

ISSUED: 10-85

REVISED:

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### Therapeutic Selection in Swine

Antibiotics do not attack all disease-causing organisms found in the pig. However, antibiotics or chemotherapeutic agents [i.e. sulfonamides, Furox] may be prescribed by your veterinarian to control concurrent or secondary bacterial infections that may intensify a viral infection.

All drug preparations are approved for specific disease control and for treatment dosages. These use instructions appear on the product label, Use of any product for other than label approval is an extra-label usage. In 1984, the Food and Drug Administration [FDA] approved a policy that allows extra-label usage under the direction of a veterinarian, The veterinarian must be familiar with the livestock operation, be available for retreatment and, with the owner, be responsible for drug residues which might occur because of the treatment. These regulations are similar to use restrictions on prescription drugs. Feed additives are under separate rules which do not allow extra-label or prescription usage. The only legally acceptable usages of feed additives are the approved uses. A feed mill or other third party cannot mix feed additives at other than approved usage.

A variety of common swine diseases use extra-label drug treatment programs. Coccidiosis is a diarrheal disease of baby pigs caused by a protozoan [*Isospora suis*]. A variety of sulfonamides and other drugs are used to treat this condition on an extra-label basis. Each pig must be individually treated orally for about 3 days. The treatment drugs are coccidiostats, which hold the total number of coccidia in the gut down, but do not prevent infection or completely remove the infection.

Therefore, treatment must be continued for several days to weeks to be effective. Because coccidiosis in piglets generally occurs from 5 to 21 days of age, entire litters should be treated several days before an anticipated outbreak. The parasitic life cycle is so advanced by the time diarrhea develops that treatment may not give a good response.

With all disease conditions, treatment of sick animals should be started as early as possible to get the best results. Most therapeutic agents are most effective on the rapidly multiplying bacteria found early in the course of a disease.

When selecting a therapeutic agent to treat a sick animal, a veterinarian should help diagnose a problem and determine an appropriate drug, route of administration, and dosage. These will vary depending on the disease condition and its severity. If response to the initial drug is not good, further tests may be required to make a rational drug selection. In some cases, this may include a laboratory isolation of the disease-causing organism and performance of tests to determine which drugs are most likely to be effective against the organism.

### Medicating Drinking Water

When using therapeutics in treating swine, medicating through the drinking water is an excellent and economical treatment method because the most important diseases are infectious and usually are herd problems, Water treatment offers the advantages of quick action, the capability of providing therapeutic levels of medication at economical rates, and lower labor requirements over individual treatment.

Water medication is preferred over feed additives because when pigs are sick, they will usually stop eating feed before they stop drinking water. This is particularly true for diseases such as swine dysentery [bloody scours] and some pneumonias. Baby pigs still nursing cannot be treated through water or feed and should be individually treated. Also, severely sick pigs should be treated individually. They require high levels of medication and may not be eating or drinking enough to obtain the medication. In some cases, both water and feed medication for the entire group and individual treatment of the most severely ill animals are required.

#### Reasons for Drug Failure

Drugs do not always work and there may be several reasons why. One major reason is not maintaining the dosage schedule long enough or not administering enough drugs in a treatment program. It is very important to follow the correct dosages at the correct time intervals. This is where a veterinarian's experience can provide valuable guidance. In some cases, it can be the difference between successful treatment and disaster.

The use of tetracyclines in feed demonstrates a special problem. When given orally, tetracyclines may bind or be tied up with certain compounds, particularly calcium and iron, so this causes the drug to stay in the gut and not be absorbed to its fullest extent. Therefore, excessive amounts of calcium and iron in the ration may be detrimental to the tetracyclines being used. Similarly drugs may be chemically altered when mixed with another injection product, possibly dropping effectiveness to zero.

Antibiotics and sulfonamides may be rendered ineffective if bacteria become resistant to them after prolonged usage. Such drugs should not be used indiscriminately or casually. Rotate the use of treatment drugs or families of drugs to reduce specific resistance by bacteria.

#### General Rules for Selecting Drugs

If therapy is not working and a switch to a different drug is considered, there are some general rules to keep in mind about selecting drugs.

- 1.If an organism is resistant to one of the tetracyclines, it will be resistant to all of the tetracyclines. For example, if chlortetracycline fails, oxytetracycline probably will not work either.
- 2.If an organism is resistant to one sulfonamide, it will be resistant to all sulfonamides. For example, switching from a short-acting sulfonamide to a longer-acting one may not work; or switching from sulfamethazine to sulfathiazole may not work either.
- 3.Organisms resistant to gentamycin will be resistant to neomycin and dihydrostreptomycin as well. Organisms resistant to neomycin will be resistant to dihydrostreptomycin but may or may not be resistant to gentamycin.

The antibiotics effective against gram positive organisms do not generally carry cross resistance. Therefore, if one is ineffective, change to another one to get a possible response.

#### Avoiding Violative Residues

When using drugs, there is always a potential for violative residues. Some drugs are available only in oral forms [bolus, tablet, etc.] because if given by injection, they leave residues for long periods. Drugs falling into this Category will stay in the gastrointestinal tract and effectively treat diarrheas or gut infections, but will not be absorbed into the rest of the body. They may have a low safety margin at other locations in the animal's body, but are very safe in the gut. If injected, these drugs attach to cells in

the body and stay for prolonged periods--greatly increasing drug withdrawal times. An example of this type of drug is neomycin.

The only way to be sure that residue problems are avoided is to read the label carefully and use the drug according to instructions. Labels may change as new data are collected.

To avoid violative residues follow these rules:

1. Read the instructions carefully.
2. Use the recommended dose.
3. Use the recommended route of administration.
4. Use the drug only in the animal species for which it is approved.
5. Do not use the same drug in two different dosage forms at the same time, i.e., oral and injectable. This may significantly increase withdrawal times.
6. Select injection sites carefully. Drugs are much more rapidly absorbed from muscle than from fat. Deposition of drugs into fat may result not only in poor response to treatment, but residues as well.
7. Keep accurate records. From these, calculate withdrawal times for any and all drugs administered. Calculate withdraws from the last day of treatment.
8. Never mix drugs that do not come premixed. This may lead to ineffective treatment (mixing may destroy one or more of the products mixed), prolonged drug residues, and adverse reactions in the animals.
9. Never use drugs without withdrawal information being provided.
10. Thoroughly clean all feed and water handling equipment and scrape pens when removing swine from medicated feed or water.

#### Conclusion

Careful selection and use of therapeutic agents for swine will increase health in the herd, help reduce production costs, increase productivity, and minimize the residues found in meat due to antibacterial drug usage. Careless use can be expensive and cause harm to the producer.