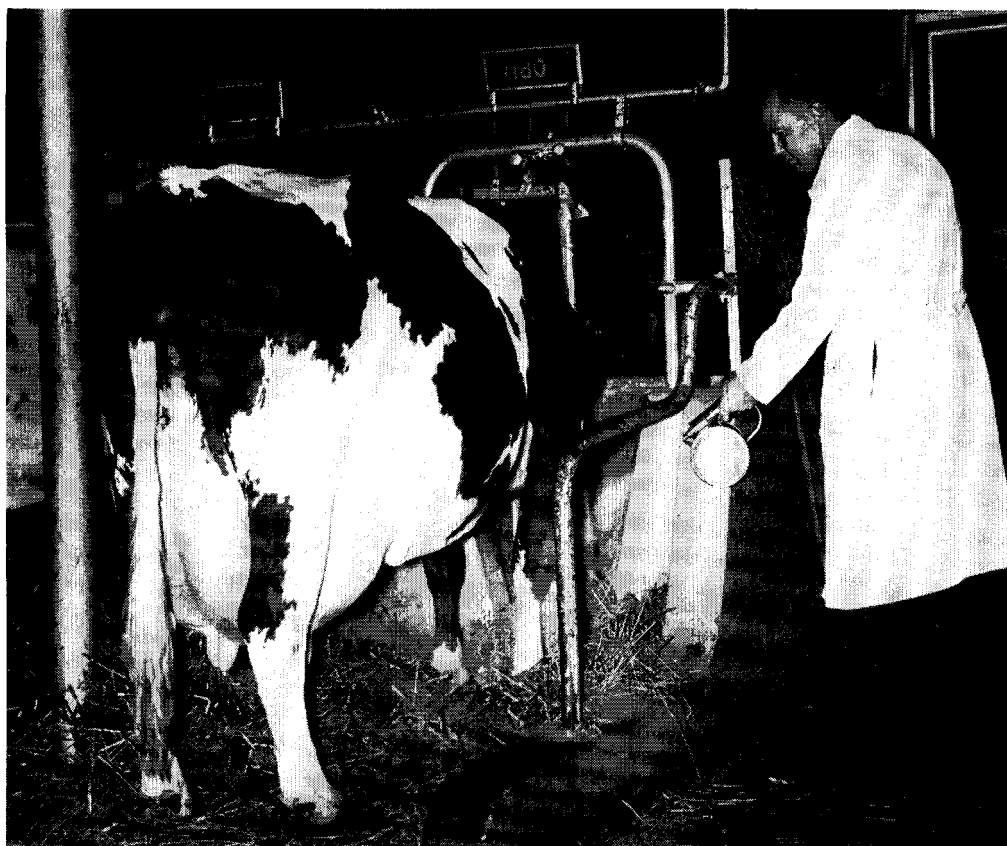


Significance of Pesticide Residues in Milk and Meat

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Is reluctance to tackle problems of pesticide residues in milk and meat a new, scientific version of taking the Fifth Amendment?



It seems to be no secret that under certain circumstances some pesticides may and do appear in milk and meat. Scientists with some breadth of training and experience in toxicology, pharmacology, and biochemistry anticipated such an eventuality. They readily accepted this discovery as a simple scientific fact which, without presenting cause for undue alarm, merely pinpointed a need for additional research data to evaluate the actual, potential, and imaginary hazards that may be involved.

On the other hand, to those individuals dedicated to a continuing campaign for the defamation and condemnation of pesticides, the appearance of pesticide residues in meat and milk represented one more ghost, which, when properly dressed with misinformation, suspicion, and apprehension, could be paraded before a perplexed and skeptical public as another horrible example of the hazards involved in pesticide usage.

The more rabid critics of pesticides demand that their use be discontinued and that they be replaced by other methods of pest control. The nature and availability of the methods they propose are left to your imagination or are presented as proposals about as fantastically absurd as the claims on which they base their condemnation of pesticides. They assume, or at least imply, that all scientists who in any way contribute to the development of

pesticides and their use are engaged in a gigantic conspiracy designed to promote the welfare and the profits of the chemical industry. They seem totally unaware that traditionally entomologists, plant pathologists, and biologists in general have held to the fundamental concept that pest control is or should be largely biological in nature. They ignore the fact that most of these practical scientists regard the use of pesticidal chemicals as emergency or fire-fighting methods, to be used largely where appropriate ecological control measures have not been developed or have not been properly applied.

