



On-farm slaughter operation food safety

Learning module 6:
Meat processing safety

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On-farm slaughter operation food safety

Learning module 6: Meat processing safety

1.0 Meat processing at on-farm slaughter operations in Alberta

This On-Farm Slaughter Operation (OFSO) meat processing safety module provides information on:

- responsibilities of an OFSO for producing safe meat products
- processing controls required for meat processing activities

Meat processing activities at an OFSO can include hanging and chilling the carcass, cutting and wrapping, grinding, fermenting, smoking, drying and canning.

OFSO licenses, issued by Alberta Agriculture and Irrigation, allow for the uninspected slaughter and processing of animals purchased by individual customers on the licensee's land for consumption by the individual customers and their households only. The land under the OFSO licence is defined as the land that is owned, leased or otherwise controlled by the OFSO licensee.

The legislation for an OFSO licence also requires that the uninspected carcasses are stored and processed in a safe and hygienic (clean and sanitary) manner.

1.1 Meat processing activities: hazard identification and control

Knowing and understanding what food safety hazards are associated with your meat processing activities are important for any food processing business. Your business and livelihood can be at risk if your meat or meat product is associated with a foodborne illness outbreak.

Additionally, when preparing or processing meat products, strict controls are required by the OFSO to prevent sickness or death. As discussed in Learning module 1: Food safety hazards and control, it is important to understand which hazards are present in your facility and what food safety controls are required to control these hazards to prevent a foodborne illness.

If you are not aware of the hazards in meat processing or how to control these hazards, the processing of high-risk foods (Section 3.1 below) is strongly discouraged.

2.0 Licensee responsibilities: meat processing activities

The legislation for an OFSO (Module 2) describes the requirements and responsibilities for any meat processing activities conducted by an OFSO. Each of the following sections reference the appropriate sections of the [Meat Inspection Regulation](#) that apply to all meat processing activities conducted at an OFSO. It is also the responsibility of the OFSO to abide by all other applicable federal, provincial and municipal legislation, zoning and by-laws.

For additional information, please refer to the [On-Farm Slaughter Operation Technical Guide](#).

2.1 Location of meat processing activities

Slaughter by an OFSO must be done outside, but the processing of an uninspected carcass by an OFSO must be done inside a building or structure. The building or structure and the equipment used to process the carcass must be made of materials that can be cleaned and sanitized/disinfected regularly. For example, concrete flooring in a carcass processing room is a much better choice than a dirt floor. A dirt floor may contaminate the carcass and cannot be effectively cleaned, sanitized or disinfected.

It is the responsibility of the OFSO licensee that the building or room where the processing activities will occur meets the requirements set out in Section 18(1)(b) of the [Meat Inspection Regulation](#) as well as all applicable municipal/regional/local zoning rules and by-laws.

Regulatory reference: Meat Inspection Regulation

General Requirements:

18(1) The operator of a meat facility shall ensure that the meat facility is designed, constructed, equipped and maintained to provide for

- (b) the hygienic production, handling and storage of meat,
 - (i) in the case of an abattoir, a slaughter area,
 - (ii) separation of incompatible activities,
 - (iii) adequate shipping and receiving areas,
 - (iv) sequential slaughtering or processing operations,
 - (v) personal hygiene facilities, and
 - (vi) food contact surfaces that are non-toxic, non-absorbent, smooth, corrosion resistant, crack or crevice free and able to withstand frequent sanitization.

2.1.1 Meat processing facility (premises)

The OFSO licence permits further processing of meat from the carcasses of animals slaughtered at your operation, from the carcasses of wildlife animals, or carcasses from another OFSO or mobile butcher slaughter.

The information contained in **six meat processing facility info-sheets** describe the requirements for an OFSO meat processing facility with options on how to meet the food safety outcomes. The information within the info-sheets is based on the requirements of the *Meat Inspection Act* and Meat Inspection Regulation (MIR) and meeting the outcome of “hygienic production, handling and storage of meat” as stated in the MIR Section 18(1)(b).

Please click on each link below for more information:

- floors, walls and ceilings
- personal hygiene facilities
- pest management
- waste shipping and receiving
- water and ice safety
- worker and product flow

2.2 Storing and processing of uninspected carcass(es)

Bacteria that can cause illness (pathogens) may be present on animals, inside animals, on people, inside people, in the environment and on carcasses and it is important that:

- carcasses are properly stored at a temperature of <4°C/40°F as soon as possible after slaughter to prevent the growth of pathogens
- proper hygienic practices are followed when processing and storing carcasses and finished meat products

**Regulatory reference: Meat Inspection Regulation
Transportation and Storage**

31.3 A carcass slaughtered as a part of an uninspected slaughter operation,

(b) if it is stored, shall be stored in accordance with the requirements for sanitary storage and handling of meat as set out in section 18(1)(b) and any other requirements set out by the Director.

