ALTERNATIVES TO THE USE OF THE CHEMICAL RIPENER POLADO (GLYPHOSATE) IN ENHANCING THE YIELD OF SUGAR IN LOUISIANA SUGARCANE DURING THE 2002 CROP

B. L. Legendre
St. Gabriel Research Station

Kenneth Gravois and Keith Bischoff
Sugar Research Station

J. L. Griffin
Department of Agronomy

SUMMARY

In the first of two field studies conducted in 2002, the chemical ripeners Polado, Arsenal and Fusilade, at various rates, significantly increased the yield of theoretical recoverable sugar per acre (TRS/A) when compared to control (untreated) plots at 54 days after treatment (DAT) in the second-stubble crop of the variety LCP 85-384. All three ripeners also increased the yield of theoretical recoverable sugar per ton of cane (TRS/TC) at 34 and 54 DAT when compared to control. Further, the TRS/TC for the Polado and Arsenal treatments were significantly higher than the two rates of Fusilade tested at 54 DAT. Polado appeared to have the greatest negative impact on mean stalk weight (MSW) at both 34 and 54 DAT; however, this might have been a cumulative effect of having applied the same treatments to the same plots in both 2001 and 2002. The estimated yield of tons cane per acre (TC/A) was derived from MSW and millable stalk counts taken prior to the 2002 harvest. There were no significant differences in stalk counts between control and either the Polado or Fusilade treatments. However, Arsenal at the two rates tested actually stimulated shoot development, which meant a significantly higher millable stalk count at harvest the year after the initial treatment. All ripener treatments in 2002 significantly increased the purity of juice when compared to control at both 34 and 54 DAT. There was further differentiation in the purity of juice among ripener treatments, with Polado and Arsenal treatments generally resulting in higher values.

In the second study, 10 chemical ripeners, A13013A, Accent, Arsenal, Kayphol, MON 37500, Oust, Palisade, Polado, Polado plus Takeup and Touchdown, at various rates, were tested on the third-stubble crop of the variety LCP 85-384. A significant increase in TRS/A was noted for A13013A at 2.87 oz/A, Polado at 8 oz/A, Polado at 6 oz/A plus Takeup and Touchdown at 8 oz/A at 49 DAT. The TRS/A for the other rates of these three ripeners as well as the low rate of Arsenal approached significance. At 37 DAT, there was a significant increase in TRS/TC for A13013A, Arsenal, Polado, Polado plus Takeup and Touchdown at all rates tested as well as the high rate of Palisade. At 49 DAT, all treatments with the exception of Accent, Kayphol, and MON 37500 at the rates tested significantly increased TRS/TC. There were no significant differences in MSW among any of the treatments when compared to control at either 37 or 49 DAT although large numerical differences were noted. Most of the ripeners tested also increased the purity of the juice when compared to control at both 37 and 49 DAT. However, purity of

juice was significantly reduced by the application of Kayphol when harvested at 37 DAT. TC/A was the product of MSW by a constant of 40,000 stalks per acre. Using these calculations, there was a significant reduction in TC/A for two rates of Polado, 4 and 6 oz/A, when compared to control. There was also a large reduction in the TC/A for the Arsenal treatment at the high rate, 9.2 oz/A, that approached significance.

Both Polado and Touchdown are glyphosate derivatives; therefore, only Arsenal offers new chemistry to compete with glyphosate as a proven chemical ripener under the conditions and the varieties found in Louisiana. Additional studies are indicated with A13013A to determine its efficacy across varieties and years.

INTRODUCTION

In Louisiana, a sugarcane crop cycle usually consists of a fall-planted crop (plant-cane), which grows very little during winter and is harvested about one year after planting, and two or more stubble (ratoon) crops. The region has a 7- to 9-month growing season that extends from early spring to late November or until harvest during the period from late September to mid January. Consequently, sugarcane is relatively immature at the beginning of harvest and sucrose levels are usually low, generally increasing as the harvest season advances, depending upon the variety. Sucrose levels in juice and yield of sugar per ton and per acre are affected greatly by variety and weather conditions during the growing season and harvest. A combination of high incident light, cool nights and drying soil prior to and during the harvest period retards vegetative growth and promotes sucrose accumulation (natural ripening) (Legendre 1975).

