more soil nutrients left in the soil after harvest.





BiOWiSH® treatments also increased available phosphorus and the population of phosphorus solubilizing bacteria in the soil. Increased phosphorus is also illustrated by the mass balance equation: similar baseline nutrients and fertilizer inputs, more crop nutrient offtake (from increased yield), and the same or more soil nutrients left in the soil after harvest.



Economic Results for Buon Ma Thuot

Treatment Group	Yield Ton/acre [mT/ha]	Yield Increase Ton/acre [mT/ha]	Yield Increase %	Net Income Gain %	Profit Increase USD/acre [USD/ha]
Standard Fertilizer Program as Control (Treatment 1)	2.10 [4.70]	-	-	-	-
Standard Fertilizer Program with BiOWiSH® Coated Starter NPK (Treatment 2)	2.32 [5.20]	0.22 [0.50]	10.64	16.12	337 [833]
Standard Fertilizer Program with BiOWiSH® Coated Full Season NPK (Treatment 3)	2.45 [5.50]	0.36 [0.80]	17.02	25.64	536 [1324]

Economic Results for Cu M'Gar

Treatment Group	Yield Ton/acre [mT/ha]	Yield Increase Ton/acre [mT/ha]	Yield Increase %	Net Income Gain %	Profit Increase USD/acre [USD/ha]
Standard Fertilizer Program as Control (Treatment 1)	1.69 [3.78]	-	-	-	-
Standard Fertilizer Program with BiOWiSH® Coated Starter NPK (Treatment 2)	1.86 [4.18]	0.18 [0.40]	10.58	18.35	269 [665]
Standard Fertilizer Program with BiOWiSH® Coated Full Season NPK (Treatment 3)	1.94 [4.35]	0.25 [0.57]	15.08	25.91	380 [940]

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

Conclusion

This study demonstrates that adding BiOWiSH® Crop Liquid to NPK fertilizer improves coffee production. When BiOWiSH® was added to the starter NPK, coffee yield increased by an average of 10.61% and farmer net income gain increased by an average of 17.24%. When the full season of NPK was coated with BiOWiSH®, coffee yield increased by an average of 16.05% and farmer net income gain increased by an average of 25.78%.

Soil analysis showed higher nitrogen and phosphorus (P₂O₅) levels, as well as beneficial microorganism populations, in the soil after applying BiOWiSH®. As a result, the soil is more fertile for the next growing season. This study shows that BiOWiSH® is a beneficial addition to best management practices for coffee farms in Vietnam.



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