Food Safety Guidelines

for Meat Processors

NOVA SCOTIA

Food Safety Guidelines for Meat Processors
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1 Guideline application

These guidelines apply to any facility that has been issued

- **a food establishment permit** under the NS Food Safety Regulations (2004), pursuant to the Health Protection Act, and established by the Administrator under Section 4 (1) of these regulations
- **a license for the operation of a meat processing plant** under the NS Meat Inspection Regulations (1990), pursuant to the Meat Inspection Act

In addition, the operator must be aware of and comply with the following, if applicable:

- Nova Scotia Food Safety Regulations
- Nova Scotia Food Retail and Food Services Code
- Nova Scotia Meat Inspection Regulations

Nova Scotia Department of Environment and Climate Change, Inspection, Compliance and Enforcement Division, is responsible for the approval and inspection of meat processors. Public health officers are available for consultation and questions related to your meat processing operation.

See Appendix 1 for definitions of common terms.

2 Prevent hazards through facility design and flow

The **design and construction** of the meat processing facility must prevent hazards that may be present from posing a risk of contamination to the food.

The size and layout of the facility must accommodate the activities conducted.

Incompatible operations must be effectively separated. For example,

- cleaning and sanitizing activities occur separately from food preparation activities
- raw food is handled in an area separate from the handling of ready-to-eat (RTE) food
- shipping of finished products is conducted in an area separate from the receiving of incoming ingredients
- waste is stored away from food preparation areas
- food with allergens is handled separately from food without allergens

The **pattern of product flow** should be one-way to ensure that incompatible activities do not occur in the same room or area at the same time:

- Separate raw and unprocessed food from processed foods.
- Separate foods containing allergens from allergen-free foods, and check that cleaning is effective.
- Use separate equipment and utensils for raw potentially hazardous foods and RTE food products.
- Evaluate areas of shared equipment or physical cross-over to ensure there are not any cross-contamination points. For example, products containing an allergenic ingredient do not travel on a conveyor belt above a product that does not contain allergens.
- Use dedicated lines whenever possible: this could prevent cross-contamination of a RTE food product.
- Prepare RTE food at the beginning of the operation, before preparing food in which low levels of pathogens can occur without presenting a health risk, or after a full clean-up and sanitization.
- When designing the process,
  - consider the proximity of equipment to other machines
  - avoid line cross-over
  - allow sufficient space to perform wash downs
  - reduce the creation and spread of dust
- Identify sanitary and restricted access zones to help control traffic flow patterns and equipment between the incoming ingredients and the finished products
- Establish a flow of operations that prevents employees working in the raw processing area from accessing the RTE area

3 Prevent cross-contamination between raw and RTE meat processing operations

Meat processing facilities that process both raw and ready-to-eat products (RTE) must meet extra requirements to ensure product safety:

new facilities must be laid out to ensure spatial separation at each step of the process, from storage to post-processing

existing facilities undergoing renovations must be laid out to ensure spatial separation at each step of the process, from storage to post-processing

existing facilities that cannot ensure complete spatial separation must use temporal separation to prevent cross-contamination

Meat processing facilities that produce both raw and RTE products must have employee procedures in place to prevent cross-contamination from the raw production area to RTE production area:

- employee handwashing
- personnel equipment changes — aprons, clothing, footwear
- established traffic flows between raw product areas and finished product areas
- entry restriction to these areas, if applicable

4 Meet facility equipment requirements

Equipment must be designed and constructed to be durable and to retain characteristic qualities under normal use and conditions.

Meat processing equipment should comply with international sanitation standards, such as those administered by third parties — NSF International, UL of Canada.

5 Establish a facility sanitation program

Facility operators must establish a **sanitation program**.

The sanitation program must be properly followed, monitored, and verified.

