



OPPORTUNITIES IN MEAT MARKETING

Meat Inspection

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History

In the early 1900s, Americans were reading stories of horrid sanitary conditions in Chicago slaughterhouses, many of which stemmed from the book *The Jungle* by Upton Sinclair. President Theodore Roosevelt requested an investigation into the reports, and the Meat Inspection Act of 1906 resulted from this investigation.

Federal Meat Inspection Act

The Meat Inspection Act of 1906 was the start of federal inspection of slaughter facilities, required for interstate and foreign commerce. Meat inspection at the federal level is done by the U.S. Department of Agriculture (USDA) Food Safety Inspection Service (FSIS). Trained inspectors conduct the required inspection of individual animals both before the animals are rendered unconscious and throughout the harvest process. Public health veterinarians make the final decision and dispose of carcasses that display signs of illness/injury.

Antemortem inspection

Antemortem inspection is the inspection of the live animal. Inspectors look for visual signs of illness or disease in the animals. Three outcomes can result from antemortem inspection: animals are passed for slaughter or declared U.S. Suspect or U.S. Condemned. Non-ambulatory cattle cannot pass antemortem inspection. (Aberle et al., 2001.)

Postmortem inspection

During postmortem inspection, inspectors look at parts of the head, lymph glands, internal organs and carcasses for evidence of disease or signs that the meat would be unfit for human consumption. Postmortem inspection is conducted throughout

the harvest process. Four results can occur from postmortem inspection of the carcass: the carcass is designated U.S. Inspected and passed without restriction, U.S. Inspected and passed with restriction (cooking or freezing), U.S. Retained, or U.S. Inspected and condemned. If a carcass is retained, a public health veterinarian is required to perform an in-depth postmortem and confirm suspicion of a disease. Depending on test results, the carcass is then declared either U.S. Inspected and passed without restriction, U.S. Inspected and passed with restriction, or U.S. Inspected and condemned. (Aberle et al., 2001.)

Condemned carcasses

If a carcass is condemned, it is slashed with a knife and denaturant is applied so that it does not resemble edible product. Denaturant is a non-toxic, green liquid dye that is applied to inedible materials, including meat, fat and meat byproducts. It does not wash off under normal circumstances and makes the material look clearly different from edible meat. Animals or carcasses that are condemned are denatured and disposed of immediately, ensuring that they do not enter the food chain.

Federal meat inspection

Federal-level meat inspection is conducted by the FSIS branch of the USDA. Inspection is a service provided to meat plants that meet regulatory criteria and is funded by tax dollars. Plants are required to pay for inspection only in the cases of overtime or voluntary services. If a meat packing or processing facility fails to meet sanitary conditions throughout all aspects of the operation or is in violation of humane handling policies, inspection status can be withdrawn by USDA-FSIS. Inspection is separate from grading meat, which is voluntary and done

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at the expense of the processor. Grading categorizes carcasses on the basis of quality; inspection focuses on the safety of the meat.

All product that is harvested or processed under USDA inspection receives an inspection mark. Each operation is assigned an establishment number. The inspection marks applied to product from each plant have the corresponding establishment number as part of the mark. Establishment number 38 (Figure 1) is reserved for schematic example by the USDA. In the case of poultry, P-42 is reserved for sample purposes. Plants that process both red meat (beef, pork, lamb and goat) and poultry will have a “P” placed in front of their establishment number when the inspection mark is applied to poultry or poultry products from their plant. Each carcass is stamped with the inspection mark in purple edible ink. Subsequent package labels must bear the USDA inspection mark.

All meat products sold interstate are required to have USDA inspection, with the exception of a few states that are currently piloting a program with the USDA. In Michigan, all meat sold either is USDA inspected or is sold through a retail establishment that has a variance license issued by the Michigan Department of Agriculture and Rural Development (MDARD). Retailers that are further cutting or processing



meat for sale under the retail variance must start with USDA-inspected meat. The meat will no longer bear the USDA inspection mark once it is processed in a retail establishment and must be sold only to consumers that come to the retail establishment. These retailers are subject to inspection by MDARD. Meat sold at farmers’ markets must be USDA-inspected, and each package must have an approved label and USDA inspection mark on it.