2.3 Uninspected processed meat must be returned to customer

All processed meat products that are made by an OFSO are uninspected and cannot be sold, traded, gifted or bartered, and must be returned to the customer (owner of the animal).

Regulatory reference: Meat Inspection Regulation

Meat for Household consumption

31.4 (1) Meat harvested from an animal slaughtered as a part of an uninspected slaughter operation

- (a) is, except as provided in subsection (1.1), for consumption only by persons who form part of the producer's household, and
- (b) shall not be sold.

(1.1) A producer of a large animal and up to three other individuals may, in respect of a large animal to be slaughtered by an uninspected slaughter operation, be identified by the producer as the co-owners of the large animal and the meat harvested from that animal may be

- (a) as agreed by the producer, the co-owners, and uninspected slaughter operation, be transported, stored or provided, to the households of the co-owners, and
- (b) be consumed by persons who form part of the households of the co-owners.

2.4 Use of inspected meat

Inspected meat or products from inspected meat, such as fat, is not permitted to be used by an OFSO to prepare any uninspected processed meat products for their customer(s).

Regulatory reference: Meat Inspection Regulation

Meat for Household consumption

31.4 (2) The operator of an uninspected slaughter operation shall not slaughter, purchase, store, process or sell inspected meat as part of that operation.

2.5 Labelling

Uninspected animal carcasses and meat products must be labelled appropriately before leaving the OFSO to clearly identify that the carcasses and meat are uninspected. The following reasons identify the need for clear labelling of carcasses and meat before leaving the OFSO site:

- a) uninspected meat (including carcasses) cannot be sold, bartered, or distributed to individuals, to retail and/or food service in Alberta
- b) if someone becomes ill, it is important that the meat can be traced back to identify the source of the illness.
- c) the customer is aware that a meat inspector has not inspected the meat

The OFSO licensee is responsible for the following:

The carcass, all edible portions of the animal, and any by-products of that carcass are labelled with:

- "UNINSPECTED - NOT FOR SALE"
- The name of the OFSO
- The date of processing

Regulatory reference: Meat Inspection Regulation

Location of operations, and identification of meat

32(3) A mobile butcher or the operator of an uninspected slaughter operation shall identify the carcass, all other edible portions of the animal, and any by-products of that carcass by affixing tags on them stating “UNINSPECTED - NOT FOR SALE” and include the OFSO name and date of processing.

2.6 Processing waste disposal and byproducts for bait

The OFSO licence requires that slaughter and processing waste, including specified risk materials (SRM) to be disposed of according to the MIR, Section 31.7 Disposal.

Uninspected slaughter operations are allowed to gift or sell uninspected slaughter waste and processing waste consisting of butcher scraps and byproducts for use as bait in hunting or trapping. Any slaughter waste used for bait must be appropriately labelled with:

- “UNINSPECTED — FOR USE AS BAIT, ONLY”.
- The name of the OFSO.
- The date of processing.

Regulatory reference: Meat Inspection Regulation

Disposal

31.7(1) Except as provided in this section, the operator of an uninspected slaughter operation shall dispose of any carcass or portion of a carcass that is not provided to a producer in accordance with the Disposal of Dead Animals Regulation (AR 132/2014).

(2) The operator of an uninspected slaughter operation may, in accordance with this section, dispose of portions of a carcass that are not provided to a producer by offering them for sale, selling them or otherwise providing them for use as bait in accordance with this section.

(3) The following portions of a carcass may not be offered for sale, sold or otherwise provided for use as bait:

- (a) the skull, brain, trigeminal ganglia, eyes, palatine tonsils, spinal cord or dorsal root ganglia of cattle aged 30 months or older;
- (b) the distal ileum of cattle of all ages; (c) material coming from an animal that is known or suspected to have a disease that is reportable under the Animal Health Act or the Health of Animals Act (Canada) or both.

(4) The operator of an uninspected slaughter operation shall identify all portions of a carcass offered for sale, sold or otherwise provided for use as bait by affixing tags on them stating “UNINSPECTED — FOR USE AS BAIT, ONLY”.

