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Antibiotic Use in Animals

This NebGuide provides general guidelines about some of the problems that can occur when using antibiotics in treating animals.

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Antibiotics are frequently used, and misused, by animal owners in an attempt to remedy disease problems. This use is encouraged by drug company sales efforts, economic pressures, and easy access to the products.

Improper use of antibiotics is costly, detrimental, and may result in: 1) delayed diagnosis; 2) ineffectiveness; 3) toxicity (poisoning); 4) allergic reactions; and 5) drug residue contamination of food animal products.

After evaluating possible benefits and risks, determining whether or not to use antibiotics for treatment depends on the diagnosis, including the bacterium involved and the specific drug and its dosage schedule. Which drug to select also hinges on the course of the infection, and the chemistry or pharmacology of the drug in the live animal.

It is important to realize that most animals recover from disease with no treatment. This is due to their own defense mechanism. Therefore, antibiotic treatment is not the only, or necessarily the best, defense. Treatment frequently aids in providing time for the immune response to reach protective levels.

Diagnosing the problem by clinical (on site) and laboratory procedures in *each* field case would be ideal, but is often impractical. Additional information concerning past history of the herd and environmental factors provide a basis for medical decision making. Similarly, laboratory work is necessary at some point in the course of many problems if you are to expect effectiveness of treatment procedures.

When the presence of a specific pathogen has been established in the laboratory, antibiotic susceptibility (sensitivity) tests can be conducted to aid in proper drug selection. Confusion seems to exist about

antibiotic susceptibility tests. There is an apparent lack of understanding about both their interpretation and the role such testing plays in a treatment program. In the laboratory, isolated bacteria are exposed to a variety of antibiotics. If the organism is killed or its growth restricted by one of these antibiotics, that bacteria is assumed to be susceptible to that drug. If the organism continues to multiply, it is assumed to be resistant to that antibiotic.

A single species of bacteria, such as *Staphylococcus aureus*, has many strains or types that may vary in their susceptibility to a given antibiotic. For this reason, it is important to determine in the laboratory if a certain strain in a particular animal or herd is susceptible or resistant to various antibiotics. If an organism is resistant to a drug such as penicillin in a laboratory test, selecting penicillin for treating the animal would not be advisable. On the other hand, susceptibility to a specific antibiotic in the laboratory tests does not necessarily mean that that antibiotic will be effective in controlling the infection in the animal. This apparent contradiction is due to the many uncontrolled factors present in the live animal as opposed to the controlled conditions of the laboratory. Many producers have seen this happen in their treatments--the laboratory report indicates susceptibility, yet that particular drug provides no, or poor, results. In spite of this, standardized susceptibility testing is a valuable means for assisting with the selection of an antibiotic. Professional interpretation and evaluation of herd health history and good individual animal records are also important factors to consider before final selection of the antibiotic. The point to be made is that a laboratory report indicating susceptibility of a bacterium to a particular antibiotic does not mean treatment with this antibiotic will guarantee elimination of the infection. For this reason, selecting antibiotics based on correct laboratory data and subsequent modifications of treatment regimen are best managed by a veterinarian.

Causes of Antibiotic Failure

1. Incorrect diagnosis--the disease may be noninfectious.
2. The disease may be due to organisms that don't respond to antibiotics (i.e., a virus).
3. Incorrect route of administration or dosage.
4. The drug may suppress normal body defense mechanisms.
5. The drug may encourage the development of resistant pathogens.
6. There is a possibility of many other complex incompatibilities.

Guidelines To Minimize Treatment Failures

1. Avoid using a combination of antibiotics in treatment.
2. Avoid using multiple treatment regimens for the same animal.
3. Treat early and long enough.
4. Consult a veterinarian about the animal.

Summary

The indiscriminate use of antibiotics is costly and can be a deterrent to supplying quality food animal products that are free of residues. The dangers of unsupervised antibiotic use are numerous and, under some circumstances, can result in liability and health risks. Veterinary counsel should be sought concerning the use and compatibility of drugs before treating animals. Although the actual administration of medicine may not appear to be difficult, the activity of the drug within the living animal is very complex and can adversely affect the animal, food animal products, and the consumer.

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F-3 General Livestock

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