

**THE USE OF CONCENTRATED
MOLASSES SOLUBLES (CMS) AS A NITROGEN
AND SULFUR FERTILIZER
IN COTTON PRODUCTION**

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Abstract

The lint yields from four different first bloom nitrogen treatments were compared and found to be statistically equivalent. Fiber quality measurements were also found to be the same for all treatments. Post harvest soil pH decreased for CMS and Ammonium sulfate treatments on one site. These same treatments also raised post harvest soil sulfate levels on the same site. Net returns to producers were found to be greater for CMS than other fertilizers however the control produced the highest returns of all treatments.

Introduction

Concentrated molasses solubles (CMS) is a by-product of Lysine manufacture. It is a low-grade liquid nitrogen and sulfur source (5-0-0-4). Currently it is registered for use as a fertilizer in the states of Missouri and Illinois. CMS is available to producers at no cost. This material has a pH of 5.0 to 5.5. As such it could contribute to soil acidification. Soil sulfur build up may also be a concern.

Materials and Methods

CMS was used as a first bloom nitrogen source on two research farms owned by the University of Missouri. These two farms had different soil pH and management histories.

A randomized complete block design was used on both farms. Four N treatments were applied. These treatments consisted of 1) Control, no first bloom N, 2) 93 lbs. N/A as CMS, 3) 93 lbs. N/A as Ammonium sulfate, and 4) 93 lbs. N/A as UAN 32%. Weed and insect control as well as irrigation was the standard practices for southeast Missouri.

The yields for each plot were measured. The resulting seed cotton was ginned. Lint percentage was determined and the USDA Cotton Classing Office in Hayti, MO determined the fiber quality properties of microaire, length, strength, uniformity and trash.

Soil samples were collected from each plot before treatment and after harvest. The results of these samples were compared.

Net returns to producers were calculated using prices for cotton from Nov. 1998 along with fertilizer and application costs.

Results and Discussion

The yields of all N treatments including the untreated control were found to be statistically equivalent at the alpha = .05 level for both farms. No significant differences were found in fiber properties for the four treatments.

Post harvest soil pH was statistically equivalent for all treatments on the Lee Farm. Soil pH on the Marsh Farm fell in to two statistical populations with the CMS and ammonium sulfate treatments having lower post harvest pH levels. This difference in the grouping of pH levels for the two locations may be explained by the recent application of lime (4-98) at the Lee Farm.

Post harvest soil sulfate levels were statistically equivalent for all treatments on the Lee Farm. Soil sulfate levels on the Marsh Farm fell in to two statistical populations with the CMS and ammonium sulfate treatments having higher sulfate levels.

Net returns to producers were calculated based on cotton prices for mid November 1998 and fertilizer plus application costs for June of 1998. The following assumptions were made: 1) lint was priced at \$0.63/lb, 2) Ammonium sulfate was priced at \$1.00/lbN, 3) UAN was priced at \$0.27/lbN and 4) Application cost for all products was \$7.50/A. Of all treatments the control was found to be greatest for both farms. Of the three fertilizers CMS had the greatest net return to producers.

Summary

1998 was not a typical year for cotton production in Southeast Missouri. Lint yields for all nitrogen treatments including the untreated control were statistically the same. This year first bloom applications of nitrogen were not profitable. Of the three first bloom fertilizers evaluated CMS had the highest net returns to producers. Fiber quality was the same for all fertilizers tested. Soil acidification may be a long-term problem associated with the use of CMS. Soil pH and sulfate levels should be monitored annually by soil testing when using CMS as a fertilizer.

Table 1. The management history and soil pH of the Lee and Marsh Farms, University of Missouri-Delta Center.

Lee Farm		
Tillage:	conventional	Variety: Stoneville 474
Irrigation:	furrow	Planted: 5-20-98
pH:	7.2	Harvested: 11-4-98
Last limed:	4-98	
Previous crop:	soybeans	
Pre plant N:	30 lbs/A	
First bloom N:	93 lbs/A	
Total N:	123 lbs/A	
Marsh Farm		
Tillage:	conservation	Variety: Deltapine 20
Irrigation:	furrow	Planted: 5-5-98
pH:	5.6	Harvested: 10-22-98
Last limed:	1993(?)	
Previous crop:	cotton	
Pre plant N:	0 lbs/A	
First bloom N:	93 lbs/A	
Total N:	93 lbs/A	

Table 2. Lint yields from Lee and Marsh Farms 1998

Lee Farm	
Treatment	Yield (lbs/A)
1) Control	778 a
2) CMS	759 a
3) Ammonium sulfate	742 a
4) UAN	786 a
Marsh Farm	
Treatment	Yield (lbs/A)
1) Control	465 a
2) CMS	449 a
3) Ammonium sulfate	482 a
4) UAN	486 a

Values with the same letter are statistically the same at the .05 level

Table 3. Post harvest soil pH and sulfate, 12-inch depth, Lee and Marsh Farms 1998.

Lee Farm		
Treatment	pH	sulfate(ppm)
Control	7.3	5.8 a
CMS	7.2	8.8 a
Ammonium sulfate	7.4	6.4 a
Marsh Farm		
Treatment	pH	sulfate (ppm)
Control	5.7	5.6 a
CMS	5.4	19.2 b
Ammonium sulfate	5.4	13.4 b
UAN	5.7	5.8 a
Pre application	5.6	3.4

Values with the same letter are statistically the same at the .05 level

Table 4. Net returns to producers Lee and Marsh Farms 1998

Lee Farm			
Treatment	lb lint/A	Gross	Net
Control	778	\$490	\$490
CMS	759	\$478	\$471
Ammonium sulfate	742	\$467	\$367
UAN	786	\$495	\$455
Marsh Farm			
Treatment	lb lint/A	Gross	Net
Control	465	\$293	\$293
CMS	449	\$283	\$275
Ammonium sulfate	482	\$304	\$203
UAN	486	\$306	\$267

All values rounded to nearest dollar.