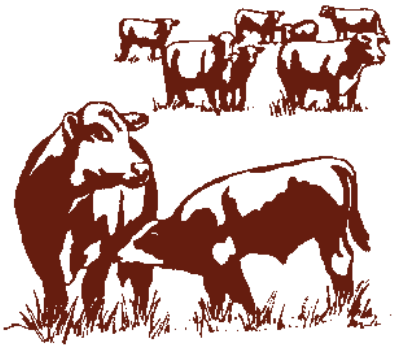
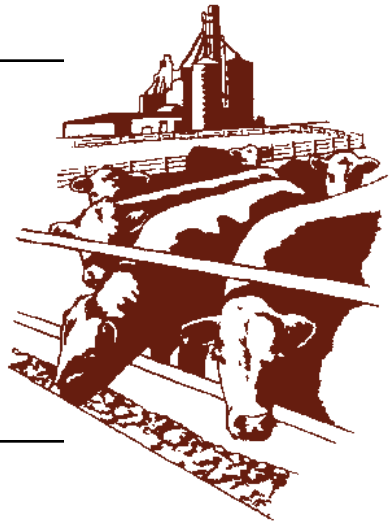


Beef Cattle Handbook



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Medicated Feed Additives for Beef Cattle

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Medicated feeds are instrumental in maintaining animal health and promoting growth and feed efficiency. However, it is important that medicated feeds be properly manufactured and withdrawal times be observed. If label instructions are not followed, animal health can be adversely affected and may result in illegal tissue residues. The purpose of this bulletin is to explain the regulations regarding the use of medicated feed additives, and to provide a list of approved drugs and drug combinations, use levels, and indications for use of medicated feed additives for beef cattle.

Definitions

The regulations pertaining to the use of medicated feed additives are found in the Code of Federal Regulations (CFR), Title 21, Part 558. The Federal Food, Drug & Cosmetic Act provides the legal authority upon which these regulations are written. The following definitions are necessary in order to understand the regulations regarding the use of medicated feed additives.

Medicated feed - Any manufactured or mixed feed which contains drug ingredients intended to promote growth or feed efficiency, or to cure, mitigate, prevent, or treat diseases of animals other than man.

Category I drug - Drugs which require no withdrawal period at their lowest use level for each approved species.

Category II drug - Drugs which require a withdrawal period at the lowest use level for at least one of the approved species.

Type A medicated article - The most concentrated form of a medicated feed additive. It usually consists of a drug source and a carrier ingredient. It can be used in the manufacture of another Type A medicated article or a Type B or C medicated feed.

Type B medicated feed - A medicated feed containing an animal drug and a substantial amount of nutrients including vitamins, minerals, and other nutritional ingredients. Nutritional ingredients must make up at least 25 percent of the feed by weight. It can be diluted to manufacture other Type B medicated feeds or Type C medicated feeds.

Type C medicated feeds - A medicated feed that is intended to be a complete feed. It can be fed as the sole ration, top-dressed, or fed free-choice. It is manufactured by diluting a Type A medicated article or a Type B or C medicated feed.

Registered Vs. Non-Registered Feed Mills

Any feed manufacturer that uses a Category II, Type A medicated feed article must be registered with the FDA as a drug establishment (FDA-2656) and must register annually (FDA-2656e). For each Category II, Type A medicated feed article (i.e. for each separate drug), a medicated feed application (FDA-1900) must be submitted to the FDA. You must be registered as a drug establishment and receive FDA approval for a particular drug before you can purchase a Category II, Type A medicated feed article containing that drug. Category II, Type B or C medicated feeds do not require a medicated feed application.

A non-registered mill can use the following medicated article/feed(s):

- Category I, Type A medicated article

- Category I, Type B or C medicated feed
- Category II, Type B or C medicated feed

If you have any questions regarding the status of any medicated feed additive you are using, contact the Kansas State University Extension Service, your animal drug supplier, or the FDA.

Most on-farm feed manufacturers will be of the non-registered type (i.e. not using a Category II, Type A medicated article). However, non-registered mills are still subject to federal regulations. The Federal Food, Drug & Cosmetic Act provides that a medicated or non-medicated feed will be considered adultered if the methods and/or equipment used to for its manufacture, processing, packing, or holding is not in compliance with current good manufacturing practices (CGMPs).