Artificial ripening of sugarcane has been made possible by the development of plant growth regulators as chemical ripeners that hasten sugarcane maturation and increase sugar yield (Nickell 1984). Glyphosate [isopropylamine salt of N-(phosphonomethyl)glycine], one of the most effective chemical ripeners used on a world-wide basis, apparently influences the way dry matter is partitioned, increasing the ratio of sucrose to fiber (Osgood et al. 1981). However, glyphosate treatment usually means a decreased cane yield in the crop being treated by slowing cane growth after treatment, thus reducing stalk weight. In Louisiana, the effectiveness of glyphosate (Polado) (manufactured by Monsanto) for ripening sugarcane is strongly dependent upon variety, treatment-harvest interval, and growing season (Legendre and Finger 1987). The Polado label for sucrose enhancement in Louisiana, Florida, and Texas stipulates use only in stubble crops, a rate range of 4 to 14 ounces per acre of the formulated product and a treatment-harvest interval of 35 – 49 days. Polado is not labeled for plant-cane crops in these states because of possible phytotoxicity to crown buds, which could adversely affect regrowth (stubbling), thus reducing stands and yields in the stubble crop. Slow stand development in spring is commonly observed in Polado-treated sugarcane in Louisiana. Millhollon and Legendre (1996) found that annual glyphosate ripener treatments will usually increase mean annual sugar yield, but the magnitude of the increase will depend on variety tolerance to the treatments. They found that CP 70-321 appeared to have adequate tolerance to annual treatments, whereas LCP 85-384 can be very sensitive.

Currently, Polado is used on approximately 350,000 acres in Louisiana, netting the state's sugarcane growers, processors, and landlords an estimated $35 million in increased gross revenues each year. However, since Polado is not labeled for plant-cane use, typically causes a loss of cane yield in the crop being treated, and has the potential for causing yield reduction in the subsequent stubble crop, additional research is needed to find alternative ripeners that can be used on the plant-cane crop, can be used at reduced treatment-harvest intervals, have little or no impact on cane yield, and will not affect the subsequent stubble crop. Further, there is the possibility that glyphosate-tolerant sugarcane varieties that would effectively eliminate the use of glyphosate as a ripener will be developed in the near future. From 1983 to 1986, Legendre (unpublished data), while employed by the USDA-ARS, SRRC, Sugarcane Research Unit at Houma, showed that two products, Fusilade (manufactured by Syngenta) and Arsenal (manufactured by BASF), had the potential to ripen sugarcane under Louisiana conditions; however, the testing of both products was discontinued by their respective companies for company reasons.

PROCEDURES

The first experiment was conducted in the second-stubble crop of the sugarcane variety LCP 85-384. Sugarcane was cultivated and fertilized according to recommended practices; insecticides were applied as required. The chemical treatments were applied on August 21, 2002, in water at a broadcast rate of 8 gal/A with a CO_2 sprayer and hand-held boom. A nonionic surfactant, Induce (0.25% v/v), was added to all spray solutions. The experiment consisted of six treatments: Polado at 0.2 lb a.e. /A (6 oz/A); Arsenal at 0.143 and 0.214 lb/A; Fusilade at 0.0625 and 0.0875 lb/A; and an untreated check serving as control. A 36-inch band was sprayed over sugarcane foliage so that most of the leaves were wet by the spray. Plots were one-row by 100 foot long with a 5-foot alley and with buffer rows on either side of treated row, arranged in a randomized complete block design with five replications. The same treatments were applied to the first-stubble crop and harvested in 2001.