A sanitation program should include but is not limited to:

- areas and items of equipment to be cleaned/sanitized
- designated employee responsible for the cleaning/sanitizing
- chemicals and process to be used:
  - include concentrations and contact time
  - use products with a drug identification number (DIN)
  - check Health Canada's list of approved sanitizers
- procedures used
- frequency of cleaning and sanitizing
- inspection and monitoring records

6 Prevent contamination through good employee practices

Everyone's responsibility:	All operators and personnel of food premises are responsible for ensuring that food products are handled in a manner which prevents contamination. This includes storage, preparation and processing, display, service, and presentation.
Clean clothing:	All personnel in the meat processing area must wear clean outer garments. Clothing that becomes soiled should be changed. Personnel who change workstations from raw food contact activities to ready-to-eat food contact activities must remove any soiled clothing before entering that area.
Hair and beard restraints:	Personnel entering or working in meat processing areas should wear hair restraints, such as clean hats or hair nets. When required, beards must be completely covered with beard nets.
Hand washing:	Personnel involved in meat processing who engage in activities that could result in the transfer of bacteria must wash their hands before resuming activities. Such activities include but are not limited to use of the washroom, eating, drinking, smoking, handling raw food products, touching hair/nose/mouth/eyes.
Jewelry and watches:	Personnel who are food handlers must remove jewelry, watches, and rings before working with food.
Cuts and bandages:	Personnel with cuts and/or bandages must wear vinyl gloves or refrain from handling foods entirely.
Illness:	Personnel suffering from communicable illness with symptoms such as diarrhea, fever, vomiting, jaundice, and/or sore throat with fever must be excluded from work and have the responsibility to advise management of their illness.

Food hygiene training:	The operator must • have successfully completed a food hygiene training program recognized by the department • ensure that another staff member who has completed food hygiene training is present when the operator is absent • ensure that all personnel who handle food are trained in safe food processing techniques appropriate for their level of responsibility and specific to their involvement in meat processing

7 Submit recipes for review

Public health officer requests:	An operator must comply with requests of the public health officer to provide information that may affect the food safety of the product manufactured. This includes, but is not limited to, meat processing recipes and ingredients, and steps in the process of the product formulation.
Proving product safety:	A report must be provided indicating that the recipes as submitted are acceptable to produce a safe food product. The report must indicate any parameters that require monitoring to ensure compliance — pH, water activity, additive levels, time/temperature — and must include accredited lab results. This report can be written by a food safety consultant.
Trade secret protection:	The information collected is protected under the definition of a "trade secret" under the NS FOIPOP Act (1993). The information collected will be used only to determine food safety compliance with this guideline, the regulations, and acts to which the guideline is pursuant.

8 Meet additive and ingredient requirements

Federally regulated additives

Foods containing additives must meet the requirements of the Food and Drug Regulations (Canada).

List of acceptable additives and additive uses in food product: Federal Food and Drug Regulations, Part B, Division 16

Nitrites/nitrates

Premixed only:	Provincial meat processing facilities must use premixed nitrites/nitrates only, for safety reasons.
Bulk forms unsafe:	The use of bulk nitrite and nitrate compounds — that is, nitrite/nitrate compounds not mixed with salt to reduce chemical food safety risk — is not permitted in provincial meat processing facilities.
Usage:	Meat products can be cured using a slow curing or a rapid curing method. The nitrate and/or nitrite salts are used in slow curing processes whereas nitrites are used in rapid curing of meat products. Find calculations and prescribed levels on the Canadian Food Inspection Agency website: inspection.gc.ca/preventive-controls/meat/nitrites/eng/1522949763138/1522949763434

