



# Feed Additives for Backgrounding Calves

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*Feed additives are ingredients added to calf rations to enhance production efficiency, improve health, and/or reduce morbidity. A variety of additives can be safe and effective when used as indicated on label specifications.*

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## Introduction

Feed additives are compounds that are added to diets for reasons other than to supply nutrients to the animal. For example, an antibiotic would be considered a feed additive because there is no "nutrient requirement" for antibiotics. Urea, on the other hand, is not considered a feed additive because it is a source of dietary protein (in the form of nitrogen) for cattle. For the most part, additives are used in cattle feeding because they enhance production efficiency, improve health, and/or reduce morbidity. The economic benefit of feed additive use is typically lowered production costs as a result of an improvement in production efficiency.

Feed additives are typically used in very small quantities. Concerns with toxicity and end-product residual make appropriate mixing, delivery and consumption critical. For these reasons, most feed additive use is regulated. No one, not even veterinarians, can authorize the use of a feed additive in a manner inconsistent with label specifications. The feed industry has developed a variety of products (premixes, supplements, vitamin/mineral packages) that enable producers to use feed additives effectively and safely.

## Classes of Feed Additives

### Antibiotics and Sulfas

These feed additives are classified as antibacterial agents because they limit the growth of certain bacteria. Bacteria are known to cause clinical sickness or subclinical reductions in health (morbidity) that can reduce performance of cattle. These compounds are generally approved for use as low-level continuous or periodic additions to the diet to enhance production efficiency or for the treatment of clinical disease. Animal response to this category of feed additive depends on the feeding conditions at the time they are used, so it is difficult to quantify the actual response that can be expected. For these reasons a positive financial return derived from the use of antibacterial feed additives is not guaranteed.

There are several production responses that can be achieved through appropriate use of anti-bacterial compounds. Compounds approved for low-level use in feedlot cattle diets to enhance gain and feed efficiency are shown in Table 1. Also, certain compounds can be used to reduce the incidence of liver abscesses in feedlot cattle (Table 2). Liver abscesses can be prevalent in cattle with erratic feed intakes fed high concentrate diets. Antibacterial compounds are also used to reduce the incidence and severity of respiratory diseases, diarrhea and anaplasmosis (Table 3).

Antibiotics are ubiquitous in nature. Many are normally produced in organisms found naturally in the soil and other places. Therefore, people and animals have been exposed to antibiotics for centuries. Their judicious use in livestock production

results in healthier animals. In over 40 years use in livestock production, bacterial resistance to antibiotics resulting from their use as feed additives has not appeared to result in any increased risk to people or animals. As long as the presence of bacteria reduces feedlot performance and bacteria continue to respond to antibiotics, proper use of anti-bacterial compounds will provide performance benefits.

**Table 1. Antibacterial compounds for use as low-level feed additive in feedlot cattle diets to increased weight gain and/or improved feed efficiency.**

Compound	Recommend use	Withdrawal Time*
Bacitracin Zinc	35 to 70 mg/hd/d	None
Bambermycins or Gain Pro <sup>◆</sup>	10 to 20 mg/hd/d	None
Chlortetracycline, CTC <sup>◆</sup> or Aureomycin <sup>◆</sup>	25-70 mg/hd/d for cattle weighing 250-400 lb;  70 to 100 mg/hd/d for cattle greater than 400 lb	None
Oxytetracycline, OTC <sup>◆</sup> or Terramycin <sup>◆**</sup>	75 mg/hd/d	None
Sulfamethazine plus Chlortetracycline, or Aureo-S700 <sup>◆</sup>	350 mg/hd/d 350 mg/hd/d	Feed for 28 d in the presence of respiratory disease (shipping fever); discontinue 7-d prior to slaughter
Virginiamycin or Vmax <sup>◆</sup>	70 - 340 mg/hd/d	None

\* Time between last treatment and slaughter.

\*\* Can be fed with lasalocid (see [table 4](#)).

