Technical Data Report

Review

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An Evaluation of Two Application Methods of NUTRIPLANT™ SL on Sugar Beet Production

Objective

The objective of the study was to determine the most effective application method of Nutriplant SL on production of sugar beets.

Materials and Methods

Field trials were conducted on sugar beets (*Beta vulgaris* sp.) at the independently owned and operated agricultural research facility, Irrigation Research Foundation, at Yuma, Colorado, USA under the supervision of Colorado State University. Two application methods of Nutriplant SL at planting were evaluated: 1) direct application to the seeds and 2) in-furrow application over the planted seeds. Application directly to the seeds was tested in 2005 and 2006. In-furrow application was tested in 2010 and 2011. Planting population was 116,000 seeds/ha (47,000 seeds/acre) in 2005 and 2006, and 110,100 seeds/ha (49,000 seeds/acre) in 2010 and 2011. Test plots consisted of 4 rows 76 cm (30 inches) wide. The plot length ranged from 30 to 213 meters (100 to 700 feet). Two uniform plots were selected for each trial. One plot was treated with Nutriplant SL applied directly to the seeds or applied in-furrow on the seeds. The control plot was left untreated. For treatment directly to the seed, Nutriplant SL was applied at 1.3 ml/kg of seeds (2 fl oz/100 lb of seeds) in 2005 and 2.6 ml/kg (4 fl oz/100 lb) of seeds in 2006. For in-furrow treatment, product was applied at 300 ml in 38 liters/ha (4 fl oz in 4 gal/acre) of water. Cultural practices, including fertilization, irrigation and pest management, followed local practices and were the same for treated and untreated plots. Beet yield and percent sugar were determined at harvest. Sugar yield was calculated based on beet yield and sugar content.

Results

Application of Nutriplant SL directly to the seeds at planting increased sugar beet yields by 9,887 kg/ha (4.40 ton/acre) in 2005, a 23.4% increase over the untreated control (Table 1). In 2006, Nutriplant SL increased yield by 14,696 kg/ha (6.54 ton/acre), a 25.6% over the untreated control. The average sugar beet increase over the two years was 12,292 kg/ha (5.47 ton/acre) or 24.5%.

Table 1. Effects of Nutriplant SL applied directly to the seeds at planting on sugar beet yields. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar Beet Yields						
	Control		Nutriplant SL		Difference		
	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(%)
2005	42,246	18.80	52,133	23.20	9,887	4.40	23.4
2006	57,526	25.60	72,222	32.14	14,696	6.54	25.6
Mean	*49,886*	*22.20*	*62,178*	*27.67*	*12,292*	*5.47*	*24.5*

In 2005, treatment with Nutriplant SL increased percent of sugar from 15.02% to 15.32% (Table 2). In 2006, the treatment increased percent sugar from 12.97% to 15.06%. Combined with the increase in beet yields, in a two year average, the treatment increased sugar yield by 2,529 kg/ha (2,250 lb/acre), a 36.6% over the untreated control. The highest sugar production increase of 40.7% was obtained in 2006 when crop was exposed to high winds and extreme heat early in the season.

Table 2. Effects of Nutriplant SL on percent sugar and sugar yield. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar (%)		Sugar Yield					
			Control		Nutriplant SL		Difference	
	Control	Nutriplant SL	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)
2005	15.02	15.32	6,345	5,648	7,987	7,108	1,642	1,460
2006	12.97	15.06	7,461	6,641	10,877	9,681	3,416	3,040
Mean	*14.0*	*15.19*	*6,903*	*6,145*	*9,432*	*8,395*	*2,529*	*2,250*

Application of Nutriplant SL in-furrow at planting increased sugar beet yields by 9,506 kg/ha (4.23 ton/acre) in 2010, a 14.3% increase over the untreated control (Table 3). In 2011, Nutriplant SL increased yields by 6,225 kg/ha (2.77 ton/acre), an 8.6% increase over the control. The average yield increase for the two years was 7,866 kg/ha (3.50 ton/acre), an 11.5% increase over the untreated control. In both years, the crop was exposed to abiotic stress of low temperatures, indicating that Nutriplant SL applied in-furrow helped overcome the negative effects of stress. These results are consistent with the effects of Cytozyme products on dryland and irrigated winter wheat, when the greatest yield increases were observed in years when the wheat was exposed to extreme abiotic stress of heat and drought.

Table 3. Effects of Nutriplant SL applied in-furrow at planting time on sugar beet yields. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar Beet Yields						
	Control		Nutriplant SL		Difference		
	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(%)
2010	66,492	29.59	75,998	33.82	9,506	4.23	14.3
2011	72,739	32.37	78,964	35.14	6,225	2.77	8.6
Mean	*69,616*	*30.98*	*77,481*	*34.48*	*7,866*	*3.50*	*11.5*

Sugar content was slightly lower in the treated compared to non-treated beets but because of the beet root yield increase, in a two year average, the treatment increased sugar yield by 905 kg/ha (805 lb/acre), a 7.7% over the control (Table 4).

Table 4. Effects of Nutriplant SL on percent sugar and sugar yield. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar (%)		Sugar Yield					
			Control		Nutriplant SL		Difference	
	Control	Nutriplant SL	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)
2010	17.13	16.82	11,390	10,138	12,783	11,377	1,393	1,239
2011	16.84	16.04	12,249	10,902	12,666	11,273	417	371
Mean	*16.99*	*16.43*	*11,820*	*10,520*	*12,725*	*11,325*	*905*	*805*

The evaluation of these two methods of application of Nutriplant SL to the seeds indicated that direct application to the sugar beet seeds is more effective than application in-furrow, increasing both sugar beet yield and sugar content in the beets.

Conclusions

Both methods of application were very effective, but direct application of Nutriplant SL to sugar beet seeds was more effective than in-furrow application.

In a two year study, Nutriplant SL applied directly to the seeds at planting increased sugar beet yields by an average of 24.5% compared to the untreated control and when applied in-furrow, increased yields by 11.5%.

Nutriplant SL applied directly to the seed increased sugar production by 36.6% and applied in-furrow increased production by 7.7% over control.

References

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