

BiOWiSH® Crop Liquid

Evaluation of BiOWiSH® Crop Liquid on Maize in Itumbriara, Goiás, Brazil



Executive Summary

BiOWiSH Technologies conducted a side-by-side study to determine the efficacy of BiOWiSH® Crop Liquid coated onto urea to create an Enhanced Efficiency Fertilizer (EEF) for maize grown under dryland, Safrinha growing conditions in Brazil.

The trial compared two treatments:

- Control, Standard Urea Fertility Program
- Control + BiOWiSH® Crop Liquid

The study determined that the addition of BiOWiSH® Crop Liquid optimized yield potential by improved nutrient uptake for maize grown under Safrinha conditions in Brazil. In this trial, a 11.4% increase was observed for the Control + BiOWiSH® Crop Liquid treatment, which led to higher profit.

Background

About BiOWiSH Technologies

Headquartered in Cincinnati, Ohio, BiOWiSH Technologies, Inc. is a global provider of biotechnology solutions. As a leader in the agricultural market, we help farmers increase crop production sustainably, safely, and cost effectively. Our revolutionary BiOWiSH® Crop Liquid is a blend of proprietary microbial cultures that can be coated onto dry fertilizer or mixed with liquid fertilizers to create an enhanced efficiency fertilizer. BiOWiSH® endophytic *Bacillus* deliver soil nutrients to crops through the rhizophagy cycle creating a symbiotic relationship between the plant and soil microbes. This helps farmers achieve consistent results across a broad range of operating conditions, climates, and environments. By unifying nature and science, BiOWiSH reinvents the way food is grown. For more information, visit biowishtech.com.

BiOWiSH® Crop Liquid



- Optimizes yield potential by improved nutrient uptake
- Increases nutrient use efficiency and supports nutrient uptake
- Optimizes soil conditions for greater root mass
- Improves soil conditions for increased plant vigor
- Enhances beneficial microbes in the rhizosphere

Available Size

- 264 gal/1000 L

Objectives

The field study was conducted to evaluate the performance of BiOWiSH® Crop Liquid coated onto urea to create an Enhanced Efficiency Fertilizer (EEF) for the second crop production (Safrinha conditions) of maize in Brazil, compared to the Control. The focus was on BiOWiSH® Enhanced Fertilizer's impact on yield and grower economics.

Implementation Program

The study was conducted as a side-by-side farm demonstration trial in Itumbriara, Goiás, Brazil. The Control treatment consisted of a standard grower program of urea at a rate of 200 kg/ha (178 lbs/acre), applied at the V4 crop stage, which was 29 days after planting. Urea at V4, with no phosphorus or potassium fertilizer, is a common practice in the region for a soybean/maize crop rotation. The urea was broadcast using a mechanical fertilizer spreader and was not incorporated into the soil. No phosphorous or potassium fertilizer was applied because the maize crop followed a soybean crop.

The Control program was compared to the same program, rate and timing, but with BiOWiSH® Crop Liquid coated onto the urea fertilizer. The study was planted at a rate of 66,000 plants/ha (26,721 plants/acre). The Control treatment area measured 11.79 hectares (29.13 acres) and the BiOWiSH® treatment area was 12.13 hectares (29.97 acres).

The Safrinha climate conditions are normally hotter and drier for the earlier planted crop; therefore, there was not consistent rainfall distribution during crop development.

Table 1. Treatments, Fertilizers, and Application Timings

Treatment	Application Rate kg/ha [lbs/acre]	Application Timing
Control	200 [178]	Sidedress
Control + BiOWiSH® Crop Liquid	200 [178]	Sidedress

*BiOWiSH® Crop Liquid used at manufacturer's recommended rate.

Results

Yield Data

Yield results showed that BiOWiSH® Crop Liquid increased yield over the Control by 0.39 MT/ha (0.17 tons/acre) for an increase of 11.4%.

Figure 1. Yield Data

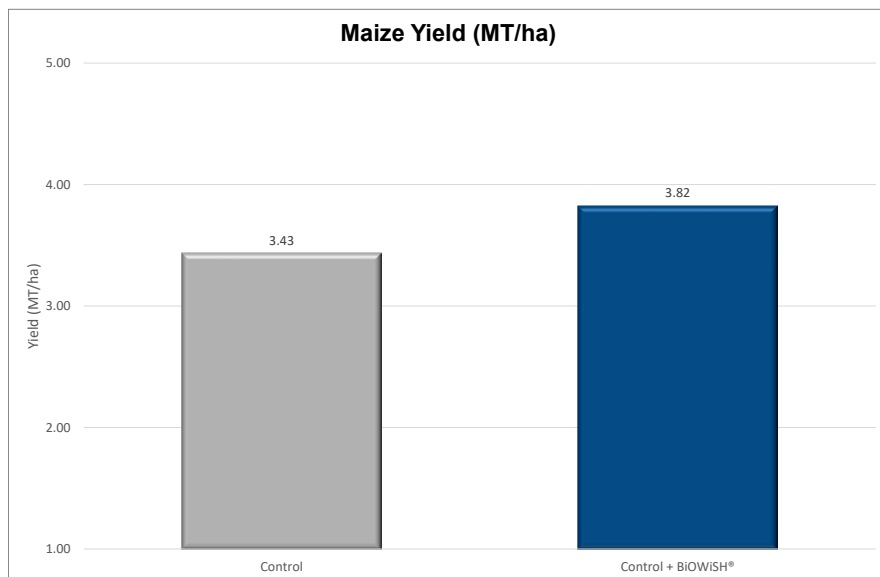


Table 2. Yield and Income Table

Treatment	Yield MT/ha [tons/acre]	Yield Increase MT/ha [tons/acre]	Yield Increase (%)	Net Income USD/ha [USD/acre]	Profit Change USD/ha [USD/acre]
Control	3.43 [1.53]	-	-	788 [319]	-
Control + BiOWiSH® Crop Liquid	3.82 [1.70]	0.39 [0.17]	11.4	884 [358]	96 [39]

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

**Net income is the crop value minus the fertility program cost. It does not account for non-fertility expenses.

***Profit change is the difference between net income of the respective program and the Control.

Conclusion

BiOWiSH® endophytic *Bacillus* deliver soil nutrients to crops through the rhizophagy cycle creating a symbiotic relationship between the plant and soil microbes. Combined, this led to optimized yield potential by improved nutrient uptake, resulting in an 11.4% yield increase and a \$96 USD/ha (\$39 USD/acre) profit increase for the grower during a high-risk season of Safrinha maize production.



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