

UREA

in Dairy Rations

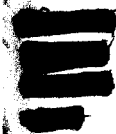
NORTH DAKOTA
STATE UNIVERSITY

NOV 9 1974
SERIALS DEPT.



George Fisher
Extension Dairyman

S
544.3
N9
A8
no. 536



COOPERATIVE EXTENSION SERVICE
NORTH DAKOTA STATE UNIVERSITY
FARGO, NORTH DAKOTA 58102

Dairy animals are ruminants and can utilize non-protein nitrogen to furnish part of their protein requirements.

Several nitrogen-containing compounds have been used in dairy rations to supply nitrogen for synthesis of protein in the cow's rumen. The most common compound used is urea.

Urea contains 42 or 45 per cent nitrogen, therefore, the protein equivalent of urea is: $6.25 \times 45 = 281\%$ or $6.25 \times 42 = 262\%$. In other words, one pound of urea contains enough nitrogen to make 2.62 pounds to 2.81 pounds of protein.

Follow these general guidelines in using urea in dairy herd:

1. Do not use in rations for animals under six months of age. Urea utilization depends upon rumen activity. Rumen activity is usually not sufficiently developed until about six months of age.

2. Do not use in both silage and concentrate mix without checking on amount of urea animal consumes each day. Urea should not supply more than one-third of protein equivalent in ration.

3. Thoroughly mix whether urea is used in silage or grain. Mixing in hammermill is not good enough!

4. Do not use urea if raw soybeans are included in ration. Soybeans contain urease which causes urea to break down faster than the animal can use it.

5. Allow time (two-three weeks) for animals to become accustomed to urea. Increase urea silage gradually and mix the first batch of grain with only one-half per cent urea instead of one per cent. Gradual feed changes are always best.

6. Balance ration with respect to mineral needs of the dairy herd.

7. Urea utilization depends on available energy. Do not use in low-energy rations. Good quality corn silage and hay with grain is essential if urea is to be used efficiently.

8. Keep supply of urea away from cattle as it is poisonous if consumed in large quantities.

9. Do not feed urea intermittently. If you discontinue feeding urea for a few days, follow procedure outlined in #5 above.

10. Contact local veterinarian immediately if urea toxicity symptoms occur (uneasiness, excess salivation, rapid breathing, incoordination, bloat and tetany). In emergency situations only, administer one gallon of vinegar as a drench.

UREA IN DAIRY RATIONS

Silage Urea can be added to corn silage for use in dairy rations. The level recommended is 10 pounds per ton of silage. This level will allow the dairyman to reduce protein level of grain ration by five percentage units (for example, from 18 per cent protein to 13 per cent protein).

Recent research indicates that best results are obtained if dry matter content of silage is 30 to 32 per cent. High dry matter (38 to 40 per cent) silage plus urea decreased consumption and very low dry matter (20 to 25 per cent) silage resulted in loss of urea through leaching. It is currently recommended that urea be added only to corn silage - not grain, sorghum, hay silage or haylage.

RECOMMENDED PROCEDURE FOR ADDING UREA TO CORN SILAGE

1. Add 10 pounds per ton to silage at ensiling time rather than at time of feeding.
2. Know capacity of wagons or trucks used in filling silo.

Length x width x height = cubic feet.

One cubic foot of 35 per cent dry matter corn silage weighs approximately 20 pounds.

Thus a 14 x 8 x 6 foot wagon would require about 67 pounds of urea $(14 \times 8 \times 6) (20) =$

$$\frac{13440}{2000} = 67.2 \text{ pounds urea}$$

3. Mix urea uniformly with the silage. If mixing is a problem, prepare a bulk mix of urea and grain. Add this mix to the silage.

You can do this by mixing 140 pounds of urea in a ton of grain. Then add 1000 pounds of the urea-grain mix to the load of silage rather than 70 pounds of urea.

There must be no lumps or uneven mixing or animals may refuse silage or possibly become sick from urea poisoning.

ADDING UREA TO SILAGE AT FEEDING TIME

It is difficult to get uniform distribution at this time. It is not recommended because of risks involved.

UREA IN PROTEIN SUPPLEMENTS

Many prepared dairy supplements contain some urea as a protein source. Feeding commercial supplements containing urea presents no problem if you follow the manufacturer's recommendations. You are essentially buying protein when you buy a commercial protein supplement or one of the oil meals. The cost of protein per pound may well determine which should be purchased. Table I shows relationship of the cost of a pound of protein in several supplements at different prices per 100 pounds.

Table I. Cost per pound of protein in various supplements at different prices.

Price/100#	Supplement and Protein Urea		
	36% Commercial	44% S.B.O.M.	50% Commercial
\$4.00	11.1¢	9.1¢	8.0¢
4.50	12.5¢	10.2¢	9.0¢
5.00	13.9¢	11.40¢	10.0¢
5.50	15.2¢	12.5¢	11.0¢
6.00	16.7¢	13.6¢	12.0¢

Seventy pounds of shelled corn and 10 pounds of urea approximately equal the energy and protein content to 70 pounds of 44 per cent soybean oil meal.

ADDITION OF UREA TO FEED GRAIN

You can also add urea to a simple grain mix to increase its protein content. Dairymen who use urea in this manner should follow these guidelines.

1. Limit the amount of urea added to the grain mix to a 2% level. A ton of mix should contain no more than 40 pounds of urea.
2. Two per cent urea is the safe limit so far as herd health is concerned. But much evidence indicates that one per cent is a more practical limit. Consumption of grain becomes a problem because urea is unpalatable to the animal if more than one per cent is added.
3. Simple mixing as grain goes through a home owned grinder does not mix well enough. Home grinder-

mixer machines will do a satisfactory job. Use these or the services of a commercial operator.

4. Do not add urea to grains which already have a protein content of 16 per cent.

5. Molasses may increase acceptance of grain-mix containing urea.

6. Balance the ration properly with respect to minerals. Adding one per cent trace mineral and salt and one per cent dicalcium phosphate to grain mix will normally balance ration satisfactorily.

North Dakota dairymen use barley or oats as a base for most dairy rations. One per cent urea per ton of feed will raise the protein equivalent of the feed by approximately 2.8 per cent. Table II shows effect of adding one per cent urea to various grain mixes.

Table II. Effect of Adding one per cent urea to protein level of various grain mixes.

	Corn	Oats	Corn 50% Oats 50%	Barley	Barley 50% Oats 50%
Grain Alone	9.0%	12.5%	10.5%	13.0%	12.7%
Grain + 1% Urea	11.7%	15.2%	13.5%	15.7%	15.4%

Cooperative Extension Service, North Dakota State University of Agriculture and Applied Science, and U. S. Department of Agriculture cooperating. A. H. Schulz, Director, Fargo, North Dakota. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.