Fifteen-stalk samples, taken at random along the row, were removed from each plot on September 24 and October 14 (34 and 54 days after treatment (DAT), respectively). All stalks were stripped of all leaves and topped approximately 4-6 inches below the apical meristem (bud). Data collected and/or calculated included mean stalk weight and height, Brix by refractometer, sucrose by polarimetry, purity as the ratio of sucrose to Brix and the yield of theoretical recoverable sugar per ton of cane (TRS/TC). On October 14 (54 DAT), each plot was harvested by a cane combine (Cameco Model 2500) operating at approximately 3.5 mph and an extractor fan speed of 950 rpm. All cane from each plot was weighed in the wagon by use of load cells, and the weights recorded. From these data, the yield of tons cane per acre (TC/A) was calculated and, with the data for TRS/TC, the yield of theoretical recoverable sugar per acre (TRS/A) was calculated for each plot. However, because of the lodged condition of the crop as a result of wind and rain associated with Tropical Storm Isidore and Hurricane Lili and record rainfall during the harvest, weighed cane yields were highly variable because of excessive field soil (mud) and trash in harvested cane. As a result, estimated yields were used in lieu of weighed yields. Millable stalk counts were taken in each plot on August 16, 2002, and used in estimating

the yield of tons cane per acre by multiplying these numbers by the mean stalk weight for each treatment.

The second experiment was conducted in the third-stubble crop of the sugarcane variety LCP 85-384. Sugarcane was cultivated and fertilized according to recommended practices; insecticides were applied as required. The chemical treatments were applied on September 4, 2002, in water at a broadcast rate of 8 gal/A with a CO_2 sprayer and hand-held boom: a nonionic surfactant, Induce (0.25% v/v), was added to all spray solutions. The experiment consisted of 17 treatments: A13013A at 2.87 and 5.75 oz/A, Accent at 0.5 oz/A, Arsenal at 8 and 9.2 oz/A, Kayphol at 2.0 qt/A, MON 37500 at 0.5 oz/A, Oust at 0.282 oz/A, Palisade at 0.111 and 0.223 oz/A, Polado at 4, 6, and 8 oz/A, Polado at 6 oz/A plus Takeup at 1.0 pt/A, Touchdown at 4, 8, and 10.6 oz/A, and an untreated check serving as control. A 36-inch band was sprayed over sugarcane foliage so that most of the leaves were wet by the spray. Plots were one-row by 25 feet long with a 5-foot alley and with buffer rows on either side of treated row, arranged in a randomized complete block design with four replications.

Fifteen-stalk samples, taken at random along the row, were removed from each plot on October 11 and 23 (37 and 49 days after treatment (DAT), respectively). All stalks were stripped of all leaves and topped approximately 4-6 inches below the apical meristem (bud). Data collected and/or calculated included mean stalk weight and height, Brix by refractometer, sucrose by polarimetry, purity as the ratio of sucrose to Brix, and the yield of theoretical recoverable sugar per ton of cane (TRS/TC). On October 23 (49 DAT), each plot was harvested by a cane combine (Cameco Model 2500) operating at approximately 3.5 mph and an extractor fan speed of 950 rpm. All cane from each plot was weighed in the wagon by use of load cells and the weights recorded. From these data, the yield of tons cane per acre (TC/A) was calculated and, with the data for TRS/TC, the yield of theoretical recoverable sugar per acre (TRS/A) was calculated for each plot. Estimated yields were again used in the second study for the reasons given above associated with the lodged conditions of the cane and the wet field conditions. In the second study, estimated yield was calculated by multiplying mean stalk weight for each treatment by a constant population of 40,000 stalks. It was estimated that the field in which the test was conducted had a uniform stalk population of 40,000 stalks per acre. All plots, therefore, were assumed to have the same number of stalks.

Data were analyzed using the Proc Mixed Procedure of the SAS (v 8.2) software package. When data were balanced, LSD values were calculated for mean separation. When data were unbalanced, least square means were calculated. Mean separation was done by the PDIFF option ($P = 0.05$).