Humane Slaughter Act of 1956

The Humane Slaughter Act of 1956 was established for processors who wanted to sell meat to governmental agencies. Under this act, approved methods of immobilizing animals, which renders them unconscious before exsanguination, were established. Exsanguination is the process of bleeding an animal out after stunning. Three types of methods can be used to immobilize or stun the animal. The chemical method utilizes carbon dioxide. Mechanical methods are captive bolt, firearm or approved compressed air devices. The third option is the electrical method; an electrical current is used to render the animal unconscious.

Wholesome Meat Act of 1967

This act created a partnership between state and federal inspection programs. It was designed to include the inspection of slaughter and processing plants that engaged in intrastate shipment of meat where state meat inspection either was absent or had inadequate standards. At this point, state inspection requirements were required to be “equal to or better than” federal inspection requirements.

Processed Products Inspection Improvement Act of 1986

The inspection category for processing only was added through this act. It enabled plants that were processing meat but not slaughtering meat to not have continuous inspection. Plants that are USDA-inspected for processing will have daily visits from their inspector, but the inspector does not have to be present continuously throughout the day. Processing refers to

Figure 1. Examples of inspection marks for carcasses, processed meat (placed on package), and poultry or poultry products. (Adapted from USDA FSIS Production and Inspection Fact Sheet.)



Inspection mark on raw meat from beef, pork, lamb or goat.



Inspection mark on poultry that is raw or processed.



Inspection mark on packaged and processed meat containing beef, pork, lamb and/or goat.

practices such as fabricating carcasses, grinding meat and making further processed meat products. Fabrication refers to breaking down a carcass into primal, subprimal or retail cuts. Examples of further processed meat products are sausage, jerky and ham.

Hazard Analysis and Critical Control Points (HACCP)

Hazard Analysis and Critical Control Points (HACCP) is a systems approach to improving food safety by preventing problems. The HACCP concept was developed by The Pillsbury Company in 1959 for NASA. It became a requirement for USDA-inspected plants in 1996. The HACCP concept focuses on the implementation of a process that reduces risk and leads to a reduction of pathogens. This, in turn, decreases the incidence of food-borne illness. The principles of HACCP are implemented by plants to develop science-based process control systems that minimize food safety hazards. The seven principles of HACCP are: conduct a hazard analysis, determine the critical control points (CCPs), establish critical limits, establish monitoring procedures, establish corrective actions, establish verification procedures, and establish record-keeping and documentation procedures (HACCP, 2006). Part of a HACCP plan is having prerequisite programs in place based on Good Manufacturing Practices (GMPs). Other prerequisite programs may include supplier approval, traceability and ingredient specifications. Sanitation Standard Operating Procedures (SSOPs) are the essential prerequisite program to HACCP and are important for the effectiveness of a HACCP plan and general sanitation in processing plants. A SSOP is a written plan of procedures conducted daily before and during processing to prevent cross-contamination and adulteration of product.

State inspection

Twenty-seven states (www.fsis.usda.gov/regulations/Listing_of_Participating_States/index.asp) have state meat inspection programs. Michigan had state inspection through 1981. State inspection standards must be equal to or higher than federal standards.



Custom exempt

Meat plants that operate under custom exempt status fall under USDA-FSIS jurisdiction in the Federal Meat Inspection Act (USDA FSIS Directive 5930.1 Revision 4). Additionally, custom exempt plants must maintain sanitary conditions and select records, and follow certain requirements: not adulterate or misbrand products; handle livestock

humanely; prepare products under sanitary conditions; keep certain records; properly mark, label and package product; and keep exempt products separate from inspected products. Records that facilities must maintain under custom exempt status include: general information including the number, species, quantities and contact information of the owners; water potability and sewage system acceptability; safety of chemicals used in the food processing area; designation of cattle less than or greater than 30 months of age; whether cattle are ambulatory at time of delivery and slaughter; proper specified risk materials (SRM) disposal; observations that the animal is free of conditions that would make the animal unfit for human food consumption; transportation of product, including when product is moved between custom exempt facilities; and documentation of implementation and monitoring of Sanitation SOPs. Records must be kept for two years.

