Salmonella in Perspective

Ralph W. Johnston*

So often when I prepare a discussion on *Salmonella* in meat, I have to ask myself "What can I say today that's any different than that which has been said for the past 30 years or so?" Things have not changed very much in these years, even though the beef industry itself has. Perhaps what has not changed is the perspective of the regulatory agency that little or nothing can be done to improve the situation from the standpoint of regulations. Indeed, an International Conference on *Salmonella* held at New Orleans, Louisiana, in 1984 ended with very pessimistic conclusions regarding the control or reduction of *Salmonella*, particularly on the farm. Since the consensus is that there is no easy way to control the problem on the farm, or to control the recycling of *Salmonella* in rendered protein for animal feeds or to control removal during processing, then the only effective control measure is to put the entire burden on consumers or further processors to render red meat safe for consumption. There is merit to this concept and it has been at least a part of the policy of FSIS, industry and academia for years. This concept is the basis for extensive consumer education programs.

USDA, WHO, industry and institutional scientists have for decades viewed enteric contamination of raw meat and poultry as an unavoidable defect. While this view has been supported by the majority of scientists involved, a minority feel that this position impedes the incentive to make progress in reducing *Salmonella*.

In perspective, the U.S. food supply, including red meat and its prepared products, continues to be recognized as the safest or one of the safest that exists in the world today. Regardless of whether we are employed by government agencies, academia, public interest groups or industry, our common goal is to maintain or even improve this record both from the domestic standpoint and the increasingly important aspect of exports. To accomplish this, we need to be constantly thinking of new ways to improve processing technology and processing control systems which are both effective and economically feasible.

While we rightfully consider our red meat supply as the safest and the most wholesome in the world, we need to recognize that epidemiological, microbiological and toxicological research is moving ahead at a very rapid pace in developing new knowledge about illnesses and their origins. These concerns are rapidly communicated to public health officials throughout the world, to regulatory agencies, to the news media and to users or consumers of red meat. During the past 5 to 10 years, the following new knowledge or trends have caused us to reevaluate the perspective of *Salmonella* in red meats:

Salmonella by itself is an old problem for the red meat industry and is for the most part well understood. What is not well understood is that *Salmonella* in meat can be viewed as an indicator system for other enteric bacteria of concern, including most of those termed emerging pathogens. Therefore, the problem of *Salmonella* is being multiplied by each new microorganism of concern in red meat. While this is a discouraging observation, it has a very bright side in that any effort to reduce *Salmonella* contamination will be multiplied through the similar reduction of other bacteria of concern.

The Centers for Disease Control have recently reviewed the human salmonellosis problem and determined that the number of annual cases continues to increase; that the illness is becoming more severe; that most of the cases are associated with meat and poultry products and that it is likely that a reduction in the incidence of *Salmonella* in meat and poultry would result in a reduction in human cases.

Many *Salmonella* isolates from severe human illnesses have patterns of antibiotic resistance that make the cases difficult to treat and control. Such strains are being epidemiologically traced to producers and the antibiotic resistance patterns appear to be associated with antibiotic treatments of animals on the farm. A chloramphenicol resistant *Salmonella newport* strain in California has been associated with beef and the human cases are now conservatively approaching 1,000 per year.

The immunosuppressed population is growing and this group is more susceptible to bacterial pathogens such as *Salmonella* than are healthy immunonormal persons.

Listeria monocytogenes has caused serious foodborne outbreaks from both milk and cheese in the past 2 years. This association with the bovine species clearly causes concern for beef and the other major red meats.

Other bacteria associated with red meat are of increasing concern. These include *Yersinia enterocolitica, aeromonas species, Campylobacter species* and *Escherichia coli* strain 0157:H7.

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*R.W. Johnston, Director, Microbiology Division, Science, FSIS, USDA

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In international trade, we continue to see sporadic rejections of U.S. red meats due to *Salmonella*.