Food and ingredients

Approved food sources:	All food and food ingredients used in the processing facility must be obtained from a source that is subject to inspection. All food sampling, analysis, detaining action, condemning action, and recall of food product at a meat processing facility are subject to the NS Food Safety Regulations (2004).
Potable water requirement:	When water will come into direct or indirect contact with food, it must be potable water. This includes direct or indirect contact during food handling, processing, and cleaning. This includes water in all its forms — liquid, steam, ice. Potable water must conform to the standards outlined in Health Canada's Guidelines for Canadian Drinking Water Quality. The sampling frequency will be governed by the most frequent sampling regimen required by a regulatory authority.
Starter culture:	Fermented meat products rely on the growth of specific lactic acid–producing bacteria to achieve the pH that ensures their safety. One method of fermenting involves the use of starter cultures. Starter cultures are pure, living cultures of the lactic acid–producing bacteria, available in two forms, freeze-dried and frozen cultures. Various strains can be used separately or in combination for making sausages and other meat products.
Back slopping not recommended:	The practice of back slopping is not recommended. If a facility operator proposes the practice of back slopping in fermented meat production, the facility is required to have in place strict controls including lab sampling of the inoculum batter for pH and for Staphylococcus aureus presence. The pH must be less than 5.3 and a confirmed absence of S. aureus prior to usage in the new batch.

9 Create a preventive control plan

A preventive control plan (PCP) **identifies** food safety risks and **demonstrates** how they will be controlled. Planning and implementing a preventative control system such as HACCP (Hazard Analysis & Critical Control Points) is an important aspect of ensuring food safety in your operation. For all proposed meat processing facilities, preventive control plans must be documented and applied.

For help developing a PCP, refer to the Canadian Food Inspection Agency website: inspection.gc.ca/food-safety-for-industry/toolkit-for-food-businesses/preventive-food-safety-controls/eng/1427304468816/1427304469520

Food safety consultants may also be contacted to provide expertise on developing preventive control plans.

Create a preventive control plan based on HACCP principles

Hazard Analysis Critical Control Points (HACCP) is a system that identifies, evaluates, and controls hazards significant for food safety. Use HACCP principles to prepare your food safety plan.

Your preventive control plan needs to ensure that you control for each food safety hazard in the meat processing industry. For each product your facility produces, this system helps you identify points in the process which microbial, physical, or chemical hazards can be removed, eliminated, or reduced.

Record keeping is also an important aspect to incorporate into a preventive control plan. Keep records such as temperature logs, cooking/cooling times, pest control, sanitation, procedure for recalling products.

Submit your preventive control plan

Your PCP plan must be submitted during the permit/license application process.

Existing permitted or licensed meat processing facilities will need to implement a documented PCP based on HACCP principles within a timeline specified by the Public Health Officer.

10 Process controls

General guideline for processing potentially hazardous foods and ingredients

- Foods and ingredients that are potentially hazardous should be processed at temperatures less than 10°C (50°F).
- The maximum time at which potentially hazardous foods can be kept at temperatures between 4–10°C (40–50°F) must not exceed four hours.
- The amount of time processing potentially hazardous foods between 20–60°C (68–140°F) must not exceed two hours.
- Exceptions: This guideline does not apply to dry cured or fermented meat production, and other similar processes requiring ripening/aging temperatures within the range of 4–60°C (40–140°F).

Shelf stability of foods

For a food product to be considered shelf-stable (including fermented and dried meat products) one of the following parameters must be met:

- pH of 4.6 or less regardless of Aw
- Aw of 0.85 or less regardless of pH

A fermented meat product is also considered shelf stable if it meets three parameters:

- it contains a minimum of 100 ppm nitrite/nitrate and 2.5% of salt
- the pH is 5.3 or lower at the end of the fermentation period
- the end product has an Aw of 0.90 or lower

Adequate packaging is required so that water activity of product is not altered during storage and display for sale.

Shelf-stability parameters:

- Determining shelf-stability parameters is the responsibility of the meat processing facility operator.
- Samples may need to be submitted to an accredited lab for verification of shelf stability.
- The operator may need to hire a food safety consultant to determine the requirements for shelf-stability, such as process controls, additives necessary, humidity, and temp controls during processing.
- Results and reports must be made available to the public health officer upon request.

