

INTERVENTIONS TO ENSURE MEAT SAFETY

All meat and poultry products that enter commerce must be inspected by the Food Safety and Inspection Service (FSIS), the public health agency within the U.S. Department of Agriculture (USDA), to ensure that it is safe and produced in compliance with federal regulations. A small percentage of meat products are inspected by state-employed inspectors who have the same jurisdiction and must enforce the same standards and regulations as FSIS meat and poultry inspectors.

Meat inspection regulations require that plants have strategies in place to reduce the possibility of microbial contamination to occur on meat and poultry products. It is common to detect very low levels of bacteria that are naturally found on livestock and on fresh meat products.

Meat comes from the muscle of livestock and is internally sterile. However, contamination can be introduced onto the product from the hide of the animal, its gastrointestinal tract, workers or the environment. The steps taken to prevent microbial contamination during the life of the animal, while the meat is processed, during the shipping of the product and during preparation are called “interventions.”

To ensure the safety of meat products, a holistic food safety approach called “HACCP” is taken and all aspects of the production system are examined. Within that system, critical control points, where contamination can occur, are identified and interventions are concentrated at the points to reduce the introduction, spread or viability of pathogens.

The introduction of key interventions, accompanied by safe handling practices throughout the life of the product, helps ensure a safe and satisfying eating experience for consumers. Since the early 1990s, many technologies have been put in places that have proven extremely effective. USDA data show significant declines in the prevalence of bacteria on carcasses and on meat products. While it remains technically impossible to produce a bacteria-free fresh meat supply, the meat industry is constantly researching new strategies to reduce bacteria as close to zero as we can possibly make it.

The following list contains some of the most common interventions used by the U.S. meat and poultry industry. Companies select and apply one or more of these interventions contingent upon what proves to be the most effective at reducing pathogens for them.

On the Farm

It is essential to strive to reduce the presence of bacteria on livestock before they arrive at plants to be processed into meat products. On-farm interventions are ongoing to identify strategies to prevent pathogenic bacteria in live animals. Some strategies in use include:

Vaccines: Virulence factors secreted by the system of *E. coli* O157:H7 were found to be effective components of a vaccine that significantly reduced shedding of these bacteria by cattle in a feedlot setting. To date, only one vaccine has been approved for conditional use.

Probiotics: Probiotic bacteria are harmless, beneficial and compete with pathogens to reduce or prevent their colonization of the gut. This is an area that is ripe for additional research.

At the Plant

Production facilities use interventions much like a series of hurdles that block bacteria from entering the final product. Different plants produce different types of products and may select various combinations of interventions based upon their unique processes. Commonly used interventions include:

Hide washes: Some plants wash hides before cattle are processed to reduce the transfer of bacteria from hides to the carcasses.

Sanitary hide removal: Animal hides can be a source of contamination during the harvesting process. Employees are carefully trained to remove or process the hide in a manner that will prevent or reduce any further cross contamination of the hide to the carcass. After hide removal, it is a common industry practice to employ decontamination and antimicrobial treatments to remove any contamination that still may be present on the carcass.

Carcass washes/hot water washes: Hot water sprays are effective in removing microbial contamination from carcasses.

Steam vacuums: Hand-held vacuums that produce steam provide spot treatment for visible contamination.

Thermal treatment /steam pasteurization: Many plants use steam pasteurization or hot water cabinets to blast the outside of carcasses with steam, which pasteurizes carcasses.

Acidified sodium chlorite: Used in conjunction with a host of approved acids, this spray or dip changes the pH of the carcass to a less favorable environment for microorganisms to survive.

Lactic acid wash: Lactic acid is commonly applied to carcasses before they are broken down into smaller pieces.

Lactoferrin or calcium hypochlorite: These water-based antimicrobial sprays can be used on the whole carcass or parts to reduce bacteria.

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Chlorine dioxide: Chlorine dioxide can be applied as a spray or dip to red meat parts and to organs to destroy bacteria.

Bacteriophages: Phages are safe, harmless viruses that can attack and destroy targeted bacteria. The Food and Drug Administration (FDA) has recently approved the use of certain phages on foods to reduce or prevent growth of pathogens.

Hypobromous Acid: Hypobromous acid is commonly used in the United States Beef Industry as a biocide for treatment of carcasses in applications that include: hides, prior to removal; carcass and head washing immediately post hide removal; and carcasses immediately before chilling and/or during chilling. There have been numerous studies conducted by USDA, manufacturers, third party research organizations over the past several years validating the use of this technology in the current applications.

During Preparation

As much progress as the industry has made in reducing bacteria on meat, there is still a critical role for food preparers to play in ensuring safety all the way to the table. Safe food handling instructions appear on all meat and poultry products. They include:

- Keep meat and poultry refrigerated, even when thawing;
- Keep raw meat and poultry separate from other foods;
- Keep hot food hot and cold foods cold;
- Cook properly: Consumers should follow the safe handling practices detailed on every package of raw meat and poultry and should take special care to cook ground beef products, such as hamburger and meat loaf, to an internal temperature of 160 F. Poultry products should be cooked to an internal temperature of 165 F. Beef products like steak or roasts can be cooked with 145 F with a three-minute rest period. What is a rest period? It is the minimum time after you remove the meat products from the heat source (oven, grill, broiler, etc.) before you may eat the product. Heat is best verified using an instant-read thermometer.

Why are there two different recommended cooking temperatures? Whole muscle cuts like steaks and roasts are sterile on the inside. Cooking the products destroys any bacteria present on the outside of these cuts. However, when meat is ground, any external bacteria that may be present are distributed throughout the ground product. That is why it is so important to ensure that ground products are thoroughly cooked to 160 F.

Consumers with food safety questions should visit www.meatsafety.org to learn more about safe food handling, or call USDA's Meat and Poultry Hotline at 1-888-674-6854.



A hot water cabinet is used to pasteurize carcasses before processing.



A worker applies a steam vacuum to areas of visible contamination that may contain bacteria