More enlightened individuals are, of course, aware that for many years entomologists devoted most of their research time to biological and ecological studies. As a matter of fact, for many years biological, ecological, cultural, and mechanical control measures dominated all pest control activity, and it was only after such methods proved wholly inadequate to give the degree of pest control expected and demanded by the public that entomologists and others cautiously and reluctantly turned to the use of chemicals.

The American people enjoy the most abundant and varied diet of any nation in history, thanks to modern technology. At the same time, the Food Protection Committee of the National Research Council warns that "Maintenance of the present nutri-

tional status of the American public is contingent upon the continued production of an adequate food supply. Plant and animal pests rank among the foremost causes of food destruction, food deterioration, and food contamination. Hence, the necessity of protecting growing crops and produce from serious attack by insects, plant diseases, and other pests is quite obvious to all concerned."

The benefits to be derived from wise and expedient use of pesticides have been evident in the most spectacular way in controlling the insect vectors of malaria, typhus fever, bubonic plague, and many other devastating diseases of man and his domestic animals. It seems doubtful that there is a single state, national, or international public health agency that would now consider abandoning the use of pesticides. Rather, it is in this field we find the world's outstanding experts carefully weighing well-calculated risks to the extent that they are willing to endorse hazardous recommendations that may mean the almost certain illness of some, and perhaps even the death of a few individuals, when the only alternative is the illness of thousands and the death of many.

In the past few years pesticides have come to play a vital role in man's everyday life. As chemical tools, they have taken their rightful place along with electrical and mechanical tools as essential components of 20th cen-

tury technology. While it is possible, if not indeed probable, that in years to come biological and ecological control measures may play a greater role in pest control, for the present we must face the fact that pesticides are here to stay. And whether we like it or not, their use will undoubtedly increase before there is any evidence of significant decline.

Actually, the public health aspects of the pesticide residue problem have been thoroughly reviewed by several scientific bodies, notably the World Health Organization, the U. S. Public Health Service, the U. S. Food and Drug Administration, the food protection committee of the National Research Council, and the committee on toxicology of the American Medical Association. The general conclusions drawn in each instance were: (a) large-scale usage of pesticides in the manner recommended by manufacturers or competent authorities, and consistent with the rules and regulations promulgated under existing laws, is not inconsistent with sound public health programs; and (b) although careless or unauthorized use of pesticidal chemicals might pose potential hazards requiring further consideration and study, there is no cause for alarm.

Milk, Meat and the Miller Amendment

The Miller Amendment to the Food and Drug Act provided for the establishment of tolerances for pesticide residues on raw agricultural commodities. Meat and milk were not specifically mentioned, but it was generally assumed they would fall within the legislative intent of this act. Subsequently the Food and Drug Administration accepted a number of petitions proposing the establishment of tolerances for specified pesticides in the fat of various animals. After due study and deliberation, several such petitions were approved. For example, there is an officially established tolerance of 7 p.p.m. of DDT in the fat of cattle, hogs, and sheep.

At various times representatives of FDA have indicated their willingness to consider petitions for the establishment of tolerances in milk, and have at least implied that if the data presented in such a petition clearly established a sufficient degree of safety, a tolerance would be established. Several such petitions have been submitted, but apparently all but one were withdrawn before action was taken. Pesticide tolerance Petition 126, 1957, requesting the establishment of a tolerance of 0.25 p.p.m. of methoxychlor in milk, was referred to an advisory committee, and upon the recommendation of that

committee, FDA established the tolerance of 0 p.p.m. As matters stand today, there is no established tolerance other than 0 for any pesticide in milk; thus, technically, at least, the movement of milk containing any amount whatsoever of any insecticide is illegal in interstate commerce. To date, Canada has not established a tolerance for any pesticide in either meat or milk.