Temperature monitoring equipment requirements

Requirements for temperature monitoring equipment used for determining temperatures of foods before, during, or after processing:

- must have sensors or probes constructed of material that does not significantly increase risk of physical contamination of food — for example, not glass that has a risk of breaking
- must have a temperature measurement range appropriate to the food process
- must have the capacity to withstand temperature extremes if the food production process requires measurement during the cooking and/or cooling
- must be easily cleaned and sanitized after each use
- must have the capability to be calibrated

Ready-to-eat cooked product – minimum temperature requirements

	Celcius	Farenheit
Pork, Veal, Lamb	71°C	160°F
Ground Meat	71°C	160°F
Whole chicken/turkey	82°C	180°F
Chicken/turkey Stuffing (inside temp.)	74°C	165°F
Chicken/turkey pieces	74°C	165°F
Ground Poultry	74°C	165°F
Beef steaks/roasts – *medium rare* – *medium* – *well done*	63°C 71°C 77°C	145°F 160°F 170°F
Ground game meat, meat mixtures, ground venison, sausage	74°C	165°F
Deer, elk, moose, rabbit	74°C	165°F

Deviations from the NS Food Code:

Approval to use a temperature/time combination in a cooking process that may deviate from the NS Food Retail and Food Services Code (NS Food Code) recommended minimum internal cooking temperatures may be granted to a facility operator if it is based on microbiologically validated information — that is, process lethality determination curves and established F-values.

For alternate internal cooking time/temperature options, refer to "Preventive control recommendations for manufacturing cooked ready-to-eat meat products": inspection.gc.ca/food/requirements-and-guidance/preventive-controls/meat/cooked-ready-to-eat/eng/1522942479864/1522942558310

Written permission needed:

The use of time/temperature cooking processes that deviate from the NS Food Code or other approved regulatory codes cannot occur until the Public Health Officer gives written permission to use such a process.

Smoking

Smoking occurs when the product is exposed to smoke and can be considered as the cooking step if the temperatures used are cooking temperatures (Refer to page 15). Smoking at cooking temperatures is referred to as hot smoking. Cold smoking occurs when smoke is introduced at lower temperatures and these products are not fully cooked.

Meat cooling curve

The following procedures are known to control the risk of pathogen growth during the cooling of heat processed meat.

Slow cooling

Slow cooling criteria

A 20-hour continuous cooling method can be used if the product meets at least one of the following prerequisites:

- a water activity above 0.92, no less than 120 ppm nitrite, and a finished product salt concentration of 3.5% or more
- a water activity above 0.92, no less than 40 ppm nitrite, and a finished product salt concentration of 6% or more
- a water activity above 0.92, no less than 180 ppm nitrite, and finished product salt concentration of 2.3% or more
- a water activity that is less than or equal to 0.92 at the beginning of the cooling process, with or without nitrite

Slow cooling

water activity	nitrite levels	finished product salt concentration
above 0.92	no less than 120 ppm	3.5% or more
above 0.92	no less than 40 ppm	6.0% or more
above 0.92	no less than 180 ppm	2.3% or more
less than or equal to 0.92 at the beginning of the cooling process	with or without	

Determining Eligibility for Slow Cooling

If a processing plant wishes to use slow cooling for a product, a food safety consultant must be contacted to determine if the parameters above are met.

An accredited lab is recommended for moisture or salt analyses, and any other parameters not measured by the operator, to ensure that the results are accurate. A validated method must be used by the lab for any analysis. Documentation must be provided to the PHO.

If the product **meets** one of the prerequisites for the slow cooling process, the following cooling steps must be met:

- The internal temperature does not remain between 49°C (120°F) and 4°C (40°F) for more than 20 hours, and
- The cooling process causes a continuous drop in the product's temperature OR controls the product's surface temperature so that it does not stay between 49°C (120°F) and 20°C (68°F) for more than 2 hours

Slow cooling for foods that meet one prerequisite

temperature	*time limit*
Surface: 49°C–20°C (120°F–68°F)	max 2 hours
Internal: 49°C–4°C (120°F–40°F)	max 20 hours

If the product **does not meet** one of the prerequisites for the continuous slow cooling process, the rapid continuous process must be used.

