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Pesticide Removal from Dairy Cows
Michigan State University
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Pesticide Removal from Dairy Cows

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By Robert M. Cook, Assistant Professor, Department of Dairy

Contamination of meat and milk with chlorinated hydrocarbon pesticides is a problem in animal agriculture. In fact, if the level of dieldrin in milk fat is 0.3 ppm (parts per million) or higher, or the level of DDT is 1.25 ppm in milk fat, the milk can be legally withdrawn from market.

Without special treatment, it may take a milk cow a year or more to eliminate the pesticides from her body. But, recent research by dairy scientists at Michigan State University shows that there is a much quicker way to eliminate chlorinated hydrocarbon pesticides.

Cows can get chlorinated pesticides through contaminated feed. Dairymen should not only take special care in pesticide control of their own grain and forage crops but also make certain that drift from treatments of crops and orchards by neighbors does not contaminate these fields. Dairymen should also make sure that they do not purchase contaminated grain and forage.

Activated Carbon and Phenobarbital Therapy

Cows secrete pesticides not only into milk, but also into the pancreatic juice, saliva, bile and probably intestinal juice, which all enter into the intestinal tract. This means that chlorinated hydrocarbon pesticides are originally absorbed from the stomach into the blood stream and recycled back to the stomach in the saliva and digestive juices.

Feeding a pesticide adsorbent, such as activated carbon, will trap the pesticide in the gut of the animal and increase excretion to rid the animal of contamination through feces (manure).

The drug, phenobarbital, stimulates the ability of the liver to break down the fat-soluble dieldrin into water-soluble forms that the kidneys excrete in urine.

Thus, treatment of cattle with phenobarbital can increase dieldrin excretion in the urine, while treatment with activated carbon can increase excretion in the feces.

In the early summer of 1969, a large-scale field test on a contaminated 100-cow dairy herd in Kentucky supported the Michigan State University research. In fact, the herd's milk was back on the market within 40 days after treatment of activated carbon and phenobarbital was started. The source of contamination was a load of purchased oats, which had been treated with aldrin and mixed in the parlor-fed grain ration. (Aldrin turns to dieldrin in the cow's digestive process.)

What To Do When Cows Are Contaminated

If you, or your milk inspector, find that your herd has been contaminated with chlorinated hydrocarbon pesticides, MSU researchers recommend that you take these steps immediately:

1. Check all feed, water and even insecticide sprays used to determine source of contamination. (You will need to send samples to the Michigan Department of Agriculture for analysis. Your veterinarian, milk inspector, or county extension office will advise you on how to make these tests.)
2. If it is an acute case of chlorinated hydrocarbon pesticide poisoning, cows should be drenched with four or five pounds of activated carbon. The drench can be a slurry made of three parts water and one part carbon. (Activated carbon may be difficult to find. Some dry cleaners use it to clean their cleaning fluid and may have a limited supply. It is manufactured by Atlas Chemical Industries, Inc., Wilmington, Del., 19899, as *Darco S-51*. Other manufacturers may make it, but this company is the source of supply used in MSU research work.)
3. If cows are in convulsions, your veterinarian may also treat the cows with intravenous injections of phenobarbital or some other barbituate. When intravenous injections of phenobarbital cease, this drug should then be fed at a rate of 10 milligrams per kilogram body weight, per day. This amounts to about five grams (one tablespoon) daily. Treatment should be continued for six weeks or until milk tests show that pesticides are below tolerance levels. Phenobarbital can be added to the grain ration. Milk should not be marketed until seven days after phenobarbital feeding has been stopped. Your veterinarian is the source for this drug.
4. Carbon should be fed at the rate of two pounds per head daily for a 1,200 lb. cow. It is very difficult to handle since it is about the consistency of ashes. However, it can be fed successfully by mixing either with silage or grain. For easier handling, mix it with an equal weight of water to form a dust-free solid material. Cows do not dislike the carbon, even though it discolors the feed and makes it look unpalatable.

Cost of Treatments

If activated carbon can be purchased in ton quantities from the manufacturer or its distributor, the cost for both the carbon and drug treatments should be between 50 and 75 cents per cow daily. This may sound high to the average dairyman, but getting the herd's milk back on the market in 40 days instead of a year or more will soon allow the dairyman to recover his cost plus veterinarian expenses.

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