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Meat Inspection

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The safety of the foods we eat is the responsibility of every person in contact with it from the farm to the dining table. No matter how effective one segment of the food industry is in ensuring a safe food product, that effort can be compromised by the next segment in the food chain. Municipal, county, state, and national governmental agencies are responsible for overseeing food production, distribution, procurement, and preparation to assure that food made available to consumers is safe.

The meat industry is generally recognized as the most highly regulated of all food industries in the U.S. No fewer than nine federal agencies serve as “watchdogs” to assure meat presented to consumers is wholesome and safe. The government agency having the greatest role in the production of wholesale meat products is the Food Safety and Inspection Service of the United States Department of Agriculture (FSIS-USDA), which administers a comprehensive system of inspection regulations to ensure that meat products intended for human consumption are wholesome and accurately labeled.

Federal and State Meat Inspection Programs

The U.S. (Federal) meat inspection program began in 1891 when Congress passed a general meat inspection act, providing for the inspection of cattle (which was expanded in 1894 to include pork). In 1905, the safety and wholesomeness of meat came under close scrutiny when Upton Sinclair wrote *The Jungle*, describing the poor sanitary conditions in the meat packing industry, kindling a storm of public concern and protest. As a result of this book, in part, the Federal Meat Inspection Act was passed in 1906, requiring the inspection of livestock and their carcasses destined for interstate and foreign commerce. In addition, processed meat, as well as meat equipment and facilities, were required to be inspected. In 1967, the Wholesome Meat Act was passed, which updated the 1906 Act to include mandatory inspection of all meat processed and sold within the same state (intrastate inspection).

Thus, with the passage of the 1967 Act, all meat destined for sale to consumers must be inspected for safety and wholesomeness. The 1967 Act provided for state inspection programs, but specified that any such

Meat Inspection vs. Meat Grading

Many consumers often confuse Meat Grading and Meat inspection. **Meat Grading** is a voluntary service performed by the Agricultural Marketing Service (AMS) of the USDA, which segments carcasses and, in turn, meat products from those carcasses, into homogeneous groups based on factors that predict the taste appeal of cooked meat and the quantity (yield) of meat from carcasses. In contrast, **Meat Inspection** is a mandatory program, conducted by the Food Safety and Inspection Service of the USDA, which oversees the production of safe and wholesome meat products for consumers. Meat Grading is paid for by the meat processor, whereas Meat Inspection programs are paid for by taxpayers, at an annual cost of less than \$2.00 per person.

FSIS Meat Inspection Procedures

As the representative of consumers in a processing plant, the FSIS meat inspector is responsible for oversight of sanitation and wholesomeness throughout the entire processing operation. Included in these responsibilities are:

- **Facilities Construction and Operational Sanitation** - Prior to the beginning of the day's production at a processing facility, an examination of the establishment and premises is made by the inspector. The inspector examines the sanitary conditions and determines if facilities continue to meet specified building and equipment regulations.
- **Antemortem Inspection** - All livestock offered for slaughter in a federally inspected processing facility must be examined on the premises of the establishment by a veterinarian or lay inspector under veterinary supervision on the day of, and prior to, slaughter. The animal is observed both in motion and at rest, in order to identify any conditions that may raise questions as to its general health. Animals suspected of a diseased condition, or showing other conditions that might result in condemnation, are retained (identified as *U.S. Suspect*), and slaughtered as a group for postmortem inspection. If during live animal inspection an animal shows obvious symptoms of disease, it is condemned at that time (identified as *U.S. Condemned*), and not allowed to enter the human food chain.
- **Postmortem Inspection** - The most intense phase of meat inspection occurs during the postmortem examination. As with antemortem inspection, this is done by, or under the supervision of a veterinary inspector. Organs, lymph nodes and the entire carcass are examined for evidence of unwholesome conditions. As with the antemortem inspection, all animals slaughtered in an inspected facility are examined during postmortem inspection. If an animal, its carcass, or any of its parts is condemned, these undergo high temperature denaturation treatment (under the supervision of the FSIS inspector), and do not enter the human food chain.
- **Product Inspection** - The jurisdiction of FSIS meat inspectors extend to the cutting and further processing departments of a meat processing plant. It is the inspectors' responsibility to assure that all processing steps (cutting, curing, smoking, grinding, etc.) are carried out under sanitary conditions, to ensure that processing methods are adequate, and to protect the consumer against the use of harmful substances in the formulations of products.
- **Application of the USDA Inspection Legend** - Each FSIS-USDA inspected plant is granted a specific establishment number which is placed on the facility's official inspection legend (Figure 1). Each inspection legend is affixed not only to packaged meat product labels, but also stamped (with edible ink) on carcasses and carcass parts, including edible byproducts.
- **Residue and Microbiological Laboratory Analysis** - Additional inspection procedures involve the use of laboratory assays to detect biological and chemical hazards, and to assure that product formulations (ex: sausage and hams) are in compliance with FSIS regulations. Samples for the laboratory analysis are routinely taken on a random basis using a statistical sampling plan that permits a high degree of assurance that the products sampled are in compliance with regulatory requirements. In addition to testing for unapproved additives and chemical residues in meat products, FSIS also oversees testing for bacteria (including generic *E. Coli* and *Salmonella*).
- **Labeling and Product Standards** - FSIS inspectors are responsible for assuring that meat products leaving a meat processing facility are accurately labeled, including both ingredient labeling, and nutritional labeling, when applicable.
- **Hazard Analysis and Critical Control Point (HACCP)** - The most significant change in meat inspection occurred 1996 with the Final Rule: Pathogen Reduction and Hazard Analysis and Critical Control Point System FSIS published in the July 25, 1996 Federal Register. The HACCP concept has been used successfully in the canning industry (thermally processed, low acid foods packaged in hermetically sealed containers) for over twenty years and now FSIS is moving towards reliance on HACCP in other areas of processing, as a form of safety regulation. The HACCP concept is a systematic approach to hazard identification, assessment, and control. A HACCP plan is implemented by plant personnel and monitored for effectiveness by FSIS inspectors. Traditional inspection is primarily focused on diseased animals and on observing problems with the final product, which is especially ineffective in identifying microbiological hazards in the final product before the food item is released to the public. HACCP is a preventative system that attempts to keep microbiological, chemical and physical hazards from entering the meat or poultry product at critical places along the production line at the processing facility.

