



WYOMING DEPARTMENT OF AGRICULTURE ANALYTICAL SERVICES
 1174 Snowy Range Road
 Laramie, Wyoming 82070
 Phone: (307)-742-2984 FAX: 307-742-2156
 Web Site : <http://wyagric.state.wy.us/divisions/asl>

NITRATE-CONTAINING FORAGES

SOME NOTES ON FEEDING

At times oat hay and other plants such as pigweed, kochia, wild sunflower, goosefoot, Sudan grass, sorghum, corn, sugar-beet tops, etc., may contain sufficient nitrates to be toxic to livestock. The amount of nitrates may not be uniform in the forage from all parts of the field. We have found variations from 0 to 2% potassium nitrate in bales of oat hay from a single stack.

The stems are usually highest in nitrate and the grain has very little. Animals may eat mostly heads and leaves, and so would not get as much nitrate as they would get from eating the whole plant. Weeds in hay may contain more nitrate than the oats or other cereals present.

Due to the lack of a sufficient number of feeding trials and to differences in animals and feeding conditions, it is difficult to make specific feeding recommendations for the feeding of nitrate-containing forages. Researchers who have run feeding trials with forages containing various amounts of nitrate do not agree on how much is necessary to cause toxic effects. Researchers at the Missouri Station make the following statement:

% KNO₃ in DRY FORAGE	ANIMAL RESPONSE
0.0 to 0.5%	Normal if on an adequate ration.
0.6 to 1.0%	Drop in milk production, slow at first, increasing after the 6th to 8th week. Typical vitamin A deficiency symptoms in 6th to 8th week.
1.0 to 1.5%	Milk production loss in 4 to 5 days. Reproduction difficulty over the period fed and may extend several weeks after withdrawal of the nitrate containing feed.
1.5% and above	DEATH; Usually several head and suddenly.

At Cornell, 16 dairy heifers were fed oat hay containing 2 levels of nitrate as their sole ration for 35 days without any harmful effects. The levels fed were 0.08% & 1.24% as NO₃, equivalent to 0.13% & 2.02% as KNO₃, on a dry basis. Some animals can tolerate larger amounts of nitrate than others, probably due to variations in the rumen micro-organisms, which convert nitrate to nitrite.

The rate of ingestion is important. Hungry animals allowed to fill up on nitrate containing plants may consume a lethal amount in a short time, whereas the same amount eaten slowly would be non-toxic. Animals on a high energy ration, such as with a molasses, corn or soybean oil meal supplement, can tolerate larger amounts of nitrate than animals on a poor quality ration. It is also recommended that the ration be of good quality in regard to carotene and added vitamin A content. High-nitrate hay can be mixed with low-nitrate hay to make it safe for feeding.

CAUTION should always be exercised when feeding high-nitrate hay. Contact your extension agent for more information.