It is also important to note that even though non-registered mills are not subject to regular inspections by the FDA (or authorized FDA agency), they can be inspected for cause, such as adulterated feed products or food products with illegal drug residues.

Drug Labeling Symbols

The Animal Health Institute and the American Feed Industry Association have developed two symbols to appear on medicated feed additive labels to promote proper use: the "Eye Clock" and the "Double Arrows" Universal Warning Symbol. The Eye Clock serves as reminder to read directions carefully, regardless of whether the particular drug has a withdrawal time. Some drugs have special manufacturing precautions and other feeding limitations. For example, some drugs such as Monensin can be fatal if ingested by equines. The Double Arrows Warning Symbol is designed to draw attention to precautions that must be observed if the producer is to avoid violative residues in his/her product.

Withdrawal Times

The failure to follow label instructions and to observe withdrawal times is the major cause of violative drug residues in animal products destined for human consumption. Violative drug residues violates federal law against the sale of adultered products. Violative tissue residues can lead to delays in marketing, condemnation of a shipment, and result in regulatory actions in accordance with the Federal Food, Drug & Cosmetic Act. The following demonstrates how to calculate withdrawal times1. Each withdrawal day is a full 24 hours starting with the last time an animal receives the drug. For example, if a drug has a five day withdrawal period and is discontinued at 9 a.m. on Friday, the end of the first withdrawal day will be 9 a.m. on Saturday. The end of the fifth withdrawal day will end at 9 a.m. on Wednesday.

Approved Drugs And Drug Combinations

Tables 1-3 provide information regarding the proper use of drugs for beef cattle. Table 1 presents approved drugs for specific uses. Table 2 presents the use level for a specific application of a drug. Table 3 lists the approved drug combinations for beef cattle.

The "use level" presented in the second table represent the intended concentration of the active ingredient or drug in the feed, NOT the amount of Type A medicated article or Type B or C medicated feed to be added. Refer to manufacturer's directions to determine the amount of medicated article to add to achieve the desired concentration. Most manufacturers provide a table showing the amount of their product to add to attain the desired concentration. These values can be obtained from the following formula:

To convert the concentration in the final feed from mg/head/day to g/ton, multiply by two and then divide that number by the number of pounds fed daily. To convert mg/lb. body weight/day to g/ton, multiply by the bodyweight then by two and then divide that number by the number of pounds to be fed daily. If desired concentration is given in mg/100 lb. body weight/day, use the same formula for mg/lb. body weight/day, but divide the result by 100. If the drug activity level (concentration of the source) is listed as a percent, it can be converted to g/lb. by multiplying by the percent activity level by 4.54. For example, if you are using a drug which contains an 11 percent drug activity level to manufacture three tons of feed and the desired concentration is 500 mg/head/day, and you will fed 2 lbs./day, you should add 30 lbs. of the medicated feed additive to your mixer.

$$\text{Amt to add (lb.)} = \frac{\text{Concentration in final feed (g/ton)} * \text{Batch Size (ton)}}{\text{Concentration of the source (g/lb.)}}$$

Using the same example as above, but changing the final feed concentration to 0.5 mg/lb. body weight/day for a 1,500 lb. cow would give the following result.

$$\text{Amt to add (lb.)} = \frac{500 * (2/2) * 3}{4.54 * 11} = 30.0$$

If the final concentration were given as 0.5 mg/100 lb. body weight/day, only 0.45 lbs. of the mediated feed additive would need to be added.

$$\text{Amt to add (lb.)} = \frac{(0.5) * 1500 * (2/2) * 3}{4.54 * 11} = 45.0$$

Some medicated feed additive directions require that an intermediate premix be made before incorporation into the final feed. To determine how much intermediate premix to add, use the same equation, but use the concentration of the intermediate premix as the "concentration of the source."

References

1. CVMM-27, 1992. *Drug Use Guide: Dairy Cattle and Calves.* Center for Veterinary Medicine. Rockville, Maryland.
2. Meyer, Suzanne (ed.), 1994. Code of Federal Regulations. *New Animal Drugs for Use in Animal Feeds.* Title 21, Part 558.
3. Muirhead, Sarah (ed.), 1994. *j* Miller Publishing Co. Minnetonka, MN.

