FARMERS ASSURING RESPONSIBLE MANAGEMENT

NATIONAL DAIRY FARM PROGRAM™

Milk and Dairy Beef Drug Residue Prevention

Producer Manual of Best Management Practices

2014




NATIONAL MILK PRODUCERS FEDERATION

Connecting Cows,
Cooperatives,
Capitol Hill,
and Consumers

www.nmpf.org
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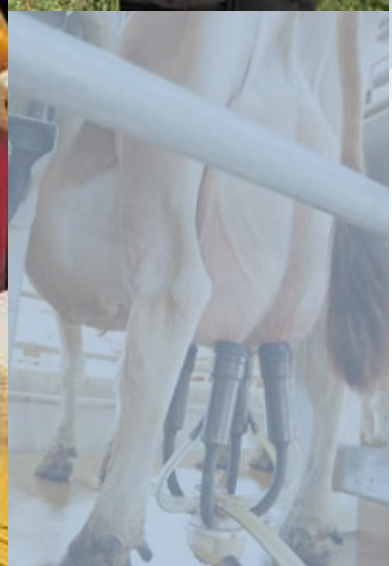


National Milk Producers Federation ("NMPF") does not endorse any of the veterinary drugs or tests identified on the lists in this manual. The lists of veterinary drugs and tests are provided only to inform producers what products may be available, and the producer is responsible for determining whether to use any of the veterinary drugs or tests. All information regarding the veterinary drugs or tests was obtained from the products' manufacturers or sponsors, and NMPF has made no further attempt to validate or corroborate any of that information. NMPF urges producers to consult with their veterinarians before using any veterinary drug or test, including any of the products identified on the lists in this manual. In the event that there might be any injury, damage, loss or penalty that results from the use of these products, the manufacturer of the product, or the producer using the product, shall be responsible. NMPF is not responsible for, and shall have no liability for, any injury, damage, loss or penalty.

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FOREWORD

The goal of our nation's dairy farmers is to produce the best tasting and most wholesome milk possible. Our consumers demand the best from us and we meet the needs of our consumers every day. Day in and day out, we provide the best in animal husbandry and animal care practices for our animals. Continually, we evaluate our best management practices and disease prevention protocols to keep our animals healthy and comfortable. There are occasions where animals may get sick and need antibiotic therapy to overcome a specific disease challenge. As dairy producers, we strategically and judiciously use our antibiotic therapy to help an individual animal that has been threatened with a disease. We take this responsibility of judicious antibiotic use seriously and take many precautions with our antibiotic-treated animals so that their milk or meat does not enter the food supply.

The avoidance of milk and meat residues in the dairy industry takes an on-farm team effort that begins with the VCPR – the Veterinary-Client-Patient-Relationship. The dairy farm owner/manager/herdsman must work with the farm veterinarian to develop treatment protocols that address the correct use of antibiotics. Once a decision is made to use antibiotics then protocols must be in place to guide employees on the safe way to handle this animal to prevent an inadvertent milk or meat residue from occurring. Identification of treated animals and recording antibiotic use are essential to prevent residues.

The newly revised Milk and Dairy Beef Residue Avoidance Manual is a concise review of appropriate antibiotic use in dairy animals. The Manual is a quick resource to review those antibiotics approved for dairy animals and can also be used as an educational tool and resource for farm managers as they develop their on-farm best management practices necessary to avoid milk and meat residues. I encourage all dairy farmers to sit down with their veterinarian and all employees to review this manual because I think you will find the information useful, practical, and easily applied to your individual farms.

Sincerely,

Karen Jordan, DVM
Dairy Producer
Chair – NMPF Animal Health and Welfare Committee

EXTRA ENERGY FOR GREATER MILK PRODUCTION EFFICIENCY*

Rumensin® means greater milk production efficiency.[1]* Rations containing Rumensin give cows up to 4% more energy per pound of feed,[1] which could mean at least a 5-to-1 return on investment.[2] **To see how you can get the most out of dairy feed with Rumensin, contact your Elanco representative.**

*Production of marketable solids-corrected milk per unit of feed intake.

The label contains complete use information, including cautions and warnings. Always read, understand, and follow the label and use directions. Consumption by unapproved species or feeding undiluted may be toxic or fatal. Do not feed to veal calves.

REFERENCES:
1. Elanco Animal Health, Data on File, INAD 1420, Efficacy Report.
2. Elanco Animal Health, Data on File.

Rumensin® is a registered trademark of Elanco's brand of monensin sodium. © 2013 Elanco Animal Health.
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Milk and Dairy Beef Residue Prevention

INTRODUCTION

The dairy industry is committed to producing safe, abundant, and affordable milk and dairy beef of the highest quality. Healthy animals help make for safe food, and disease prevention is the key to keeping cows healthy. When dairy animals get sick and treatment is necessary, producers and veterinarians use drugs judiciously. Antibiotics should be used appropriately to prevent residues from occurring in milk or dairy beef. The marketing of milk or beef with antibiotic residues, even unintentionally, is illegal and can result in financial and criminal penalties.

Photo courtesy of DMI

ANIMAL DRUGS

There are three classes of animal drugs: Over-the-Counter (OTC), Prescription (RX), and Veterinary Feed Directive (VFD). OTC drugs can be sold by any person or establishment without the prescription of a veterinarian. Prescription drugs can only be sold to the farmer by a veterinarian or pharmacist, and only with the prescription of a veterinarian. VFD is a drug intended for use in or on feed, which is limited by an approved application to use under the professional supervision of a licensed veterinarian. Pulmotil® (tilmicosin) is the first VFD product approved for use in cattle. The Food and Drug Administration (FDA) approved the drug as a treatment for groups of cattle in the early stages of bovine respiratory disease outbreak to provide 14 days of sustained in-feed therapy. Pulmotil® is approved for use in beef and non-lactating dairy cattle.

One type of drug is an antibiotic. An antibiotic is a chemical substance or compound that kills or reduces the growth of susceptible bacteria. An antimicrobial is a substance that kills or inhibits the growth of microorganisms such as bacteria, fungi, or protozoans. Therefore, an antibiotic is an antimicrobial drug that attacks bacteria.

Any use of a drug not specifically listed on the label is called "extra-label drug use" and is regulated by the FDA under the Animal Medicinal Drug Use Clarification Act (AMDUCA) of 1994. Using a prescription or over-the-counter drug in an extra-label manner is illegal unless it is specifically recommended under the guidance of a veterinarian working in the context of a Veterinary-Client-Patient Relationship (VCPR). There are no legal extra-label uses of VFD drugs.

Examples of extra-label drug use:

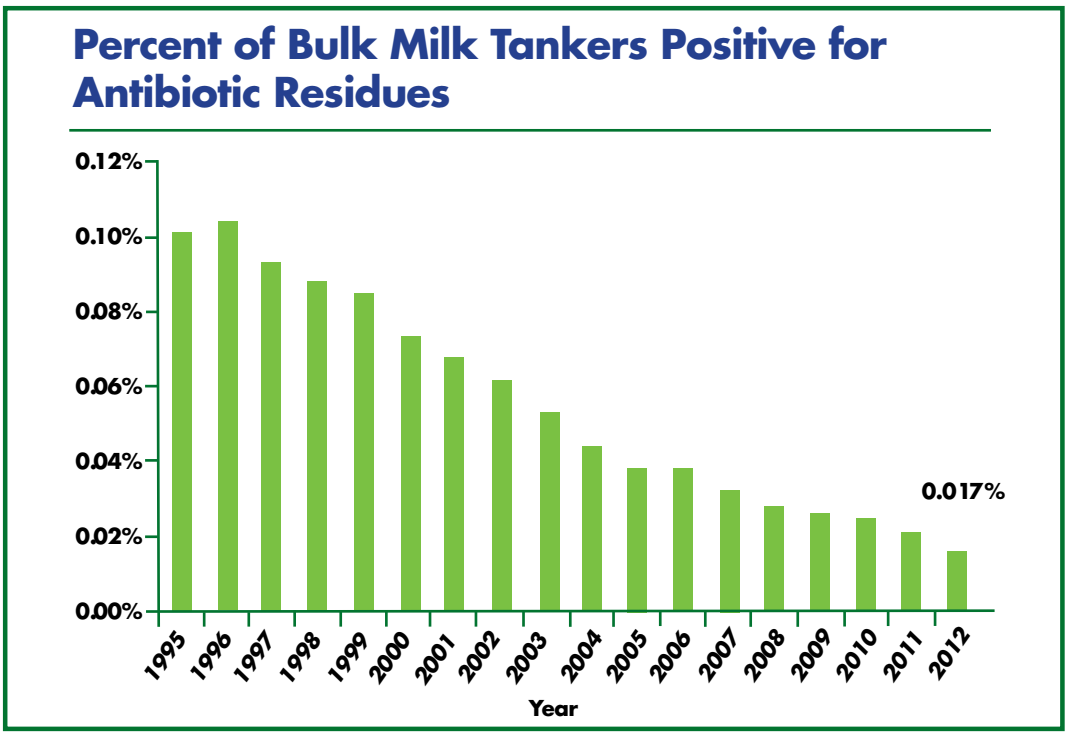
1. Changing the **dose**, such as giving more penicillin than is listed on the label.
2. Changing the **route** of administration, such as giving flunixin intramuscularly (IM) or subcutaneously (SQ) instead of intravenously (IV).
3. Changing the **frequency** of use, such as giving Spectramast™ LC twice a day instead of once a day.
4. Giving a drug to a **different production class** of animal, such as using Nuflor® in a lactating dairy cow.
5. Giving a drug for an **indication (disease)** not listed on the label, such as using Excede® for diarrhea.
6. Changing the **withholding times**, such as not following milk withholding times for fresh cows after dry treatment administration.
7. Changing the **amount of drug** per injection site.
8. Changing the **duration** of therapy.

MILK ANTIBIOTIC RESIDUE TESTING

The Grade "A" Pasteurized Milk Ordinance (PMO), the rules which state regulatory agencies use to implement their Grade "A" milk programs, requires that all bulk milk tankers be sampled and analyzed for beta-lactam drug residues before the milk is processed. Customers (e.g. processors) may also require additional testing for quality assurance purposes.

Any tanker found positive for beta-lactam residue is rejected for human consumption. In 1996, of the 3,384,779 bulk milk pick-up tankers tested, only 0.104 percent tested positive.[1] Through increased education and industry advancements, of the 3,196,413 bulk milk pick-up tankers tested by industry and state regulatory agencies from October 2011 to September 2012 only 0.017 percent tested positive for antibiotic residues. This signifies a dramatic decrease from an already low-level of occurrence.[2]

Figure 1. PERCENT OF BULK MILK TANKERS POSITIVE FOR ANTIBIOTIC RESIDUES, 1995–2012.



MULTIDRUG SCREENING TEST FOR BULK TANK MILK

In 2010, the Food and Drug Administration developed a multi-class, multi-residue liquid chromatography/tandem mass spectrometry (LC-MS/MS) screening and confirmation method for drug residues in milk. The procedure is detailed in FDA Laboratory Information Bulletin #4443. According to the bulletin's authors, the intended purpose of this method is to screen samples to determine if a residue is present at the level of interest (i.e., safe / tolerance levels, or established levels of detection) and also to confirm the identity of the compound. An exact quantitative determination of any residue is not addressed with this procedure and will need to be obtained using other methodology.

This method tests for the following drugs: ampicillin, penicillin G, cloxacillin, cephapirin, sulfamethazine, sulfadiazine, sulfadimethoxine, sulfathiazole, sulfaquinoxaline, sulfapyridine, sulfachloropyridazine, sulfamerazine, oxytetracycline, tetracycline, chlortetracycline, doxycycline, tylosin, tilmicosin, erythromycin, sarafloxacin, enrofloxacin or ciprofloxacin, flunixin, bacitracin, thiabendazole, virginiamycin, and tripelennamine. Some testing laboratories have modified this method to include additional drugs.

MEAT DRUG RESIDUE TESTING

The United States Department of Agriculture (USDA) Food Safety Inspection Services (FSIS) conducts tests for chemicals—including antibiotics and various other drugs, pesticides and environmental chemicals—in meat, poultry, and egg products destined for human consumption. Scheduled sampling plans consist of the random sampling of tissue from healthy-appearing food animals. The development of scheduled sampling plans is a process that proceeds in the following manner: 1) determine which compounds are of food safety concern; 2) use algorithms to rank the selected compounds; 3) pair these compounds with appropriate production classes; and 4) establish the number of samples to be collected.[3]

The FSIS HACCP program implemented at slaughter facilities identifies the animals most likely to have drug residues. Animals that display lameness, injection site lesions or signs of illness are targeted for testing. Factors that can contribute to higher risk of residues are found in Figure 3 and can be useful in assessing animals destined for slaughter. If there is any doubt about the potential for drug residues in an animal, they should be withheld from market. In 2011, inspectors collected 95,275 samples from market dairy cows to test for drug residues.[4] Confirmed violations in suspect animals consisted of flunixin and antibiotics.

Each year, nearly 3 million adult dairy cows are slaughtered for beef. Of that amount, a very small percentage test positive for a residue. Over the past few years, USDA has made several changes in its residue screening program including implementation of the KIS test which is more sensitive than earlier tests and increasing the number of tests conducted on dairy market dairy cows. In spite of these changes, the number of tissue residues in market dairy cows has decreased by 55% since 2007.

If the animal looks sick, it will be targeted for drug residue testing. However the risk of violative tissue residues should be minimized if treatment protocols are carefully followed and approved lactating animal drugs are used for the class of animal being treated. If treatment records are well maintained and proper doses, routes and frequency of administration are heeded, the risk of violative tissue residues will be minimized.

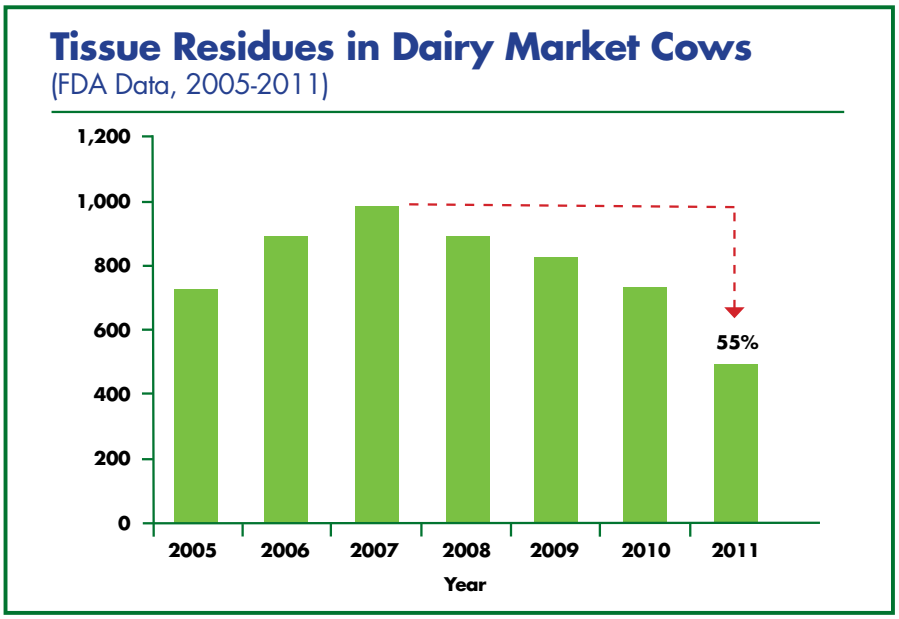


FIGURE 2. TISSUE RESIDUES IN DAIRY MARKET COWS, 2005–2011.