RESULTS AND DISCUSSION

Table 1 shows the effect of the three chemical ripeners applied in the first study on mean stalk weight (MSW) at 34 and 54 days after treatment (DAT). Polado appeared to have the greatest negative impact on MSW at both 34 and 54 DAT; however, this might have been a cumulative effect of having applied the same treatments to the same plots in both 2001 and 2002. In the 2001 study, Polado caused a significant reduction in MSW only at 49 DAT when compared to control (Data not shown). Table 2 shows the effect of the three chemical ripeners

on the yield of theoretical recoverable sugar per ton of cane (TRS/TC) for the two harvest dates. All three ripeners increased TRS/TC at 34 and 54 DAT when compared to control. Further, the TRS/TC for the Polado and Arsenal treatments were significantly higher than the two rates of Fusilade tested at 54 DAT. Table 3 shows the effect of the three chemical ripeners on juice purity at the two sampling dates. All ripener treatments significantly increased the purity of juice when compared to control at both 34 and 54 DAT. There was further differentiation in the purity of juice among ripener treatments, with Polado and Arsenal treatments generally resulting in higher values. Table 4 shows the effect of the three chemical ripeners on the yield of tons cane per acre (TC/A), TRS/TC, and TRS/A at 54 DAT. All three ripeners significantly increased the yield of theoretical recoverable sugar per acre (TRS/A) when compared to control (untreated) plots at 54 DAT. The estimated yield of TC/A was derived from mean stalk weight and millable stalk counts taken prior to the 2002 harvest. There was no difference between TC/A for Polado and the low rate of Fusilade when compared to the control. The TC/A for the two Arsenal treatments was significantly higher than control, undoubtedly because of the higher numbers of millable stalks (Table 5) at harvest as a result of the previous year's treatment. There were no significant differences in millable stalks between control and either the Polado or Fusilade treatments. However, Arsenal at the two rates tested actually stimulated shoot development, which meant a significantly higher stalk count at harvest. It is apparent that Arsenal has commercial potential for ripening sugarcane in Louisiana. However, commercialization decisions rest with BASF, the manufacturer.

The effect of the 10 chemical ripener treatments on MSW is shown in Table 6. There were no significant differences in MSW between any of the treatments when compared to control at either 37 or 49 DAT although large numerical differences were noted. Undoubtedly, the lodged condition of the crop had an impact on the variability in MSW at harvest. Table 7 shows the effect of the various ripener treatments on TRS/TC. At 37 DAT, there was a significant increase in TRS/TC for A13013A, Arsenal, Polado, Polado plus Takeup and Touchdown at all rates tested as well as the high rate of Palisade. On the other hand, all treatments with the exception of Accent, Kayphol, and MON 37500 at the rates tested significantly increased TRS/TC at 49 DAT. Most of the ripeners tested also increased the purity of the juice when compared to control at both 37 and 49 DAT (Table 8). However, purity of juice was actually significantly reduced in cane by the application of Kayphol when harvested at 37 DAT. Table 9 shows the effect of the various chemical ripeners on TC/A, TRS/TC, and TRS/A at 49 DAT. TC/A was the product of MSW times a constant of 40,000. Using these calculations, there was a significant reduction in TC/A for two rates of Polado, 4 and 6 oz/A, when compared to control. There was also a large reduction in the TC/A for the Arsenal treatment at the high rate, 9.2 oz/A, that approached significance. A significant increase in TRS/A was noted for A13013A at 2.87 oz/A, Polado at 8 oz/A, Polado at 6 oz/A plus Takeup and Touchdown at 8 oz/A. The TRS/A for the other rates of these three ripeners as well as the low rate of Arsenal approached significance.

These data show that Polado and possibly Arsenal at the rates tested are effective in increasing both TRS/TC and TRS/A for the sugarcane variety LCP 85-384, while Arsenal at the low rate has minimal impact on TC/A. The millable stalk counts obtained from plots treated the previous year show that at harvest of the following year Arsenal, at the rates studied, can actually increase the number of millable stalks in the subsequent stubble crop. Both Polado and

Touchdown are glyphosate derivatives; therefore, only Arsenal offers new chemistry to compete with glyphosate as a proven chemical ripener under the conditions and the varieties found in Louisiana. Additional studies are indicated with A13013A to determine its efficacy across varieties and years.