Under USDA-FSIS jurisdiction, plants are inspected randomly. This is typically done annually if there have been no previous problems associated with a plant. The inspector will look for evidence that humane handling is taking place; make sure record keeping and documentation are current; evaluate general sanitation and maintenance of facilities; look for pest control; and make sure that inedible material control is in place (see “Inedible material” section below). Additional visits or more frequent visits will occur for any plants not found in compliance with the custom exempt requirements.

Antemortem and postmortem slaughter inspection is not conducted by an inspector when animals are slaughtered under custom exempt status. Meat that is processed under custom exempt status must be used by the owner of the live animal, members of the owner’s family, non-paying guests of the owner or employees of the owner. Custom exempt meat cannot be sold or donated. It may not be sold directly to consumers,

to food service establishments, to stores, or at farmers' markets. The person utilizing the meat from a custom exempt facility must own the live animal, and accepts responsibility for the health status of the animal and husbandry that the live animal received. All packages of meat must be clearly labeled "not for sale." Some USDA-inspected meat plants may also process custom exempt meat in their plants; however, the product and time of processing must be kept separate from that of inspected product. Once an animal has been offered for antemortem USDA inspection, the status of the animal cannot be changed to custom exempt (FSIS directive 5930.1 rev.4, 2009).



have a state inspection program, but the bordering states of Ohio, Indiana and Wisconsin do have state inspection. This can lead to some confusion for producers and consumers in Michigan. It is essential that anyone processing meat for sale have a thorough understanding of the laws surrounding inspection.

Inedible material

Inedible materials include specified risk materials (SRM), which are not allowed for human consumption and must be removed from the carcass and disposed of properly. Items classified as SRMs from cattle 30 months of age or older include the skull, brain, trigeminal ganglia, eyes, spinal cord, dorsal root ganglia, vertebral column, tonsils and distal ileum. Additionally, the tonsils and distal ileum from cattle of all ages are SRMs.

Location of USDA-inspected Plants

A full list of USDA-inspected slaughter and processing facilities can be found here: www.fsis.usda.gov/Regulations_&Policies/Meat_Poultry_Egg_Inspection_Directory/index.asp. This resource is updated regularly by USDA FSIS.

Summary

The meat industry is the most highly regulated and inspected of any food processing industry in the United States with the goal of protecting consumers from food-borne illness. Meat intended for sale must be slaughtered and processed in a USDA-inspected plant. Meat that is consumed by the owner of the livestock may be processed under custom exempt parameters. Some states have state inspection programs that take the place of federal-level inspection for meat that is sold within that state's boundaries. Michigan does not

Literature cited

Aberle, E.D., J.C. Forrest, D.E. Gerrard, E.W. Mills, H.B. Hedrick, M.D. Judge, R.A. Merkel. Principles of Meat Science (fourth edition). 2001. Dubuque, Iowa: Kendall/Hunt Publishing Company.

Federal Meat Inspection Act. Title 21, Chapter 12, Sections 601-695. Available at: www.fsis.usda.gov/regulations/federal_meat_inspection_act/index.asp.

Scott, V.N. and K.E. Stevenson (eds). 2006. HACCP – a systematic approach to food safety: a comprehensive manual for developing and implementing a hazard analysis and critical control point plan. Fourth Edition. Washington, D.C.: Grocery Manufacturers Association.

U.S. Department of Agriculture Food Safety Inspection Service. Ante-mortem livestock inspection. FSIS PHIS Directive 6100.1. April 11, 2011. Available at: www.fsis.usda.gov/OPPDE/rdad/FSISDirectives/PHIS_6100.1.pdf.

U.S. Department of Agriculture Food Safety Inspection Service. Production and Inspection Fact Sheet. Available at: www.fsis.usda.gov/factsheets/inspection_&grading/index.asp.

U.S. Department of Agriculture Food Safety Inspection Service. Custom exempt review process. FSIS Directive 5930.1 rev.4. July 15, 2009. Available at: www.fsis.usda.gov/OPPDE/rdad/

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