**Table 2. Antibacterial compounds for use to reduce the incidence of liver abscesses in feedlot cattle.**

Compound	Recommend use	Withdrawal Time*
Bacitracin Methylene Disalicylate	70 mg/hd/d continuously or 250 mg/hd/d for 5 d followed by 25 d without medication and repeat every 30 d	None
Chlortetracycline, CTC <sup>◆</sup> or Aureomycin <sup>◆</sup>	70 mg/hd/d	None
Oxytetracycline, OTC <sup>◆</sup> or Terramycin <sup>◆**</sup>	75 mg/hd/d	None
Tylosin or Tylan <sup>◆***</sup>	60-90 mg/hd/d	None
Virginiamycin or Vmax <sup>◆</sup>	85-240 mg/hd/d	None

\* Time between last treatment and slaughter.

\*\* Can be fed with lasalocid (see [table 4](#)).

\*\*\* Can be fed with either monensin, monensin in combination with melengesterol acetate (MGA), or lasalocid in combination with MGA (see [table 4](#)).

**Table 3. Antibacterial compounds for use as an aid in reducing the incidence of other disease conditions in feedlot cattle.**

Compound	Recommend use	Claim and Withdrawal Time*
Chlortetracycline, CTC or Aureomycin**	350 mg/hd/d	Bacterial pneumonia, shipping fever. Withdraw 48 hr prior to slaughter.
	10 mg/lb BW/d. Feed for not more than 5 d.	Bacterial enteritis and bacterial pneumonia. Withdraw 48 hr prior to slaughter.
	350 mg/hd/d for beef cattle under 700 lb;	Anaplasmosis. Withdraw 48 hr prior to slaughter.
	0.5-2.0 mg/lb BW/d for beef cattle over 700 lb	Anaplasmosis. Withdraw 48 hr prior to slaughter.
Oxytetracycline, OTC or Terramycin	0.5-2.0 g/lb BW/d. Feed for 3-5 d before and after feedlot arrival.	Early stages of shipping fever.
	10 mg/lb BW/d. Feed continuously for 7-14 d.	Bacterial enteritis, shipping fever. Withdraw 5-d before slaughter.

\* Time between last treatment and slaughter. Actual times may vary with manufacturer. See label description for specific withdraw times.

\*\* Can be fed with sulfamethazine (see [table 1](#)).

## Ionophores

Ionophores (Table 4) are a unique class of antibiotics that selectively affect certain microorganisms by altering the passage of **ions** through "**pores**" on their outer cell membrane, thus the name "ionophores". Ionophores were originally used as a coccidiostat in the poultry industry. Later, they were shown to enhance feed efficiency in cattle by altering the microbial fermentation of feed in the rumen.

**Table 4. Ionophores for use as feed additives in feedlot cattle.**

Compound	Recommend use	Withdrawal Time*
Laidlomycin propionate or Cattlyst	5-10 g/ton of complete feed; do not feed more than 150 mg/hd/d	None
Lasalocid or Bovatec**	10-30 g/ton of complete feed; do not feed more than 360 mg/hd/d	None
Monensin or Rumensin***	5-30 g/ton of complete feed; do not feed more than 360 mg/hd/d	None

\* Time between last treatment and slaughter.

\*\* Can be fed with oxytetracycline, melengesterol acetate (MGA),

and in combination with MGA and tylosin (see [tables 1](#) and [2](#)).

\*\*\* Can be fed with tylosin (see [table 2](#)) and/or melengesterol acetate (MGA).

Changes in microbial fermentation result in an increase in propionate production and a reduction in ruminal protein degradation. Propionate tends to enhance the energetic efficiency of growth, while reduced protein degradation increases the amount of feed protein that "bypasses" the rumen to the lower digestive tract.

Improvements in feed efficiency due to ionophore use increase as the level of roughage in the diet increases. In higher concentrate diets, there are other subtle benefits from ionophore use. Primarily, feed intake of high grain diets is less variable when ionophores are used. This in turn can lead to a reduction in the potential for acidosis and bloat. Ionophores can improve the potential return to cattle feeders up to \$12 per head.

