Preventing Illegal Antibiotic Residues in Beef Products

One of the responsibilities of the United States Department of Agriculture – Food Safety and Inspection Service (USDA-FSIS) is to monitor for illegal drug residues in beef products intended for human consumption. However, the prevention of illegal antibiotic residues is a continuous, coordinated effort between government agencies, veterinarians, and livestock producers that begins before the antibiotic is ever used in animals. The drug approval process, on-farm antibiotic use measures and the US National Residue Program are all specifically designed to prevent animal products with illegal drug residues from entering the food supply.

Animal Drug Approval Process

Before an antibiotic to be used in veterinary medicine is approved by the Food and Drug Administration, the animal health company must prove that it is both safe and effective for the intended animal patient, much like the drug approval process for human antibiotics. If the intended patient is a food-producing animal, there is an additional requirement to prove that use of the antibiotic does not present a risk to human health. Currently, 13 drugs are restricted for use in food-producing animals due to potential human health concerns[1]. In addition, the veterinary profession has discouraged the use of certain additional antibiotics due to the high potential for an illegal residue.[2]

Drugs, families of drugs, and substances 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 routed of administration; or
III. If the drug is not approved for that species and production class.
Drugs, or classes of drugs, approved for treating or preventing influenza A, prohibited from extra-label use in chickens, turkeys, and ducks
1. Adamantanes
2. Neuraminidase inhibitors
SOURCE: 61 FR 57743, Nov. 7, 1996, Subpart E

When an antibiotic can be safely used in food-producing animals, the animal health company must conduct research to establish a withdrawal period. The withdrawal period is the time between the last dose of the antibiotic and the time when the animal can be safely slaughtered for food (or the milk can be safely consumed in dairy cattle)[3]. The recommended withdrawal time not only protects the consumer of the food product from exposure to illegal antibiotic residues, but also assures the livestock producer that his/her animals meet the applicable requirements.

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On-farm Antibiotic Use Measures

Illegal antibiotic residues are not possible in animals that have never been exposed to antibiotics. That is why cattle veterinarians[4] and livestock producers[5] are committed to preventive health management and nutritional programs that limit the need for antibiotics.

When an animal must receive antibiotic treatment for a bacterial infection, several safeguards can prevent an illegal antibiotic residue. Of all the on-farm measures taken to protect against illegal antibiotic residues, the most important are complete antibiotic treatment records and animal identification. Antibiotic treatment records are used to verify that the proper withdrawal time (established during the approval process for that specific antibiotic) has been observed prior to harvest. Animals that have been treated with antibiotics, but have not yet met the full withdrawal period, can be removed from the group based on their identification and marketed at a later date.

The prevention of drug residues is further ensured as veterinarians and producers work together to: use antibiotics according to the label directions (dose, route and frequency of administration, and duration of treatment), provide training on the proper use of antibiotics in cattle and use antibiotics with the shortest withdrawal time, whenever possible.

US National Residue Program

The final step in protecting and preventing illegal antibiotic residues from entering the food supply is surveillance testing conducted by the USDA – FSIS. The program consists primarily of 2 tiers of testing: scheduled and inspector generated. Scheduled antibiotic residue testing is pre-planned to provide a large sample across different food animal industries (beef cattle, veal calves, swine, poultry, etc.) and locations. As scheduled sampling is purposely designed to collect samples from several locations and classes of animals (beef, dairy, veal, pork, etc.), it ensures adequate testing to make conclusions regarding the overall status of antibiotic residues in our food supply and to direct future surveillance efforts. In the most current National Residue Program report (2012), 5,838 scheduled samples were collected with 12 illegal residues detected (less than 1%).[6]

Inspector generated samples are collected from animal carcasses that show signs of previous disease or medical treatments – animals that may present an above average risk for illegal antibiotic residues. In the 2012 sampling period, 214,654 samples were screened for potential residues. Of these, 1,166 (<1%) were confirmed positive, representing a decrease in positive samples of almost 10% from the previous year.[6]

In the rare cases when an illegal drug residue is confirmed, that beef product is considered "adulterated" and is never allowed to enter the food supply. The USDA and FDA then initiate a cooperative effort to investigate the reasons for the illegal residue. Depending on the severity of the residue, the intent and history of violations, the investigation may lead to a variety of outcomes for the animal owner from a warning letter to injunction to criminal prosecution.

Each of these areas represents a vital part of what the entire beef industry is doing, along with many others, to prevent illegal antibiotic residues. Although some areas are often more apparent than others, it is important to recognize that they do not work independently. Rather, they are the coordinated parts of a continuum to protect the integrity of our food supply.

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