1 National Milk Drug Residue Data Base: Fiscal Year 1996 Annual Report. GLH, Incorporated. Lighthouse, FL. February 10, 1997. http://www.fda.gov/Food/FoodSafety/Product-SpecificInformation/MilkSafety/Miscellaneous-MilkSafetyReferences/ucm115756.htm

2 National Milk Drug Residue Data Base: Fiscal Year 2011 Annual Report. GLH, Incorporated. Lighthouse, FL. February 2013. Pages 2-3. http://www.kandc-sbcc.com/nmdrd/fy-12.pdf

3 2011 FSIS National Residue Program Scheduled Sampling Plans. USDA Food Safety Inspection Service Office of Public Health Science. April 2011. Page 1. http://www.fsis.usda.gov/PDF/2011_Blue_Book.pdf

4 2011 Residue Sample Results. USDA Food Safety Inspection Service. May 2013. Page 26. http://www.fsis.usda.gov/wps/wcm/connect/f511ad0e-d148-4bec-95c7-22774e731f7c/2011_Red_Book.pdf?MOD=AJPERES

Protect Your Farm with the Same Residue Tests that Plants Use

PROTECT YOUR FARM

Charm® Dairy and Animal Testing Solutions:

Charm (SL) Safe Level Test: Beta-lactam results in 3 or 8 minutes. Charm tests are the industry quality standard.

Charm (SL) Aflatoxin Test: Validated test to detect action levels of concern.

Broad Spectrum Inhibition: CowSide® II test for beta-lactams, sulfonimides, aminoglycosides, and tetracyclines is the most comprehensive inhibition test.

Live Animal Testing: KIS and flunixin test for determining the status of antibiotics in an animal before market.

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Figure 3. TISSUE RESIDUE RISK ASSESSMENT OF A DAIRY COW FOR MARKET

Low Risk
Animal history is documented, recorded and available.

❑ Animal never treated with drugs

OR-

❑ Single drug administration of lactating/ non-lactating animal approved drug – AND
Followed drug label information for dose, route of administration, duration of therapy and withholding time.

OR-

❑ Veterinary oversight of the use of drugs in an extra-label manner.

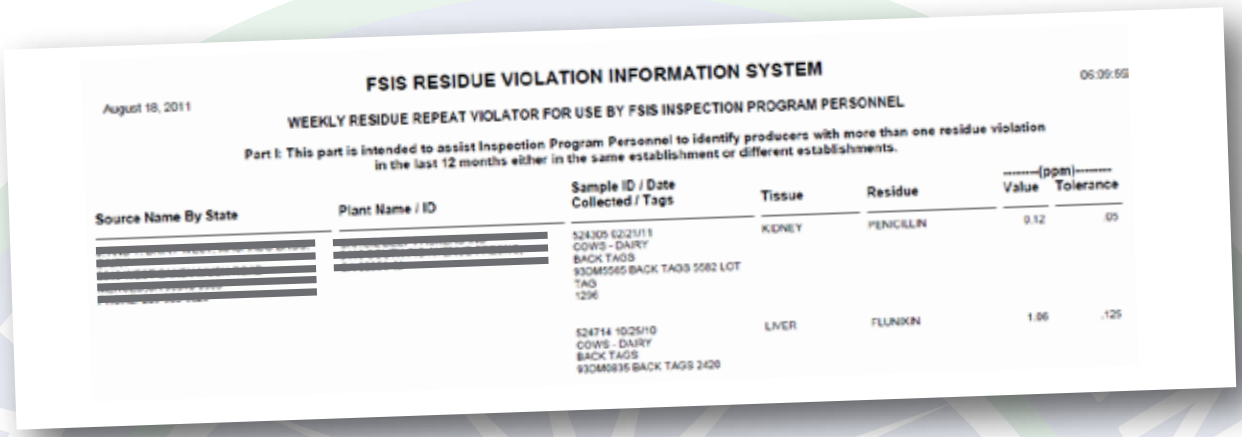
High Risk
Animal is displaying lameness, injection sites, surgical evidence or looks sick – AND any of the below apply:

❑ History of animal treatment not documented or not communicated to person sending cow to market.
❑ Route of administration that was used is not as prescribed on the label.
❑ Multiple drug administration without veterinary oversight.
❑ Drug not approved for animal status, e.g. lactating.
❑ Doses or withholding times not followed or unknown.
❑ Duration of therapy not followed.

If any of the above high risk attributes exist, consult pharmaceutical, veterinary or screening test experts to determine status of animal before offered for sale – **When in doubt hold it out!**

FSIS maintains a "Repeat Residue Violator List for Use by FSIS Inspection Personnel" that contains the names and addresses of producers who have more than one meat residue violation in a 12-month period in animals presented for slaughter. Specific information about the violation can also be found in this list, including the plant where the violation was determined, the drug residues discovered, and their concentrations and tolerances. Violators listed may have had multiple violations documented in the same processing facility or separate facilities. This list is intended to aid inspectors in discovering residue tolerance violations before they reach consumers. FSIS provides a user guide that explains the information contained in the list.

FSIS also maintains a "Residue Repeat Violator List for Use by Livestock Markets and Establishments" that contains similar information intended to assist plant owners and operators in identifying residue history of livestock suppliers. This second list documents only the source name and address information of repeat violators, so that livestock marketers and buyers may use precaution when marketing and processing animals from listed suppliers.



FSIS RESIDUE VIOLATION INFORMATION SYSTEM

August 18, 2011

WEEKLY RESIDUE REPEAT VIOLATOR FOR USE BY FSIS INSPECTION PROGRAM PERSONNEL

Part I: This part is intended to assist Inspection Program Personnel to identify producers with more than one residue violation in the last 12 months either in the same establishment or different establishments.

Source Name By State	Plant Name / ID	Sample ID / Date Collected / Tags	Tissue	Residue	(ppm) Value	(ppm) Tolerance
[redacted]	[redacted]	524305 02/21/11 COWS - DAIRY BACK TAGS 93OM5565 BACK TAGS 5582 LOT TAG 1296	KIDNEY	PENICILLIN	0.12	.05
		524714 10/25/10 COWS - DAIRY BACK TAGS 93OM0835 BACK TAGS 2429	LIVER	FLUNIXIN	1.06	.125

The regulatory tolerances for milk and meat antibiotic residues vary depending on the type of drug used and route of administration. The withdrawal times and safety tolerances are only valid if a drug is used according to the label directions AND in the class of animal listed on the label. If a drug is used in a class of animal NOT on the label, then there is NO TOLERANCE established for that drug and any trace amount, even if it is below the safe/tolerance level established for the labeled class, is a violation. All of these products have a tolerance limit if it is used in the labeled class of animal. Extra-label drug use in unapproved classes of animals is discouraged. A complete listing of the tolerances can be found in the FDA Green Book, which lists all approved animal drugs. The Green Book is available in searchable format online.

When there is doubt about an animal drug residue status it is advised to consult experts that can help determine the status of the drug in the animal before it is sent to slaughter. Your herd health veterinarian is a good first resource. The veterinarian can help determine if pharmaceutical companies should be consulted or live animal screening tests employed to determine an animal drug residue status. If you have questions or concerns about potential residues or withdrawal times please contact your local veterinarian. For additional help or information the following phone numbers and websites of pharmaceutical and screening test manufacturers may also help with advice and determine residue status.

Charm Science, Inc. • 1-800-343-2170
www.charm.com
Merck Animal Health • 1-800-211-3573
www.resflorgold.com • www.nuflor.com

Zoetis • 1-800-366-5288
www.residueavoidance.com

RESOURCES

FDA Green Book, for tissue residue thresholds
http://www.fda.gov/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/UCM042847
FSIS Residue Repeat Violator Lists
http://www.fsis.usda.gov/Science/Chemistry/index.asp
Food Animal Residue Avoidance & Depletion Program (FARAD) **http://www.farad.org**
2011 PMO - Drug Residue Testing and Farm Surveillance
http://www.fda.gov/downloads/Food/FoodSafety/Product-SpecificInformation/MilkSafety/NationalConferenceonInterstateMilkShipmentsNCIMSModelDocuments/UCM291757.pdf
Animal Drugs@FDA, FDA Approved Animal Drug Products **http://www.accessdata.fda.gov/scripts/animaldrugsatfda/**

Food Animal Residue Avoidance Database (FARAD)

FARAD is a national, USDA-sponsored, cooperative project, with a primary mission to prevent or mitigate illegal residues of drugs, pesticides and other chemicals in foods of animal origin. Producers should work with the veterinarian with whom they have a valid VCPR for drug residue information first. The veterinarian is the ideal resource to discuss FARAD-specific information regarding withdrawal times, especially for extra-label drug use.

FARAD provides the following services:

- *Advice on residue avoidance or mitigation*
- *VetGram search for required withdrawal times for approved food animal drugs*
- *FARAD-recommended withdrawal intervals for extra-label use of approved food animal drugs*

Visit www.farad.org for more information.

RECORDS MANAGEMENT

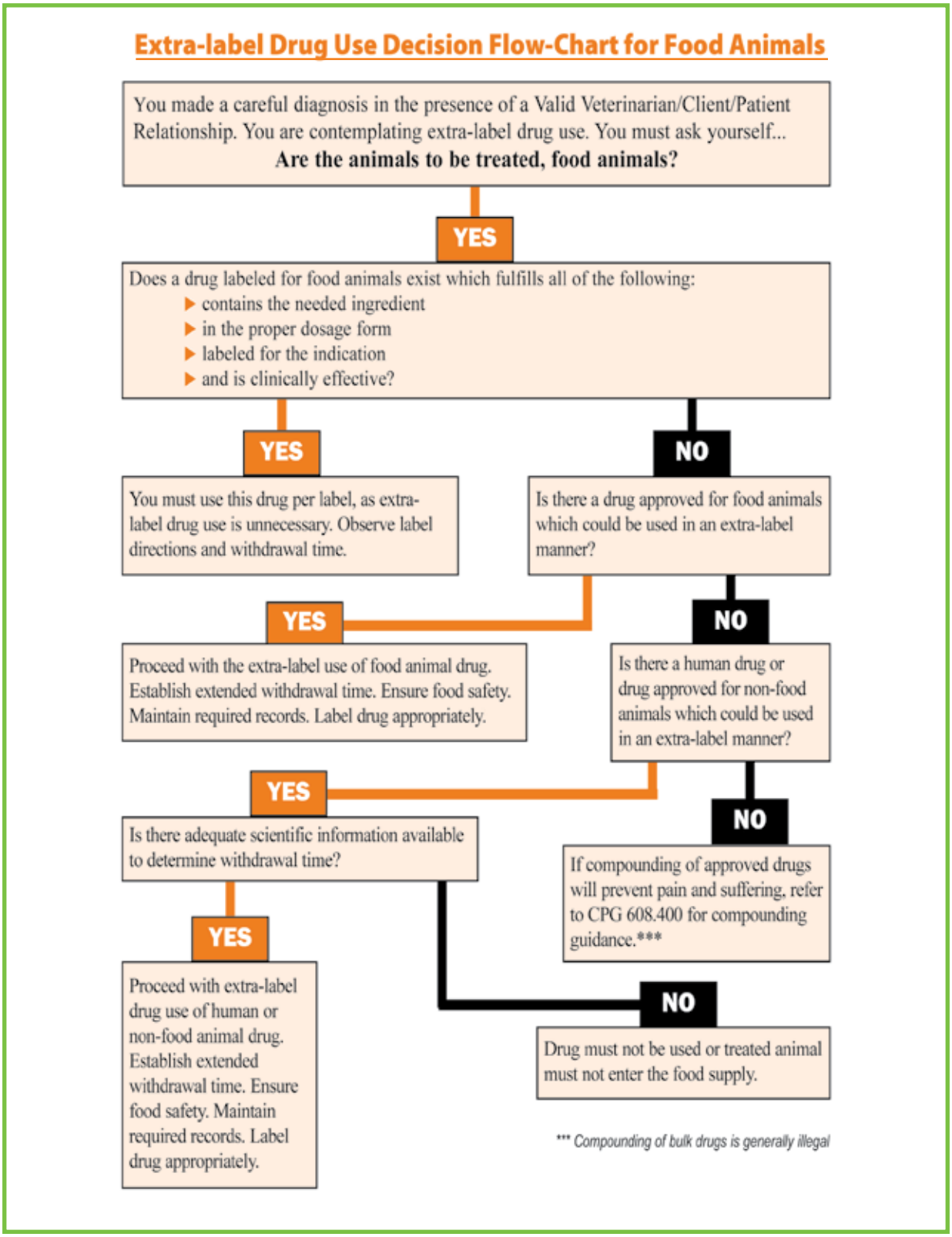
FDA requires veterinarians to maintain records for two years of all animals treated using extra-label drugs (21 CFR 530.5).[5] Though not a regulatory requirement, a good management practice for producers is to keep records on all animals treated with drugs. The record system should be easily accessible to everyone who works with the animals. Records should be permanent so the veterinarian has a history to which he/she can refer to prescribe effective therapy and to serve as protection in case of regulatory follow-up. The producer needs to be able to show how all drugs purchased were used or disposed.

The treatment record should contain the following basic information:

- Treatment date
- Animal identification
- Dosage
- Route of administration and expected duration
- Withdrawal time for milk and meat
- Individual who administered the drug
- Drug used
- Duration of therapy

5 Code of Federal Regulations 21 CFR 530.5. Food and Drug Administration. April 11, 2013. http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=530.5

Figure 4. EXTRA-LABEL DRUG USE DECISION TREE



This chart provided by the Center for Dairy Excellence.

Safe Levels for Extra-label Use of Drugs in Animals and Drugs Prohibited From Extra-label Use in Animals (21 CFR Sec. 530.41)[6]

The Code of Federal Regulations (CFR) provides an updated list of animal drugs prohibited from extra-label use and drugs not approved for use in food animals. The lists below are subject to changes. Consult the current version of 21 CFR Sec. 530.4 for the most up-to-date list.

Drugs prohibited for extra-label use in animals

21 CFR Section 530.41(a):

The following drugs, families of drugs, and substances are prohibited for extra-label animal and human drug uses in food-producing animals.

1) Chloramphenicol
2) Clenbuterol
3) Diethylstilbestrol (DES)
4) Dimetridazole
5) Ipronidazole
6) Other nitroimidazoles
7) Furazolidone
8) Nitrofurazone
9) Sulfonamide drugs in lactating dairy cattle (except approved use of sulfadimethoxine, sulfabromomethazine, and sulfaethoxypyridazine)
10) Fluoroquinolones
11) Glycopeptides
12) Phenylbutazone in female dairy cattle 20 months of age or older
13) Cephalosporins (not including cephapirin) in cattle, swine, chickens, or turkeys:

(i) For disease prevention purposes;

(ii) At unapproved doses, frequencies, durations, or routes of administration; or

(iii) If the drug is not approved for that species and production class.

[62 FR 27947, May 22, 1997, as amended at 67 FR 5471, Feb. 6, 2002; 68 FR 9530, Feb. 28, 2003; 68 FR 14134, Mar. 24, 2003; 71 FR 14377, Mar. 22, 2006, 77FR745, Jan. 6, 2012]

6 Code of Federal Regulations Title 21. 21CFR 530.41. Food and Drug Administration. April 1, 2013. **http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/cfrsearch.cfm?fr=530.41**

Drugs not approved for use in food-producing animals

The following drugs are **not approved for use** in any species of food-producing animal:

- Chloramphenicol
- Clenbuterol
- Diethylstilbestrol (DES)
- Dipyrone
- Gentian violet
- Glycopeptides (example vancomycin)
- Nitrofurans (including topical use)
- Nitroimidazoles (including metronidazole)

Following a thorough literature review, the American Veterinary Medical Association (AVMA), the American Association of Bovine Practitioners (AABP), and the Academy of Veterinary Consultants (AVC) recommend that veterinarians refrain from using aminoglycosides (Amikacin, Gentamicin, Kanamycin, and Neomycin) in cattle except where approved for use by the Food and Drug Administration as these antibiotics can cause very prolonged tissue residues.

Cephalosporin Extra-label Use Prohibitions

On April 6, 2012, the U.S. Food and Drug Administration Order of Prohibition of Cephalosporins became effective. The FDA order prohibits certain "extra-label" or unapproved uses of the cephalosporin (excluding cephapirin) class of antimicrobial drugs in cattle, swine, chickens and turkeys.

Specifically, the ***prohibited uses*** include:

- using cephalosporin drugs at unapproved dose levels, frequencies, durations, or routes of administration;
- using cephalosporin drugs in cattle, swine, chickens or turkeys that are not approved for use in that species (e.g., cephalosporin drugs intended for humans, companion animals or a different species or class of food animal);
- using cephalosporin drugs for disease prevention.

