

Managing Tobacco Specific Nitrosamine Levels in Burley Tobacco

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What are Tobacco Specific Nitrosamines (TSNA's) ?

Nitrosamines are nitrogen-containing compounds that have been identified in a number of everyday items

Cosmetics	Sunscreens	Nonfat dry milk
Beer	Rubber	Bacon
Tobacco Leaf	Tobacco Smoke	

Certain Nitrosamines have been identified as being harmful or cancer causing, Therefore tobacco companies have actively worked to reduce nitrosamines in tobacco and tobacco smoke.

Steps to Reduce the Formation of TSNA's in Burley Tobacco:

1. Use "LC" low converter varieties

LC = low conversion ($\leq 3\%$) of nicotine to nornicotine

Fig. 1. TN 90 B (Non-Screened foundation seed)

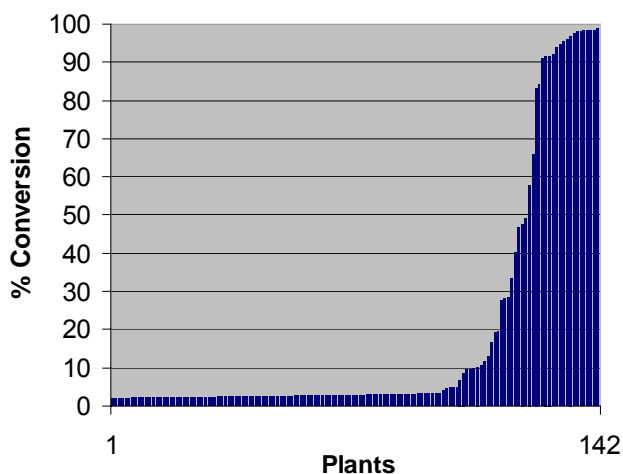


Fig. 2. TN 90 D (Screened foundation seed)

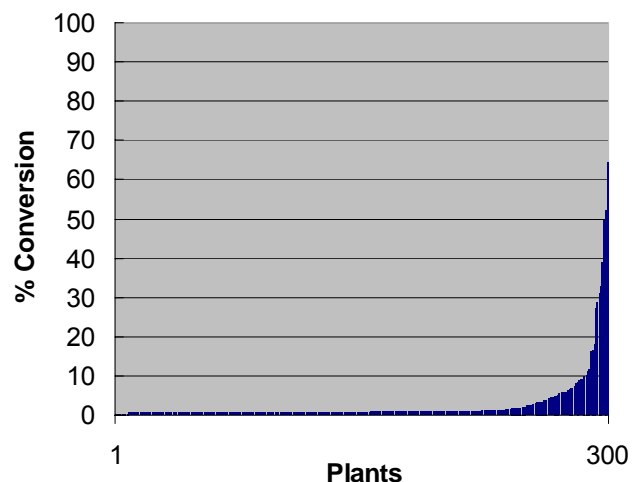


Table 1. Effect of Selecting for LC on Variety Performance*

TN 90

Seed Lot	Yield			Mean	Black Shank % Surv.
	GRV	LEX	WC		
TN 90	3251 ab	2626 a	2294 a	2724 a	28 a
TN 90LC	3007 b	2914 a	2336 a	2752 a	26 a
R TN 90LC	3340 a	2736 a	2027 a	2701 a	21 a
R TN 90SC	3233 ab	2812 a	2250 a	2765 a	18 a
MEAN	3208 a	2772 b	2227 c		

*Data from experiments conducted by Dr. Bob Miller, University of TN & KY

2.Nitrogen Fertilization

Don't over fertilize and Don't side-dress late in the season with ammoniated products (34-0-0)

Table 2. Lamina TSNA by N Rate Across 4 Location in 2004 & 2005*

Side-dress N (lbs/ac)	Pre-plant N (lbs/ac)		
	80	160	240
	-----Total TSNA (ppm)-----		
0	1.43	1.85	2.76
50	2.10	2.77	3.57
100	2.56	2.89	4.48

*Data from a cooperative study with Paul Denton, Danny Peek & Bob Pearce

Table 3. Lamina TSNA by N Rate at Glade Spring, VA 2004

Side-dress N (lbs/ac)	Pre-plant N (lbs/ac)		
	80	160	240
	----- Total TSNA (ppm) -----		
0	1.43	1.85	2.76
50	2.10	2.77	3.57
100	2.56	2.89	4.48

Table 4. Yield by N Rate Across 8 experiments for 2004, 2005, & 2006*

Side-dress N (lbs/ac)	Pre-plant N (lbs/ac)		
	80	160	240
	----- Leaf Yield (lbs/ac) -----		
0	2385	2551	2711
50	2534	2698	2724
100	2651	2680	2721

Data from a cooperative study with Paul Denton, Danny Peek & Bob Pearce

3.Curing Management

1. Low humidity “K” conditions reduces potential for high TSNA levels
2. High humidity “house burn” conditions increases potential for high TSNA levels

Good ventilation is key to reducing potential for higher TSNA formation in burley tobacco during curing

1. Barn or curing structure and/or location
2. Stick Spacing
3. Keep curing facility covered

Table 5. Lamina TSNA Impacted by Ventilation and N Rate, 2006*

	N Rate (lbs/ac)			
	100		200 + 100	
	Vent	N Vent	Vent	N Vent
	-----ppm TSNA-----			
Greeneville	0.43	0.55	1.68	5.99
Highland R	1.96	2.59	3.76	5.26

*Data from Dr. Paul Denton The University of Tennessee

Table 6. Lamina TSNA Impacted by Variety, Ventilation, and N Rate, 2006*

		N Rate (lbs/ac)	
		100 + 100	300 + 100
		-----ppm-----	
KT 204 LC	Vent	1.71	2.91
	N Vent	2.27	3.40
NC 6	Vent	3.15	4.22
	N Vent	4.59	8.08

*Data from Dr. Paul Denton The University of Tennessee

4. Bale moisture

1. Don't Grade high moisture tobacco
2. Don't over press bales (increased bale density)
3. Don't cover bales with plastic