

# Scientific Approaches to Meat Inspection

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## Introduction

Greetings and welcome to the reciprocation session entitled "Scientific Approaches To Meat Inspection." My name is Herbert W. Ockerman and I am a professor in the meat science area of the Department of Animal Science at The Ohio State University. Working with this session this afternoon, we have as leader Mr. John McCutcheon from FSIS of USDA and as cooperators we have Dr. Charles F. Cook, Oscar Mayer Foods Corp. Charlie Cook will lead off the session and try to bring us up to speed on what is the responsibility of FSIS-USDA in the food inspection realm. Charlie is currently Manager of Regulatory Affairs, Oscar Mayer Foods Corp., Madison, Wis.

## FSIS-USDA Responsibility

C.F. Cook

I'd like to give you a quote from the Federal Meat and Poultry Regulation "Bible" (9 CFR), so we can get some definitions of what the responsibilities of USDA are in the area of meat inspection. Before I quote these definitions, I think it is important that we understand some of the legislative authority vested within USDA and how this flows down. Firstly, Congress in its wisdom enacted the Federal Meat Inspection Act, and for poultry, the Poultry Products Inspection Act. Subsequent to that, authority has been granted to the Department of Agriculture to enforce the provisions of the Act and in doing so, the Department of Agriculture codified their regulations in a document, "The Code of Federal Regulations."

As we look at the task of USDA, I think it is important that we understand what these regulations say. When you look at the Federal Meat Inspection Act and the Poultry Products Inspection Act, and eliminate all the "legalese," it says two

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things: Meat and poultry shall not be *adulterated*; and it shall not be *misbranded*. One of the problems is that lawyers wrote these documents and scientists are trying to enforce them; so let me read through the definitions of "adulterated" and "misbranded" and I think it will give you a better idea of where John McCutcheon is coming from when he discusses the scientific approaches to meat inspection. In the last few years we have seen tremendous changes in meat inspection. One of the things that Herb didn't mention in his introduction is that he is a member of a National Academy of Sciences task force which is addressing the scientific basis of meat and poultry inspection. We are all waiting for July 16th when this document is released and Herb's not quite sure if he's going to be in the country or not, or whether he wants to be in the country when that document is released.

Going back to the regulations, let's try to define some of these terms. The Act states that product shall not be adulterated or misbranded. What is an adulterated product? No. 1, if it bears or contains any poisonous or deleterious substance which may render it injurious to health. No. 2, if it bears or contains by reason of administration any substance, to the live animal or otherwise, any added poisonous or deleterious substance which may in the judgement of the administrator make any article unfit as human food. No. 3, if, in whole or in part, a raw agricultural commodity, and such commodity bears a pesticide chemical which is unsafe within the meaning of Section 408 of the Food, Drug and Cosmetic Act – if it bears or contains any additive which is unsafe within the meaning of 409; (you must know what 408 and 409 say), if it bears or contains any color additive which is unsafe. If it consists, in whole or in part, of any filthy, putrid, decomposed substance, or is for any other reason unhealthful. We talk about health. What is an unhealthful product – unwholesome or otherwise unfit for human food? No. 4, if it has been prepared or packed or held under unsanitary conditions. What are unsanitary conditions? No. 5, if it is, in whole or in part, the product of an animal which has died other than by slaughter. No. 6, if its container is composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health. No. 7, if it has been intentionally subjected to irradiation, unless the use of irradiation was in conformity with 409 of the Federal Food, Drug and Cosmetic Act. No. 8, if any valuable constituent has been, in whole or in part, subtracted from there on or has been substituted.

Let us look very briefly at the definition of misbranding. If its labeling is false or misleading in any particular manner, if it is offered for sale under the name of another food, if it is an

imitation of another food, unless its label bears in type of uniform size and prominence, the word "imitation." If its container is so formed or filled to be misleading – the name and place of business of the manufacturer or packer has to be there, – and there must be an accurate statement of the net weight. If any word, statement, or other information is required by authority of the Act to appear on the label, it must be in a prominent place. If it purports to be or is represented as a food for which there is a definition, a standard of identity or of composition, it must conform to these regulations. If it purports to be or is represented as a food for which there is a standard of fill which has been prescribed by regulation and it falls under that fill, it is not subject to the provisions of 404. You must have the common and usual name if it purports to be a representative of special dietary use. If it contains any artificial flavoring, coloring, they must be listed in the ingredients. I think the provisions of the mislabeling part of the Act are a lot simpler to understand than the adulteration provision.

