



Dairy Update

NPN SOURCES FOR CORN SILAGE

Update 18

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Interest in adding non-protein nitrogen (NPN) to corn silage continues. Several new commercial products are on the market in various forms along with several new methods of application. Dairymen are asking about cost, method, form, and pros and cons of using these additives in corn silage.

Advantages of adding NPN to corn silage

1. Adding NPN can raise protein content from 8% to 13% crude protein making the forage more nutritionally balanced.
2. The NPN will be effectively utilized by rumen bacteria.
3. No intake or feed refusal problems would be expected (as in grain mixes).
4. Rations can be balanced with less protein.
5. Corn silage containing ammonia is more stable (less secondary fermentation or heating after removal from the silo).

Disadvantages of adding NPN to corn silage

1. Losses of NPN as ammonia gas or seepage can occur.
2. Is additional protein necessary (NPN or vegetable)?
3. The expense of adding NPN occurs at ensiling time.
4. Feed intake can be lowered if corn silage is too dry.
5. Less flexibility since the forage is treated at ensiling time.

Forms of NPN Sources

Several sources and methods of application are available. Below are available sources and suggested levels.

| <u>Source</u> | <u>Form</u> | <u>%N</u> | <u>Level</u> (lb per wet ton) |
|---|-------------|-----------|----------------------------------|
| Urea | Dry | 45 | 10 |
| Monoammonium Phosphate | Dry | 11 | 20 |
| Pre-mixed Ammonia-Water | Liquid | 20to30 | 25 |
| Commercial Ammonia-Water with Minerals | Liquid | 13.6 | 60 |
| Anhydrous Ammonia | Gas | 81 | 6 |

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Generally, 5 lb of nitrogen (N) is added per wet ton of corn silage (35% dry matter). The anhydrous ammonia-water mixtures are not approved by FDA at this time (the commercial product has approval).

Costs and Losses

These two factors should be considered by dairymen when they make their decision as to which product to use. Urea is dry, easy to handle, but must be spread uniformly to avoid toxicity. A tunnel or chain drive distributor on the blower is desirable although spreading on top of silage also works. Monoammonium phosphate contains 25% phosphorus in addition to NPN. The level of this mineral added should be adjusted to meet phosphorus needs. The ammonia-water mixtures vary from 20 to 40% nitrogen (used as a fertilizer). Commercial products are formulated for feed purposes and contain minerals to balance the ration and molasses. Accurate metering devices and individual help are also included in the price of the product. Anhydrous ammonia can be applied by mixing it with water (2 parts water:1 part ammonia) in a mixing chamber. Another method is "cold flow" (the ammonia is cooled to -28°F causing it to liquify) and is applied as a liquid.

| <u>Source</u> | <u>Price/Ton</u> | <u>Cost/lb N</u> | <u>Estimated Loss of N</u> |
|------------------------|------------------|------------------|----------------------------|
| Urea | \$275 | \$.31 | 10 to 15% |
| Monoammonium Phosphate | \$330 | \$1.50 | Less than 5% |
| Ammonia-water mix | \$ 70 | \$.17 | 10 to 15% |
| Commercial Product | \$250 | \$.92 | Less than 5% |
| Anhydrous Ammonia | | | |
| Water (in solution) | \$260 | \$.16 | 5 to 15% |
| Cold Flow | \$260 | \$.16 | 20 to 30% |
| Gas Only | \$260 | \$.16 | 40 to 50% |

In Summary

Good quality corn silage is a must. Dry matter should be 33 to 40% to avoid seepage loss or poor fermentation. A desirable length of chop ($\frac{1}{4}$ "), rapid filling, and compaction are also good management tips. Care must be exercised with NPN products since ammonia gas is dangerous and causes irritation. Gas can accumulate in the silo.

Livestock producers should be good managers, understand how the NPN product works and correct application techniques, and decide if NPN will be advantageous in his feeding program before making his final decision.

References

Farmer Magazine, February 1, 1975, p.50.

Second Annual NPN Seminar, July 14 and 15th, 1975. Ann Arbor, Michigan.

Feeding NPN Treated Silage to Dairy Cows, J. T. Huber (Presented 2nd Annual Seminar).

Methods of Applying Anhydrous Ammonia and Water to Fresh Cut Corn Silage, Michigan State University Ag. Eng. Fact Sheet AEIS #279 by C. M. Hansen.

Adding Anhydrous Ammonia To Corn Silage (Cold Flow Method), Pennsylvania State University Ag. Eng. Fact Sheet PM 48 by B. S. Horne.

Journal of Dairy Science, 57:263 and 56:1283 by J. T. Huber.