ACKNOWLEDGMENTS

We acknowledge the assistance of Jonathan Siebert and Curtis Jones for their assistance in making this study possible. This research was supported in part by a grant from the American Sugar Cane League of the U.S.A.

REFERENCES

Legendre, B.L. 1975. Ripening of sugarcane: Effects of sunlight, temperature, and rainfall. Crop Sci. 15(3):349-352.

Legendre, B.L. and C.K. Finger. 1987. Response of sugarcane varieties to the chemical ripener glyphosate. Proc. Plant Growth Regulator Soc. 14:479-484.

Millhollon, R.W. and B.L. Legendre. 1996. Sugarcane yield as affected by annual glyphosate ripener treatments. JASSCT16:7-16.

Nickell, L. G. 1984. Sucrose increases with bioregulators, p.101-112 In R. L. Ory and F. R. Rittig, Ed., Bioregulators: Chemistry and Uses. ACS Symposium Series, No. 257.

Osgood, R.V., P.H. Moore and H.S. Ginoza. 1981. Differential dry matter partitioning in sugarcane cultivars treated with glyphosate. Proc. Plant Growth Regulator Working Group 8:92-93.

Table 1. Effect of the chemical ripeners Polado, Arsenal, and Fusilade on mean stalk weight (MSW) of the sugarcane variety LCP 85-384 in the second-stubble crop when harvested at 34 and 54 days after treatment (DAT)[12].

		Mean stalk weight (lb)	
		DAT	
Treatment	Rate	34	54
Polado	0.200 lb/A	1.39 B	1.44 ABC
Arsenal	0.143 lb/A	1.53 AB	1.61 A
Arsenal	0.214 lb/A	1.54 AB	1.37 BC
Fusilade	0.062 lb/A	1.51 AB	1.48 AB
Fusilade	0.087 lb/a	1.58 A	1.28 C

[1] Treatment date, August 21, 2002; Harvest dates, September 24 (34 DAT) and October 14 (54 DAT)
[2] Means in a column followed by the same letter are non-significant at the 0.05P

Table 2. Effect of the chemical ripeners Polado, Arsenal, and Fusilade on the yield of theoretical recoverable sugar per ton of cane (TRS/TC) of the sugarcane variety LCP 85-384 in the second-stubble crop when harvested at 34 and 54 days after treatment (DAT)[12].

		TRS/TC	
		DAT	
Treatment	Rate	34	54
Control	-	169 C	200 C
Polado	0.200 lb/A	240 A	276 A
Arsenal	0.143 lb/A	220 AB	264 A
Arsenal	0.214 lb/A	231 A	274 A
Fusilade	0.062 lb/A	207 B	236 B
Fusilade	0.087 lb/a	221 AB	235 B

[1] Treatment date, August 21, 2002; Harvest dates, September 24 (34 DAT) and October 14 (54 DAT)
[2] Means in a column followed by the same letter are non-significant at the 0.05P

Table 3. Effect of the chemical ripeners Polado, Arsenal, and Fusilade on the juice purity of the sugarcane variety LCP 85-384 in the second-stubble crop when harvested at 34 and 54 days after treatment (DAT) [12].