I think the important question that one might ask is: How do we approach a more scientific basis for meat inspection? I think it's also important that we look at some other questions. What type of products are amenable to the Act? It is rather interesting that under the provisions of the Meat Inspection Act, those type of products which are amenable are different than in the Poultry Products Inspection Act. To what extent is USDA's enforcement authority? There are some questionable areas here. I think we all know that USDA authority is at the federally inspected plant. Does it extend to the retailer?

I think this is very important to consider, since we are all in the business of providing the consumer with a safe, healthful product, so I think it is important that we understand that the system of delivery from the producer to the ultimate consumer is only as good as the weakest link. What is the weakest link in the chain? We know that FDA controls the feed and animal production. The Act mandates continuous inspection at every meat and poultry plant shipping product into interstate commerce. What is the regulatory authority of the department to do that? Specifically, what does USDA do and is there a scientific basis for USDA to perform these regulatory activities? John McCutcheon will address some of these but I wanted to give you a brief outline of the background so as to better understand USDA's perspective.

There are basically two parts to the meat industry in terms of the regulatory enforcement – No. 1 is slaughter and No. 2 is the processing activities; I think John will develop these, and what the differences may be in terms of regulatory enforcement. I think it is also interesting to look at the specific language of the regulations, again in terms of the meat inspection regulations. It states very clearly that the carcass and all parts have to be inspected. How do you interpret this? Whereas, in the Poultry Products Inspection Act, it says that the inspector at time of slaughter must perform a bird-by-bird inspection. So there are some nuances between the two different regulations and I think it is important that we look at these in terms of some of the discussion that John is going to follow with.

*H. Ockerman:* Thank you, Charlie. John McCutcheon is now going to bring us up to date on some of the new ideas as far as new procedures in meat inspection that show some promise. John is the Deputy Administrator of Technical Ser-

vices for FSIS. Technical Services is responsible for researching and developing new methods of slaughter inspection, developing new systems of processing inspection, and in addition it operates the FSIS Training Center. Technical Services also is responsible for label approval.

## **New Procedures in Meat Inspection**

**John McCutcheon**

What Charlie Cook and I did in going through the Act (or some of the languages from the Act), was to define the criteria that we have to live with as government regulators – we have to implement the law and the regulations. We looked at the statements in the regulations as criteria under which we have to make judgements about new processes that come along. So what I have done is to pick some topics to illustrate the type of issues that we have to deal with in almost all areas.

The first topic I want to spend time on is the use of rapid tests in on-line cattle inspection. Although the Federal Meat and Poultry Inspection program is nearly 80 years old, it is still being evaluated by FSIS to determine where changes should be made. A major reason is to accommodate the new developments in science and technology, which is what we are all about in this meeting. The relatively new development of rapid tests to detect unwholesome conditions (and Charlie got into the definition of unwholesomeness), has already had an impact on meat and poultry inspection. Rapid tests are used to detect violative levels of certain chemical residues, to verify species in imported meat, and to check the adequacy of heat treatment in canned or cooked meat.

Recently, we organized a task force to study the potential of rapid tests as a diagnostic tool to detect unwholesome conditions during on-line carcass inspection of cattle. The objective was to compare rapid test methodology for effectiveness and labor efficiency to current methods of inplant cattle inspection. Is this something to help us do our job better or more quickly?

In discussing the implementation of rapid tests in on-line carcass examination, the task force considered several aspects of the inspection process. These included a review of unwholesome conditions presently found, current detection methods, signs that can be directly observed by the inspector, examination of existing and emerging technologies in meat inspection and diseases of public health consequence that inspectors should be aware of.

The task force noted early in its deliberations that the function of FSIS inspectors was not primarily to look for a disease, since many animal diseases have little or no public health consequences, but to look for conditions that would render an animal unfit for human consumption. I might say that what the act talks about is a "diseased carcass." It is immaterial to us if the disease in the carcass may not be transmittable to humans through direct contact or through eating, since the act says that a diseased animal is unfit for human consumption. The point I am making here is that we frequently don't know what the disease condition is; so all we can look for are signs and symptoms of the disease and there could be the result of a number of different diseases. All we need to do is detect the evidence of disease; we don't have to detect the disease itself. The task force also noted that many

gross pathologies and advanced stages of diseases are easily observed by inspectors. The rapid tests that are coming along are usually disease-specific so that they detect a disease itself. But from a research point of view, that does not necessarily solve our problem.

The task force found that the current state of the art in rapid tests would not improve the procedures to segregate wholesome from unwholesome meat, nor would it aid in disposition decisions. For us, a disposition decision is whether we pass the carcass or not – it's the jargon in our trade. For example, one type of rapid test, the antibody test, indicates only exposure to a disease, but does not reveal if a disease is in the active stages. False positive test results would occur in vaccinated animals when antibody tests are used.