Further processors of red meats are becoming increasingly unhappy with their liability problems when their products are involved in human salmonellosis. They believe that their supplier chain is equally liable and some lawyers are willing to pursue this issue.

These observations have led FSIS to reevaluate its perspective on *Salmonella*. FSIS continues to recognize the presence of enteric bacteria, including *Salmonella*, as an unavoidable defect but has observed that certain company practices have reduced or controlled the level of the defect. In addition, some current research shows promise of effectively reducing enteric bacteria economically. Procedures that are known to control enteric bacteria in meat and poultry differ in their degree of effectiveness, yet nearly all are perceived as "Good Manufacturing Practices" in regard to reduction of *Salmonella*. Not all processors utilize these procedures, and, for those that do, one or more are utilized depending on the technological advancement of each firm. It is important to recognize that these constitute advanced controls, laboratory or processing technologies, none of which are required by the laws enforced by FSIS. Their use constitutes commercial practices exceeding legal requirements of the Federal Meat Inspection Act or Poultry Products Inspection Act. Many of these procedures may be potentially designated Hazard Analysis and Critical Control Point (HACCP) control measures. A document entitled "An Evaluation of the Role of Microbiological Criteria for Foods and Food Ingredients," published by the National Research Council, National Academy of Science in May of 1985, strongly recommends that the four major U.S. food regulatory agencies greatly expand the application of the HACCP system in their operations.

It is clear that there are controls and processes available in the red meat area that reduce *Salmonella* and other bacteria when applied. Many firms have the same microbial concerns as FSIS and in effect currently produce red meats with fewer *Salmonella* than the average or majority of processors. These firms are in essence using parts of the recommended HACCP system. The HACCP system is intended to be designed on a plant-by-plant basis. Thus FSIS finds it somewhat difficult to establish formal regulations in accord with the HACCP system. Differences between individual plant operations may mean that a requirement is beneficial for one firm but repressive for another that performs a given task in another way. Instead of a mandatory regulation to achieve the goal of pathogen reduction, FSIS will soon try a different and novel approach. This will be an incentive label approach which will permit those firms which process meat and poultry with superior methods and controls to use some kind of a logo on their product to indicate to their customers that they exceed FSIS requirements. In essence, we expect to nurture and in one sense reward those firms that now utilize a HACCP system. The program will be voluntary and there will be no penalties for firms deciding not to participate.

In the very near future, we will issue a notice of intent to permit incentive labeling via the Federal Register. This notice will also call for industry comments on the kinds of controls and procedures that are in use and have led to better microbial control. Certain procedures and control systems will probably become requirements for the incentive award program. How these are delivered and carried out will be negotiable between FSIS and interested firms.

In conclusion, FSIS believes that superior manufacturing practices already exist which could improve both the public health safety and keeping quality of fresh meat. The general adoption of this technology has been stagnated by lack of incentive. We believe that the incentive labeling product labeling program will stimulate both the adoption of existing good technology and the development of newer and better procedures.

Discussion

R. Terrell: What do you have in mind for terminology to be applied in this labeling program?

R. Johnston: We have had terrible problems with that. I think that Grade A would be a good one, but we can't use it, because we have a grading system. We are going to leave that open to suggestions from processors, but there would be some kind of logo. I did mention superior manufacturing practices of GMP's, an old term, something along those lines, something that the consumer or that purchasers could identify with a process well done, nothing specific yet.

Terrell: The only concern, Ralph, I see is: If one chooses to put a logo on the label, and I am the buyer of the product, and I find one salmonella positive out of a 40,000-pound load, legally I can check the whole load. You'll have to repackage the product because it has some kind of logo on there that says it doesn't have salmonellae.

Johnston: We are going to participate in this and we are probably going to have a salmonella standard. We will carefully explain to everybody that this does not mean freedom, it simply means that it will pass a given level of testing. We understand we need to do a good bit of work to educate receivers and the public that this does not mean total freedom, it only means reduced levels and that these reduced levels are better all the way round. We do understand that we cannot reach total freedom or zero defects.