Food Safety and Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

HACCP and Sanitation for Livestock and Poultry Slaughter and Fabrication

Module Objectives

1) Define sanitation and Hazard Analysis and Critical Control Points (HACCP)

2) Introduce processing categories for livestock and poultry products

3) Overview of processes used and products produced

Sanitation

- What is a simple definition of sanitation?

➢ Keeping things clean!

Sanitation Defined – Webster's

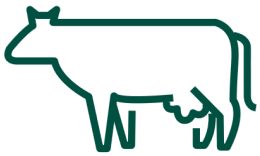
- **Sanitation** - "…development and application of sanitary measures for the sake of cleanliness, protecting health, etc."
- **Sanitary** - "… of or pertaining to health or the conditions affecting health, especially with reference to cleanliness, precautions against disease, etc."
- No definition in statutes
- Statutes do discuss "sanitary practices" and "sanitary measures"

Sanitation and HACCP– FMIA Section 608, PPIA Section 456

- Directly supports FSIS regulations 9 CFR Parts 416 and 417
- Gives Food Safety and Inspection Service (FSIS) ability to ensure product is handled and held in a sanitary manner
- Provisions under which 9 CFR 417 HACCP regulations, 9 CFR 416 Sanitation Performance Standards (SPS) and Sanitation Standard Operating Procedures (SSOP) are based

Hazard Analysis and Critical Control Points (HACCP)

- Science-based approach to food safety
- Establishes controls over all aspects of food production
- Addresses food safety hazards

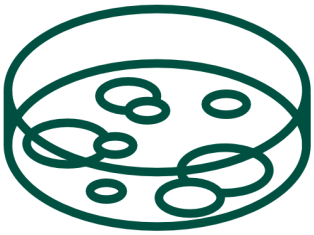


HACCP - 7 Principles

1. Conduct a Hazard Analysis
2. Determine Critical Control Points
3. Establish Critical Limits
4. Establish Monitoring Procedures
5. Establish Corrective Actions
6. Establish Recordkeeping Procedures
7. Establish Verification Procedures

Common Hazards – 3 Categories

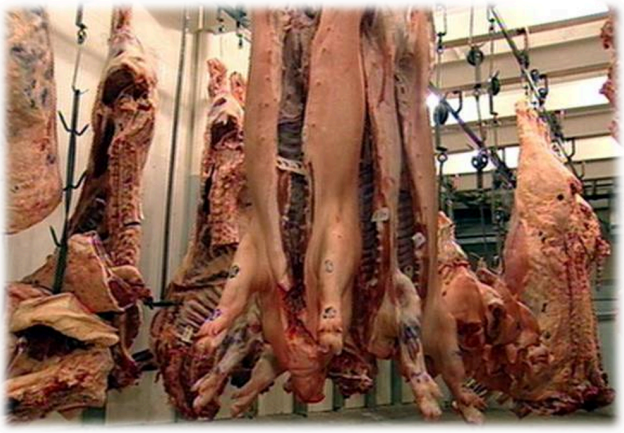
- Biological
  - Pathogenic bacteria, parasites
- Chemical
  - Violative drug residues, chemicals
- Physical
  - Metal, glass, buckshot, etc.



Poultry and Livestock Slaughter

Processing Categories: Livestock and Poultry

- Slaughter
- Raw Intact
- Raw Non-Intact



Poultry Slaughter

- Different kinds of poultry
  - Chickens, turkeys, ducks, etc.
- Different classes of poultry
  - Fryers, roasters, hens, etc.

Poultry Slaughter General Steps

- Steps may include receiving, hanging, stunning, bleeding, scalding, washing, evisceration, trimming, and chilling
- Features unique to poultry slaughter include:
  - Picking and immersion chilling
  - Carcass presentation
  - Salvage step (reprocessing)

Poultry Slaughter: Carcass Chilling

- Water chiller

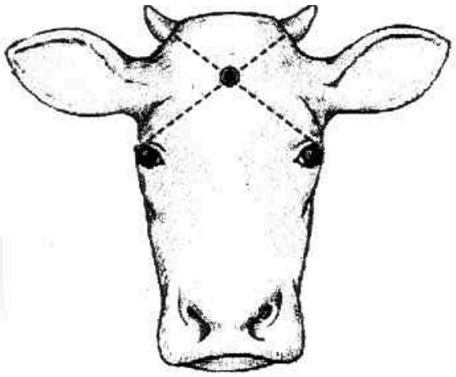
- Air chiller

Livestock Slaughter – Receiving and Holding

- Livestock are received, unloaded from truck, and held in pens
- Must have access to water in all holding pens at all times
- Must provide feed if animals are held more than twenty-four hours
- FSIS conducts ante-mortem inspections for disease conditions

