

RESPONSIBILITIES FOR CHEMICAL USE AND RESIDUES

R. R. Legault
Department of Agricultural Chemistry
Washington State University, Pullman, Washington

First responsibility lies with the organization that will market the chemical, usually the manufacturer. He must present convincing evidence to the Pesticide Regulations Division of the U.S. Department of Agriculture as to the need and efficiency of the chemical. Usually, this demands tests of the chemical's ability to control the pest without damage to the crop in several areas of the country. At the same time the manufacturer must present evidence on the fate of the pesticide when used on the crop. Thus, he must present data on the amount of chemical, called residue, in or on the crop. The residue may be a portion of the original pesticide chemical or it may be conversion products, or both. An example is the existence of both dieldrin and aldrin residues when aldrin alone is used for crop protection. There are numerous examples of this sort. Doubtless more will be found because greater attention is being paid to this problem.

If use of the pesticide chemical according to directions leaves no residue on the crop the USDA may grant registration on the so-called No Residue Basis. Any grower, who uses this chemical must follow directions otherwise a residue may be left on the crop. This would make the crop illegal and subject to seizure. Inasmuch as State and Federal laws are similar with regard to regulation of pesticides, the crop would be illegal both for inter- and intra-state commerce.

On the other hand, if the evidence presented by the manufacturer shows residues on the crop, he has the choice of abandoning his project or of petitioning the Federal Food and Drug Administration for a tolerance. This calls for more information. In addition to data on the amounts and nature of residues found on the crop, he must present FDA with data on the toxicity of the original chemical and on each kind of residue entailed in its use. This includes data on both chronic and acute toxicity. This kind of information is costly and it requires at least 2 years of experimentation.

If the toxicity data show no danger to public health through use of the pesticide chemical according to directions, the FDA must grant a tolerance. This is a definite amount, such as 7 parts per million, that will be allowed on the crop. In setting the tolerance, FDA takes into account many factors such as the amount of residue involved when the chemical is used properly. It takes into account the toxicity of the chemical. Also, it takes into account other matters too numerous for consideration here. The crop will be legal so long as its load of the particular residue does not exceed the established tolerance. It is most important to bear in mind that the load of residue will depend on the amount of chemical used in protecting the crop, on the growth of the crop when the pesticide is applied, on the kind of formulation used, and on other details.

As the grower is responsible for residues on his crops, he must avoid practices that might lead to excessive residues. To this end, he should follow official

recommendations related to use of the pesticide. In most instances, directions on the label are adequate. However, there are instances when local conditions may require special care.

Official recommendations issued by Washington State University are based on many considerations, most of which must be checked for influences of local conditions.

- (1) The chemical must be satisfactory for control of the pest.
- (2) It must not cause injury to the crop.
- (3) Residue information must be available for both the edible part of the crop and byproducts used as feed. This information must be complete so as to show the residue levels related to (a) various growth stages of the crop, (b) recommended dosage, and (c) more than recommended dosage.
- (4) In addition, evidence must show that the pesticide chemical does not impart off-flavor to the crop.
- (5) Persistence of the pesticide residues in the soil is also considered as these may build up to dangerous levels in succeeding years. There is also the danger of injury or illegal contamination of another crop that follows in the rotation system.
- (6) Last but not least among responsibilities related to recommendations is the legal status of the pesticide for the intended use. This calls for up-to-date information on both registration and tolerance status because these may and sometimes do change from season to season.

It is clearly evident that legal clearance for use of pesticide chemicals calls for work on many fronts. The manufacturer usually initiates the action, but he finds it necessary to enlist the help of others. Thus, he calls on State Experiment Stations for assistance in testing chemicals for effectiveness in controlling pests. At the same time, he may solicit assistance of the Stations in determination of residues. Grants-in-aid are usually made by the manufacturer to cover some of the expenses. Toxicity tests are usually made under contract between the manufacturer and private laboratories. Simultaneously, research of each type may be done by federal laboratories. All of this is to fulfill the responsibility of safeguarding the public health.

There is a tremendous amount of experimental work involved in use of pesticide chemicals. It is necessary to do field and pesticide residue work for each crop-chemical combination. Every distinct difference in formulation and in mode of application calls for experimental work to insure against injury to the crop or excessive residues. This is to cover such variations as time of application, foliar or soil treatment, dust or spray, etc. In view of the complexity it is not surprising to find great need for more information even for chemicals that have been used commercially for many years.

A clear understanding of the many responsibilities involved in use of agricultural chemicals is essential to their continued use. To this end it is important to establish and to maintain effective communication between WSU and growers. Through cooperation we can avoid misuse of pesticides that are so vital to the economy.