The following ***exceptions to the prohibition*** apply:

- extra-label use of approved cephapirin products in food-producing animals;
- use to treat or control an extra-label disease indication, as long as this use adheres to a labeled dosage regimen (i.e., dose, route, frequency, and duration of administration) approved for that particular species and production class; and
- extra-label use in food-producing minor species, such as sheep, goats, ducks or rabbits.

Cephapirin

Cephapirin drug products are excluded from the prohibition order. Cephapirin is currently only approved for use in food-producing animals as an intramammary infusion formulation for dairy cattle and there are currently no approved cephapirin drug products approved for use in humans.

More Information

All drugs given to dairy animals must be used for specific disease indications according to label recommendations and withdrawal periods. In dairy animals, cephalosporins can be used in an extra-label manner only for disease indication and only under the recommendation of a veterinarian for which the farm has a current VCPR. Any use of a drug in a manner not listed on the label without a VCPR is illegal.

Underlying Causes of Antibiotic Residues in Milk and Meat

Drug residues can be avoided by a well-planned drug use program. Reasons given for milk and meat residues result from many on-farm situations. These include, but are not limited to, the following:

- Lack of consultation from a licensed veterinarian.
- Not following veterinarian's recommendation when using any drug.
- Not following manufacturer– or veterinarian–prescribed label directions for correct treatment.
- Not following the manufacturer– or veterinarian–prescribed label directions for the appropriate withdrawal period.
- Poor identification of all cattle including bull calves.
- Accidentally milking a treated cow into the bulk tank or not diverting from bulk tank.
- Long-term residue following treatment as a calf.
- Use of medicated milk replacers in calves that may be sold for human consumption.

When multiple treatments are combined or overlapped, the time to clear those drugs from an animal's system can increase. Producers should consult with their veterinarian for appropriate withdrawal times. Animal liver function, particularly with poor animal metabolism, may not be able to keep up with multiple circulating drugs and therefore withholding times can be prolonged.

In sustainable farm management, you can maximize the value of your market animals and the good reputation of your farm, while reducing increased regulatory oversight risk, with good record keeping and intelligent risk assessment of animals prior to sending animals to market.

By identifying the on-farm areas where incidents can occur that cause residues, producers can look deeper at the underlying issues. Some key underlying problems that lead to residues are:

1. The person(s) in charge of treating the cows is/are not working under a valid veterinary/client/patient relationship.
2. Employees are not trained properly and continuously in treatment protocols and maintaining written records.
3. The producer does not review all treatment records for veterinarian-recommended withdrawal times prior to marketing milk or meat.

Malicious Contamination

Dairymen should recognize and remember that antibiotic residues in milk may occur because of intentional, malicious contamination.

Photo courtesy of DMI

Potential Residue Violations from Extra-label Drug Use In an Unapproved Class of Cattle

The FDA establishes tolerances for drug residues in food animals. These tolerances are based on approved labeled use of the drug. This is because the FDA only has data for drug residue depletion on the approved production class. The main production classes are beef, dairy and veal. Many products have been approved for beef and non-lactating dairy (less than 20 months of age), so the FDA does not have established tolerance levels for these products if used in lactating dairy or veal. If a drug is approved in one production class, usage in another class is considered extra-label drug use (ELDU). Therefore, such use would mean there is not an established tolerance and any detectable level would be a violative drug residue.

What does this mean for dairy producers and their veterinarians? The labeled withdrawal times would not apply to an unapproved production class. While FARAD can provide withdrawal recommendations for ELDU, they generally do not have enough information to project a "zero detectable level", particularly with the sensitivity of current testing methodologies. Veterinarians and cattle producers should therefore exercise extreme caution using drugs not approved for that production class of animal and consider avoiding such use due to the unknown withdrawal times. Remember that the FDA definition of a lactating dairy cow is a dairy breed animal over 20 months of age. Springing heifers and dry cows are classified as "lactating dairy cattle".

What are some examples of such use?

Example – Using Nuflor® (florfenicol), Micotil® (tilmicosin), or Draxxin® (tulathromycin) in a dairy animal over 20 months of age. The labeled meat withdrawal time for beef cattle would not apply to use in this production class. The meat withdrawal time would be the amount of time for the detection level to be "zero" which is unknown, may be hard to predict, and is subject to the sensitivity of the residue testing methodology. Using the beef labeled withdrawal time for these drugs in lactating dairy cows could result in a violative residue.

Example – Using most products in bob veal calves. There are few medications that are approved for male dairy calves intended for veal. Most medication detected in this production class of animal will likely result in a violation.

What else should a producer do to prevent residue violations and minimize liability?

- Keep accurate treatment records and follow all withdrawal times.
- Only use drugs extra-label if you have a valid VCPR, directions from your veterinarian and can ensure that no residue will occur from such use.
- Refrain from using antibiotics and other drugs that are not approved for that production class (i.e. beef cattle antibiotics in lactating dairy cows).
- For veal producers or dairy bull calves that may be marketed soon, use only products that are approved in pre-ruminant calves. Avoid any products with the statement "not for use in calves to be processed for veal". Consult FARAD's VetGRAM search for products that are approved in veal.
- For extra-label indications in cattle, use a product approved in that production class as your first treatment option.
- Do not market recently treated cattle. Dairy farmers need to stop marketing recently treated cows that have not responded to treatment. Alternatives for these cows are to hold the animal until she is healthy and free of drug residues or to humanely euthanize. Marketing a cow should not replace euthanasia on dairy farms.
- Do not use prohibited drugs or aminoglycosides (e.g. gentamicin) in cattle. The USDA and FDA are still detecting a significant number of gentamicin residues in cattle. Do not use sulfa products extra-label in lactating dairy cows.
- Do not use compounded medications in cattle.
- Monitor the residue violators list that is posted on the FSIS web page.
- Veterinarians and producers should consider that any withdrawal times from projections provided by FARAD are current FARAD recommendations and are subject to change as new research and testing methodologies become available.

EXAMPLES OF PRODUCTS AND RISK FACTORS FOR RESIDUES

Ceftiofur (also known as Ceftiflex®, Excede®, Excenel®, Naxcel®, Spectramast®)	- Using the withholding time for one product when using another. The withholding times for each product are different. - Not keeping accurate records to record the exact product given (Excede versus Excenel). - Using the drug in an unapproved route of administration. Excede is labeled to be given at the base or pinna of the ear only. Spectramast is the only ceftiofur product labeled for intramammary administration.Using these drugs in a route of administration not listed on the label is prohibited. - All products have a preslaughter withdrawal period, please consult prescribing veterinarian or manufacturer for withdrawal times.
Enrofloxacin (Baytril 100®)	- Extra-label use in food animals is prohibited. - Only labeled for non-lactating dairy animals twenty months of age or less and beef animals for pneumonia.*
Danofloxacin (A180™, Advocin™)	- Extra-label use in food animals is prohibited. - Only labeled for non-lactating dairy animals twenty months of age or less and beef animals for pneumonia.*
Florfenicol (Nuflor®)	- Sustained release has a longer withdrawal time. - Not approved for dairy cattle over 20 months of age. - No tolerance level for dairy cattle.
Flunixin (also known as Flumeglumine®, Flu-Nix™, Flunixin meglumine**, Prevail™)	- Using the drug in an unapproved route of administration such as intramuscular or subcutaneous. These drugs are only approved for intravenous administration. Using another administration route results in extended withdrawal times, well beyond the labeled withholding time.
Gentamicin	- Use of gentamicin results in extended withdrawal times and therefore its use is discouraged by AVMA, AABP and AVC. - Use of gentamicin in lactating dairy cows for intramammary use is not recommended. - FARAD recommends not less than a TWO-YEAR withdrawal and, therefore, the use of this drug should not be considered.
Neomycin	- Not following withdrawal time on the bag. - Feeding medicated milk replacer to calves to be processed for slaughter. - Extra-label use of oral neomycin products.
Penicillin	- Increasing the dose without using an extended withdrawal period. - Increasing the frequency or duration of administration without using an extended withdrawal period. - Using the drug in a route of administration not approved, such as intramammary or subcutaneous. - Giving more than 10CC/injection site (as per label instructions).
Sulfas	- Using any sulfonamide product not labeled for lactating dairy cows is illegal. - Using a higher dose or frequency of administration will result in extended withdrawal times. - Inadvertently administering a sustained release product when intending to use a daily use product.
Tetracycline	- Single-site, large-volume injection through non-intravenous route. - Extra-label use such as uterine infusion to treat an infected post-partum uterus.

*Bovine respiratory disease (BRD); consult product label for actual indications.
**Due to the high risk of a violative residue, flunixin must only be used intravenously and not be given by either subcutaneous or intramuscular routes of administration.

RESOURCES

- Antibiotic Stewardship and Biosecurity Tool Kit for Dairy Producers, Washington State University Veterinary Extension http://vetextension.wsu.edu/programs/bovine/stewardship/index.htm
- Understand and Prevent Antibiotic Residues Risk in Food of Animal Origin, Delvotest http://www.dsm.com/le/static/delvotest/downloads/GuideDelvotest-10Points_En.pdf
- Antibiotic Residues, UC Davis Veterinary Medical Extension http://www.vetmed.ucdavis.edu/vetext/INF-DA/INF-DA_AntibioticResidues.html
- Food Safety Concerns of Pesticides, Veterinary Drug Residues, and Mycotoxins in Meat and Meat Products Asian Journal of Animal Sciences http://scialert.net/qredirect.php?doi=ajas.2010.46.55&linkid=pdf
- Preventing Drug Residues in Milk and Dairy Cull Cows, Virginia Tech University Extension http://pubs.ext.vt.edu/404/404-403/404-403.html

STEPS TO PREVENT ANTIBIOTIC RESIDUES

Dairy producers realize the importance of eliminating the possibilities of having antibiotic residues in milk and dairy beef. Producers can take the following steps to mitigate or lessen the chances of antibiotic residues:

1. Establish a valid veterinary/client/patient relationship (VCPR) to ensure proper diagnosis and treatment of disease.
2. Keep records of antibiotic use and identify all treated animals, including treatment protocols.
3. Implement a preventive animal health program to reduce the incidence of disease.
4. Maintain milk quality and implement an effective mastitis management program to reduce the use of antibiotics, including protocol development and review.
5. Implement employee training and awareness of proper animal drug use.
6. Use drugs approved for specific disease indications according to labeled recommendations and withdrawal periods. If ELDU is indicated by a veterinarian's prescription, that veterinarian must establish and document appropriate withdrawal periods.
7. Do not use drugs that are specifically prohibited for use in milking, dry, or growing animals.
8. Segregate and milk treated animals after, or in a separate facility from, all non-treated animals to ensure that milk is not accidentally commingled.
9. Use drug residue screening tests specific for the drug utilized before marketing milk and/or meat from treated animals.
10. If in doubt about residue status, do not market milk and/or dairy beef from treated animals.

Rx and Extra-label Use

"Federal law restricts this drug to use by or on the order of a licensed veterinarian."

This statement is on every prescription drug sold. Any extra-label use of antibiotics must be used as prescribed by a veterinarian, following the written instructions for the specific lifecycle of animals to be treated, including dose, route of administration, frequency of use, and withdrawal times for milk and/or meat.

Remember, extra-label use will generally require an extended withdrawal time.

BEST MANAGEMENT CHECK LIST TO AVOID ANTIBIOTIC RESIDUES

1. Establish a Valid Veterinary/Client/Patient Relationship (VCPR)

- ❑ A veterinarian has assumed the responsibility for making medical judgments regarding the health of the animals.
- ❑ A veterinarian has made routine and timely visits to the dairy to gain sufficient knowledge of the animals to initiate general or preliminary diagnosis of the medical condition of the animals.
- ❑ A veterinarian is readily available for follow-up in case of adverse reactions or failure of treatment.
- ❑ Employees are aware that it is policy to follow the instructions of a veterinarian.
- ❑ The veterinarian and producer have established an approved drug list.
- ❑ All drugs on the dairy have proper labeling.
- ❑ The veterinarian establishes and reviews antibiotic use protocols in conjunction with the producer/farm management team.

2. Use Only Prescription (Rx) Drugs or FDA-Approved Over-the-Counter (OTC) Drugs with Veterinarian's Guidance

- ❑ Only FDA-approved drugs are used to treat animals.
- ❑ Copies of drug inserts and/or product labeling are available for all drugs used on the dairy.
- ❑ Only a veterinarian can prescribe drugs in an "extra-label" manner.
- ❑ A list of current over-the-counter and prescription drugs has been developed that can be used with the dairy cows.
- ❑ Any Veterinary Feed Directive (VFD) feeds on the dairy are stored in such a way that an accidental use cannot occur.

3. Administer All Drugs Properly and Identify All Treated Animals

- ❑ Two or more methods are used to identify treated animals.
- ❑ The label and the package insert information is read and followed.
- ❑ Package inserts for drugs the veterinarian and the producer have put on the approved drug list are reviewed.
- ❑ A proper facility to segregate treated animals from untreated animals is available.

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4. Maintain and Use Proper Treatment Records on All Treated Animals

- ❑ A record system is maintained for all treated animals.
- ❑ Treatment records are reviewed with the consulting veterinarian.
- ❑ Records are used to improve management of potential hazards and to reduce risk to milk quality.
- ❑ Record use is reviewed with family members and/or employees.

5. Implement Employee/Family Training of Proper Drug Use to Avoid Marketing Adulterated Milk and Meat Products

- ❑ Recommendations from the veterinarian are reviewed with employees and/or family members.
- ❑ Employees and/or family members receive regular training on the prevention of milk and meat residues.
- ❑ Properly document when all training sessions took place and who was in attendance.
- ❑ Awareness exists that milk contamination often occurs when the normal pattern of milking changes (vacation, children home from college, sickness, etc.).
- ❑ Treatment records are checked before marketing animals.
- ❑ Employees and/or family members understand the cost of marketing adulterated meat or milk.
- ❑ Family members and/or employees understand the instructions found on the drug label.
- ❑ Family members and/or employees understand that all treated animals are milked last and/or their milk is diverted from saleable milk to prevent violative residues.

Intermediate Owners

Residue issues associated with animals sent to slaughter might occur after the animal leaves the farm. Use a transportation company that is knowledgeable about your animal care expectations and provides for the safety and comfort of the animals during transport. Communicate with the hauler about where the animals are destined to go, especially when selling bull calves. If medicated milk replacers have been given, that animal should be withheld from sale, or the hauler should be clear that the animal has been treated and can affirm that the animal will not go to a terminal market. When not selling animals directly to a terminal market, sell your animals to intermediate owners who have instituted residue prevention programs consistent with those defined in this document. Be sure to document chain-of-custody as you may be held responsible for residues caused outside of your facility.

6. Use Drug Residue Screening Tests

- ❑ Withholding times are never decreased for meat or milk from treated animals.
- ❑ Milk from dry-cow-treated cows that freshen early is always tested for residues prior to marketing.
- ❑ Milk from newly purchased animals is always tested before adding their milk to the bulk tank.
- ❑ When a cow is treated in an extra-label manner, the milk gets tested. (When using bulk tank tests on individual cow milk, consult the test kit manufacturer.)
- ❑ When using bulk tank tests on individual cows, consult the manufacturer's directions to ensure applicability.

Precautions While Administering Drugs

When treating animals with any product that is given IM, SC, or IV, or intramammary (IMM), take the following precautions:

- Read both the product label and insert, and consult your veterinarian before administering drugs.
- Use a clean injection site and use a sterile needle for all injections.
- Use the labeled dosage and method of administration least likely to create a drug residue.
- Discard milk from all four quarters even when treating only one quarter with an IMM infusion.
- Milk treated cows last or use a segregated facility (divert milk from bulk tank or saleable milk).
- Thoroughly wash all equipment (inflations, hoses, weigh jars, etc.) that has come in contact with milk from treated cows.
- Make certain that any procedure used to divert milk from treated cows cannot accidentally send contaminated milk into the pipeline.
- Keep medicated feeds separated from non-medicated feeds.
- Ensure that calves fed antibiotic waste milk are not sent to slaughter until withdrawal times are met.
- Train employees on proper injection site selection.