For more information, view [Meat Inspection Regulation Amendments, Salvage and sale of meat by-products](#).

3.0 Meat processing controls

The OFSO licence allows for the processing of uninspected meat. Further processing of meat products is a high-risk activity and controls must be in place to prevent food safety hazards (biological, chemical, allergenic and physical) from making the product unsafe.

Meat processing activities can include chilling, cutting and wrapping, grinding, fermenting, smoking, drying and canning.

Meat and poultry products are foods that have ideal conditions for bacterial growth and where pathogens (disease-causing organisms) and other microorganisms like viruses and parasites can be found. These ideal conditions include:

- low acidity (pH greater than 4.6)
- high starch or protein content
- high moisture or water activity (available water)

3.1 High-risk meat processing activities

A. Chilling

To slow the growth of bacteria (spoilage and pathogens), chill the carcass as soon as possible after slaughter (within 2 hours or sooner on a hot day). Chilling occurs when the whole carcass or the sides of the carcass are placed in a cold environment (<4°C/40°F) to quickly lower the internal temperature of the meat. Industry best practices for chilling are a cooler with refrigeration unit. Leave all carcasses unwrapped and hung away from other carcasses, so that the air can circulate freely around each carcass.

Hazards associated with chilling

Biological hazards

- Condensation can be a problem with refrigeration in coolers. Condensation occurs when warm, humid air meets cold surfaces or cold air, which creates water droplets (condensate) that can contaminate the meat surface(s). To reduce condensate, increase air circulation and reduce the flow of warm air into a refrigerated area. Protect carcasses by installing drip pans and ducts under refrigeration units, wiping, or sponging the walls, or other equipment surfaces (e.g., hanging hooks) or by moving carcasses into areas of the cooler without dripping condensate.

if the cooler/refrigeration unit is unable to maintain the temperature of carcasses at <4°C or 40°F, then rapid growth of bacteria or pathogens, such as *Escherichia coli* O157:H7 (*E. coli* O157:H7), can occur as the temperature enters the danger zone (4°C/40°F - 60°C/140°F) and where bacteria or pathogens can double their growth in as little as 20 minutes.

- cross-contamination between different species can occur during chilling. To prevent cross contamination of carcasses by different species, hang the same species in a separate area, away from other species. Prevent carcasses from touching to permit sufficient air flow.
- to prevent or reduce contamination of processed and RTE meat products by raw meat:
 - create a dedicated area in the cooler for processed meat
 - schedule processing of meat when cooler is empty or less full
 - store processed meat in separate cooler/freezer

B. Cutting and Wrapping

After the carcass has been cooled and hung if required, the carcass can be cut into steaks, ribs and roasts and then wrapped/packageged.

Hazards of cutting and wrapping

Biological Hazards

pathogenic bacteria including *E. coli* O157:H7 and *Salmonella* that may have contaminated the meat during the slaughter and dressing process

- cross-contamination between species
- contamination by bacteria from unclean cutting equipment or processing environment
- bacteria from workers due to unhygienic practices

Physical hazards

metal particles from cutting utensils or equipment (e.g. band saw).

C. Grinding

Grinding is the action of cutting meat into very small pieces, which are then forced through very small holes using either a mechanical or hand-held meat grinding machine.

During grinding, the outside surfaces of the meat carcass are blended with the interior muscle meat cuts, which exposes the interior meat to any pathogenic bacteria present on the surface of the meat carcass.

Hazards of grinding

Biological hazards:

- pathogenic bacteria including *E. coli* O157:H7 and Salmonella that may have contaminated the meat during the slaughter and dressing process
- cross-contamination between species
- bacteria from unclean grinding equipment or processing environment
- viruses or bacteria from workers

Physical hazards:

- metal particles from grinding equipment

Manufacture of a safe ground product includes:

- grinding of meat in small batches—keep the remaining meat to be ground in the cooler
- grinding cold (4°C/40°F) meat
- using potable water or ice to cool the meat during grinding
- refrigerating or freezing meat immediately after grinding
- cleaning and sanitizing processing equipment between species
- cleaning and sanitizing processing equipment and processing area/room after each use
- processing is conducted by healthy workers
- grinding equipment is checked for broken/chipped/missing pieces before and after processing. Replace/repair any damaged equipment before grinding. A metal detector can be used to find metal pieces or to confirm that none are present. (dispose of all ground meat in which metal pieces are present)

D. Fermented sausages

Fermenting meat is a way to preserve meat using microbial cultures. During fermentation, the acidity of the product is increased, which inhibits the growth of pathogens. Creating a safe and consistent product through the fermentation process requires knowledge of the proper techniques and the successful control of hazards.

