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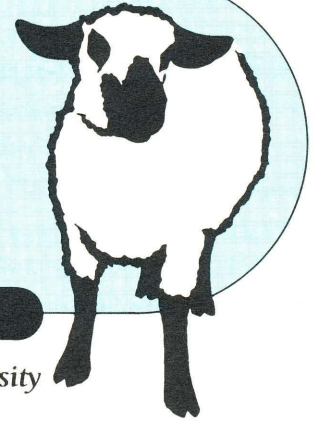
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Use of Lasalocid (Bovatec®) in Sheep Diets

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COOPERATIVE EXTENSION SERVICE MICHIGAN STATE UNIVERSITY

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In June 1984, the sheep industry received approval from the Food and Drug Administration (FDA) to use lasalocid to prevent coccidiosis in sheep housed in confinement. Coccidiosis is an economically important disease problem to the sheep industry. An increased incidence of this disease has been seen in more intensified operations. Lasalocid, when used to prevent coccidiosis, is administered as a feed additive at 30 grams per ton in a complete diet.

What is Coccidiosis?

Coccidiosis is a contagious parasitic disease caused by a protozoa called *coccidia*. Coccidia are ingested by the sheep, usually in water or feed contaminated with infected feces, and colonize in the intestinal lining. Coccidia are well-adapted to reproduce and grow within the intestines. Mild coccidial infections are characterized by decreased appetite, lethargy and slight scours. These symptoms progress to profuse diarrhea, intestinal hemorrhage (bloody scours) and ultimately death in severe cases. Fecal exams provide easy, inex-

pensive and accurate diagnosis of coccidial infestations.

Coccidia are present in small numbers in the intestinal tract of nearly all mature sheep. Mature animals develop a resistance to these parasites and are rarely affected. Young lambs, however, do not possess this resistance and are more likely to be the victims of this disease. The most serious outbreaks are seen in stressed lambs, lambs recently placed in feedlots (first 2 to 4 weeks) and in farm flock lambs of 1 to 3 months old. Abrupt changes in diet and therefore changes in the intestinal contents provide an ideal environment for coccidial growth.

What is Lasalocid and How Does it Work?

Lasalocid is a member of a group of compounds classified as polyether ionophores. Another familiar member of this class of compounds is monensin (*Rumensin*®), which is used extensively in beef cattle feeding, but is not cleared for use in sheep. Ionophores alter the transport of

chemically charged particles across a cellular membrane. Lasalocid's action as a coccidiostat alters ion transport in the membranes of the coccidia living in the intestinal wall of the host animal. Coccidial oocysts (coccidia in the egg stage of their life cycle), die when they are unable to maintain specific ion concentrations within their cells. Lasalocid has reduced fecal coccidial egg counts by 99 percent after 50 days of supplementation in lambs affected by either naturally occurring or experimentally induced coccidiosis. Since lasalocid is effective on coccidia during a specific life cycle stage, 30 to 60 days of treatment may be required to attain near zero egg counts in treated lambs.

Another widely publicized action of ionophores is they improve the rate of gain and feed conversion when fed to ruminant livestock. Although sheep have responded to ionophore supplementation with both improved rate of gain and improved feed conversion, this action is not mentioned in the clearance statement of use for lasalocid. Furthermore, recom-

mended levels are based on the amount required for effectiveness as a coccidiostat and not for improved performance.

Ionophores enhance performance parameters by altering metabolic processes of the rumen microbial population, as well as possible alteration of nutrient absorption for the intestines. Rate of gain may be enhanced by stimulating rumen microbes to produce more energy efficient products. This has been demonstrated by increased propionate concentrations relative to acetate concentrations in ionophore-fed lambs. In some cases, animals consuming an ionophore will maintain rate of gain while consuming less feed and in doing so, improve their conversion of feed into gain.

The response of improved performance of lambs fed lasalocid is not uniform nor consistent. Factors influencing the magnitude of response include the level of coccidial infection, amount of lasalocid consumed, and the type of diet (Figure 1).

Performance of Lasalocid Supplemented Lambs

Table 1 summarizes the results of two trials in which *Bovatec*[®] (lasalocid) was added to high concentrate, pelleted diets fed free choice. The response in average daily gain (ADG) to lasalocid supplementation varied from a 12 percent improvement in Trial 1 to only a 3 percent change in Trial 2. In Trial 1 this

Figure 1: Factors influencing the magnitude of response to lasalocid:

Level of Coccidial Infection

Lambs that carry a moderate to heavy load of coccidia (> 2000 coccidia oocytes/gram of feces) are more likely to respond with improvements in gain and feed conversion than lambs that are not carrying a significant parasite load. Heavy infestations of coccidia, as with other parasitic infestations will drain nutrients away from productive purposes in the animal and inhibit performance.

Amount of Lasalocid Consumed

The actual amount of active ingredient consumed per lamb per day will vary considerably when included in the diet at 30 grams per ton of complete feed. At this rate, young lambs consuming one pound of feed per day will receive 15 mg of active ingredient, while a lamb consuming 4 pounds of feed daily would receive 60 mg of active ingredient. Therefore, when feed intake is low, the 30 grams per ton concentration may not be enough to produce positive responses in lamb performance.