APPROVED DRUGS AND SCREENING TESTS

NMPF does not endorse any of the veterinary drugs or tests identified on the lists in this manual. The lists of veterinary drugs and tests are provided only to inform producers what products may be available, and the producer is responsible for determining whether to use any of the veterinary drugs or tests. All information regarding the veterinary drugs or tests was obtained from the products' manufacturers or sponsors, and NMPF has made no further attempt to validate or corroborate any of that information. NMPF urges producers to consult with their veterinarians before using any veterinary drug or test, including any of the products identified on the lists in this manual.

Data provided by the manufacturer or marketer is current as of September 2013. Veterinarians needing extra-label information should consult the FDA **Green Book** or contact the Food Animal Residue Avoidance Databank (FARAD) at **888-873-2723** or **www.FARAD.org**.

Photo courtesy of DMI

FDA-Approved Drugs for Injectable Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Ampicillin trihydrate	Rx	6 days	Polyflex®	Boehringer Ingelheim Vetmedica,Inc.
Ceftiofur crystalline free acid	Rx	13 days	EXCEDE®	Zoetis, Inc.
Ceftiofur hydrochloride	Rx	3 days	EXCENEL® RTU P	Zoetis, Inc.
Ceftiofur sodium	Rx	4 days	Naxcel® Sterile Powder	Zoetis, Inc.
Cloprostenol sodium	Rx	None	Estrumate	Merck Animal Health
Dinoprost tromethamine	Rx	None	Lutalyse® Sterile Solution	Zoetis, Inc.
Doramectin	O-T-C	35 days	Dectomax® Injectable	Zoetis, Inc.
Erythromycin	Rx	21 days	Gallimycin-100	Bimeda, Inc.
Florfenicol	Rx	38 days	Nuflor Gold™	Merck Animal Health
		28 or 38 days## (See label)	Nuflor® Injectable Solution	Merck Animal Health
Florfenicol and Flunixin meglumine	Rx	38 days	Resflor Gold®	Merck Animal Health
Flunixin meglumine	Rx	4 days	Flu-Nix™ D Injection	Agri Laboratories, Ltd.
	Rx	4 days	Banamine	Merck Animal Health
	Rx	4 days	Flumeglumine®	Phoenix Pharmaceutical, Inc./Clipper Distributing
	Rx	4 days	Flunixin Injection	Norbrook Laboratories, Ltd.
	Rx	4 days	Flunazine	Bimeda, Inc.
Gonadotropin (chorionic)	Rx	None	Chorulon®	Merck Animal Health
Gonadorelin diacetate tetrahydrate	Rx	None	Cystorelin	Merial Limited
	Rx	None	Fertagyl®	Merck Animal Health
Gonadorelin hydrochloride	Rx	None	Factrel®	Zoetis, Inc.
Isoflupredone acetate	Rx	7 days	Predef® 2x	Zoetis, Inc.
Ivermectin*	O-T-C	35 days	Agri-Mectin® Injection	Agri Laboratories, Ltd.
	O-T-C	35 days	IVOMEC 1% Injection for Cattle	Merial Limited
	O-T-C	35 days	Noromectin® Injection	Norbrook Laboratories, Ltd.
Ivermectin/Clorsulon*	O-T-C	49 days	IVOMEC Plus Injection for Cattle	Merial Limited
	O-T-C	49 days	Noromectin® Plus Injection	Norbrook Laboratories, Ltd.
Oxytetracycline	O-T-C	28 days	Agrimycin® 200 Injection	Agri Laboratories, Ltd.
	O-T-C	28 days	Bio-Mycin® 200	Boehringer Ingelheim Vetmedica,Inc.
	O-T-C	28 days	Liquamycin® LA-200®	Zoetis, Inc.
	O-T-C	28 days	Oxytetracycline Injection 200	Norbrook Laboratories, Ltd.
	O-T-C	28 days	Pennox 200™	Pennfield Animal Health
	Rx	28 days	Tetradure 300	Merial Limited
	O-T-C	28 days	Tetroxy LA	Bimeda, Inc.
Oxytetracycline hydrochloride	O-T-C	22 days	Agrimycin® 100✦	Agri Laboratories, Ltd.
	Rx	18 days	Bio-Mycin® C	Boehringer Ingelheim Vetmedica,Inc.
	O-T-C	18 days	Oxy-Tet™ 100	Boehringer Ingelheim Vetmedica,Inc.
	O-T-C	22 days	Oxytet 100	Norbrook Laboratories, Ltd.
Penicillin G (benzathine)	O-T-C	30 days	Combi-Pen™-48	Bimeda, Inc.
	O-T-C	30 days	Hanford's/US Vet Sterile Penicillin G Benzathine/Penicillin G Procaine Aqueous Suspension	Norbrook Laboratories, Ltd.

** The term non-lactating cattle is defined as dairy bulls, dairy calves, and replacement heifers. Read label indications carefully. Some products are not approved for non-ruminating calves and female dairy cattle 20 months of age and older. Some products cannot be used with veal calves. Carefully consult the labels.

Withholding times depend upon labeled dosage used.

* Ivermectin is not approved for female dairy cattle of breeding age.

✦ Not intended for use in veal calves.

FDA-Approved Drugs for Injectable Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Penicillin G (procaine)	O-T-C	10 days	Agri-Cillin Injection	Agri Laboratories, Ltd.
	O-T-C	4 days	Pro-Pen-G™ Injection	Bimeda, Inc.
	O-T-C	10 days	Hanford's/US Vet Sterile Penicillin G Penicillin G Procaine Aqueous Suspension	Norbrook Laboratories, Ltd.
	O-T-C	14 days	Norocillin	Norbrook Laboratories, Ltd.
Selenium (sodium selenite)	Rx	30 days	BO-SE	Merck Animal Health
Spectinomycin sulfate	Rx	11 days	ADSPEC®	Zoetis, Inc.
Sulfachlorpyridazine (sodium)	O-T-C	5 days	Vetisulid Injection	Boehringer Ingelheim Vetmedica, Inc.
Sulfadimethoxine	O-T-C	5 days	Di-Methox Injection 40%	Agri Laboratories, Ltd.
Tilidipirosin	Rx	21 days	Zuprevo 18%	Merck Animal Health
Tilmicosin phosphate*	Rx	42 days	Micotil Injection	Elanco Animal Health
Tripelennamine HCL	Rx	4 days	Recovr Injectable	Zoetis, Inc.
Tulathromycin	Rx	18 days	DRAXXIN™	Zoetis, Inc.
Tylosin	O-T-C	21 days	Tylan Injection 50/200	Elanco Animal Health
	O-T-C	21 days	Tylosin Injection	Boehringer Ingelheim Vetmedica, Inc.
Vitamin E	O-T-C	None	Vitamin E 300	Agri Laboratories, Ltd.
	Rx	30 days	BO-SE	Merck Animal Health
	Rx	None	Vital E	Merck Animal Health

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* Not for use in female dairy cattle 20 months of age or older.

FDA-Approved Drugs for Intramammary Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Ceftiofur hydrochloride	Rx	None	16 days	SPECTRAMAST™ DC	Zoetis, Inc.
Cephapirin (benzathine)	O-T-C	72 hours	42 days	Tomorrow Infusion	Boehringer Ingelheim Vetmedica, Inc.
Cloxacillin (benzathine)	Rx	None	30 days	Dry-Clox®	Boehringer Ingelheim Vetmedica, Inc.
	Rx	None*	28 days	Orbenin-DC®	Merck Animal Health
Novobiocin	O-T-C	72 hours Postcalving	30 days	BioDry®	Zoetis, Inc.
Penicillin G (procaine)	O-T-C	72 hours Postcalving	14 days	Hanford's/US Vet go-dry™	G.C. Hanford Mfg. Co.
Penicillin G (procaine)/ Dihydrostreptomycin	Rx	96 hours Postcalving	60 days	Quartermaster® Dry Cow Treatment	Zoetis, Inc.
Penicillin G (procaine)/ Novobiocin	O-T-C	72 hours Postcalving	30 days	AlbaDry® Plus Suspension	Zoetis, Inc.

*Do not use within 4 weeks (28 days) of calving.

FDA-Approved Drugs for Oral Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Albendazole	O-T-C	27 days	Valbazen® Suspension	Zoetis, Inc.
Amprolium	O-T-C	1 day	CORID 9.6% Oral Solution	Merial Limited
	O-T-C	1 day	CORID 20% Powder	Merial Limited
Chlortetracycline hydrochloride	O-T-C	1 day	Chlortetracyline Soluble Powder Concentrate	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	1 day	Pennchlor 64 Soluble Powder	PennField Animal Health
Citric acid	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Decoquinate	O-T-C	None	Deccox-M	Zoetis, Inc.
Dextrose	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Fenbendazole	O-T-C	8 days	Panacur 10% Paste/Safe-Guard 10% Paste	Merck Animal Health
	Rx	8 days	Panacur 10% Suspension	Merck Animal Health
	O-T-C	8 days	Safe-Guard 10% Suspension	Merck Animal Health
Glycine	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Lasalocid	O-T-C	None	Crystalyx® Iono-Lyx® B300	Ridley Block Operations
Levamisole hydrochloride	O-T-C	2 days	Prohibit Soluble Drench Powder	Agri Laboratories, Ltd.
Monensin (sodium)	O-T-C	None	Rumensin 90	Elanco Animal Health
Neomycin sulfate	O-T-C	1 day	Biosol® Liquid	Zoetis, Inc.
	O-T-C	1 day	Neo-Sol 50	Zoetis, Inc.
	O-T-C	1 day	Neomix® 325	Zoetis, Inc.
	O-T-C	1 day	Neomix® Ag 325	Zoetis, Inc.
	O-T-C	1 day	NeoMed 325 Soluble Powder	Bimeda, Inc.
Oxfendazole	O-T-C	7 days	Synanthic® Bovine Dewormer Suspensions, 22.5 % and 9.06%	Boehringer Ingelheim Vetmedica, Inc.

** The term non-lactating cattle is defined as dairy bulls, dairy calves, and replacement heifers. Read label indications carefully. Some products are not approved for non-ruminating calves and female dairy cattle 20 months of age and older. Some products cannot be used with veal calves. Carefully consult the labels.

FDA-Approved Drugs for Oral Use
Non-lactating Cattle** (continued)

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Oxytetracycline dihydrate	O-T-C	5 days	Pennox 343 Soluble Powder	PennField Animal Health
Oxytetracycline hydrochloride	O-T-C	None	Oxy 500 Calf Bolus and Oxy 1000 Calf Bolus	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	5 days	Terramycin® 343 Soluble Powder	Zoetis, Inc.
	O-T-C	7 days	Terramycin® Scours Tablets	Zoetis, Inc.
	O-T-C	5 days	Terramycin® Soluble Powder	Zoetis, Inc.
Potassium citrate	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Potassium dihydrogen phosphate	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Sodium chloride	O-T-C	None	Re-Sorb® Powder	Zoetis, Inc.
Streptomycin sulfate	O-T-C	2 days	Strep Sol 25%	Veterinary Services, Inc.
Sulfachlorpyridazine (sodium)	O-T-C	7 days	Vetisulid® Powder	Boehringer Ingelheim Vetmedica, Inc.
Sulfadimethoxine	O-T-C	7 days	Albon® Concentrated Solution 12.5%	Zoetis, Inc.
	Rx	12 days	Albon® S.R. (Sustained Release Bolus)	Zoetis, Inc.
	O-T-C	7 days	Di-Methox 12.5% Oral Solution	Agri Laboratories, Ltd.
	O-T-C	7 days	Di-Methox Soluble Powder	Agri Laboratories, Ltd.
	O-T-C	7 days	SulfaMed-G	Bimeda, Inc.
Sulfamethazine	O-T-C	10 days	Sulmet® Oblets	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	12 days	Sustain III - Cattle	Bimeda, Inc.
	O-T-C	12 days	Sustain III - Calf	Bimeda, Inc.
Sulfamethazine (sodium)	O-T-C	10 days	Sulmet® Drinking Water Solution	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	10 days	Sulmet® Soluble Powder	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	10 days	SMZ-Med	Bimeda, Inc.
Sulfaquinoxaline (sodium)	O-T-C	10 days	Liquid Sul-Q-Nox	Boehringer Ingelheim Vetmedica, Inc.
Tetracycline hydrochloride	O-T-C	4 days	Polyotic® Soluble Powder	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	7 days	Polyotic® Soluble Powder Concentrate	Zoetis, Inc.
	O-T-C	5 days	Tet-Sol 10	Zoetis, Inc.
	O-T-C	5 days	Tet-Sol 324	Zoetis, Inc.
	O-T-C	5 days	TetraMed 324 HCA	Bimeda, Inc.
	O-T-C	5 days	Tetra-Bac 324	Agri Laboratories, Ltd.

FDA-Approved Drugs for Topical Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Doramectin	O-T-C	45 days	Dectomax® Pour-On	Zoetis, Inc.
Eprinomectin	O-T-C	None	Ivomec Eprinex Pour-On for Beef and Dairy Cattle	Merial Limited
Ivermectin*	O-T-C	48 days	Agri-Mectin Pour-On	Agri Laboratories, Ltd.
	O-T-C	48 days	IVOMEC (Ivermectin) Pour-On	Merial Limited
	O-T-C	48 days	Noromectin® Pour-On	Norbrook Laboratories, Ltd.
Moxidectin	O-T-C	None	Cydectin® (moxidectin) 0.5% Pour-On for Cattle	Boehringer Ingelheim Vetmedica, Inc.

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* Not for use in female dairy cattle 20 months of age or older.

FDA-Approved Drugs for Feed Additive Use
Non-lactating Cattle**

Active Ingredient	Drug Type	Meat Withholding Time	Product Name	Manufacturer/Marketer
Amprolium	O-T-C	24 hours	Corid 1.25% Type C	Merial Limited
	O-T-C	24 hours	Corid 2.5% Type B	Merial Limited
	O-T-C	24 hours	Corid 25% Type A	Merial Limited
Bacitracin zinc	O-T-C	None	Baciferm	Zoetis, Inc.
Bacitracin methylene disalicylate	O-T-C	None	BMD 30	Zoetis, Inc.
	O-T-C	None	BMD 50	Zoetis, Inc.
	O-T-C	None	BMD 60	Zoetis, Inc.
Chlortetracycline	O-T-C	7 days	Aureo S700G	Zoetis, Inc.
	O-T-C	None	Aureomycin G	Zoetis, Inc.
	O-T-C	1 day	ChlorMax 50	Zoetis, Inc.
Chlortetracycline calcium	O-T-C	None	Pennchlor™	PennField Animal Health
Chlortetracycline hydrochloride	O-T-C	0-10 days##	Pennchlor™ 100-MR	PennField Animal Health
	O-T-C	0-10 days##	CLTC 100 MR	Phibro Animal Health
Decoquinate	O-T-C	None	Deccox	Zoetis, Inc.
Fenbendazole	O-T-C	13 days	Safe-Guard 0.5% Top Dress Pellets	Merck Animal Health
	O-T-C	13 days	Safe-Guard1.96% Free-Choice Mineral	Merck Animal Health
	O-T-C	13 days	Safe-Guard 20% Salt Free-Choice Mineral	Merck Animal Health
	O-T-C	11 days	Safe-Guard En-Pro-Al	Molasses Blade
Lasalocid	O-T-C	None	Bovatec Premix***	Zoetis, Inc.
Morantel tartrate	O-T-C	14 days	Rumatel® 88	Phibro Animal Health
Monensin (sodium)	O-T-C	None	Rumensin 90	Elanco Animal Health
Neomycin sulfate	O-T-C	1 day	Neomix® 325 Medicated Premix	Zoetis, Inc.
	O-T-C	1 day	Neomix Ag® 325 Medicated Premix	Zoetis, Inc.
Neomycin-oxytetracycline	O-T-C	0-30 days##	Neo-Oxy 50/50	PennField Animal Health
	O-T-C	0-30 days##	Neo-Oxy 100/100	PennField Animal Health
	O-T-C	0-30 days##	Neo-Oxy 100/50	PennField Animal Health
	O-T-C	30 days	Neo-Oxy 100/50 MR	PennField Animal Health
	O-T-C	0-5 days##	Neo-Terramycin® 50/50	Phibro Animal Health
	O-T-C	0-5 days##	Neo-Terramycin® 50/50D	Phibro Animal Health
	O-T-C	0-5 days##	Neo-Terramycin® 100/100	Phibro Animal Health
	O-T-C	0-5 days##	Neo-Terramycin® 100/100D	Phibro Animal Health
Oxytetracycline (quaternary salt)	O-T-C	0-5 days##	Pennox™	PennField Animal Health
Oxytetracycline hydrochloride	O-T-C	0-5 days##	Pennox™ 100-MR	PennField Animal Health
Oxytetracycline dihydrate	O-T-C	None	Terramycin® 50	Phibro Animal Health
	O-T-C	None	Terramycin® 100	Phibro Animal Health
	O-T-C	None	Terramycin® 100MR	Phibro Animal Health
	O-T-C	None	Terramycin® 200	Phibro Animal Health
Poloxalene	O-T-C	None	Bloat Guard® Liquid Type A - Medicated Article	Phibro Animal Health
	O-T-C	None	Bloat Guard® Medicated Top Dressing	Phibro Animal Health
	O-T-C	None	Bloat Guard® Type A Medicated Article	Phibro Animal Health
Sulfamethazine	O-T-C	7 days	Aureo S700G	Zoetis, Inc.
Virginiamycin	O-T-C	None	V-Max™	Phibro Animal Health
	O-T-C	None	V-Max™ 50	Phibro Animal Health

** The term non-lactating cattle is defined as dairy bulls, dairy calves, and replacement heifers. Read label indications carefully. Some products are not approved for non-ruminating calves and female dairy cattle 20 months of age and older. Some products cannot be used with veal calves. Carefully consult the labels.