Table 1. Approved Beef Cattle Medicated Feed Additives by Specific Application.

Feed Efficiency and Growth Promotion Bacitracin Zinc Bambermycins Chlortetracycline Laidlomycin Propionate Lasalocid Melengestrol Acetate Monensin Oxytetracycline **Anaplasmosis** Chlortetracycline	**Bloat** Poloxalene **Coccidiosis** Amprolium Decoquinate Lasalocid Monensin **Face Flies** Rabon **Fecal Flies** Rabon	**Foot Rot** Chlortetracycline **Horn Flies** Mehoprene Rabon **House Flies** Rabon **Ketosis** Propylene Glycol
Liver Abscesses Bacitracin Methylene Disalicylate Chlortetracycline Oxytetracycline Tylosin **Respiratory Infection** Chlortetracycline **Shipping Fever** Chlortetracycline Oxytetracycline **Stable Flies** Rabon **Suppression of Estrus** Melengestrol Acetate	**Worms** **Coopers Worms - Cooperia** Coumaphos Fenbendazole Levamisole Hydrochloride Morantel Tartrate Thiabendazole **Hair Worm - Trichostrongylus** Coumaphos Fenbendazole Levamisole Hydrochloride Morantel Tartrate Thiabendazole **Hookworm - Bunostomum** Fenbendazole Levamisole Hydrochloride	**Large Intestinal Worms - Oesophagostomum - Nodular Worms** Fenbendazole Levamisole Hydrochloride Morantel Tartrate Thiabendazole **Lungworms - Dictyocaulus viviparous** Levamisole Hydrochloride **Stomach Worm - large, medium and and small Haemonchus, Ostertagia, and Trichostrongylus** Coumaphos Fenbendazole Levamisole Hydrochloride Morantel Tartrate Thiabendazole
Thread-Necked Strongylus - Nematodirus Coumaphos Fenbendazole Levamisole Hydrochloride Morantel Tartrate Thiabendazole		

Table 2. Approved Uses for Beef Cattle Medicated Feed Additives.

Drug	Use Level	Indications for Use	Withdrawal Time (days)
Bacitracin Methylene Disalicylate	70 mg/head/day	Feedlot beef cattle: Reduction in number of liver condemnations due to abscesses.	None
Bacitracin Zinc	35-70 mg/head/day	Growing Cattle: To aid in stimulating growth and improving feed efficiency; For increased rate of weight gain and improved feed efficiency.	None
Bambermycins	1-4 g/ton	Feed only to cattle being fed in confinement for slaughter for increased rate of weight gain and improved feed efficiency.	None
Chlortetracycline	70 mg/head/day	Feedlot Cattle: aid in prevention of liver abscesses.	None
	70 mg/head/day	Beef cattle weighing up to 700 lb.: Aid in reduction of bacterial diarrhea; aid in prevention of foot rot.	None
	70 mg/head/day	Growing Cattle (in finished feed): growth promotion and feed efficiency.	None
	100 mg/head/day	Beef cattle weighing over 700 lb.: Aid in reduction of bacterial diarrhea; aid in prevention of foot rot.	None
	350 mg/head/day	Beef Cattle: aid in prevention of bacterial pneumonia and shipping fever; aid in reduction of losses due to respiratory infection (infectious rhinotracheities, shipping fever complex).	2
	350 mg/head/day	Beef cattle weighing up to 700 lb.: Aid in prevention of anaplasmosis.	2
	500 mg/head/day	Beef cattle weighing 700-1,000 lb.: Aid in prevention of anaplasmosis.	2
	750 mg/head/day	Beef cattle weighing 1,000-1,500 lb.: Aid in prevention of anaplasmosis.	2
	0.5 mg/lb. bodyweight/day	Beef cattle weighing over 1,500 lb.: Aid in prevention of anaplasmosis	2
	5.0 mg/lb. bodyweight/day	Aid in elimination of the carrier state of anaplasmosis. For use in the carrier state only.	10
Chlortetracycline and Sulfamethazine	350 mg/head/day 350 mg/head/day	Beef Cattle: Feed for 28 days as an aid in maintenance of weight gains in the presence of respiratory disease such as shipping fever.	7
Coumaphos	0.054 g/lb. bodyweight/day	As an aid in the reduction of fecal breeding flies through control of fly larvae	None
	0.091 g/100 lb. bodyweight/day	Control of gastrointestinal roundworms	None
Decoquniate	22.7 mg/100 lb. bodyweight/day	Prevention of coccidiosis in ruminating and non-ruminating calves and cattle caused by Eimeria bovis and Eimeria zuernii.	None
Famphur	1.1 mg/lb. bodyweight/day	For control of grubs and as an aid in control of sucking lice	4
	2.3 mg/lb. bodyweight/day	For control of grubs	4