Use of ionophores in higher than approved levels can be toxic to cattle. Horses are especially susceptible to ionophore toxicity. **Horses should not be allowed to eat feed or supplements containing ionophores.**

## Coccidiostats

Coccidia are protozoal organisms that can invade and destroy the intestinal mucosa of cattle. They are generally present in most animals at subclinical numbers and do not affect the performance and health of cattle. At certain times, however, their numbers increase to the point that production efficiency is decreased and irritation of the digestive tract becomes so severe that bloody feces and scouring can result. Certain factors (e.g. stress during transportation, abrupt diet changes, severe weather changes) can cause an episode of clinical coccidiosis.

Interpretation of fecal coccidia is difficult, since a clinical problem can be present even with low coccidia counts. Preventive measures are recommended when there is concern or a history of coccidiosis. Four additives (Table 5) are approved for the prevention and/or treatment of coccidiosis in feedlot cattle.

**Table 5. Coccidiostats for use as feed additives in feedlot cattle.**

Compound	Recommend use	Withdrawal Time*
Amprolium or Corrid <sup>®</sup>	Prevention: 2.27 mg/lb BW/d for 21 d; Treatment: 4.54 mg/lb BW/d for 5 d	Withdraw 24 hr before slaughter Withdraw 24 hr before slaughter
Decoquinatate or Deccox <sup>®</sup>	Prevention: 0.227 mg/lb BW/d for at least 28 d	None
Lasalocid or Bovatec <sup>®</sup>	Control: 1 mg/2.2 lb BW/d up to a maximum of 360 mg/hd/d	None
Monensin or Rumensin <sup>®</sup>	Control: 10-30 g/ton up to a maximum of 360 mg/hd/d	None

\* Time between last treatment and slaughter.

## Estrous suppression

Melengesterol acetate (MGA) is a steroidal feed additive that is used to suppress estrus (cyclic sexual activity or heat) and to improve the growth rate and feed efficiency in feedlot heifers. The recommended level is 0.25 to 0.50 mg of MGA per head daily. Melengesterol acetate is approved for use with lasalocid or monensin (see [table 4](#)).

## Other Additives

Additives are available for the alleviation of other problems in feedlot cattle. These include bloat, flies (e.g. face, horn and stable) and internal parasites (e.g. stomach, intestinal and lung worms). The cattle feeder using feed additives for these specific purposes should read and follow all label instructions and manufacturers' recommendations. Currently, the products available include:

### Bloat

- Poloxalene or Bloat Guard ♦ (used primarily for pasture rather than feedlot bloat). *10-20 mg/lb BW/d.*

### Flies

- Methoprene or Altosid ♦. *0.227-0.454 mg/lb BW/month.*
- Rabon. *0.68 mg/lb BW/d.*

### Footrot

- Older products/techniques using feed additives are not currently listed in Feed Additive Compendium (FAC, 1998).

### Internal Parasites (worms)

- Fenbendazol or Safe-Guard ♦. *Two treatment regimes available: 2.27 mg/lb BW for one day or 2.27 mg/lb BW given over a 3 to 6 day period. 13-day withdraw period prior to slaughter.*
- Levamisole or Tramisol ♦. *3.6 mg/lb BW/d. 48-hr withdraw period prior to slaughter.*
- Morantel Tartrate or Rumatel ♦. *4.4 mg/lb BW/d. 14-day withdraw period prior to slaughter.*
- Thiabendazole or TBZ ♦. *30-50 mg/lb BW/d. 3-day withdraw period prior to slaughter.*

## Summary

When used properly, feed additives pose little risk to cattle, producer and consumer. Approved additives have been thoroughly researched and their safety is assured when used in ways approved by the Food and Drug Administration (FDA). The responsibility of proper use rests with the cattle feeder. All additives have complete instructions that must be read and followed. Levels to be used, time of administration and withdrawal periods, if required, must be followed. Proper use of additives is a must if the consumer is going to continue to purchase beef with complete confidence in its wholesomeness.

## Sources of Information

FAC. 1998. Feed Additive Compendium. Sarah Muirhead, Editor. The Miller Publishing Co., Minnetonka, MN.

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