Withholding times depend upon labeled dosage used.

***Approved only for replacement heifers up to freshening or calving.

FDA-Approved Drugs for Injectable Use
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Ampicillin trihydrate	Rx	48 hours	6 days	Polyflex®	Boehringer Ingelheim Vetmedica, Inc.
Ceftiofur crystalline-free acid	Rx	None	13 days	EXCEDE®	Zoetis, Inc.
Ceftiofur hydrochloride	Rx	None	3 days	EXCENEL® RTU	Zoetis, Inc.
Ceftiofur sodium	Rx	None	4 days	Naxcel® Sterile Powder	Zoetis, Inc.
Cloprostenol sodium	Rx	None	None	Estrumate	Merck Animal Health
Dexamethasone	Rx	None	None	Dexamethasone Solution	Phoenix Pharmaceutical, Inc./Clipper Distributing
	Rx	None	None	Dexium	Bimeda, Inc.
Dinoprost tromethamine	Rx	None	None	Lutalyse® Sterile Solution	Zoetis, Inc.
Flunixin meglumine	Rx	36 hours	4 days	Flu-Nix D Injection	Agri Laboratories, Ltd.
	Rx	36 hours	4 days	Banamine	Merck Animal Health
	Rx	36 hours	4 days	Flunazine	Bimeda, Inc.
	Rx	36 hours	4 days	Flunixin Injection	Norbrook Laboratories, Ltd.
Gonadorelin diacetate tetrahydrate	Rx	None	None	Cystorelin Injectable	Merial Limited
	Rx	None	None	Fertagyl®	Merck Animal Health
Gonadorelin hydrochloride	Rx	None	None	Factrel®	Zoetis, Inc.
Gonadotropin (chorionic)	Rx	None	None	Chorulon®	Merck Animal Health for Chorulon (CG)
Isoflupredone acetate	Rx	None	7 days	Predef® 2x	Zoetis, Inc.
Oxytetracycline	O-T-C	96 hours	28 days	Agrimycin 200	Agri Laboratories, Ltd.
	O-T-C	96 hours	28 days	Bio-Mycin® 200	Boehringer Ingelheim Vetmedica, Inc.
	O-T-C	96 hours	28 days	Oxytetracycline Injection 200	Norbrook Laboratories, Ltd.
	O-T-C	96 hours	28 days	Pennox 200 Injectable	Pennfield Animal Health
	O-T-C	96 hours	28 days	Liquamycin® LA-200®	Zoetis, Inc.
Oxytocin	Rx	None	None	Oxytocin Injection	Bimeda, Inc.
Penicillin G (procaine)	O-T-C	48 hours	10 days	Agri-Cillin Injection	Agri Laboratories, Ltd.
	O-T-C	48 hours	4 days	Pro-Pen-G™ Injection	Bimeda, Inc.
	O-T-C	48 hours	10 days	Hanford's/US Vet Sterile Penicillin G Penicillin G Procaine Aqueous Suspension	Norbrook Laboratories, Ltd.
	O-T-C	48 hours	14 days	Norocillin	Norbrook Laboratories, Ltd.
Sometribove zinc	O-T-C	None	None	Posilac	Elanco Animal Health
Sulfadimethoxine	O-T-C	60 hours	5 days	Di-Methox Injection 40%	Agri Laboratories, Ltd.
Tripelennamine hydrochloride	Rx	24 hours	4 days	Recovr Injectable	Zoetis, Inc.

FDA-Approved Drugs for Intramammary Use
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Amoxicillin trihydrate	Rx	60 hours	12 days	Amoxi-Mast®	Merck Animal Health
Ceftiofur hydrochloride	Rx	72 hours	2 days	SPECTRAMAST™ LC	Zoetis, Inc.
Cephapirin (sodium)	O-T-C	96 hours	4 days	Today®	Boehringer Ingelheim Vetmedica, Inc.
Cloxacillin (sodium)	Rx	48 hours	10 days	Dariclox®	Merck Animal Health
Hetacillin (potassium)	Rx	72 hours	10 days	Hetacin®K;	Boehringer Ingelheim Vetmedica, Inc.
Penicillin G (procaine)	O-T-C	60 hours	3 days	Hanford's/US Vet MASTICLEAR™	G.C. Hanford Mfg. Co.
Pirlimycin	Rx	36 hours	9 days	Pirsue® Sterile Solution	Zoetis, Inc.

FDA-Approved Drugs for Oral Use
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Fenbendazole	Rx	72 hours	None	Safe-Guard 10% Paste	Merck Animal Health
	O-T-C	None	8 days	Safe-Guard 10% Suspension	Merck Animal Health
Magnesium hydroxide	O-T-C	12 hours	None	Carmilax Bolus	Zoetis, Inc.
	O-T-C	12 hours	None	Carmilax Powder	Zoetis, Inc.
Poloxalene	O-T-C	None	None	Bloat Guard® Top Dressing	Phibro Animal Health
	O-T-C	None	None	TheraBloat® Drench Concentrate	Zoetis, Inc.
Sulfadimethoxine	O-T-C	60 hours	7 days	ALBON® Bolus	Zoetis, Inc.

FDA-Approved Drugs for Feed Additive Use
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Fenbendazole	O-T-C	None	13 days	Safe-Guard 0.5% Top Dress Pellets	Merck Animal Health
	O-T-C	None	13 days	Safe-Guard 1.96%	Merck Animal Health
	O-T-C	None	13 days	Safe-Guard 20% Salt Free-Choice Mineral	Merck Animal Health
	O-T-C	None	13 days	Safe-Guard 35% Salt Free-Choice Mineral	Merck Animal Health
Monensin (sodium)	O-T-C	None	None	Rumensin 90	Elanco Animal Health
Morantel tartrate	O-T-C	None	14 days	Rumatel® 88	Phibro Animal Health
Poloxalene	O-T-C	None	None	Bloat Guard® Liquid - Type A Medicated Article	Phibro Animal Health
	O-T-C	None	None	Bloat Guard® Medicated Top Dressing	Phibro Animal Health
	O-T-C	None	None	Bloat Guard® Type A Medicated Article	Phibro Animal Health

FDA-Approved Drugs for Intravaginal Administration
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Progesterone	O-T-C	None	None	EAZI-Breed™ CIDR® Cattle Insert	Zoetis, Inc.

FDA-Approved Drugs for Topical Use
Lactating Cows

Active Ingredient	Drug Type	Milk Withholding Time	Meat Withholding Time	Product Name	Manufacturer/Marketer
Balsam peru oil	O-T-C	None	None	Granulex Liquid	UDL Laboratories, Inc.
Castor oil	O-T-C	None	None	Granulex Liquid	UDL Laboratories, Inc.
Eprinomectin	O-T-C	None	None	Ivomec® Eprinex® Pour-On for Beef & Dairy Cattle	Merial Limited
Moxidectin	O-T-C	None	None	Cydectin® (moxidectin) 0.5% Pour-On for Cattle	Boehringer Ingelheim Vetmedica, Inc.
Oxytetracycline hydrochloride/Polymyxin B sulfate	O-T-C	None	None	Terramycin® Ophthalmic Ointment with Polymyxin	Zoetis, Inc.
Trypsin	O-T-C	None	None	Granulex Liquid	UDL Laboratories, Inc.

Serum and Urine Screening Tests

Screening Tests Available as of September 2013

Can be used in any dairy animal for detecting drug residues in serum and urine.[§]

Residues Detected	Test Name	Sponsor	Specimen	Sensitivity (ppb)
Amoxicillin	Charm II Beta-lactam Test	Charm Sciences	Serum	500
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	100
			Urine	100
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	40
	Meatsafe™ ß-Lactam One-Step Test	SILVER LAKE Research Corporation	Urine	‡
	Premi®test	DSM	Urine	5.0
Ampicillin	Charm II Beta-lactam Test	Charm Sciences	Serum	200
			Urine	800
	Charm KIS Test	Charm Sciences	Serum	100
			Urine	100
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	55
	Meatsafe™ ß-Lactam One-Step Test	SILVER LAKE Research Corporation	Urine	‡
	Premi®test	DSM	Urine	5.0
Ceftiofur	Charm II Beta-lactam Test	Charm Sciences	Serum	500
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	300
	Premi®test	DSM	Urine	100
Cephalexin (unapproved in dairy cattle)	Charm II Beta-lactam Test	Charm Sciences	Serum	500
			Urine	2000
	Charm SL Beta-lactum Test for Urine	Charm Sciences	Urine	300
	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
Cephapirin	Charm II Beta-lactam Test	Charm Sciences	Serum	200
			Urine	800
	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	85
	Premi®test	DSM	Urine	100
Chloramphenicol [Ð] (prohibited)	Charm II Amphenicol Test	Charm Sciences	Serum	10
			Urine	10
	Charm II Chloramphenicol Test	Charm Sciences	Serum	0.3
			Urine	10

§ Inclusion of product names and associated information does not constitute an endorsement by the NMPF. Unless otherwise noted, all information contained herein was provided by the product's sponsor and no further attempts were made to validate or corroborate the sponsor's information. Neither the AVMA, NMPF, FDA, nor FARAD assumes any responsibility for penalties which may result from the use of this table or any of the products listed herein.

‡ Predicts pass or fail on USDA tissue residue tests.

Ð The use of chloramphenicol in any food-producing animal is strictly forbidden under federal law. Consider testing for chloramphenicol in purchased new additions to the lactating herd or in other instances where the drug-treatment history is unknown.

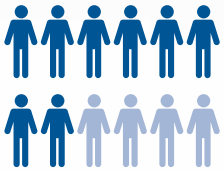
DO RIGHT BY *your* COWS.

RESIDUE FREE GUARANTEE

Follow good protocols for good health and management

Think about the last time you were sick — sick enough to go to the doctor. Did you go home with a prescription for antibiotics? Did you read the instructions? They should have contained clear information for how much medicine to take, as well as when, how and for how many days. Did you follow those directions? If you're like many Americans, you didn't.

66%

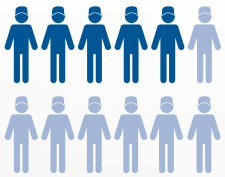


OF PEOPLE ADMITTED NOT FOLLOWING PRESCRIPTION DIRECTIONS[1]

Noncompliance with treatment protocols and prescriptions is a problem

If you don't follow your own prescriptions, are you treating your dairy cattle the same way? If so, you may be risking the wellness and bottom line of your dairy.

43%



OF DAIRY PRODUCERS ON WELL-MANAGED DAIRIES WERE NOT FOLLOWING PROTOCOLS WHEN OBSERVED[2]

What compliance should mean to you

- Use the correct treatment
- Give the correct dosage amount
- Use the correct route of administration
- Treat for the correct duration and at the correct time
- Keep accurate records
- Work with your veterinarian

Why compliance should matter to you

Compliance means doing what's right. Compliance ensures your dairy wellness by doing what's right for the health of your animals, your dairy and the food you provide.

Successful treatment requires a full course of therapy with the appropriate drug. Experts establish protocols to treat diseases and offer your cattle the best chance of a recovery.

The price of the medication isn't the only factor in the cost of a treatment. If workers don't complete protocols and the treatment fails, dairies face additional expenses to retreat or cull cows.

Compliance is vital for protecting the food supply. Using products that carry the Residue Free Guarantee™* means you won't have to worry about a violative residue in meat or milk as long as you follow the label.

***Residue Free Guarantee:** If you use a Zoetis-branded ceftiofur product according to label indications, and experience a violative ceftiofur milk or meat residue, Zoetis will compensate you for the beef market value of the animal or purchase the tanker of milk at fair market value. You must purchase the product from a Zoetis-approved supplier, use the product according to label indications, have documentation of the product purchase and treatment records, and have conducted training on appropriate use to ensure proper dose and route of administration of the product. Extra-label use as prescribed by a veterinarian is excluded from the guarantee. If you experience a ceftiofur residue violation after following label indications and the above steps, contact Zoetis VMIPS (Veterinary Medical Information and Product Support) at 800-366-5288 to report the situation.

[1] Prescription Drug Compliance a Significant Challenge for Many Patients, According to New National Survey, *The Wall Street Journal Online Health Industry Edition.* March 29, 2005.
[2] Wenz JR. Good Health Records: The Foundation of Consistent, Effective Dairy Health Management; Oct. 11, 2012; Rochester, Minn.

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Why compliance can get results

After the first treatment is given, the concentration of the medicine gradually declines. Compliance with the protocol for additional treatments will help keep the level of therapy above the minimum inhibitory concentration (MIC), which is the lowest amount of medicine that will prevent the bacteria from growing. For example, a second dose of EXCEDE® (*ceftiofur crystalline free acid*) Sterile Suspension is needed 72 hours after the first dose to keep the level of therapy high to fight the bacteria associated with metritis.

Put compliance into action

You count on your employees to care for your animals. Make sure they get the message about why following protocols is the right thing to do. Use the next section to help train your employees and to remind them to be compliant with treatments on your dairy.

Remember, your veterinarian should be your number one resource and partner when it comes to treatment compliance. Developing a valid veterinarian-client-patient relationship (VCPR) should be your first step toward compliance. With a valid VCPR, your veterinarian can help you:

- Develop written protocols for common diseases. Protocols should include compliance information as well as how to identify the illness and any milk and meat withholding times.
- Keep accurate and consistent health records. This will help with compliance, enhancing overall herd health and avoiding drug residues.
- Review the protocols every six months. Involve your employees in the review process to address any possible changes. Also, share the results of record-keeping with your employees to show them how the protocols are working.

Important Safety Information: The use of EXCEDE is contraindicated in animals with known allergy to ceftiofur or to the ß-lactam group (penicillins and cephalosporins) of antimicrobials. Though safe in cattle when properly administered, inadvertent intra-arterial injection is possible and fatal. EXCEDE has a pre-slaughter withdrawal time of 13 days following the last dose in cattle. Do not use in calves to be processed for veal.

SIX TIPS FOR PROPER DRUG TREATMENTS

El propietario de la lechería cuenta con que usted brinde el mejor cuidado a las vacas. Si una vaca se enferma, es su responsabilidad brindarle el tratamiento adecuado; para esto debe seguir las indicaciones de las etiquetas de los medicamentos o una receta del veterinario.

DETERMINE THE RIGHT TREATMENT

Revise los protocolos para las enfermedades comunes y siga las instrucciones relativas a la enfermedad de la vaca. Usted debe contar con el medicamento adecuado para tratar la enfermedad.

GIVE THE CORRECT AMOUNT

En la mayoría de los medicamentos, no todas las vacas reciben la misma cantidad. Calcule el peso de la vaca cuidadosamente, con el fin de administrarle la cantidad correcta del medicamento.

GIVE FOR THE CORRECT NUMBER OF DAYS AND AT THE CORRECT TIME

Una vaca puede comenzar a mejorar antes de terminar el protocolo; sin embargo, debe administrar todas las dosis indicadas para que la vaca se recupere completamente.