Table 2. Approved Uses for Beef Cattle Medicated Feed Additives. (continued)

Drug	Use Level	Indications for Use	Withdrawal Time days)
Fenbendazole	2.27 mg/lb. bodyweight	For the removal and control of Lungworms; barberpole worms; brown stomach worms; small stomach worms; hookworms; thread necked intestinal worms; small intestinal worms; bankrupt worms; and nodular worms.	13
Lasalocid Sodium	10-30 g/ton	Feed in Type C feeds to cattle in confinement for slaughter for improved feed efficiency.	None
	25-30 g/ton	Feed in Type C feeds to cattle in confinement for slaughter for improved feed efficiency and increased rate of weight gain.	None
	60-200 mg/head/day	Feed to pasture cattle for increased rate of weight gain.	None
	1 mg/2.2 lb. bodyweight/day up to 800 lb.	For control of coccidiosis caused by Eimeria bovis and Eimeria zuernii	None
	150 g/ton	Feed only as a free choice mineral Type C feed to pasture cattle for increased rate of weight gain.	None
	1,440 g/ton	Feed only as a free choice mineral Type C feed to pasture cattle for increased rate of weight gain.	None
	60-200 mg/head/day	Feed only as a free choice mineral Type C feed to pasture cattle for increased rate of weight gain.	None
Levamisole Hydrochloride	0.08-0.8 percent (0.36-3.6 g/lb.)	For treating cattle infected with the following gastrointestinal worms and lung worms: stomach worms; intestinal worms; lung worms	2
Melengestrol Acetate	0.25-0.50 mg/head/day	Heifers: For increased rate of weight gain, improved feed efficiency and suppression of estrus in heifers being fed in confinement for slaughter.	2
Monensin	5-30 g/ton	Feed only to cattle being fed in confinement for slaughter for improved feed efficiency	None
	150 mg/lb.	Feed as free-choice protein-mineral blocks to pasture cattle weighing more than 400 lb. for increased rate of weight gain.	None
	25-400 g/ton	Improved feeding efficiency for mature reproducing beef cows receiving supplemental feed.	None
	10-30 g/ton	Feedlot cattle: for the prevention and control of coccidia due to Eimeria bovis and Eimeria zuernii .	None
	25-400 g/ton	Feed to pasture cattle weighing more than 400 lb. for increased rate of weight gain.	None
Morantel Tartrate	0.44 g/100 lb. bodyweight	Feed as single therapeutic treatment for removal and control of mature gastrointestinal nematode infections including stomach worms, worms of the small intestine, and worms of the large intestine.	14
Oxytetracycline	75-80 mg/head/day	Feed to cattle weighing over 400 lb. as an aid in reducing incidence and severity of liver abscesses.	None
	75-80 mg/head/day	As an aid in reducing incidence and severity of bloat; to increase rate of gain and improve feed efficiency;	None
	0.1-0.5 mg/lb. of body weight/day	As an aid in the prevention of bacterial diarrhea.	None

Table 2. Approved Uses for Beef Cattle Medicated Feed Additives. (continued)