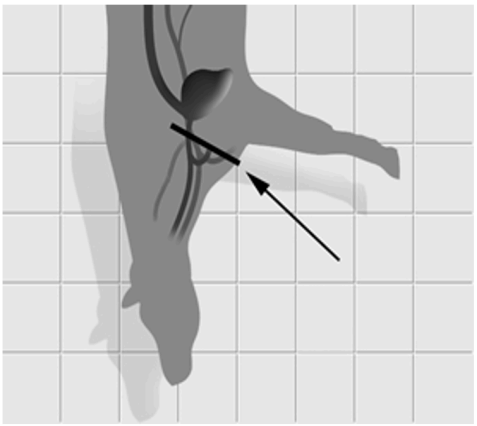
Beef Slaughter – Stunning

- Must comply with Humane Methods of Slaughter Act (1978)
- Typically involves a mechanical method (captive bolt or gun shot)
- Must render animal completely unconscious with minimal excitement and discomfort



Beef Slaughter – Sticking

- Death from loss of blood (exsanguination)
- Usually done while animal is hanging head down from a rail



Beef Slaughter - Hide Removal/Washing

- Hide Removal
  - May be achieved through mechanical equipment or by hand
- Carcass Washing
  - May include antimicrobial wash or rinse to reduce microbial contamination (used as part of a multi-hurdle approach)

Beef Slaughter - Evisceration

- Follows head removal step
- Separates internal organs from carcass
- Must be done properly so carcass is not contaminated with contents of internal organs
  - May contain pathogens like *E. coli* O157:H7 and *Salmonella*

Beef Slaughter – Carcass Splitting/Trim Rail

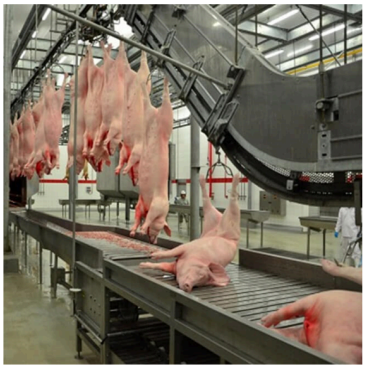
- Carcasses split with a saw
- Inspection at trim rail indicates whether carcass is free of contamination or quality concerns that can be removed by trimming
- Example: Bruising is normally a quality issue that can be removed by trimming (unless significant enough to warrant veterinary disposition)

Livestock Slaughter – Carcass Chilling

- Temperature, humidity, and air flow in coolers must be maintained at levels adequate to inhibit bacteria growth
- After chilling, carcasses are ready for fabrication
- This further processing may happen on-site or carcasses may be shipped to another establishment

Swine Slaughter Specifics

- Stunning procedures are usually electrical or carbon dioxide
- Captive bolt and gun-shot are also used in some establishments
- Sticking and bleeding sometimes done while hog is lying on its side or held on its back
- Instead of removing hide, swine can be scalded, de-haired, and singed to remove any hair remaining



Raw Intact Livestock and Poultry

Raw Intact Product

- HACCP processing category applies to establishments that further process directly after slaughter or after receiving raw products
- Poultry Examples:
  - **Poultry parts**
  - **Whole birds**
  - **Edible byproducts** (hearts, livers, gizzards)

- Livestock Examples:
  - **Trimmings**
  - **Steaks**
  - **Roasts**
  - **Edible byproducts** (tongues, hearts, livers, kidneys, sweetbreads)

Raw Intact Product - Poultry

- Cut up
  - Cutting carcasses into specific types of products (legs, breasts, wings)
- Packaging
  - Usually wax treated paper or plastic film
  - Protects product from damage during refrigerated or frozen storage
- Storage (refrigerated or frozen)
- Distribution
  - To other departments in same establishment, to other establishments, or retail markets

Raw Intact Poultry - Giblets

- Hearts, livers, gizzards
- Must be chilled quickly after slaughter and processed or moved quickly into retail
- May be sold fresh or frozen and may be used to make other processed foods

Raw Intact Livestock - Fabrication

- **Fabrication**: taking various cuts from carcasses to produce specific products
- Primal (wholesale) beef cuts
  - Brisket, shank, rib, loin, round, chuck, flank, short plate
  - Primal parts often de-boned before cutting into subprimal cuts to produce boneless items
- Subprimal (retail) beef cuts
  - Rib roast, round steak, ribeye, top round, whole tenderloin, etc.