The task force concluded that rapid-test methods probably would not, at the present time, increase the effectiveness or reduce the cost of on-line cattle inspection. Certain inspection steps might be automated to increase efficiency; however, rapid-test technology has not advanced to the point where it could replace traditional inspection, with its focus on finding pathological conditions, rather than diseases. Current procedures are rapid and cost-effective, and any attempt to implement rapid tests could increase inspection costs. The task force further stated that more research must be done on the significance and prevalence of various diseases, before we can establish priorities of conditions for which rapid tests might be needed. That gives us the answer to the question that someone asked, "which rapid test would be most suitable?" That's an area where we don't have information available to us to even begin to rank-order the rapid-test methods.

Turning to another topic, the topic of irradiation has come up and is actively being pursued. Irradiation as a method of preserving food has been under scientific scrutiny for 40 years. The technology has not yet gained general acceptance in this country, but has won varying degrees of acceptance in 21 other countries for commodities such as fish, poultry, fruits and vegetables. Commercial irradiation in the United States has been limited to such commodities as potatoes, wheat, wheat flour and spices.

As part of its responsibility for ensuring that meat and poultry products are safe and wholesome, FSIS is considering the implications of food irradiation as a preservative technique for meat and poultry. In the United States, food irradiation is regulated by the FDA, which regards irradiation as a food additive; and one of the reasons I included irradiation was to bring out some of the distinctions between the FDA and USDA which cause some confusion in carrying out some research. FSIS is required to act in agreement with the FDA guidelines for irradiation usage. In February 1984, FDA proposed regulations for using low-level irradiation for treating fresh fruits and vegetables, and revised the permissible irradiation level for spices to include more extensive treatment. The Agency is now analyzing the thousands of comments received on the proposal.

Although meat and poultry products were not included in the proposal, it is possible that irradiation applications for these products will be approved in the future. At low levels, the shelf life of fresh meat and poultry could be extended. In addition, trichina infestation in fresh pork could be controlled

more effectively. At higher levels, meat and poultry products could be sterilized and safely stored for years without refrigeration.

Irradiation might not only help food processors meet consumer demand for fresh food, but it also might be used as a substitute for part of the heating process currently used to preserve canned foods, thereby resulting in "fresher" canned foods. Despite these advantages, and despite the FDA's confidence in the safety of the process as outlined in its proposal, the public is wary of the concept of irradiation, as opposed to more traditional food preservation techniques (cooking, freezing, drying, etc.). I point that out because not only do we have the issue of safety and wholesomeness; we get into the consumer's right to know – the misbranding issues – i.e. should the foods be labeled that they have been irradiated?

Another area of general interest to us is inspection controls for combination products and genetically-engineered animals. I'll talk most about the meat-fish combination. Meat-fish combination products may soon find their way to the American dinner table. That's not a prediction, by the way. But there is certainly a lot of interest. I am not saying we are about to approve anything. The technology to develop such products and the products as well must be assessed for their potential impact.

Minced fish has been used experimentally in hamburgers and hot dogs, and has been promoted by the seafood industry as a low-fat source of protein to fortify and extend meat and poultry products. Moreover, the National Fisheries Institute intends to propose to FSIS a change in the standard of identity for franks, to permit the inclusion of minced fish as an optional ingredient at levels up to 15%.

The use of fish in meat or poultry systems raises some questions. What is the significance of mingling seafood, inspected on a voluntary basis, with meat and poultry products, inspected on a mandatory basis? In meat, we have all the products under a 100% inspection system; the fish industry has a different system. Should fish as an ingredient be treated differently from other ingredients, such as powdered milk or spices? Does the inclusion of fish compromise the safety or wholesomeness of standardized products, such as hot dogs, luncheon meat and bologna? What microbiological or toxicological concerns will have to be dealt with?

There are relatively few species among meat and poultry products as contrasted with fish and other seafood, which are comprised of hundreds of species. Moreover, such species may have a distinctive texture, color or taste. Should the various species be grouped together as "fish," or should they be identified on a species-by-species basis as an ingredient in processed products? How should the seafood component appear in the ingredients declaration on the labels? These and other legal and regulatory questions will have to be addressed as the technology for developing meat-fish combination products moves further along.

Similar legal and regulatory issues will arise with the development of genetically-engineered animals, particularly food animals. The criteria and procedures for the inspection and labeling of traditional food animals, such as cows and chickens, have been established over many years, but so far not for genetically-engineered animals, or "novel food animals," as they have been called. The latter term applies to

any potential food animal for which there are no established criteria or procedures for inspection and labeling, and could also include animals produced by traditional breeding as well as by genetic engineering.