Rapid Cooling

Rapid cooling criteria

During cooling, product's maximum internal temperature must not remain between 54°C (129° F) and 27°C (81°F) for more than 2.0 hours, nor from 54°C (129°F) to 4°C (40°F) for more than 7 hours.

As an option, products consisting of a piece of intact (excluding tenderized) muscle such as roast beef, moist cooked beef, turkey breast or pork loin, may be cooled to 4°C (40°F) within 7.5 hours from initiation of the cooling process while taking no more than two hours for the 50°C (122°F) to 20°C (68°F) temperature zone.

Rapid cooling

temperature	*time limits*
Internal: 54°C–27°C (129°F–81°F)	max 2 hours
Internal: 54°C–4°C (129°F–40°F)	max 7 hours

Rapid cooling for intact muscle, untenderized

temperature	*time limits*
Internal: 50°C–20°C (122°F–68°F)	max 2 hours
Cooled to 4°C (40°F)	within 7.5 hours

Interrupted Cooling Rate

The following applies to heat-treated product kept at intermediate temperatures. Heat-treated products that are cooled from 54°C (129° F) to 18° C (64° F) within 2 hours may be held for up to 4 hours if they are:

- kept below 18° C (64° F) during the 4 hours, and
- protected from post cooking contamination (covered, wrapped, etc.), and
- cooled to 4° C (40° F) within 2 hours immediately at the end of the 4-hour holding period

Alternative cooling process

Any deviation from the approved process must be assessed by a food safety consultant to validate its safety. If there is no objection to the reviewed process, there must be scientific evidence provided by the facility operator to support the decision of using an alternative cooling process.

More information on cooling processes can be found here: inspection.canada.ca/preventive-controls/meat/cooling-heat-processed/eng/1522948253869/1522948254134

Destroy Trichinella spiralis in pork

Meat processing operators that process pork must implement control measures for Trichinella spiralis. T. spiralis larvae may be destroyed by curing, heating, and freezing.

If pork is sourced from a commercial supplier and has already been treated for Trichinella, or if the pork is sourced from a Trichinella-free herd, then additional Trichinella control is not necessary. Trichinella-free or Trichinella-treated pork will be certified by the CFIA and a label identifying it as such will be on the meat packaging.

For information on methods of destruction of T. spiralis, refer to "Control recommendations for the inactivation of T. spiralis in pork products": inspection.gc.ca/food/requirements-and-guidance/preventive-controls/meat/trichinella-spiralis/eng/1522956607996/1522956608262

Listeria monocytogenes controls

Contamination of a food with L. monocytogenes is one of many hazards that should be considered when developing a preventive control plan.

It is recommended that meat processing operators use validated L. monocytogenes controls.

For more information refer to "Control measures for Listeria monocytogenes in ready-to-eat Foods": inspection.gc.ca/food/requirements-and-guidance/preventive-controls/listeria-monocytogenes/eng/1518103693274/1528201904208

11 Fermented and dried meat

Fermentation is the process of using lactic acid producing bacteria to lower the pH of meat, by allowing the growth of lactic acid producing bacteria, while preventing the growth of pathogens.

All products that are fermented are also cured. They may subsequently be cooked and may be dried as well.

Starter culture containing lactic acid bacteria and other microorganisms that encourage the fermentation process must be obtained from an approved source.

Control of Clostridium botulinum in fermented meat products

To control the outgrowth of C. botulinum spores and the development of the botulinum toxin in fermented meats, a minimum level of 100ppm of nitrite/nitrate are added as well as a minimum of 2.5 % salt.

Control of Staphylococcus aureus (S. aureus) in fermented meat products

Certain strains of the bacteria S. aureus are capable of producing a highly heat stable toxin that causes illness in humans. Above a critical temperature of 15.6°C, S. aureus multiplication and toxin production can take place. Once a pH of 5.3 is reached, S. aureus multiplication and toxin production are stopped.