		Purity (%)	
		DAT	
Treatment	Rate	34	54
Control	-	78.6 B	81.0 D
Polado	0.200 lb/A	84.2 A	87.7 AB
Arsenal	0.143 lb/A	84.3 A	87.2 ABC
Arsenal	0.214 lb/A	84.6 A	88.2 A
Fusilade	0.062 lb/A	82.9 A	86.0 BC
Fusilade	0.087 lb/a	84.3 A	85.5 C

[1] Treatment date, August 21, 2002; Harvest dates, September 24 (34 DAT) and October 14 (54 DAT)
[2] Means in a column followed by the same letter are non-significant at the 0.05P

Table 4. Effect of the chemical ripeners Polado, Arsenal, and Fusilade on estimated yield of tons cane per acre (TC/A), yield of theoretical recoverable sugar per ton of cane (TRS/TC) and estimated yield of theoretical recoverable sugar per acre (TRS/A) of the sugarcane variety LCP 85-384 in the second-stubble crop when harvested 54 days after treatment (DAT) [12].

		TC/A	TRS/TC	TRS/A
Treatment	Rate	(tons)	(lb)	(lb)
Control	-	39.5 AB	200 C	6,632 B
Polado	0.200 lb/A	36.1 B	276 A	8,700 A
Arsenal	0.143 lb/A	43.0 A	264 A	9,446 A
Arsenal	0.214 lb/A	43.5 A	274 A	10,052 A
Fusilade	0.062 lb/A	40.8 AB	236 B	8,451 A
Fusilade	0.087 lb/a	44.3 A	235 B	9,854 A

[1] Treatment date, August 21, 2002; Harvest date, October 14, 2002 (54 DAT)
[2] Means in a column followed by the same letter are non-significant at the 0.05P

Table 5. Millable stalk counts in the second-stubble crop following the application of the chemical ripeners Polado, Arsenal, and Fusilade in August 2001 to the sugarcane variety LCP 85-384 in the first-stubble crop [12].

		Millable stalk count
Treatment	Rate	(number)
Control	-	51,561 B
Polado	0.200 lb/A	52,025 B
Arsenal	0.143 lb/A	56,338 A
Arsenal	0.214 lb/A	56,439 A
Fusilade	0.062 lb/A	53,826 AB
Fusilade	0.087 lb/a	55,931 A

[1] Treatment date, August 23, 2001; Millable stalk counts taken on August 16, 2002
[2] Means in a column followed by the same letter are non-significant at the 0.05P

Table 6. Effect of various chemical ripeners on mean stalk weight (MSW) of the sugarcane variety LCP 85-384 in the third-stubble crop when harvested at 37 and 49 days after treatment (DAT)[1].

		Mean stalk weight (lb)	
		DAT	
Treatment	Rate	37	49
Control	-	1.38	1.44
A13013A	2.87 oz/A	1.39	1.46
A13013A	5.75 oz/A	1.25	1.35
Accent	0.50 oz/A	1.34	1.26
Arsenal	8.00 oz/A	1.44	1.41
Arsenal	9.20 oz/A	1.29	1.25
Kayphol	2.00 qt/A	1.46	1.32
MON 37500	0.50 oz/A	1.48	1.42
Oust	0.28 oz/A	1.43	1.35
Palisade	0.11 lb/A	1.33	1.38
Palisade	0.22 lb/A	1.42	1.42
Polado	4.00 oz/A	1.48	1.21
Polado	6.00 oz/A	1.33	1.23
Polado	8.00 oz/A	1.41	1.37
Polado + Takeup	6.00 oz/A 1.00 pt/A	1.38	1.42
Touchdown	4.00 oz/A	1.41	1.36
Touchdown	8.00 oz/A	1.50	1.43
Touchdown	10.6 oz/A	1.32	1.44
LSD (P=0.05)		NS	NS

[1] Treatment date, September 4, 2002; Harvest dates, October 11 (37 DAT) and October 23 (49 DAT).

Table 7. Effect of various chemical ripeners on the yield of theoretical recoverable sugar per ton of cane (TRS/TC) of the sugarcane variety LCP 85-384 in the third-stubble crop when harvested at 37 and 49 days after treatment (DAT)[1].