The special problems posed by the appearance of pesticide residues in milk and meat, and the procedures required for their practical solution, are visualized and evaluated quite differently by individuals and groups representing various social and economic interests: (1) There is a small group definitely and sometimes radically opposed to any and all types of pesticide residues. (2) The public at large is primarily interested in maintaining or improving its present standard of living, including its nutritional and public health aspects, by the most economical procedures available, provided the safety and wholesomeness of its food supply are adequately protected. (3) Officials of governmental regulatory agencies are primarily interested in guarding the rights and welfare of the public, but more specifically in the practical and efficient administration of the various laws, rules, and regulations for which they are responsible. (4) Representatives of the chemical industry are interested in development of sound, safe insect control practices that will promote the orderly marketing of their products with a minimum of unwarranted or essentially arbitrary and dictatorial regulations. (5) Farmers in general are interested in safe, sound insect control practices that will permit them to produce and market their crops efficiently and profitably. (6) Farmers engaged in the production of milk and meat are of necessity particularly interested in the development of sound practices that will permit them efficiently and effectively to meet prescribed residue tolerances; they will be hopeful, of course, that tolerances, rules, and regulations that may be imposed will be fair and as liberal as a sound, scientific balancing of farmers' needs and public health requirements will permit.

With so many distinct points of view and diverse interests involved, some conflicts of opinion will be inevitable, and perhaps a few heated controversies must be expected.

The appearance of pesticide residues in mammalian tissues is not new. It has long been known that some of the component parts of commonly used inorganic insecticides such as arsenic, lead, mercury, and fluorine were, under certain conditions, assimilated and deposited in some of the soft and bony

tissues of man and animals. However, the question of establishing tolerances for such substances in meat and milk was not raised until very recently. Even now the public's primary interest in pesticide residues in meat and milk seems to be essentially confined to the fat-soluble organic chlorinated hydrocarbon insecticides.

When preliminary research some 10 years ago indicated that animals might acquire some of the chlorinated hydrocarbon insecticides through one or more of three possible routes—inhala-tion, absorption, or ingestion—entomologists began an immediate review of current and proposed insect control recommendations.

While there was some doubt that inhalation was a factor, the very fact that barn spraying resulted in milk contamination led to the abandonment of chlorinated hydrocarbon insecticides as barn sprays. Livestock sprays containing such compounds were withdrawn from the market, including some where no incriminating evidence existed, and suspicion was hardly justified. Where the available data indicated milk contamination was probable, recommendations for the use of insecticides on forage crops were revoked. But it was in this field that differences of opinion were inevitable.

Since a pattern has been set by the establishment of tolerances for several compounds in animal fat, the problem of residues in meat is comparatively simple. For practical purposes, meat is just another raw agricultural commodity bearing a pesticide residue. In general, one can follow for meats the same types of procedures used for evaluation of residues on plants and other products, i.e., establish dosage-time-residue relationships, evaluate the toxicological hazards, and after comparing the two establish a sound, safe, and reasonable tolerance.

No Reason for Milk to Be the Sacred Cow

Milk presents quite a different problem. Because of its unique position as the principal item in the diet of infants, the infirm, and the aged, milk has been set apart as the one food which must be most diligently guarded. That is as it should be, and no one is more in favor of adequate safeguards for milk than the farmer, the entomologist, and the chemical manufacturer; for they, too, have loved ones to be protected. Furthermore, their reputations and the integrity of their products are at stake.

But while all seem to agree milk should receive special consideration, there seems to be no valid scientific or moral reason why it should be set apart

as something to be worshipped like the sacred cow of India if the establishment of safe tolerances falls within the realm of possibility. There are many competent scientists who feel this can and should be done. While not competent to pass judgment in this field, I feel that duly established tolerances at any level, including zero, when necessary, are more easily enforceable than no tolerance at all—that is, of course, provided the experts can and will reach some agreement on a suitable biological definition of zero, or its equivalent.

At the moment it would appear that the problems posed by the appearance of pesticide residues in milk are more psychological than biological in nature. The question is, "Do we have the wisdom, the intestinal fortitude, and the moral courage to stand up and face the problem squarely and fearlessly, and to resolve it solely on the basis of its scientific merit, or will we continue to bury our heads in the sand or hide behind smoke screens and pretend it does not exist?"

Actually, the basic scientific facts and principles are or soon will be pretty well established. Either the toxicology of the pesticides under consideration has been adequately developed, or we have erred in the establishment of tolerances for other raw agricultural commodities.

It has been quite clearly established that for any given species and any given time interval the quantity of a chlorinated hydrocarbon insecticide to be found in the fat will be in proportion to its concentration in the diet. Data already available or being developed in work now nearing completion should, if properly analyzed and evaluated, establish the propensity for storage in fat of most, if not all, pesticides in current use. Furthermore, it will be clearly established that chlorinated hydrocarbon insecticides are stored in body fat or excreted in milk in varying quantities depending upon the magnitude and duration of the exposure, the specific characteristics of the compound, and the species involved. It appears, therefore, that the solution of this problem lies in the field of public relations and education, rather than in science.

