

Evaluation of BiOWiSH™ Crop on Biomass Yield in Silage Corn

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, Tennessee, the company has been in the business for more than 50 years and has been working on product development and providing research services for more than eight years.

Objective

The objective of this research study was to determine the effectiveness of BiOWiSH™ Crop, manufactured by BiOWiSH Technologies, Inc., in the USA, on growth and yield in silage corn.

Solution

BiOWiSH™ Crop is a fertilizer additive 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 the BiOWiSH™ Crop technology improves crop yields and quality, adding directly to the farmer’s bottom line.

Implementation Program

The study was conducted on the Helena Research and Development Farm in Merced, California, on silage corn. Treatments were organized as a Randomized Complete Block Design with 4 replications. Plots were set up in adjacent rows with spacing. The following treatments were under evaluation:

Treatment Name	Fertilization Program	Rate [Kg/Ha]	Application Timing [Stage]
Control	Urea (46-0-0)	212	Preplant
	MAP (11-52-0)	56	Preplant
	MOP (0-0-60)	67	Preplant
	Urea (46-0-0)	56	V9
	Urea (46-0-0)	56	VT
	Control + BiOWiSH™	BiOWiSH™ Crop Coated Urea (46-0-0)*	212
MAP (11-52-0)		56	Preplant
MOP (0-0-60)		67	Preplant
BiOWiSH™ Crop Coated Urea (46-0-0)		56	V9
BiOWiSH™ Crop Coated Urea (46-0-0)		56	VT

*BiOWiSH™ Crop Coated Urea (46-0-0) is urea coated with BiOWiSH™ Crop Liquid at 0.2% w/w.

Treatment Name	Fertilization Program	Rate [Kg/Ha]	Application Timing [Stage]
Stabilized Nitrogen Technology	Stabilized Nitrogen Coated Urea	288	Preplant
	MAP (11-52-0)	56	Preplant
	MOP (0-0-60)	67	Preplant
Controlled Release Polymer Coated	Urea (46-0-0)	112	Preplant
	Polymer Coated Urea	106	Preplant
	MAP (11-52-0)	56	Preplant
	MOP (0-0-60)	67	Preplant

Observations of the following characteristics were made to represent the effect of BiOWiSH™ Crop on silage corn performance:

1. Plant Growth: Height
2. Yield: Ear Length, Ear Diameter and Biomass Yield

Soil samples were collected before planting (soil baseline) and after harvest. Plant tissue samples were collected at the early-dough stage for each fertilization program. An economic evaluation of the different fertilizer programs was performed based on current cost data for farmers in California.

Results

Crop Performance

All nitrogen-enhancement technologies showed a higher plant height as compared to the most common practice base fertilizer treatment (control). Moreover, BiOWiSH™ treatment showed the highest ear length and diameter that resulted in the highest biomass yield.

Treatment Name	Plant Height [cm]	Ear Length [cm]	Ear Diameter [cm]	Biomass Yield [Ton/Ha]
Control	256	35.1	4.71	85.5
Control + BiOWiSH™	262	37.3	5.11	108.9
Stabilized Nitrogen Technology	264	36.1	5.10	92.1
Controlled Release Polymer Coated	260	33.0	4.62	78.1

Soil Analysis

Baseline soil analysis revealed similar values for all treatments. The post-harvest soil analysis in the table below illustrates the BiOWiSH™ program produces higher yields while maintaining soil fertility.

Treatment Name	N [ppm]	P [ppm]	K [ppm]	Mg [ppm]	Ca [ppm]	OM [%]	pH	CEC [%]
Soil Baseline	909	202	2365	8939	5249	1.2	7.2	25
Control	873	216	2187	7956	4580	0.9	6.9	24
Control + BiOWiSH™	985	240	2478	9401	4898	0.9	6.8	22
Stabilized Nitrogen Technology	923	244	2453	9316	6578	1.0	6.7	28
Controlled Release Polymer Coated	920	245	2321	9439	6848	1.0	6.7	26

Plant Tissue Analysis

The plant tissue analysis also showed BiOWiSH™ treatments can increase yield while maintaining plant nutrient levels. All treatments showed sufficient Nitrogen, Phosphorous and Potassium levels for a high-quality plant.

Treatment Name	Nitrogen [%]	Phosphorus [%]	Potassium [%]
Control	3.03	0.35	2.15
Control + BiOWiSH™	2.88	0.38	2.41
Stabilized Nitrogen Technology	3.12	0.29	2.13
Controlled Release Polymer Coated	3.45	0.36	2.38

Economics

BiOWiSH™ treatments resulted in a significant increase in the economic return as compared to the recommended best management practice fertilizer program. The urea plus BiOWiSH™ Crop treatment gave the best economic results: an additional \$1153 per hectare (\$467/acre) over the recommended most common fertilizer program and \$819 per hectare higher than the best-performing enhanced nitrogen treatment.

Treatment Name	Gross Income [US\$/Ha]	Profit [US\$/Ha]*
Control	4273	--
Control + BiOWiSH™	5446	1153
Stabilized Nitrogen Technology	4607	334
Controlled Release Polymer Coated	3903	(371)

*Profit relative to control.

Conclusions

BiOWiSH™ Crop treated fertilizer performed very well on silage corn in California. It had a significant effect on plant growth and yield compared to the grower standard fertilization practice and other nitrogen efficiency technologies. The demonstrated ability to improve production offers a significant return on investment opportunity for growers. Furthermore, laboratory plant and soil analysis illustrated that in addition to the high tonnage increase, the BiOWiSH™ program maintains plant quality for producing a valuable commodity and soil fertility for future crops.

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