Type of Diet

Digestion and metabolism of concentrate feedstuffs differ from that of roughages. Ionophores potential to alter nutrient metabolism, therefore, would be expected to function differently in response to different dietary ingredients and combinations. Most cases of improved animal performance in response to ionophore feeding have been with high concentrate diets.

improvement in ADG resulted in lasalocid fed lambs reaching a market weight of 105 pounds 9 days earlier than control lambs.

The amount of feed required for lambs to gain one pound was 4.3 percent and 1.6 percent less in lasalocid supplemented lambs in Trials 1 and 2, respectively. As with rate of gain, an improvement in feed conversion can enhance profitability since feed represents the greatest single cost of lamb production.

As indicated in Trials 1 and 2, daily feed intake was not

significantly changed when lasalocid was included in the diet. This illustrates that lasalocid does not reduce palatability of a diet, which has been a problem associated with other ionophores used in the livestock industry.

Typically, a 5 percent improvement in rate of gain and feed conversion is quoted as the expected response to lasalocid feeding. This will be accurate for some situations, but it should be recognized that considerable variation exists.

Carcass characteristics of ion-

ophore supplemented lambs are similar to control lambs. Dressing percent, quality grade and yield grade were evaluated on all lambs in Trial 2 (Table 1) and no differences were found. These findings are consistent with other studies evaluating the same parameters.

Approved Levels of Lasalocid in Sheep Diets

Official FDA regulations define levels of use for lasalocid as 20 to 30 grams per ton (as-fed) in a complete feed. This feed is to be provided on a continuous basis and provide not less than 15 mg, nor more than 70 mg, of lasalocid per head per day depending on body weight. This means that in order to be effective, lambs must consume at least one pound of complete feed per day to attain the 15 mg level. Therefore, lasalocid effectiveness on the performance of young lambs just starting on feed (such as in a creep ration) will be limited until consumption approaches one pound per day.

The ionophore is often added to a protein supplement where the lasalocid is mixed with a protein carrier. When provided in this form 1,440 grams of lasalocid may be included per ton of supplement. Many of the currently available commercial protein supplements formulated for sheep include lasalocid supplementation. If lasalocid is included it will be listed on the tag. Although prices of protein supplements vary considerably among locations and market conditions, in many instances

lasalocid supplemented feeds costs only marginally more than supplements without the ionophore.

Hoffman-LaRoche Inc., Nutley, N.J. markets lasalocid as *Bovatec 68*[®]. This premix contains 68 grams of lasalocid per pound and is to be incorporated into a complete feed or a supplement as discussed earlier. This product was granted approval after Hoffman-LaRoche, Inc. conducted efficacy and safety studies required by the Food and Drug Administration. These studies determined that no withdraw time was required with the use of lasalocid prior to the slaughter of lambs.

Lasalocid has been shown to have a wide margin of safety. However, strict adherence to proposed feeding recommendations is essential. Lasalocid and

other ionophores are not to be fed to unapproved species. Horses are particularly susceptible to ionophore toxicity and ingesting only small amounts of an ionophore can be fatal.

Conclusion:

Coccidiosis can be a significant problem in Michigan lambs. Lasalocid provides an effective, safe and economical means of controlling coccidial infestations. It is for this reason that lasalocid was approved for use in the sheep industry and its use is recommended. The possibility of improved lamb performance when this product is included in the feed makes its use even more attractive. This product has been proven to be an asset to sheep and lamb production and has been widely accepted throughout the industry.

Table 1: Comparison of lamb performance on diets with and without *Bovatec*[®] supplementation.

Trial ¹	No. of lambs	Bovatec	ADG, ² lb	Intake, ³ lb	Feed/gain
1	54	0	0.65	3.03	4.6
	54	30	0.73	3.17	4.4
	% of change from control		+12%	+4.6%	-4.3%
2	40	0	0.63	3.9	6.2
	40	30	0.65	4.0	6.1
	% of change from control		+3%	+2.6%	-1.6%

¹Trial 1: Diet—all concentrate pellet fed free choice for 56 days. Initial weight—55 pounds (Vermeire et al. 1986. SID Digest 3(1):1).

Trial 2: Diet—corn based pellet fed free choice for 70 days. Initial weight—62 pounds (Stobart et al. 1987. SID Digest 3(2):9).

²Level of *Bovatec*[®] in the complete diet (g/ton).

³Average daily gain.

Many other Extension publications are available on sheep production. Call, write or visit the Cooperative Extension Service office in your county for more information. Following is a list of related publications available there or by writing to the MSU Bulletin Office, P.O. Box 6640, East Lansing, MI 48826-6640.

E-0479, Controlling Internal Parasites of Sheep, 8 pp, 30¢

E-0836, Controlling Insects and Mites on Sheep and Goats, 4 pp, 5¢

E-1501, Housing Your Sheep, 8 pp, 30¢

E-2084, Determining the Equivalent Nutritive Values of Feedstuffs in Sheep Diets, 8 pp, \$1.20 (for sale only)

E-2123, Use of Lasalocid (Bovatec) in Sheep Diets, 4 pp (available May 1988)

E-2125, Creep Feeding Lambs, 4 pp (available May 1988)

NCR221, Sheep Flock Management Calendar (poster), 45¢ (for sale only)

NCR235, Feeding Ewes, 12 pp, 55¢ (for sale only)

NCR300, The Sound Sheep: Mouth and Eyes, 4 pp (available May 1988)

NCR301, The Sound Sheep: Feet and Legs, 4 pp (available May 1988)



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