In view of the well demonstrated fact that he who dares to violate tradition almost certainly faces crucifixion by a press that has repeatedly demonstrated its avidity for exploiting the fantasies of skeptics and pseudoscientists at the expense of science and truth, it is doubtful that anyone can be found who will dare to assume the responsibility for advocating the establishment of even the safest tolerance for a foreign chemical in milk. It

seems clear that the Food and Drug Administration, while reiterating its willingness to consider such petitions, has no intention of assuming the responsibility of approving one. Furthermore, in the light of the report submitted by the special advisory committee appointed to review the methoxychlor petition, there is no reason to expect that such a committee will ever do more than find the data inadequate to permit development of any positive or negative conclusions. This being the case, there is little likelihood that we shall soon, if ever, have an officially established tolerance for any pesticide in milk.

Whether we have an established tolerance of zero or no tolerance at all makes no real difference; the endpoint is the same. In either case, any residue in milk moving in interstate commerce is illegal. The significant questions are: How much is any? And what is zero? The most logical and practical answers would be: Any is the smallest amount that can be detected and its presence established by the most sensitive analytical method available; a lesser amount would be zero. But it is not that simple. Let us suppose that we have a method sensitive to 0.01 p.p.m. for Compound A and a method sensitive only to 0.1 p.p.m. for Compound B, and that both A and B are present in the amount of 0.05; regardless of their respective toxicities, one is illegal and the other is not. This situation can and does exist. However, it would appear that, on the basis of the available toxicological data, toxicologists could, if they would, designate a level below which traces of a given substance would be inconsequential, e.g., A, 1.0 p.p.m.; B, 0.1 p.p.m.; or C, 0.01 p.p.m.

Perhaps the most baffling and controversial of the unsolved problems involves evaluation of pesticide residues on feed and forage crops. Forage moving in interstate commerce may go to any consumer. In most cases its ultimate destination and use are not known in advance; hence, of necessity all forage and feed moving in interstate commerce must be regarded as potential feed for dairy animals. It follows logically, therefore, that if the feed supply of dairy animals is to be protected, there can be no established tolerance for a pesticide on a forage crop unless it has been established that the amount designated will not result in the contamination of milk. This, of course, has a definite bearing on the recommendations that can be made for the control of pests on forage crops.

This question of tolerances for pesticide residues on forage crops is a knotty one. Large percentages of all

feed and forage crops never leave the farms on which they are produced, and therefore tolerances alone are hardly the answer to this problem. Here it would seem the judicious application of the Insecticide, Fungicide, and Rodenticide Act offers the greatest promise of a practical solution of the problem. Label warnings such as "Do not feed to dairy animals or animals being finished for slaughter" have been used with success, and the effectiveness of this device can be greatly enhanced by the development of additional educational programs—which can be successfully launched as rapidly as existing uncertainties are clarified by adequate tolerances and/or labeling.

Wholly Prohibiting Practical Uses of Pesticides is Futile

Attempts at wholly prohibiting many valid and practical uses for pesticides on all forage and feed crops, on the vague presumption that a small fraction of the crop so treated might conceivably eventually reach dairy animals, will prove futile; such prohibition was most certainly not the intent of the Congress which passed the Miller Bill. Some insist there will always be a few farmers who will not adhere to such label restrictions. This, of course, is true. But it is equally true that Congress has never passed a law and FDA has never promulgated a regulation that was universally obeyed.

The conversion of fruit and vegetable byproducts such as corn silage, apple pomace, and citrus pulp into animal feeds also creates a problem, but it should not be as serious as some would like us to believe. There is only one solution—educate the producers and users. For a government agency to prohibit a practical control measure that would protect a crop merely because some byproduct might find its way into dairy feed would amount to the usurpation of powers beyond the intent of Congress.

There are many instances of the timing of pest control applications so that the chemical residues have completely decomposed or have been reduced to the vanishing point before harvest. In the case of fruits, vegetables, and even some forage crops FDA under such conditions specified a tolerance of zero on the basis of no residue (less than 0.1 p.p.m.) present. In such cases FDA contended no tolerance was needed or justified. This all seems reasonable and proper until one discovers that the pesticide registration section of USDA may refuse label approval on a no-residue basis if it and its advisers refuse to accept failure to detect a residue by an analytical method sensitive