GIVE THE TREATMENT IN THE CORRECT WAY

Existen diversas maneras para administrar el medicamento a las vacas. Asegúrese de comprender las diferencias y de hacer solo lo que el protocolo le indica.

KEEP ACCURATE RECORDS

Después de brindar tratamiento a una vaca, registre toda la información relativa al tratamiento. Esto permitirá que el veterinario y el encargado del rebaño sepan qué tan bien funcionan los tratamientos.

ASK FOR HELP

Si no comprende alguna parte del protocolo, no adivine. Solicite ayuda al encargado o al veterinario encargado.

Zoetis is here to help, too. Visit AvoidResidues.com for posters, videos and more information on how to comply with drug treatment protocols.

DAIRY WELLNESS MAKES A DIFFERENCE™

zoetis

EXCEDE®

(Ceftiofur Crystalline Free Acid)
Sterile Suspension

For subcutaneous injection in the posterior aspect of the ear where it attaches to the head (base of the ear) in lactating dairy cattle. For subcutaneous injection in the middle third of the posterior aspect of the ear or in the posterior aspect of the ear where it attaches to the head (base of the ear) in beef and non-lactating dairy cattle. Not for use in calves to be processed for veal.

CAUTION
Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS
EXCEDE Sterile Suspension is indicated for treatment of bovine respiratory disease (BRD, shipping fever, pneumonia) associated with *Mannheimia haemolytica, Pasteurella multocida,* and *Histophilus somni* in beef, non-lactating dairy, and lactating dairy cattle.

EXCEDE Sterile Suspension is also indicated for the control of respiratory disease in beef and non-lactating dairy cattle which are at high risk of developing BRD associated with *M. haemolytica, P. multocida,* and *H. somni.*

EXCEDE Sterile Suspension is also indicated for the treatment of bovine foot rot (interdigital necrobacillosis) associated with *Fusobacterium necrophorum and Porphyromonas levii* in beef, non-lactating dairy, and lactating dairy cattle.

EXCEDE Sterile Suspension is also indicated for treatment of acute metritis (0-10 days postpartum) associated with bacterial organisms susceptible to ceftiofur in lactating dairy cattle.

CONTRAINDICATIONS
As with all drugs, the use of EXCEDE Sterile Suspension is contraindicated in animals previously found to be hypersensitive to the drug.

WARNINGS

FOR USE IN ANIMALS ONLY. NOT FOR HUMAN USE.
KEEP OUT OF REACH OF CHILDREN.

Penicillins and cephalosporins can cause allergic reactions in sensitized individuals. Topical exposures to such antimicrobials, including ceftiofur, may elicit mild to severe allergic reactions in some individuals. Repeated or prolonged exposure may lead to sensitization. Avoid direct contact of the product with the skin, eyes, mouth and clothing. Sensitization of the skin may be avoided by wearing protective gloves.

Persons with a known hypersensitivity to penicillin or cephalosporins should avoid exposure to this product.

In case of accidental eye exposure, flush with water for 15 minutes. In case of accidental skin exposure, wash with soap and water. Remove contaminated clothing. If allergic reaction occurs (e.g., skin rash, hives, difficult breathing), seek medical attention.

The material safety data sheet contains more detailed occupational safety information. To obtain a material safety data sheet please call 1-800-733-5500. To report any adverse event please call 1-800-366-5288.

Intra-arterial injection may occur during administration of EXCEDE Sterile Suspension via middle third of the ear injection or base of the ear injection directed toward the opposite eye. Intra-arterial injection of EXCEDE Sterile Suspension is likely to result in sudden death of the animal.

RESIDUE WARNINGS

- **Following label use as either a single-dose or 2-dose regimen, a 13-day pre-slaughter withdrawal period is required after the last treatment.**
- **Following label use as either a single-dose or 2-dose regimen, no milk discard period is required for this product.**
- **Use of dosages in excess of 3.0 mg CE/lb. (6.6 mg CE/kg) BW or administration by unapproved routes (subcutaneous injection in the neck or intramuscular injection) may cause violative residues.**
- **A withdrawal period has not been established for this product in pre-ruminating calves.**
- **Do not use in calves to be processed for veal.**

PRECAUTIONS
Following subcutaneous injection in the middle third of the posterior aspect of the ear, thickening and swelling (characterized by aseptic cellular infiltrate) of the ear may occur. As with other parenteral injections, localized post-injection bacterial infections may result in abscess formation. Attention to hygienic procedures can minimize their occurrence.

Following injection at the posterior aspect of the ear where it attaches to the head (base of the ear), areas of discoloration and signs of inflammation may persist at least 13 days post administration resulting in trim loss of edible tissue at slaughter. Injection of volumes greater than 20 mL, in the middle third of the ear, may result in open draining lesions in a small percentage of cattle.

The effects of ceftiofur on bovine reproductive performance, pregnancy, and lactation have not been determined.

ADVERSE EFFECTS
Intra-arterial injection may occur during administration of EXCEDE Sterile Suspension via middle third of the ear injection or base of the ear injection directed toward the opposite eye. Intra-arterial injection of EXCEDE Sterile Suspension is likely to result in sudden death of the animal. During the conduct of clinical studies, there was a low incidence of acute death (see ANIMAL SAFETY) confirmed to be the result of inadvertent intra-arterial injection. No other adverse systemic effects were noted for either the antibiotic or formulation during any of the clinical and target animal safety studies.

STORAGE CONDITIONS
Store at controlled room temperature 20° to 25°C (68° to 77°F). Shake well before using. Contents should be used within 12 weeks after the first dose is removed.

HOW SUPPLIED
EXCEDE Sterile Suspension is available in the following package sizes:
100 mL vial
250 mL vial

NADA #141-209, Approved by FDA
www.EXCEDE.com or call 1-866-387-2287
Revised December 2011

Pfizer

EXD12041

Distributed by
Pharmacia & Upjohn Company
Division of Pfizer Inc, NY, NY 10017

Serum and Urine Screening Tests

Screening Tests Available as of September 2013

Residues Detected	Test Name	Sponsor	Specimen	Sensitivity (ppb)
Chlortetracycline (prohibited as feed additive for lactating dairy cows)	Charm II Tetracycline Test	Charm Sciences	Serum	200
			Urine	3000
	Charm KIS Test	Charm Sciences	Serum	2000
			Urine	2000
	Premi®test	DSM	Urine	50
Cloxacillin	Charm II Beta-lactam Test	Charm Sciences	Serum	2500
			Urine	10,000
	Charm KIS Test	Charm Sciences	Serum	500
			Urine	500
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	300
	Meatsafe™ ß-Lactam One-Step Test	SILVER LAKE Research Corporation	Urine	‡
	Premi®test	DSM	Urine	50
Danofloxacin	Premi®test	DSM	Urine	600
Dihydrostreptomycin	Charm II Streptomycin Test	Charm Sciences	Serum	100
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
	Premi®test	DSM	Urine	3000
Enrofloxacin	Charm Enroflox Test (ROSA Test)	Charm Sciences	Urine	100
	Premi®test	DSM	Urine	600
Erythromycin	Charm KIS Test	Charm Sciences	Serum	500
			Urine	500
	Charm II Macrolide Test	Charm Sciences	Serum	500
			Urine	500
	Premi®test	DSM	Urine	100
Florfenicol	Charm II Amphenicol Test	Charm Sciences	Serum	400
			Urine	400
Gentamicin (unapproved in dairy cattle) (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	Charm II Gentamicin and Neomycin Test	Charm Sciences	Serum	250
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	600
			Urine	600
	Meatsafe™ Gentamicin Strip Test	SILVER LAKE Research Corporation	Urine	‡
	Premi®test	DSM	Urine	100

‡ Predicts pass or fail on USDA tissue residue tests.

Serum and Urine Screening Tests

Screening Tests Available as of September 2013

Residues Detected	Test Name	Sponsor	Specimen	Sensitivity (ppb)
Hetacillin	Charm II Beta-lactam Test	Charm Sciences	Serum	200
			Urine	1000
	Charm KIS Test	Charm Sciences	Serum	100
			Urine	100
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	250
	Meatsafe™ ß-Lactam One-Step Test	SILVER LAKE Research Corporation	Urine	‡
Kanamycin (unapproved in dairy cattle) (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	Charm II Gentamicin and Neomycin Test	Charm Sciences	Serum	2000
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Lincomycin (unapproved in dairy cattle)	Charm II Macrolide Test	Charm Sciences	Serum	2000
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	2000
			Urine	2000
	Premi®test	DSM	Urine	100
Neomycin	Charm II Gentamicin and Neomycin Test	Charm Sciences	Serum	50
			Urine	10,000
	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
	Premi®test	DSM	Urine	300
Oxacillin	Charm II Beta-lactam Test	Charm Sciences	Serum	2500
			Urine	10,000
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	300
	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
Oxytetracycline (prohibited as feed additive for lactating dairy cows)	Charm II Tetracycline Test	Charm Sciences	Serum	200
			Urine	2500
	Charm KIS Test	Charm Sciences	Serum	3500
			Urine	3500
	Premi®test	DSM	Urine	50
Penicillin	Charm II Beta-lactam Test	Charm Sciences	Serum	200
			Urine	800
	Charm KIS Test	Charm Sciences	Serum	30
			Urine	30
	Charm SL Beta-lactam Test for Urine	Charm Sciences	Urine	25

‡ Predicts pass or fail on USDA tissue residue tests.

Serum and Urine Screening Tests

Screening Tests Available as of September 2013

Residues Detected	Test Name	Sponsor	Specimen	Sensitivity (ppb)
Penicillin	Meatsafe™ ß-Lactam One-Step Test	SILVER LAKE Research Corporation	Urine	‡
	Premi®test	DSM	Urine	5.0
Pirlimycin	Charm II Macrolide Test	Charm Sciences	Serum	3000
			Urine	3000
Streptomycin	Charm II Streptomycin Test	Charm Sciences	Serum	100
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfachloropyridazine	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
	Premi®test	DSM	Urine	100
Sulfadiazine* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	150
			Urine	500
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfadimethoxine	Charm II Sulfonamide Test	Charm Sciences	Serum	150
			Urine	500
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
	Charm ROSA SDSM Test	Charm Sciences	Urine	400
	Premi®test	DSM	Urine	100
Sulfadoxine* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	300
			Urine	800
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfamerazine* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	150
			Urine	500
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfamethazine[oe] (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	400
			Urine	1250
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
	Premi®test	DSM	Urine	100
Sulfamethizole (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	300
			Urine	1600
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000

‡ Predicts pass or fail on USDA tissue residue tests.

* Prohibited from use of any kind in lactating cattle.

oe Sulfamethazine is prohibited for use in female dairy cattle 20 months of age or older.

Serum and Urine Screening Tests

Screening Tests Available as of September 2013

Residues Detected	Test Name	Sponsor	Specimen	Sensitivity (ppb)
Sulfamethoxazole* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	120
			Urine	300
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfanilamide* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	1600
			Urine	4000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfapyridine* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	400
			Urine	1000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfathiazole* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	300
			Urine	1000
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Sulfisoxazole* (unapproved in dairy cattle)	Charm II Sulfonamide Test	Charm Sciences	Serum	250
			Urine	600
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
Tetracycline (prohibited as feed additive for lactating dairy cows)	Charm II Tetracycline Test	Charm Sciences	Serum	40
			Urine	600
	Charm KIS Test	Charm Sciences	Serum	10,000
			Urine	10,000
Tilmicosin	Charm KIS Test	Charm Sciences	Serum	1000
			Urine	1000
	Premi®test	DSM	Urine	50
Tulathromycin* (unapproved in dairy cattle)	Charm II Macrolide Test	Charm Sciences	Serum	500
			Urine	500
	Charm KIS Test	Charm Sciences	Serum	5000
			Urine	5000
	Premi®test	DSM	Urine	18,000
Tylosin	Charm II Macrolide Test	Charm Sciences	Serum	2000
			Urine	2000
	Charm KIS Test	Charm Sciences	Serum	500
			Urine	200
	Premi®test	DSM	Urine	50

*Prohibited from use of any kind in lactating cattle.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
2, 4-D	100#	2,4-D RaPID Assay®	Strategic Diagnostics, Inc.	50.0
Aflatoxin M1	0.5	Charm II Aflatoxin Test (Competitive)	Charm Sciences	0.5
	0.5	Charm II Aflatoxin Test (Sequential)	Charm Sciences	0.5
	0.5	Charm ROSA SL Aflatoxin Test (Quantitative)	Charm Sciences	0.5
	0.5	Reveal for Aflatoxin M1	Neogen Corporation	0.5
	0.5	SNAP Aflatoxin M1	IDEXX Labs, Inc.	0.5
Amoxicillin	10#	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	5.5
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	7.5 •
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	8.1 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	8.1 •
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	7.5 •
		Charm Cowside II Test	Charm Sciences	4.0
		Charm HPLC-Receptogram	Charm Sciences	10.0
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	5.6 •
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	8.4 *
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	7.1 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	5.9 •
		Delvotest BLF	DSM Food Specialties	3.0
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	4.6 •
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	7.7 •
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	6.0 •
		Delvotest SP-NT	DSM Food Specialties	2-3.0
		Delvotest T	DSM Food Specialties	4.0
		Eclipse® 3G	ZEU-Inmunotec	3.0
		New SNAP Beta-lactam (Reader, FDA-Approved)	IDEXX Labs, Inc.	7.3
		New SNAP Beta-lactam (Visual)	IDEXX Labs, Inc.	6.9
		Penzyme® Milk Test	Neogen Corporation	6.0
Ampicillin	10#	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	5.2
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	5.7 •
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	6.6 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	6.6 •
		Charm Cowside II Test	Charm Sciences	4.0
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	6.7 •
		Charm HPLC-Receptogram	Charm Sciences	2.0
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	8.5 •

Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.

• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Ampicillin (cont.)	10#	Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	8.0 •
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	9.6 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	6.8 •
		Delvotest BLF	DSM Food Specialties	5.0
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	4.0 •
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	5.1 •
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	7.9 •
		Delvotest SP-NT	DSM Food Specialties	2.0
		Delvotest T	DSM Food Specialties	3.0
		Eclipse® 3G	ZEU-Inmunotec	3.0
		New SNAP Beta-lactam (Reader, FDA-Approved)	IDEXX Labs, Inc.	5.8 •
		New SNAP Beta-lactam (Visual)	IDEXX Labs, Inc.	6.2
		Penzyme® Milk Test	Neogen Corporation	7.0
Atrazine	20#	Atrazine RaPID Assay®	Strategic Diagnostics, Inc.	5.0
Bacitracin (unapproved in lactating dairy cows)	500#	Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	>1000
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	>1000
		Delvotest SP-NT	DSM Food Specialties	580
		Eclipse® 3G	ZEU-Inmunotec	600
Carbendazim	20#	Benomyl RaPID Assay®	Strategic Diagnostics, Inc.	5.0
Cefoperazone	Noneý	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	8.0
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	20
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	20
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	5.0
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	50
		Charm CowSide II Test	Charm Sciences	30
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	1.0
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	15
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	15
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	9.0
		Delvotest T	DSM Food Specialties	40

Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).
ý No official tolerance or "safe levels" have been established by the FDA.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Cefquinome	None[ý]	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	8.0
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	40
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	40
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	10
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	100
		Charm CowSide II Test	Charm Sciences	60
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	50
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	30
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	60
		Charm Flunixin and Beta-lactam Test	Charm Sciences	75
		Delvotest T	DSM Food Specialties	40
Ceftiofur	100[£]	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	80
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	47 •
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	8.0 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	58 •
		Charm Cowside II Test	Charm Sciences	> 100
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	> 100 •
		Charm HPLC-Receptogram	Charm Sciences	30-40
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	77 •
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	79 •
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	72 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	63 •
		Delvotest BLF	DSM Food Specialties	< 20
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	> 100
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	> 100
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	> 100
		Delvotest SP-NT	DSM Food Specialties	130
		Eclipse® 3G	ZEU-Inmunotec	60
		New SNAP Beta-Lactam (Reader, FDA-Approved)	IDEXX Labs, Inc.	12 •

ý No official tolerance or "safe levels" have been established by the FDA.
£ The tolerance was established for the marker residue, not the parent compound. The ceftiofur tolerance has been changed from 50 ppb ceftiofur (parent drug) to 100 ppb ceftiofur marker residue (DCA, desfuroylceftiofur metabolite derivative).
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Cephalexin	None[ý]	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	500
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	45
(unapproved in dairy cattle)		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	40
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	40
		Charm Cowside II Test	Charm Sciences	50
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	85
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	50
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	3000
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	50
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	50 •
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	60-100
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	60-100
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	60-100
		Delvotest SP-NT	DSM Food Specialties	5-6.0
		Delvotest T	DSM Food Specialties	30
		Eclipse® 3G	ZEU-Inmunotec	60
Cephapirin	20[#]	BetaStar Plus Bet-lactam Test (FDA-Approved)	Neogen Corporation	19
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	4.2 •
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	4.1 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	4.1
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	11.7 •
		Charm Cowside II Test	Charm Sciences	10
		Charm HPLC-Receptogram	Charm Sciences	2.0
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	13.7 •
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	20.0 •
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	18.7 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	13.4 •
		Delvotest BLF	DSM Food Specialties	4.0
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	8.2 •
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	7.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	7.7 •
		Delvotest SP-NT	DSM Food Specialties	4-6.0
		Delvotest T	DSM Food Specialties	5.0
		Eclipse® 3G	ZEU-Inmunotec	8.0

ý No official tolerance or "safe levels" have been established by the FDA.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).
Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Cephapirin (continued)	20#	New SNAP Beta-lactam (Reader, FDA-Approved)	IDEXX Labs, Inc.	11.7 •
		New SNAP Beta-lactam (Visual)	IDEXX Labs, Inc.	11.9
		Penzyme® Milk Test	Neogen Corporation	11.6
Chloramphenicol Ð (prohibited in food producing animals)	Noneý	BetaStar 4D Beta-lactam, Tetracycline, Streptomycin, Chloramphenicol Test	Neogen Corporation	0.3
		Charm II Chloramphenicol Test	Charm Sciences	0.1
		Charm II Amphenicol Test (FDA-Approved)	Charm Sciences	1.0
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	20,000
		Charm HPLC-Receptogram	Charm Sciences	1.0
		Charm ROSA Chloramphenicol Test	Charm Sciences	0.15
		Delvotest SP-NT	DSM Food Specialties	2500
		Delvotest T	DSM Food Specialties	3080
		Eclipse® 3G	ZEU-Inmunotec	5000
		Reveal CPP/STREP Chloramphenicol and Streptomycin	Neogen Corporation	0.3
Chlortetracycline (prohibited as feed additive in lactating dairy cattle)	300#	Charm II Tetracycline Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	257 •
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000 †
		Charm Cowside II Test	Charm Sciences	100
		Charm HPLC-Receptogram	Charm Sciences	15
		Charm ROSA Tetracycline Test	Charm Sciences	250
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	250-300
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	250-300
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	250-300
		Delvotest SP-NT	DSM Food Specialties	200
		Delvotest T	DSM Food Specialties	150
		SNAP Tetracycline	IDEXX Labs, Inc.	100
Clindamycin (unapproved in dairy cattle)	Noneý	Charm II Macrolide Test	Charm Sciences	50

Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).
Ð The use of chloramphenicol in any food-producing animal is strictly forbidden under federal law. Consider testing for chloramphenicol in purchased new additions to the lactating herd or in other instances where the drug-treatment history is unknown.
ý No official tolerance or "safe levels" have been established by the FDA.
^ Values indicate the FDA-established "safe levels" and do not represent official tolerance levels. "Safe levels" are used by the FDA as guides for deciding whether or not to prosecute. They are not and cannot be transformed into tolerances that are established for animal drugs under section 512 (b) of the Federal Food, Drug & Cosmetic Act. They are not binding, do not dictate any result, do not limit the FDA's discretion in any way, and do not protect milk producers (or milk) from court enforcement action.
† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Cloxacillin	10#	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	8.2
		Charm II for Cloxacillin in Milk (Competitive) (FDA-Approved)	Charm Sciences	8.5 •
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	70❖•
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	8.5 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	CharmSciences	50❖•
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	48❖•
		Charm Cowside II Test	Charm Sciences	25
		Charm HPLC-Receptogram	Charm Sciences	10
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	50❖
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	8.6 •
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	8.3 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	75 •
		Eclipse® 3G	ZEU-Inmunotec	30
		Delvo P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	25❖•
		Delvo SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	20❖•
		Delvotest BLF	DSM Food Specialties	17
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	30❖
		Delvotest SP-NT	DSM Food Specialties	11
		Delvotest T	DSM Food Specialties	5.0
		New SNAP Beta-Lactam (FDA-Approved)	IDEXX Labs, Inc.	50❖•
Dapson	Noneý	Charm II Sulfa Drug Test (Competitive) (FDA-Approved)	Charm Sciences	2.0
		Charm II Sulfa Drug Test (Sequential)	Charm Sciences	2.0
		Charm CowSide II Test	Charm Sciences	2.0
		Delvotest T	DSM Food Specialties	40
Dicloxacillin (unapproved in dairy cattle)	Noneý	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	7.0
		Charm II for Cloxacillin in Milk (FDA-Approved)	Charm Sciences	9.0
		Charm II Beta-lactam Test (Competitive)	Charm Sciences	45
		Charm II Beta-lactam Test (Quantitative)	Charm Sciences	5.0
		Charm II Beta-lactam Test (Sequential)	Charm Sciences	45
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	40
		Charm Cowside II Test	Charm Sciences	10
		Charm HPLC Receptogram	Charm Sciences	10
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	50

Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, & FDA & reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).
❖ 90/95% concentrations were not determined for sensitivities significantly above the tolerance/safe level.
ý No official tolerance or "safe levels" have been established by the FDA.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Dicloxacillin (continued)	None[ý]	Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	7.0
		Charm SL6 Beta-lactam Test	Charm Sciences	5.0
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	60
		Delvotest BLF	DSM Specialties	24
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	20
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	15
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	20
		Delvotest SP-NT	DSM Food Specialties	6.0
		New SNAP Beta-lactam (FDA-Approved)	IDEXX Labs, Inc.	50
Dihydrostreptomycin	125[#]	BetaStar 4D Beta-lactam, Tetracycline, Chloramphenicol, Streptomycin Test	Neogen Corporation	200
		BetaStar Charm II Streptomycin Test	Charm Sciences	75
		Charm Rosa Streptomycin Test	Charm Sciences	75
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	5000
		Delvotest SP-NT	DSM Food Specialties	680
		Delvotest T	DSM Food Specialties	800
		Reveal CAP/STREP Chloramphenicol, Streptomycin Test	Neogen Corporation	200
Enrofloxacin (not approved in lactating dairy cattle 20 months of age or older)	None	Charm Enroflox Test (ROSA Test)	Charm Sciences	7.0
		Delvotest SP-NT	DSM Food Specialties	1000-1500
Erythromycin	50[^]	Charm II Macrolide Test	Charm Sciences	25 [†]
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	400 [†]
		Charm Cowside II Test	Charm Sciences	100
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	500
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	250
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	500-1500
		Delvotest SP-NT	DSM Food Specialties	90
		Delvotest T	DSM Food Specialties	150
		Eclipse® 3G	ZEU-Inmunotec	200

ý No official tolerance or "safe levels" have been established by the FDA.
Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.
^ Values indicate the FDA-established "safe levels" and do not represent official tolerance levels. "Safe levels" are used by the FDA as guides for deciding whether or not to prosecute. They are not and cannot be transformed into tolerances that are established for animal drugs under section 512 (b) of the Federal Food, Drug & Cosmetic Act. They are not binding, do not dictate any result, do not limit the FDA's discretion in any way, and do not protect milk producers (or milk) from court enforcement action.
† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Florfenicol (unapproved in lactating cows, consult with your veterinarian)	None	Charm II Amphenicol Test (FDA-Approved)	Charm Sciences	40
Flunixin	2	Alert Flunixin Test	Neogen Corporation	2.0
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	1.9‡•
Gentamicin (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	30^	Charm II Gentamicin and Neomycin Test	Charm Sciences	24
		Charm II Gentamicin and StreptomycinTest	Charm Sciences	30 †
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	100
		Charm Cowside II Test	Charm Sciences	100
		SNAP Gentamicin	IDEXX Labs, Inc.	30 †
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	1000
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	400
		Delvotest SP-NT	DSM Food Specialties	100
		Delvotest T	DSM Food Specialties	80
		Eclipse® 3G	ZEU-Inmunotec	>1000
Hetacillin	Noneý	Charm Cowside II Test	Charm Sciences	3
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	7.5
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	7.5
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	7.5
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	7.5
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	7.5
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	8
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	7.5
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	5.9
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	5
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	5
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	5

‡ 5-hydroxyflunixin marker.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).
^ Values indicate the FDA-established "safe levels" and do not represent official tolerance levels. "Safe levels" are used by the FDA as guides for deciding whether or not to prosecute.
† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.
ý No official tolerance or "safe levels" have been established by the FDA.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Kanamycin (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	None[ý]	Charm II Gentamicin and Streptomycin Test	Charm Sciences	1000
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000
		Delvotest SP-NT	DSM Food Specialties	5000
		Delvotest T	DSM Food Specialties	1310
		Eclipse® 3G	ZEU-Inmunotec	2000
Lincomycin (unapproved in dairy cattle)	150[#]	Charm Cowside II Test	Charm Sciences	150
		Charm II Macrolide Test	Charm Sciences	100
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	400-1000
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	400-1000
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	300-400
		Delvotest SP-NT	DSM Food Specialties	156
		Delvotest T	DSM Food Specialties	180
		Eclipse® 3G	ZEU-Inmunotec	150
Neomycin (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	150[#]	Charm II Gentamicin and Neomycin Test	Charm Sciences	20 †
		Charm Cowside II Test	Charm Sciences	150
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	1000-5000 †
		Delvotest SP-NT	DSM Food Specialties	810
		Delvotest T	DSM Food Specialties	60
		Eclipse® 3G	ZEU-Inmunotec	1500
Novobiocin	100[#]	Charm II Novobiocin Test	Charm Sciences	100 †
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000 †
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	600
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	600
		Delvotest SP-NT	DSM Food Specialties	750-800
Oxytetracycline (prohibited as feed additive for lactating dairy cattle)	300[#]	Charm II Tetracycline Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	119 •
		Charm Cowside II Test	Charm Sciences	100
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000 †
		Charm HPLC-Receptogram	Charm Sciences	15
		Charm ROSA Tetracycline Test	Charm Sciences	250
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	300
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	400
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	400
		Delvotest SP-NT	DSM Food Specialties	235
		Delvotest T	DSM Food Specialties	80
		Eclipse® 3G	ZEU-Inmunotec	50
		SNAP Tetracycline	IDEXX Labs, Inc.	50

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† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Penicillin	5^	BetaStar Plus Beta-lactam Test (FDA-Approved)	Neogen Corporation	4.7
		Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Charm Sciences	3.0 •
		Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Charm Sciences	3.4 •
		Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Charm Sciences	3.4 •
		Charm Cowside II Test	Charm Sciences	3.0
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	3.8 •
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Charm SL Beta-lactam Test (FDA-Approved)	Charm Sciences	3.6 •
		Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Charm Sciences	3.8 •
		Charm SL6 Beta-lactam Test (FDA-Approved)	Charm Sciences	4.2 •
		Charm Flunixin and Beta-lactam Test (FDA-Approved)	Charm Sciences	2.0 •
		Delvotest BLF	DSM Specialties	3.0
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	2.1 •
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	3.1 •
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	2.7 •
		Delvotest SP-NT	DSM Food Specialties	1.5
		Delvotest T	DSM Food Specialties	2.0
		Eclipse® 3G	ZEU-Inmunotec	2-3.0
		New SNAP Beta-lactam (Reader, FDA-Approved)	IDEXX Labs, Inc.	3.0
		New SNAP Beta-lactam (Visual)	IDEXX Labs, Inc.	3.1
		Penzyme® Milk Test	Neogen Corporation	5.0
Pirlimycin	400#	Charm II Macrolide Test	Charm Sciences	80
		Charm Cowside II Test	Charm Sciences	50
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	100
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	80
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	80
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	50
		Delvotest SP-NT	DSM Food Specialties	20-80
Polymixin B	None[ŷ]	Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	30

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• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Rifaximin	None[ý]	Delvotest T	DSM Food Specialties	40
Spectinomycin	None[ý]	Charm Cowside II Test	Charm Sciences	1000
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000 †
		Delvotest T	DSM Food Specialties	1850
		Eclipse® 3G	ZEU-Inmunotec	>2500
Streptomycin (AVMA, AABP and Academy of Veterinary Consultants [AVC] advocate their members voluntarily refrain from use)	None[ý]	BetaStar 4D Beta-lactam, Tetracycline, Chloramphenicol, Streptomycin Test	Neogen Corporation	200
		Charm II Gentamicin and StreptomycinTest	Charm Sciences	20 †
		Charm Cowside II Test	Charm Sciences	1000
		Charm ROSA Streptomycin Test	Charm Sciences	75
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000 †
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	4000
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	4000
		Delvotest SP-NT	DSM Food Specialties	1200
		Delvotest T	DSM Food Specialties	400
		Eclipse® 3G	ZEU-Inmunotec	1500
		Reveal CAP/STREP Chloramphenicol, Streptomycin Test	Neogen	200
Sulfachlorpyridazine (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	5.0
		Charm Cowside II Test	Charm Sciences	50
		Charm ROSA Sulfa Test	Charm sciences	3.0
		Charm HPLC Receptogram	Charm Sciences	10
Sulfadiazine (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	4.9 •
		Charm Cowside II Test	Charm Sciences	50
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Charm ROSA Sulfa Test	Charm Sciences	2.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	50
		Delvotest T	DSM Food Specialties	50
		Eclipse® 3G	ZEU-Inmunotec	100
Sulfadimethoxine	10[#]	Charm II Sulfa Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	4.0 •
		Charm Cowside II Test	Charm Sciences	25
		Charm ROSA Sulfa Test	Charm Sciences	1.0
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	10,000
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	100
		Delvotest T	DSM Food Specialties	40
Sulfadoxine (unapproved in lactating dairy cattle)	None[ý]	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	7.0
		Charm Cowside II Test	Charm Sciences	100
		Charm ROSA Sulfa Test	Charm Sciences	15
		Delvotest SP-NT	DSM Food Specialties	110

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# Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.
• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Sulfamerazine (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	4.0 †
		Charm Cowside II Test	Charm Sciences	100
		Charm ROSA Sulfa Test	Charm Sciences	3.0
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP-NT	DSM Food Specialties	50-100
Sulfamethazine✖ (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	9.4 •
		Charm Cowside II Test	Charm Sciences	100
		Charm ROSA Sulfa Test	Charm Sciences	6.0
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	25-100
		Delvotest T	DSM Food Specialties	150
		Eclipse® 3G	ZEU-Inmunotec	150
		SNAP Sulfamethazine Test	IDEXX Labs, Inc.	10
Sulfamethizole* (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	6.0 †
		Charm Cowside II Test	Charm Sciences	20
		Charm ROSA Sulfa Test	Charm Sciences	1.0
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	50
Sulfamethoxazole* (unapproved in lactating dairy cattle)	None ý	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	20 †
		Charm Cowside II Test	Charm Sciences	50
		Charm ROSA Sulfa Test	Charm Sciences	2.0
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP-NT	DSM Food Specialties	<50
Sulfanilamide (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	20
		Charm Cowside II Test	Charm Sciences	200
		Charm ROSA Sulfa Test	Charm Sciences	50
		Charm HPLC-Receptogram	Charm Sciences	10
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	1000
		Delvotest SP-NT	DSM Food Specialties	100
Sulfapyridine (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	10
		Charm Cowside II Test	Charm Sciences	100
		Charm ROSA Sulfa Test	Charm Sciences	10
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	250

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† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.

✖ Sulfamethazine is illegal for use in female dairy cattle 20 months of age or older.

• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

* Prohibited from use of any kind in lactating dairy cattle.