Drug	Use Level	Indications for Use	Withdrawal Time days)
Oxytetracycline (con.)	0.5-5.0 mg/ lb. bodyweight/day	As an aid in the treatment of bacterial diarrhea, also known as scours.	None
	0.5-2.0 g/head/day	for the prevention and treatment of the early stages of shipping fever complex.	5, if 2 g/ton
Poloxalene	1.0-2.0 g/100 lb. bodyweight/day	Prevention of legume and wheat pasture bloat when fed continuously during exposure to bloat-producing conditions.	None
Rabon	0.00015 lb./100 lb. bodyweight/day (0.07 g/cwt/day)	Control of fecal flies in manure of treated cattle. Prevents development of face flies, horn flies, house flies and stable flies in the manure of treated cattle.	10
Ronnel	0.35 g/100 lb. body weight/day	Control of grubs	10
	0.82 g/100 lb. body weight/day	Control of grubs; aid in the reduction of cattle lice, when the drug is used for cattle grub control	10
	6.24 g/100 lb. body weight/day	Control of grubs and horn flies	10
	0.41 g/100 lb. body weight/day	Control of grubs	10
	5.5 g/100 lb. body weight/month	Control of grubs and horn flies	10
Thiabendazole	3 g/100 lb. bodyweight	Control of infections of gastrointestinal roundworms.	3
	5 g/ 100 lb. bodyweight	Control of severe infections of gastrointestinal roundworms	3
Tylosin	8-10 g/ton	For reduction of incidence of liver abscesses in beef cattle caused by Fusobacterium necrophorum and Actinomyces pyogenes.	None

Table 3. Approved Drug Combinations for Beef Cattle.

Drug	Use Level	Indications for Use	Withdrawal Time (days)
Lasalocid Sodium and Oxytetracycline	10-30 g/ton 7.5 g/ton	For improved feed efficiency and reduction of incidence and severity of liver abscesses in cattle fed in confinement for slaughter.	None
	25-30 g/ton 7.5 g/ton	For improved feed efficiency and increased rate of weight gain and reduction of incidence and severity of liver abscesses in cattle fed in confinement for slaughter	None
Lasalocid Sodium and Melengestrol Acetate	100-360 mg/head/day. 0.25-0.50 mg/head/day.	Beef Heifers: for increased rate of weight gain, improved feed efficiency and suppression of estrus in heifers fed in confinement for slaughter.	2
	100-1,440 g/ton. 0.125-1.0 mg/lb.	For increased rate of weight gain, improved feed efficiency and suppression of estrus in heifers fed in confinement for slaughter.	2
Lasalocid Sodium and Melengestrol Acetate and Tylosin	10-30 g/ton 0.25-0.50 mg/head/day 90 mg/head/day	Beef Heifers: for increased rate of weight gain, improved feed efficiency, suppression of estrus, and reduced incidence of liver abscesses in heifers fed in confinement for slaughter.	2
Melengestrol Acetate and Monensin	0.25-0.40 mg/head/day (0.25-1.6 g/ton) 50-360 mg/head/day (5-30 g/ton)	Heifers: For increased rate of weight gain, improved feed efficiency and suppression of estrus in heifers being fed in confinement for slaughter.	2
Melengestrol Acetate and Lasalocid Sodium	0.25-.50 mg/head/day 100-360 mg/head/day	Heifers: For increased rate of weight gain, improved feed efficiency and suppression of estrus in heifers being fed in confinement for slaughter.	2
Melengestrol Acetate and Tylosin	0.25-0.50 mg/head/day 90 mg/head/day	Heifers: For increased rate weight gain, improved feed efficiency, suppression of estrus, and reduced incidence of liver abscesses in heifers being fed in confinement for slaughter.	2
Melengestrol Acetate and Monensin and Tylosin	0.25-.50 mg/head/day 50-360 mg/head/day 90 mg/head/day	Heifers: For increased rate weight gain, improved feed efficiency, suppression of estrus, and reduced incidence of liver abscesses in heifers being fed in confinement for slaughter.	2
Monensin and Melengestrol Acetate	5-30 g/ton 0.25-1.6 g/ton	Feed to heifers being fed in confinement for slaughter for increased rate of weight gain, improved feed efficiency, and suppression of estrus.	2
Monensin and Tylosin	5-30 g/ton 8-10 g/ton	Feed only to cattle being fed in confinement for slaughter for improved feed efficiency; for reduction of liver abscesses caused by Fusobacterium necrophorum and Corynebacterium pyogenes	None
Oxytetracycline and Lasalocid	75 mg/head/day 25-30 g/ton in complete feed	As an aid in reducing incidence and severity of liver abscesses. For improved feed efficiency and increased weight gain.	None

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