state programs must have regulations equal to or better than the federal inspection requirements. Although the state and federal meat inspection programs are considered equal, meat processing facilities that utilize state inspection programs are not permitted to sell or transport meat products across state lines.

FSIS-USDA Inspectors

In 1990, approximately 6,500 meat processing plants operated under federal inspection in the U.S. More than 7,800 FSIS employees are responsible for implementing inspection in these plants. Each inspector serves as the consumer's representative in assuring the wholesomeness of meat offered for sale to the public.

Two categories of meat inspectors may be found in a processing plant: a lay inspector or a veterinary inspector (who is a Doctor in Veterinary Medicine). The qualifications of lay inspectors range from high school graduates to food technologists with degrees from accredited universities. All slaughter inspection procedures and many processing inspection procedures occur under the supervision of a highly trained

veterinary inspector, who has expertise in the areas of anatomy, physiology, microbiology, and pathology of animals. Lay inspectors in the slaughter area are trained to carefully observe the slaughter procedures and to identify and retain carcasses or carcass parts that appear abnormal. It is the supervising veterinary inspector's responsibility to make the final decision as to whether a carcass or part is condemned. In 1990, 0.33% of the total U.S. livestock slaughter was condemned (the role of the lay inspector in the processing area is discussed on the following page).

The HACCP system is comprised of 7 components:

1. Assess hazards and risks associated with growing and harvesting raw materials and ingredients and with processing, manufacturing, distribution, marketing, preparation, and consumption of the food.
2. Determine Critical Control Points (CCP) required to control the identified hazard. A CCP is a location, practice, procedure, or process at which control can be exercised over one or more factors which, if controlled, could minimize or prevent a hazard. An example of a CCP in a cooked ham product would be the cooking phase in the smokehouse, which should be controlled to assure the destruction of microbiological pathogens.
3. Establish the critical limits that indicate whether an operation is under control at a particular CCP. Critical limits may be defined as physical (e.g. time or temperature), chemical (e.g. salt or acetic acid), or biological (e.g. sensory evaluation). For example, the cooking of a meat patty should be designed to eliminate the most heat resistant pathogen (ex. *Listeria* and *trichina*), which could be expected to be in that product. The critical limits for the cooking of meat patties would include oven temperatures, cooking times, and patty thickness.
4. Establish and implement procedures to monitor each CCP to check that it is under control. Monitoring is the scheduled testing or observation of a CCP and its limits and must be documentable and determinable at the time the production line is in operation. Ideally, the monitoring would be performed by mechanical methods continually during production, such as temperature recording device with an alarm system. In the HACCP system there is zero tolerance for exceeding a critical limit. Microbiological testing is of limited value for monitoring CCP's as the time required to obtain results does not permit action to be taken while the meat product is being produced and therefore if not useful in determining is the CCP is under control.
5. Establish a corrective action plan to initiate when monitoring results indicate that a CCP is not under control. This plan must eliminate the actual or potential hazard which was created by a deviation from the HACCP plan, and assure safe disposition of the product involved.
6. Maintain an effective record keeping system that documents the operation of and action taken during the implementation of the HACCP plan.
7. Establish procedures for verification that the HACCP plan is working correctly. This component includes periodically performed procedures by plant employees and outside parties (including visual inspection and random sample collection and analysis for hazards), reviews the HACCP plan and CCP records, which includes a written record of verification inspections. This record certifies compliance with the HACCP plan or deviation from the plan and the corrective action taken. An example of a verification procedure would be a microbiological test for *Salmonella* in a cooked pork sausage product.

In order for HACCP plan to be truly effective in eliminating hazards from foods, it should encompass every phase or production, from the time the animal is born, through the processing plant, to the consumer's table. Therefore, while a HACCP plan for the processing facility alone would minimize hazards, it would not totally eliminate food hazards.

Summary

The safety and wholesomeness of the nation's pork products is overseen by the Food Safety and Inspection Service of the United States Department of Agriculture. From the construction of pork processing facilities to the shipment of pork products from a plant, the FSIS-USDA is involved in every aspect of manufacturing wholesome meat products. An on-site FSIS-USDA inspector observes the hog before, during and after slaughter as well as during the processing of a carcass into smaller, value added pork products. FSIS tests meat and meat products for residues and microbiological hazards and makes sure the food additives are used correctly and reported accurately on food labels.

Food safety and wholesomeness is the responsibility of everyone that comes into contact with a food from production to consumption. It is the government's responsibility to oversee the safe manufacturing, distri-

bution and marketing of wholesome pork products to the public.

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