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Milk Screening Tests

Not all of the tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Residues Detected	Tolerance (ppb)	Test Name	Sponsor	Sensitivity (ppb)
Sulfathiazole (unapproved in lactating dairy cattle)	10^	Charm II Sulfa Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	7.3 •
		Charm Cowside II Test	Charm Sciences	50
		Charm ROSA Sulfa Test	Charm Sciences	1.0
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	50
		Delvotest T	DSM Food Specialties	50
		Eclipse® 3G	ZEU-Inmunotec	50
Sulfisoxazole (unapproved in lactating dairy cattle)	None[ý]	Charm II Sulfa Drug Test (FDA-Approved)	Charm Sciences	6.0
		Charm Cowside II Test	Charm Sciences	50
		Charm ROSA Sulfa Test	Charm Sciences	15
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
Tetracycline (prohibited as feed additive for lactating dairy cows)	300#	Charm II Tetracycline Drug Test (Competitive Assay) (FDA-Approved)	Charm Sciences	67 •
		Charm Cowside II Test	Charm Sciences	100
		Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Charm Sciences	1000
		Charm HPLC-Receptogram	Charm Sciences	5.0
		Charm ROSA Tetracycline Test	Charm Sciences	90
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	300
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	300
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	400
		Delvotest SP-NT	DSM Food Specialties	270
		Delvotest T	DSM Food Specialties	75
		Eclipse® 3G	ZEU-Inmunotec	100
		SNAP Tetracycline	IDEXX Labs, Inc.	50
Tilmicosin	None	Charm II Macrolide Test	Charm Sciences	20
		Charm Cowside II Test	Charm Sciences	50
		Delvotest SP-NT	DSM Food Specialties	50
		Delvotest T	DSM Food Specialties	60
Trimethoprim	None	Charm CowSide II Test	Charm Sciences	300
		Delvotest T	DSM Food Specialties	110
Tulathromycin (unapproved in lactating dairy cattle)	None	Charm II Macrolide Test	Charm Sciences	20
Tylosin (unapproved in lactating dairy cows)	50#	Charm II Macrolide Test	Charm Sciences	50 †
		Charm Cowside II Test	Charm Sciences	30
		Delvotest P/Delvotest P Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest P 5 Pack (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP/Delvotest SP Mini (FDA-Approved)	DSM Food Specialties	100
		Delvotest SP-NT	DSM Food Specialties	50
		Delvotest T	DSM Food Specialties	50
		Eclipse® 3G	ZEU-Inmunotec	40

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• Sensitivities based on evaluations of raw commingled bovine milk samples by test sponsors, independent laboratories, and FDA and reported in FDA memo M-a-85 Revision #14 and FDA memorandum (03/22/12).

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Tolerance is the maximum legally allowable level or concentration of a drug or chemical in a food product at the time milk is marketed or the animal is slaughtered.

† The sensitivity of the test method was determined by independent research at Virginia Polytechnic Institute and State University.

Milk Screening Tests

Screening Tests Available as of September 2013 for Detecting Drug Residues in Bulk Tank Milk.

Only Use Drugs Approved for Lactating Dairy Cows.

Tests listed below are approved by the FDA for residue testing. These tests are believed to be reliable indicators of antibiotic contamination in milk and should be viewed as tools to screen bulk tank milk.

Test Name	Residues Detected At or Below Safe/Tolerance Levels
BetaStar Plus Beta-lactam Test (FDA-Approved)	Amoxicillin, Ampicillin,Ceftiofur, Cephapirin, Cloxacillin, Penicillin
Charm II Amphenicol Test (FDA-Apporved)	Chloramphenicol
Charm II Beta-lactam Test (Competitive) (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Hetacillin, Penicillin
Charm II Beta-lactam Test (Quantitative) (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Cloxacillin, Hetacillin, Penicillin
Charm II Beta-lactam Test (Sequential) (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Hetacillin, Penicillin
Charm *B. stearothermophilus* Tablet Disc Assay (FDA-Approved)	Amoxicillin, Ampicillin, Cephapirin, Hetacillin, Penicillin, Pirlimycin
Charm SL Beta-lactam Test (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Hetacillin, Penicillin
Charm 3 SL3 Beta-lactam Test (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Cloxacillin, Hetacillin, Penicillin
Charm Flunixin and Beta-lactam Test (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Cloxacillin, Flunixin, Hetacillin, Penicillin
Charm SL6 Beta-lactam Test (FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Cloxacillin, Hetacillin, Penicillin
Charm II Test for Cloxacillin in Milk (Competitive Assay) (FDA-Approved)	Cloxacillin
Charm II Sulfa Drug Test (Competitive Assay) (FDA-Approved)	Sulfadiazine, Sulfadimethoxine, Sulfamethazine, Sulfathiazole
Charm II Tetracycline Test (FDA-Approved)	Chlortetracycline, Oxytetracycline, Tetracycline
Delvotest P 5 Pack (FDA-Approved)	Amoxicillin, Ampicillin, Cephapirin, Penicillin, Pirlimycin, Tetracycline
Delvotest P/Delvotest P Mini (FDA-Approved)	Amoxicillin, Ampicillin, Cephapirin, Penicillin, Pirlimycin, Tetracycline
Delvotest SP/Delvotest SP Mini (FDA-Approved)	Amoxicillin, Ampicillin, Cephapirin, Penicillin, Pirlimycin, Tetracycline
New SNAP Beta-Lactam Test Kit (Reader, FDA-Approved)	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Penicillin

Milk Screening Tests

Screening Tests Available as of September 2013 for Detecting Drug Residues in Bulk Tank Milk.

Only Use Drugs Approved for Lactating Dairy Cows.

Tests listed below are NOT APPROVED by the FDA for residue testing.

Test Name	Residues Detected At or Below Safe/Tolerance Levels
2,4 D RaPID Assay	2,4-D
Atrazine RaPID Assay	Atrazine
Benomyl RaPID Assay	Carbendazim
Charm Cowside II Test	Amoxicillin, Ampicillin, Cephapirin, Chlortetracycline, Gentamicin, Hetacillin, Neomycin, Oxytetracycline, Penicillin, Pirlimycin, Tetracycline, Tylosin
Charm HPLC-Receptogram	Amoxicillin, Ampicillin, Ceftiofur, Cephapirin, Chlortetracycline, Cloxacillin, Penicillin, Sulfadiazine, Sulfadimethoxine, Sulfamethazine, Sulfathiazole, Oxytetracycline, Tetracycline
Charm II Gentamicin and Neomycin Test	Gentamicin, Neomycin
Charm II Novobiocin Test	Novobiocin
Charm II Macrolide Test	Erythromycin, Pirlimycin, Tylosin
Charm ROSA Sulfa Test	Sulfadiazine, Sulfadimethoxine, Sulfamethazine, Sulfathiazole, Sulfachlorpyridazine, Sulfamerazine, Sulfamethizole, Sulfamethoxazole, Sulfapyridine
Charm II Streptomycin Test	Dihydrostreptomycin, Gentamicin
Charm ROSA Streptomycin Test	Dihydrostreptomycin
Charm ROSA Tetracycline Test	Chlortetracycline, Oxytetracycline, Tetracycline
Charm II Aflatoxin Test	Aflatoxin M1
Charm SL Aflatoxin Test (Quantitative)	Aflatoxin M1
Penzyme® Milk Test	Amoxicillin, Ampicillin, Cephapirin, Penicillin
Reveal for Aflatoxin in M1	Aflatoxin M1
SNAP Tetracycline Test	Chlortetracycline, Oxytetracycline, Tetracycline
SNAP Aflatoxin M1 Test	Alfatoxin M1
SNAP Gentamicin Test	Gentamicin
SNAP Sulfamethazine Test	Sulfamethazine

Addresses and Telephone Numbers of Companies Marketing Drug Residue Tests

Charm Sciences Inc.
659 Andover St.
Lawrence, MA 01843
Phone: 800-343-2170

DSM Food Specialties USA, Inc.
45 Waterview Blvd.
Parsippany, NJ 07054
Phone: 800-662-4478

IDEXX Laboratories, Inc.
One IDEXX Drive
Westbrook, ME 04092
Phone: 800-321-0207

NEOGEN Corporation
620 Lesher Place
Lansing, MI 48912
Phone: 800-234-5333

SILVER LAKE
Research Corporation
911 So. Primrose Ave. Ste. N
Monrovia, CA 91016
Phone: 888-438-1942

Strategic Diagnostics, Inc.
111 Pencader Drive
Newark, DE 19702
Phone: 800-544-8881

Zeu-Inmunotec, S.L.
Polígono Plaza
C/Bari, 25 dpdo.
50197 Zaragoza SPAIN
(34) 976.731533

RESOURCES

VCPR Form

Sample Record-Keeping Forms

- 8-Step Plan for Keeping Records
- Recommended or Approved Drug List
- Sample Animal Treatment Plan
- Beginning Drug Inventory
- Record of Drug Purchases
- Daily Treatment Record
- Drug Disposal Record
- Certificate of Review

VETERINARY/CLIENT/PATIENT RELATIONSHIP VALIDATION FORM

I. Producer

Producer Name: _____

Address: _____City: _____Zip: _____

Farm Name and Location: _____

Section: _____Township: _____County: _____

Premises ID Number (optional): _____

Producer Signature: _____

Date: _____

II. Veterinarian

Name: _____

Address: _____City: _____Zip: _____

Clinic Name: _____

Phone Number: (_____)_____

I hearby certify that a valid Veterinarian/Client/Patient Relationship (VCPR) is established for the above listed owner and will remain in force until canceled by either party.

Veterinarian's Signature: _____

Date: _____

Adapted from the Center for Dairy Excellence

8-STEP PLAN for Keeping Records

(Please duplicate record pages for additional records as needed.)

Why keep drug records?

- **Prevent an accidental violative residue**
- **Save money**
- **Ensure effective herd health plan**
- **Reduce liability (drug records are required by law)**
- **Improve your veterinarian's effectiveness**

STEP 1

Recommended or Approved Drug List (Page 63)

Early in your discussion with your herd health veterinarian you need to make a narrow list of drugs to be used on your dairy. The intent is to reduce the scope of antibiotics used. A short list will permit you to focus your knowledge and will help to prevent an accidental violation of antibiotic residue laws.

STEP 2

Animal Treatment Plan (Page 64)

When practicing preventive medicine or treating early symptoms of a disease or infection, it is important to be consistent. The second step is for you to establish a treatment plan for your herd health practices. Review with your herd health veterinarian.

STEP 3

Beginning Inventory (Page 65)

You and your herd health veterinarian should discard all old drugs and all drugs not on your approved drug list (Step 1) then annually inventory the remaining drugs and other appropriate information.

STEP 4

Record Medicated Feed Purchases

Accidental antibiotic residues can occur from feeding practices as well as injections or other medical treatments. Be sure to clean feed equipment between batches. Carefully avoid disposing of leftover feed from feeder calves, hogs, etc., to lactating dairy cattle.

STEP 5

Record of Drug Purchases (Page 66)

Most successful dairy producers will record every purchase of drugs the day they are purchased. The FDA requires a paper trail of all drugs used on your dairy, so it is important to record the purchase of drugs promptly.

STEP 6

Daily Treatment Record (Page 67)

Milking and the sale of market cows will bring your Daily Treatment Record into use. Dairy producers that have accidently marketed milk or dairy beef with violative residues state that it is important to keep these records. Properly identify treated cows. Develop good habits to properly manage antibiotics.

STEP 7

Monthly Economic Comparison (Page 67)

When do you "cull" a market cow from your herd? Every month you should review the investment you are making in each cow in the milking string. Compare your expenses by using the Daily Treatment Records.

STEP 8

Drug Disposal (Page 68)

Periodic review of drugs in storage will mean you occasionally throw away drugs which have expired. By recording your daily animal treatments and any discarded drugs, you create a paper trail of what has happened to all drugs purchased. This eight-step antibiotic management system may prevent you from incurring a costly and embarrassing antibiotic accident!

Recommended or Approved Drug List for _____Dairy

(These are the only drugs to be used on my dairy.)

Veterinarian _____

Drug (Active Ingredient)	Company Name	Product Source	Animal Condition	Notes

Sample Animal Treatment Plan

Protocol Number	Diagnosis or Conditions Treated and Signs	Treatment Plan			Withdrawal Time		Appropriate Antibiotic Screening Test
		Antibiotic or Drug Used	Dose and Route	Length of Treatment	Milk (hrs)	Meat (days)	
1	*Mild Mastitis*	*Oxytocin*	*2cc IM*	*4 Milkings*			
2	*Mastitis w/ hard qtr.*	*Pirsue*	*24 hrs./2 times*	*2 days*	*36*	*28*	*none*
3	*dry treat*	*Tomorrow*	*1 tube/qtr.*	*once*	*72*	*42*	*follow label*

Animal Treatment Plan (review with veterinarian)

Protocol Number	Diagnosis or Conditions Treated and Signs	Treatment Plan			Withdrawal Time		Appropriate Antibiotic Screening Test
		Antibiotic or Drug Used	Dose and Route	Length of Treatment	Milk (hrs)	Meat (days)	

Beginning Drug Inventory

Drug Name	Amount Stored	OTC or Rx	"Extra-Label" Use	Meets Labeling Requirments		Storage Location	Indications for Use			Screening Tests Names
				Yes	No		Lactating	Cull Cows and Calves	Both	

Record of Drug Purchases

Drug Purchased	Date Purchased	Where Purchased	Amount Purchased	Purpose	Notes

Daily Treatment Record Herd _____ Veterinarian _____

Developed by the American Association of Bovine Practitioners

Cow ID	Time of Treatment				Pen	Diagnosis	Treatment	Withdrawal Time		Calculated Withdrawal Period Expires Milk/Meat	Actual Date In Tank	Residue Test		Remarks for example: initials of person treating or testing
	Date	AM	PM	3X				Milk (hrs)	Meat (days)			Date Tested	Test Results	
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								
						LF RF LR RR								

Drug Disposal Record

Date	Drug	Reason for Disposal	Method of Disposal	Notes

Milk and Dairy Beef Residue Prevention

2014

Producer's Certificate of Participation

presented to

_____
Producer/Dairy Name

_____
Permit Number

_____
Field Representative of Cooperative or Proprietary Dairy

_____
Date

I have reviewed the Milk and Dairy Beef Residue Prevention manual with _____, D.V.M., V.M.D. I agree to implement appropriate management procedures to avoid violative drug residues from the milk or dairy beef produced at my dairy. I understand that I am responsible for any drug residues that occur in my milk or meat animals. I am renewing my commitment to meeting the consumers' concern for quality.

_____ _____
Producer Signature **Date**

I have reviewed the Milk and Dairy Beef Residue Prevention manual with _____. I have explained the manual to the producer named above. The producer acknowledges that he/she understands the best management practices and the actions that need to be implemented. Upon request by the dairy producer, I will provide additional recommendations designed specifically for this dairy including individual consultation as needed.

_____ _____
Consulting Veterinarian's Signature **Date**

National Milk Producers Federation (NMPF) has prepared the Milk and Dairy Beef Residue Manual as part of its Farmers Assuring Responsible Management (FARM) program. This certificate affirms both the commitment of the dairy producer to adhere to the terms of that manual, and the oversight and supervision of the producer's consulting veterinarian. NMPF makes no separate guarantees or representations with respect to producer's adherence.

NATIONAL MILK PRODUCERS FEDERATION

The National Dairy FARM Program:

Farmers Assuring Responsible Management™

The National Dairy FARM Program™ is a nationwide, verifiable animal well-being program designed to demonstrate that U.S. milk producers are committed to the highest quality standards.

Education

Participating producers will be provided training materials that include a comprehensive animal care resource manual, a quick-reference user guide, animal care instructional videos and other educational materials. An on-farm instructor may be available from your cooperative or other source.

On-Farm Evaluation

Once a producer completes the education component, an on-farm evaluation will be completed by a trained veterinarian, extension educator, co-op field staff member, university personnel, or otherwise qualified personnel who have completed National Dairy FARM Program training. The producer then receives a status report and, if necessary, an action plan for improvement.

Third-Party Verification

To protect the integrity and credibility of the program, and enhance consumer trust, the National Dairy FARM Program includes objective third-party verification – a quantifiable validation that producers are meeting their ethical obligation for on-farm animal care.

Photos courtesy of DMI

www.nationaldairyfarm.com

www.nationaldairyfarm.com