



# Prevention and control of nitrate toxicity in cattle

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## Topics Include:

Complexity

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General recommendations

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**Table 5. Example of Nitrate Intake Worksheet for Ruminants**

	<i>A</i> <i>Daily Intake As Fed</i>	<i>B</i> <i>% Moisture</i>	<i>C</i> <i>% Dry Matter</i>	<i>D</i> <i>Lb DM Intake Daily</i>	<i>E</i> <i>Lb Feed Water</i>	<i>F</i> <i>Feed NO<sub>3</sub>-N Content</i>	<i>G</i> <i>Content Factor</i>	<i>H</i> <i>mg of NO<sub>3</sub>-N Intake</i>
<i>Calculation:</i>	<i>Lb</i>	<i>Test</i>	<i>100-B</i>	<i>AxC/100</i>	<i>AxB/100</i>	<i>PPM</i>	<i>Given</i>	<i>DxFxG</i>
<b>A. Feed Item<sup>a</sup></b>								
Corn silage	28.6	65	35	10.0	18.5	1700 <sup>b</sup>	.454	7718
MML haylage	26.8	50	50	13.4	13.4	460	.454	2798
Grain mix	20.0	12	88	17.6	2.4	48	.454	384
_____							.454	
_____							.454	
_____							.454	
_____							.454	
_____							.454	
_____							.454	
<b>Feed Total</b>				<b>41.0</b>	<b>34.3</b>			<b>10900</b>

<sup>a</sup>Include expected pasture intake in all diets using such

<sup>b</sup>Amount in a single meal must be limited due to a content of 1100 ppm or higher. See Table 4 for details.

**B. Drinking water contribution (for average cow at 1300 lb BW and producing 60 lb of 3.7% milk)**

Expected total water intake <sup>a</sup>	<u>270</u>	(I) [60 x 4.5]
Feed water (Total E)	<u>34</u>	(J)
Drinking water (I-J)	<u>236</u>	(K)
Mg NO <sub>3</sub> -N from drinking water:		(L)
K x Water NO <sub>3</sub> -N as ppm or mg/l		
Example: <u>236</u> x <u>8</u> x .454 = <u>857</u>		(L)

**C. Total mg NO<sub>3</sub>-N intake daily** (M)

Total H + L  
Example: 10900 + 857 = 11757 (M)

**D. NO<sub>3</sub>-N content of total diet as % DM<sup>b</sup>** (N)

[(M/454,000) ÷ Total D] x 100  
Example: .0259 ÷ 41 x 100 = .063 (N)

<sup>a</sup>See Table 7 for expected water intakes.

<sup>b</sup>See Table 8 and the text for interpretation

(continued on next page)



**Table 6. Expected Nitrate Content of Feeds Grown Under Normal Weather Conditions**

	<i>NO<sub>3</sub> range</i>	<i>Nitrate content—dry matter basis</i>	
		<i>NO<sub>3</sub> mean</i>	<i>NO<sub>3</sub>-N mean</i>
	<i>ppm</i>	<i>ppm</i>	<i>ppm</i>
Water	0 - 44	34	8
Dairy grain mix	111 - 400	209	48
Corn grain	139 - 188	164	37
Protein concentrate	105 - 120	113	26
Corn silage	440 - 2200	1365	310
Grass, MMG <sup>a</sup> forage	46 - 1600 <sup>c</sup>	1003 <sup>c</sup>	228
Legume, MML <sup>b</sup> forage	490 - 4100 <sup>c</sup>	2025 <sup>c</sup>	460

<sup>a</sup>Mixed mainly grass

<sup>b</sup>Mixed mainly legume

<sup>c</sup>Ensiled forage may contain about 30% less nitrate than hay or fresh forage of the same nitrate content at harvest.

**Table 7. Expected Water Intakes for Dairy Cattle<sup>a,b</sup>**

Milk Cows—4.5 to 5.0 lb<sup>c</sup> per lb milk produced minus feed water

Dry Cows—75 to 108 lb<sup>d</sup> for small and large breed animals, respectively

Calves, 6 months—37 lb<sup>d</sup>

Heifers, 12 months—45 lb<sup>d</sup>

Heifers, 18 months—61 lb<sup>d</sup>

<sup>a</sup>See other sources for beef cattle, sheep, and goats. As a rule of thumb, beef cattle may need water at the rate of 1% of BW in gallons daily.

<sup>b</sup>One gallon of water = 8.34 lb

<sup>c</sup>Use higher values given during hot weather

<sup>d</sup>Drinking water, not total water intake as with milk cows