Hazards of fermented sausages

Biological hazards:

- *Escherichia coli*
- *Clostridium botulinum*
- *Staphylococcus aureus*
- *Trichinella spiralis*

Manufacture of safe fermented sausages requires:

- a facility design and/or procedures that eliminates the possibility of cross-contamination between raw meat and fermented products
- an acceptably designed smokehouse that provides consistent temperatures throughout and does not have any cold spots
- accurate thermometers for recording both product temperatures and smokehouse temperatures, to monitor the progress of fermentation
- use of a commercial starter culture only (no back slopping—the practice of adding a small amount of the fermented product into a fresh batch fermented sausage)
- use of a pH meter to measure pH during the fermentation step
- use of a water activity meter to measure available water in the product
- monitoring of the fermentation process to confirm that the degree/hours limit has not been exceeded

E. Smoking (cooking)

Smoking is a process of exposing food to heat and smoke to preserve, brown and add flavor. Since many smoked meats are eaten without further cooking (i.e., ready-to-eat), it is important that these products are properly prepared to kill pathogens that cause foodborne illness.

Hazards of smoking

Biological hazards:

- *Escherichia coli*
- *Trichinella spiralis*
- *Staphylococcus aureus*
- *Listeria monocytogenes*
- *Clostridium botulinum*
- mould growth on the finished product

Manufacture of safe smoked meat or sausage requires:

- an acceptably designed smokehouse
- working thermometers that can be calibrated
- scales that can be calibrated
- a smoked meat product that has met a minimum temperature for a designated period to ensure pathogens have been killed
- rapid cooling of smoked products to prevent growth of pathogens
- physical separation of cooked and raw products
- labelling products that are not fully cooked during the smoking process, including additional cooking instructions

F. Drying or dehydration

Drying is the process where water or moisture is gradually removed from pieces of meat that have been cut to a uniform shape, increasing the shelf-life of the product and protecting it from the growth of pathogens and spoilage microorganisms. Dried meat products can include beef jerky, dry and semi-dry sausages and prosciutto.

Biological hazards:

- *Escherichia coli*
- *Campylobacter jejuni*
- *Listeria monocytogenes*
- *Salmonella spp.*

- *Staphylococcus aureus*
- *Clostridium botulinum*
- Noroviruses
- parasites found in the meat

Manufacturing of safe dried meat requires:

- lean meat with no visible fatty tissue
- pre-heating of beef to 71°C (160°F) before starting the dehydrating process.
- time/temperature critical limit is reached to destroy non-spore forming bacteria
- controlled temperatures in drying rooms or smokehouses
- controlled relative humidity in drying rooms or smokehouses
- meat strips to be hung individually from one end or arranged on drying racks to allow free air circulation along the whole length of the piece for fast and uniform drying. Do not allow the meat pieces to touch
- physical separation of cooked and raw products
- use of a water activity meter to check that the water activity value of the processed product is below 0.85 to prevent growth of pathogens (especially if the product is vacuum-packed or wrapped in plastic)

Note: It is recommended to store all dried meat product(s) at a refrigeration temperature of 4°C (40°F) or lower.

G. Canning

Canning is the process of placing food into jars and heating to a specific defined temperature. Meat (ham, sausage, poultry etc.) and meat by-products (broth) are low-acid foods (pH greater than 4.6), which require pressure canning to destroy pathogens, spore forming bacteria and inactivate enzymes. The criteria for pressure canning low-acid foods must be strictly and carefully followed as inadequate processing can cause severe foodborne illness or even death.

Biological hazards

- *Clostridium botulinum* and spore formation (spores are heat-resistant and in the absence of oxygen they grow and produce toxins).

Manufacture of safe canned meat products requires:

- using a pressure canner with an accurate gauge, rather than a boiling water canner. A water canner is unable to reach the proper temperature required to destroy the *Clostridium botulinum* bacteria
- using correct processing times and pressures for the kind of food, the size of jar, including the method of packing food in the jar. It is crucial to identify proper processing times and pressures for low-acid foods
- recipes that are current and have been scientifically tested and from a reliable canning website
- new lids and jars only (do not re-use lids or jars)

4.0 Quiz

Please complete the **learning module 6: meat processing safety** quiz

For more information on high-risk meat processing, please contact agi.foodsafety@gov.ab.ca.