These areas I have covered in a very broad sense give some examples of a possible future direction of meat inspec-

tion, I think the main purpose of this type of meeting is to get at questions and answers rather quickly. I have tried to raise three broad areas of concern in the hope that we are setting the stage for further discussion. With that, I think we might want to go on to our question and answer session.

## Discussion – Session One

*D. Meisinger:* John, what Charlie started off with was talking about the codes. Once you get to the point where you can recognize the official test for trichinosis (like the pooled Digestion Technique or the ELISA Test, both of which are in some state of involvement or some state of recognition as an official test), it seems to me that you have a responsibility to require 100% mandatory testing for trichinosis. That's what's in the code. Am I hearing that wrong?

*J. McCutcheon:* Yes! We do a lot of things on a voluntary basis like our voluntary Total Quality Control program, which is another way of handling processed products inspection, which is not for all processors. In the case of those types of tests, I would see them as being on a voluntary basis for those members of the industry that would wish to use them. I think that our concern is that the public must be protected and informed. If there are alternate ways of doing that, such as the time and temperature requirements for freezing which historically have been available, then you continue to use them because there is no reason to say that product is any less safe tomorrow just because these tests came along. Economics of the situation is usually what drives us, both our economics and industry's economics, in that if there is a test that "is as good as or better than" on the basis of some criteria, then we're going to migrate to that test. We would then use it either for our own inspection purposes, which would have no impact on the industry other than the potential influence on line speed, and/or industry would use a test or a technique for itself when it would become economical. But we are not in a position where we have to mandate that.

*Meisinger:* Okay, but based on all those different approaches like your curing, smoking, etc., or freezing techniques that are already approved in regulations and in consideration of what you termed the "public's right to know," you would almost have to approve labeling, so that the public could differentiate between products that were so tested or so treated and the product that wasn't. Right?

*McCutcheon:* I wouldn't say we must approve labeling like that. I think it's a good question, whether we would approve or feel that we must inform consumers of the use of a particular process. We would certainly have to inform the consumer in some way; it would be mandatory if safe use was dependent upon consumers doing something like cooking a meal or somehow behaving differently than they have in the past. Information such as that would have to be on the package.

*Meisinger:* But why isn't it dependent on that? The consumer has to cook the product if it is not labeled "ready to eat." Therefore, it has undergone some smoking and curing-time temperature treatments under those regulations. If you don't know that it has either been tested or treated in some

way, then you have to cook it in some way. That's why it does require the consumer to do something.

*C. Cook:* David, I understand your logic, where you are coming from, but it scares me, to be very truthful. Using your logic, we can also address the salmonella issue and I don't think we even want to get near that. What you are saying is that if you could produce a certified trichina-free product, I think John will accept the fact that if there is a certification program, you can make a label claim. I don't see that the Department (FSIS) has any problem in terms of certifications or claims. If you do claim that your product is trichina-free by some certified or approved test program, USDA must be able to verify that this information is correct. I don't see where the Department would have any trouble with that.

*McCutcheon:* I didn't mean to imply that we wouldn't permit it. I was just responding to your statement that we "make it mandatory" and I'm saying that's not a valid assumption.

*R. Terrell:* Is trichina in pork a problem? Who says so and where are the data? How many outbreaks of trichina from human trichinosis do we have from pork on an annual basis over the last 50 years?

*Meisinger:* The problem is perception. Perceptions are realities in the market place. We keep hearing that and it is definitely true with trichinosis. Our surveys show that some 96% of the population (the consumers) know that they have to cook pork until it is well done. Until you can guarantee that there is absolutely no chance of them ever contracting trichinosis from eating pork, there is no way that you can tell people that you don't have to cook pork well done.

*Terrell:* So your rationale from a producer's viewpoint is to come out with a campaign that pork is trichina-free. At the same time, we should say it is salmonella-free, there are no drug-resistant microorganisms and that antibiotics don't promote drug resistance. You see what I am saying? You can't singly point to trichina and go to the government and say, "hey Mr. Government, we need more regulatory controls in government." The Reagan administration says we need less and I think the general public says we need less. I would be very, very careful about this whole subject of trichina and irradiating pork so we can get export markets, too. I am not opposed to the idea but you better be careful about how it is handled, Dave. I can see right now, if you come to me and say I should have a trichina-free pork program, I say why? I'm not having problems with what I have now. I'm selling all the hogs I can kill. You want me to sell more – I have only a certain amount of kill capacity. You want me to certify trichina-free? How many technicians am I going to have to hire? Where's the customer who really needs it?