		TRS/TC (lb)	
		DAT	
Treatment	Rate	37	49
Control	-	204	191
A13013A	2.87 oz/A	235	232
A13013A	5.75 oz/A	232	242
Accent	0.50 oz/A	204	193
Arsenal	8.00 oz/A	241	226
Arsenal	9.20 oz/A	246	226
Kayphol	2.00 qt/A	190	202
MON 37500	0.50 oz/A	213	203
Oust	0.28 oz/A	218	220
Palisade	0.11 lb/A	208	214
Palisade	0.22 lb/A	222	216
Polado	4.00 oz/A	241	232
Polado	6.00 oz/A	259	242
Polado	8.00 oz/A	253	242
Polado + Takeup	6.00 oz/A 1.00 pt/A	246	243
Touchdown	4.00 oz/A	249	235
Touchdown	8.00 oz/A	236	230
Touchdown	10.6 oz/A	251	238
LSD (P=0.05)		18	16

[1] Treatment date, September 4, 2002; Harvest dates, October 11 (37 DAT) and October 23 (49 DAT)

Table 8. Effect of various chemical ripeners on the juice purity of the sugarcane variety LCP 85-384 in the third-stubble crop when harvested at 37 and 49 days after treatment (DAT) [1].

		Purity (%)	
		DAT	
Treatment	Rate	37	49
Control	-	82.6	75.7
A13013A	2.87 oz/A	84.0	79.2
A13013A	5.75 oz/A	83.8	79.8
Accent	0.50 oz/A	81.6	75.7
Arsenal	8.00 oz/A	85.8	78.5
Arsenal	9.20 oz/A	86.6	78.1
Kayphol	2.00 qt/A	80.0	77.2
MON 37500	0.50 oz/A	82.9	77.3
Oust	0.28 oz/A	83.6	78.8
Palisade	0.11 lb/A	83.0	78.9
Palisade	0.22 lb/A	84.8	78.9
Polado	4.00 oz/A	84.7	79.1
Polado	6.00 oz/A	86.5	80.2
Polado	8.00 oz/A	85.6	79.6
Polado + Takeup	6.00 oz/A 1.00 pt/A	85.2	79.5
Touchdown	4.00 oz/A	85.3	79.2
Touchdown	8.00 oz/A	85.1	79.2
Touchdown	10.6 oz/A	85.8	79.2
LSD (P=0.05)		2.4	2.4

[1] Treatment date, September 4, 2002; Harvest dates, October 11 (37 DAT) and October 23 (49 DAT)

Table 9. Effect of various chemical ripeners on estimated yield of tons cane per acre (TC/A), yield of theoretical recoverable sugar per ton of cane (TRS/TC) and estimated yield of theoretical recoverable sugar per acre (TRS/A) of the sugarcane variety LCP 85-384 in the third-stubble crop when harvested 49 days after treatment (DAT) [1].

Treatment	Rate	TC/A (tons)	TRS/TC (lb)	TRS/A (lb)
Control	-	28.8	191	5,539
A13013A	2.87 oz/A	29.1	232	6,757
A13013A	5.75 oz/A	27.0	242	6,544
Accent	0.50 oz/A	25.3	193	4,873
Arsenal	8.00 oz/A	28.1	226	6,347
Arsenal	9.20 oz/A	24.9	226	5,640
Kayphol	2.00 qt/A	26.3	202	5,320
MON 37500	0.50 oz/A	28.3	203	5,745
Oust	0.28 oz/A	27.1	220	5,956
Palisade	0.11 lb/A	27.6	214	5,904
Palisade	0.22 lb/A	28.4	216	6,114
Polado	4.00 oz/A	24.2	232	5,651
Polado	6.00 oz/A	24.6	242	5,981
Polado	8.00 oz/A	27.5	242	6,641
Polado + Takeup	6.00 oz/A 1.00 pt/A	28.4	243	6,857
Touchdown	4.00 oz/A	28.6	235	6,572
Touchdown	8.00 oz/A	28.8	230	6,851
Touchdown	10.6 oz/A	27.2	238	6,411
LSD (P=0.05)		4.1	16	1,054

[1] Treatment date, September 4, 2002; Harvest date, October 23 (49 DAT)