The safety of fermented products is determined by the production of a minimum level of acid at a sufficient rate. The measurement of the rate of acid production in fermented products is referred to as degree-hours.

Degree-hours are the product of **time** multiplied by **degrees Celsius**:

- time (as measured in hours at a particular temperature) multiplied by
- degrees Celsius (measured in excess of 15.6°C, the critical temperature for growth of S. aureus)

Degree-hours are calculated for each temperature used in the process. The limitation of the number of degree-hours depends upon the highest temperature in the fermentation process prior to the time that a pH of 5.3 or less is attained.

A fermentation process must meet S. aureus degree-hour limits as outlined in "Preventive control recommendations for manufacturing fermented and dried meat products": inspection.gc.ca/food/requirements-and-guidance/preventive-controls/meat/fermented-and-dried/eng/1522951036924/1522951037158#a2

Documentation by the facility operator to show compliance with these time/temperature requirements must be available for review during inspection. A food safety consultant can help with this documentation.

E. coli and Salmonella control options in fermented sausages

To suitably control these hazards and prevent incidents of food borne disease, facilities that manufacture fermented sausages can use one of the five options as listed in "Preventive control recommendations for manufacturing fermented and dried meat products" for the control of verotoxinogenic E. coli including E. coli O157:H7 and Salmonella when they:

- use beef as an ingredient in a dry or semi-dry fermented meat sausage or
- store or handle uncooked beef on site or
- obtain raw meat from a supplying facility which stores or handles uncooked beef on site

Facilities that do not use beef and do not obtain meat ingredients from facilities that handle beef are not currently required to use one of the five options for the control of E. coli O157:H7 in dry/semi-dry fermented sausages. However, they must validate through a microbiological testing program that their process will not result in the presence of E. coli O157:H7 or Salmonella in the finished product.
inspection.gc.ca/food/requirements-and-guidance/preventive-controls/meat/fermented-and-dried/eng/1522951036924/1522951037158#a3

Control of E. coli O157 in dried beef products

Jerky and similar dried meat products are generally considered ready-to-eat and processed to be shelf stable. If these meat products are sold as shelf stable (i.e., not labelled as "keep refrigerated"), they must meet one of the following requirements:

- the pH of a finished product must be 4.6 or less, regardless of its final water activity (Aw)
- the Aw of the finished product is 0.85 or less, regardless of its final pH

As dried beef products may pose a hazard associated with E. coli O157:H7, these products must be submitted to a heat treatment before the drying process.

The following methods have been found acceptable for this purpose:

- cooking the product so it reaches an internal temperature of 71°C (160°C) for 15 seconds before starting the drying process
- using one of the heat processes that are recognized as controlling E. coli O157:H7 and Salmonella — Refer to "Preventive control recommendations for manufacturing fermented and dried meat products" for recognized processing parameters (Option 1 table): inspection.gc.ca/food/requirements-and-guidance/preventive-controls/meat/fermented-and-dried/eng/1522951036924/1522951037158#a4

Use of a commercial dehydrator is required.

12 Commodity-specific requirements: donair and shawarma

Donair:	made with ground meat that is formed into a cone shape and frozen
Shawarma:	made with thin, whole cuts of meat that are marinated before being stacked on a vertical skewer
	Microbial hazards associated with both products are similar: • thin layers of sliced meats stacked on top of one another have increased surface areas resembling that of ground product • pathogens may be introduced throughout all areas of the meat • the slow, extended cooking process on a vertical broiler may further contribute to potential microbial hazards These risks can be minimized through controls implemented during • donair cone production, cooking, and serving • cooling and storage procedures followed at the end of the day
Molds recommended:	Molds should be used to ensure size consistency of product and hygienic storage during the freezing stage.
Mold requirements:	Molds for donair meat must be made of food grade material • cleaned and sanitized between each use
Cooking temperature:	Ready-to-eat donair/shawarma meat must be cooked to a temperature outlined for ground meat in the NS Food Code, or other temperatures as directed by Health Canada.
Cooling process:	Donair/shawarma meat must be cooled continuously • from 60°C (140°F) to 20°C (68°F) within 2 hours • and from 20°C (68°F) to 4°C (40°F) within 4 hours

