

Technical Data Report

Review

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Effects of Nutriplant™ AG on Sugar Beet Production

Objective

The objective of the study was to determine the effects of one foliar application of Nutriplant AG compared to two applications on the 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. The effects of a single application of Nutriplant AG was tested for four years (1998, 1999, 2003 and 2004) and compared to two applications of Nutriplant AG tested for three years (2003, 2004 and 2006). Planting population was 116,000 seeds/ha (47,000 seeds/acre). Test plots consisted of four rows 76 cm (30 inches) wide and 195 meters (650 feet) long. Two uniform plots were selected for each trial. One plot was treated with Nutriplant AG applied once at the 8-10 leaf stage or twice (8-10 leaf and 2 weeks later) at the rate of 1,200 ml/ha (16 fl oz/acre). The other plot was left untreated as control. Cultural practices, including fertilization, irrigation and pest management, followed local practices and were the same for treated and untreated plots. At harvest, beet yield and percent sugar were determined. Sugar yield was calculated using beet yield and sugar content data.

Results

A single application of Nutriplant AG at the 8-10 leaf stage increased sugar beet yields by an average of 7,157 kg/ha (3.19 ton/acre), a 17% over the untreated control (Table 1). The lowest yield increase of 921 kg/ha (0.41 ton/acre) was obtained in 1998 when the crop was severely damaged by adverse weather conditions in spring and, despite re-planting, the crop had sporadic, poor stand. The highest yield increase of 14,674 kg/ha (6.53 ton/acre) was obtained in 2004 when the crop was exposed to four hail storms during growing season proving that Nutriplant AG helped plants overcome adverse weather conditions.

Table 1. Effects of one application of Nutriplant AG on sugar beet yields. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar Beet Yields						
	Control		Nutriplant AG		Difference		
	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(%)
1998	46,560	20.72	47,482	21.13	921	0.41	2.0
1999	55,953	24.90	63,369	28.20	7,416	3.30	13.3
2003	43,819	19.50	49,437	22.00	5,618	2.50	12.8
2004	36,808	16.38	51,482	22.91	14,674	6.53	39.9
Mean	45,785	20.38	52,943	23.56	7,157	3.19	17.0

In three of the four years, one application of Nutriplant AG also increased percent of sugar in beets (Table 2). Combined with the increase in beet yield, Nutriplant AG consistently increased sugar

production. The average increase of sugar yield for the four years was 1,288 kg/ha (1,147 lb/acre), an 18.9% increase, ranging from 339 kg/ha (303 lb/acre) in 1998 to 2,111 kg/ha (1,880 lb/acre) in 2004.

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

Year	Sugar (%)		Sugar Yield					
			Control		Nutriplant AG		Difference	
	Control	Nutriplant AG	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)
1998	14.19	14.63	6,607	5,880	6,947	6,183	339	303
1999	12.24	12.87	6,849	6,096	8,156	7,259	1,307	1,163
2003	16.44	17.39	7,204	6,412	8,597	7,652	1,393	1,240
2004	17.90	16.90	6,589	5,864	8,700	7,744	2,111	1,880
<i>Mean</i>	<i>15.19</i>	<i>15.45</i>	<i>6,812</i>	<i>6,063</i>	<i>8,100</i>	<i>7,210</i>	<i>1,288</i>	<i>1,147</i>

Two applications of Nutriplant AG, at 8-10 leaf and two weeks later, consistently increased sugar beet yields by an average of 12,861 kg/ha (5.72 ton/acre), a 30.1% increase (Table 3) ranging from 7,258 kg/ha (3.23 ton/acre) in 2006 to 16,853 kg/ha (7.5 ton/acre) in 2003. The highest yield increase of 39.3% or 14,471 kg/ha (6.44 ton/acre) was obtained in 2004 when the crop was exposed to four hail storms during growing season proving that Nutriplant AG helped plants overcome adverse weather conditions. In 2003, high yield increase was obtained without obvious severe stress conditions, however that year production of sugar beets in Yuma, Colorado was one of the lowest on the record in the last decade.

Table 3. Effects of two applications of Nutriplant AG on sugar beet yields. Irrigation Research Foundation, Yuma, Colorado, USA.

Year	Sugar Beet Yields						
	Control		Nutriplant AG		Difference		
	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(kg/ha)	(ton/acre)	(%)
2003	43,819	19.50	60,672	27.00	16,853	7.50	38.5
2004	36,808	16.38	51,279	22.82	14,471	6.44	39.3
2006	57,526	25.60	64,784	28.83	7,258	3.23	12.6
<i>Mean</i>	<i>46,051</i>	<i>20.49</i>	<i>58,912</i>	<i>26.22</i>	<i>12,861</i>	<i>5.72</i>	<i>30.1</i>

In two of the three years, two applications of Nutriplant AG also increased percent of sugar in beets (Table 4). Combined with the increase in beet yield, Nutriplant AG consistently increased sugar production. The average increase of sugar yield for the three years was 2,522 kg/ha (2,244 lb/acre), a 35.6% increase, ranging from 1,972 kg/ha (1,754 lb/acre) in 2006 to 3,608 kg/ha (3,211 lb/acre) in 2003.

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

Year	Sugar (%)		Sugar Yield					
			Control		Nutriplant AG		Difference	
	Control	Nutriplant AG	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)	(kg/ha)	(lb/acre)
2003	16.44	17.82	7,204	6,412	10,812	9,623	3,608	3,211
2004	17.90	16.72	6,589	5,864	8,574	7,631	1,985	1,767
2006	12.97	14.56	7,461	6,641	9,433	8,395	1,972	1,754
<i>Mean</i>	<i>15.77</i>	<i>16.37</i>	<i>7,085</i>	<i>6,306</i>	<i>9,606</i>	<i>8,550</i>	<i>2,522</i>	<i>2,244</i>

The evaluation of the one versus two applications of Nutriplant AG to sugar beets indicates that the two applications were more effective in increasing sugar beet yield and sugar production than one application. Two applications increased beet production by an average of 12,861 kg/ha (5.72 ton/acre), a 30.1% increase, while one application increased by 7,157 kg/ha (3.19 ton/acre), a 17% increase over control. Two applications increased sugar production by 2,522 kg/ha (2,244 lb/acre), a 35.6% increase, while one application increased by 1,288 kg/ha (1,147 lb/acre), an 18.9% increase over the untreated control.

Conclusions

Nutriplant AG was very effective in increasing beet yield and sugar production with both one and two applications.

Two applications of Nutriplant AG were more effective than one application increasing sugar beet yield by 30.1%, compared to 17% with one application.

Two applications of Nutriplant AG were more effective in increasing sugar yield by 35.6%, compared to 18.9% for single application.

References

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