Raw Intact Product - Livestock

- Carcass receiving
  - Carcasses chilled for specified time to firm up, which facilitates cutting
- Packaging
  - Protects product from damage during refrigerated or frozen storage
- Storage (refrigerated or frozen)
- Distribution
  - To other departments in same establishment, other establishments, or retail

Raw Intact Livestock – Examples of Edible Offal

- Tongues, hearts, livers, kidneys, sweetbreads (thymus or pancreas)
  - Must be chilled quickly after slaughter and processed or moved quickly into retail
  - May be sold fresh or frozen and may be used to make other processed foods
- **Specified Risk Materials (SRM) in cattle are inedible and prohibited for use as human food**
  - Tonsils must be removed from tongues

Raw Non-Intact Livestock and Poultry

Raw Non-Intact Product

- HACCP processing category applies to establishments that use processing steps such as grinding, comminuting, injecting solutions, or mechanical tenderization by needling, cubing, pounding devices, or other means of creating non-intact product

Raw Non-Intact Product Examples

- Ground beef, ground pork, ground chicken, ground turkey
- Hamburger, beef patties
- Fabricated steaks
- Advanced Meat Recovery (AMR)
- Product injected with solutions
- Tenderized product whether through mechanical or chemical means

Mechanical Separation

- Obtains more usable product from bones
- Bones are ground, then forced through a sieve
  - Some incorporated bone and marrow
  - Resulting product has paste-like consistency
- Not considered meat or poultry
  - Must be identified in ingredients statement

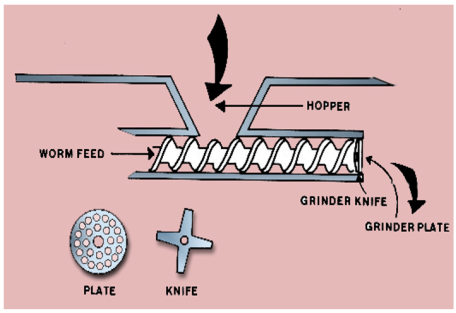
- **Prohibited for beef due to SRM (Advanced Meat Recovery used for beef – see FSIS Directive 7160.3)**

Comminution

- Process which reduces particle size
  - Grinding
  - Chopping
  - Flaking
- Several different machines may be used
  - Grinder
  - Bowl chopper
  - Flaker
  - Some combination of these

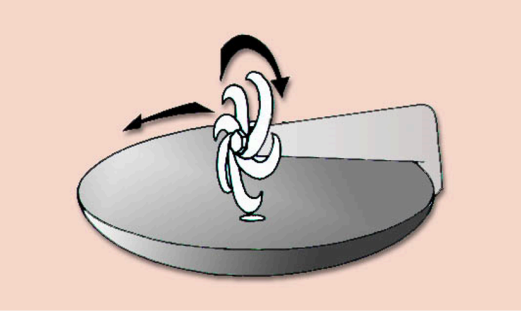
Grinding

- Meat loaded into a hopper, moves along an auger or screw through a cylinder, passes through a plate with holes, then cut into smaller pieces with a knife



Chopping

- Metal bowl revolves while a rotating knife cuts meat or poultry
- Bowl chopper also mixes product as it chops

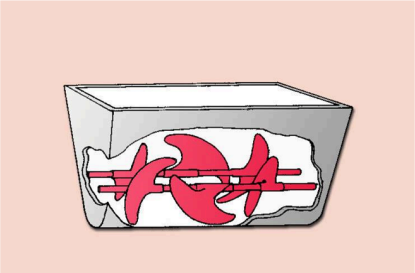


Flaking

- Used on large frozen blocks of meat or poultry
- Product block is pressed against knife blades, which shave off pieces of frozen meat or poultry

Mixing

- Meat or poultry mixed within a chamber by revolving paddles
- Results in uniform distribution of fat/lean particles, non-meat ingredients



Metal Contamination

- Possible chipping or breakage of moving metal parts common in these operations
- Metal detection step used by some establishments to identify contamination

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This concludes the HACCP and Sanitation for Livestock and Poultry Slaughter module.