13 Packaging

Packaging that reduces or eliminates oxygen content must not create an environment favourable for pathogenic anaerobic bacterial growth and toxin production:

- modified atmosphere packaging
- vacuum packaging
- selectively permeable wrapping

A number of factors affect the likelihood of pathogenic microbial growth and toxin in an anaerobic environment. The combination of factors that must be considered in assessing the safety of using oxygen-reduced environments for food packaging include

- type of food product
- processing treatments, including salt content and nitrite presence
- temperature control, such as refrigeration and freezing

For vacuum-packaged food product in which the only control for C. botulinum is refrigeration, employ a shelf-life reduction to a **maximum of 10 days**.

Labelling of product must be in accordance with the Safe Food for Canadians Regulations, Food labelling for industry - Canadian Food Inspection Agency: inspection.canada.ca/food-label-requirements/labelling/industry/eng/1383607266489/1383607344939#

Appendix 1: Common Terms

Acidity	describes how much acid is in a food product. Higher acid increases the tangy or sour taste of food. Many pathogenic bacteria cannot grow in foods with high level of acid, specifically with a pH of 4.6 or lower.
Acidulants or Acidifiers	ingredients added to food products to lower the pH, and therefore limit or control the growth of pathogenic bacteria. Examples of acidifiers are Gluconolactone, or Citric Acid.
Aw, or Water activity	the amount of available moisture in a food that microorganisms can use to grow and multiply. If you control the amount of moisture in food, you can limit and control the growth of pathogenic bacteria.
Curing	describes various meat preservation and flavoring processes that involve adding combinations of salt, nitrates, nitrites, and/or sugar. Curing can reduce the water activity of meat and adding nitrate/nitrite salts prevents bacterial growth.
Fermentation	a process in which lactic acid-producing bacteria increase the acidity of a food by converting sugars, such as dextrose or sucrose in the meat mixture, to lactic acid. By lowering the pH, you can limit or control growth of pathogenic bacteria.
Food safety consultant	an experienced food safety professional who provides expert knowledge for a fee. They work in an advisory capacity only and usually are not accountable for the outcome of a consulting exercise.
Hazard analysis critical control points (HACCP)	a system that identifies, evaluates, and controls hazards significant for food safety.

Heat treatment	heat can be used as a kill step (i.e., cooking) to make a ready-to-eat meat product. Heat treatment can also refer to a process that uses heat to change the look and taste of a meat product but does not guarantee the safety of the food product (e.g., cold smoking). The times and temperatures used will vary depending on the purpose of the heat treatment.
Modified atmosphere packaging (MAP) or controlled atmosphere packaging (CAP)	MAP involves replacing air and oxygen inside a sealed package with an inert gas, such nitrogen, carbon dioxide, or carbon monoxide. CAP uses a MAP process that includes a packet of oxygen-absorbing material inside the package.
Nitrate/Nitrite	chemical compounds added to meat through the curing process. Nitrite prevents the growth of pathogenic bacteria and spoilage organisms, as well as giving the meat product a desirable pink-red "fresh" color. In meat, nitrate will convert to nitrite as time passes. Adding nitrate to meat is useful where a long release of nitrite is needed.
pH	a measure of acidity (pH <7) or alkalinity (pH >7) of a food.
Potable water	water that at is safe for human consumption. Potable water must conform to the standards outlined in Health Canada's Guidelines for Canadian Drinking Water Quality.
Recipe	the ingredients of the meat product and the components of the ingredients, including food additives, and the proportions of those ingredients and components.
Starter culture	a product made up of microorganisms that perform the fermentation of food products. Starters usually consist of nutrient liquids or powdered cultivation medium that have been colonized by specific bacteria, yeast, and molds.