

Retail Meat and Poultry Processing Guidelines



Association of Food and Drug Officials

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Introduction

AFDO is pleased to make these guidelines available in response to requests from state and local government agencies to provide them guidance on the processing of meat and poultry products at retail. AFDO finds that guidance currently available to regulatory officials on commercial practices and regulatory surveillance in this area of retail operations is sparse and inconsistent.

These guidelines provide sound scientific support for the production of unique meat and poultry products such as dry and semi-dry fermented sausage, meat jerky, and cured and smoked meat and poultry.

These guidelines are intended to promote greater uniformity in the regulation of these products. Accordingly, these guidelines reflect AFDO-recommended best practices that are consistent with USDA requirements for these products under federal laws.

The guidelines have been reviewed and approved by members of the AFDO Meat and Poultry Committee, AFDO Retail Food Committee, and the AFDO Board of Directors, in cooperation with the U.S. Department of Agriculture, Food Safety and Inspection Service.

Association of Food and Drug Officials

Retail Meat and Poultry Processing Guidelines

I. USDA-FSIS Retail Exemption

The mandatory inspection requirements of the Federal Meat Inspection Act (FMIA) and the Poultry Products Inspection Act (PPIA) do not apply to the preparation of meat and poultry products traditionally and usually conducted at retail stores, when conducted at retail stores in normal retail quantities. These exemptions are found in 9 CFR 303.1(d) for red meat and 9 CFR 381.10(d) for poultry. It is important to note that the adulteration and misbranding provisions of the FMIA and PPIA other than the requirement of the official inspection legend do apply to articles that are exempted from inspection. In order to qualify for these exemptions the following requirements must be met.

A. Red Meat

1. Operations of types of traditionally and usually conducted at retail stores are the following:
 - (a) Cutting up, slicing, and trimming carcasses, halves, quarters, or wholesale cuts into retail cuts such as steaks, chops, roasts, and freezing such cuts;
 - (b) Grinding and freezing products made from meat;
 - (c) Curing, cooking, smoking, rendering or refining of livestock fat or other preparation of products, except slaughtering or the retort processing of canned products;
 - (d) Breaking bulk shipments of meat products;
 - (e) Wrapping or rewrapping meat products.

2. Normal Retail Quantity—As described in 9 CFR § 303.1(d)(2)(ii), the normal retail quantity is not more than one-half carcass. This section further provides examples of the amount of product that will be accepted as representing one-half carcass for different species, which are as follows:
 - (a) Cattle – 300 pounds

- (b) Swine – 100 pounds
- (c) Calves – 37.5 pounds
- (d) Sheep – 27.5 pounds
- (e) Goats – 25 pounds

3. Retail Stores—The requirements to qualify as a retail store are listed in 9 CFR § 303.1(d)(2)(iii). These requirements are as follows:

- (a) The sales of meat products are made to consumers only;
- (b) At least 75 percent, in terms of dollar value, of total sales of meat product represents sales to household consumers, and the total dollar value of sales of product to consumers other-than-household consumers does not exceed the dollar limitation per calendar year set by the FSIS Administrator;
- (c) Only federally or state inspected and passed meat product is handled or used in the preparation of any product;
- (d) No sale of meat product is made in excess of a normal retail quantity as described in Part I. A. 2;
- (e) The preparation of meat products for sale to household consumers is limited to the operations listed in Part I. A. 1. of this section;
- (f) The preparation of meat products for sale to other-than-household consumers is limited to the operations described in Part I. A. 1. (a), (b), (d), and (e).

4. Retail Sales—The sale of meat products produced in a retail store under the exemption from inspection requirements described in 9 CFR § 301.1(d) is limited to household consumers or hotels, restaurants, or institutions (HRI) only. The term “consumer” is defined in 9 CFR § 303.1(d)(2)(vi) as “any

household consumer, hotel, restaurant, or similar institution as determined by the Administrator in specific cases”.

B. Poultry Products

1. Operations of types traditionally and usually conducted at retail stores include any processing of poultry products, except canning and slaughtering of poultry, unless such slaughtering is conducted on live poultry purchased at the retail store and processed by the retail store operator in accordance with the consumer’s instruction.
2. A normal retail quantity is any quantity of a poultry product purchased by a household consumer from a retail supplier that does not exceed 75 pounds. A normal retail quantity sold by a retail supplier to other than a household consumer is any quantity that does not exceed 150 pounds.
3. A retail store is a place of business where:
 - (a) The sales of poultry products are made to consumers only;
 - (b) At least 75 percent, in terms of dollar value, of total sales of poultry product represents sales to household consumers, and the total dollar value of sales of product to consumers other-than-household consumers does not exceed the dollar limitation per calendar year set by the FSIS Administrator;
 - (c) Only federally or state inspected and passed poultry product is handled or used in the preparation of any product;
 - (d) No sale of poultry product is made in excess of a normal retail quantity as described in Part I. B. 2;
 - (e) The preparation of poultry products to household consumers is limited to the operations listed in Part I. B. 1. of this section.

- C. Recordkeeping Requirements—Any retail store claiming exemption under 9 CFR § 303.1(d) must maintain complete, accurate, and legible records of total monthly purchases and of total monthly sales of meat, meat byproducts, and meat food products in terms of dollar values of the products involved. These records must also separately show total sales to household consumers and total sales to other-than-household consumers. These recordkeeping requirements are detailed in 9 CFR § 303.1(d)(3). These records are required to be maintained for a period of two years after December 31 of the year in which the transaction has occurred and for any further period as FSIS may require for purposes of any investigation or litigation by written notice to the person required to keep these records as described in 9 CFR § 320.3.
- D. Adulteration and Misbranding—The adulteration and misbranding provisions of the Federal Meat Inspection Act and 9 CFR Part 300 to end, other than the requirement of the official inspection legend, apply to articles which are exempt from inspection, or not required to be inspected. This includes the requirement that any pork and any product containing pork be prepared only in compliance with any applicable requirement for the destruction of trichina, as provided in 9 CFR § 318.10.

All meat products produced at a retail store for sale to other-than-household consumers must be labeled in accordance with the requirements of 9 CFR Part 317. Each package or container is required to show the following information:

- (a) The name of the product;
- (b) If the product is fabricated from two or more ingredients, the word “ingredients,” followed by a list of the ingredients as prescribed in 9 CFR § 317.2(f);
- (c) The name and place of business of the retail store;
- (d) An accurate statement of the net quantity of contents;
- (e) Safe handling instructions as described in 9 CFR 317.2(l).

The Secretary of Agriculture may extend the requirements of the Federal Meat Inspection Act to any establishment where meat products are prepared for distribution, if it is determined that, in accordance with the adulteration provisions of the Act, the establishment is producing adulterated products which would clearly endanger the public health.

E. Commonly Asked Questions Concerning the Retail Preparation of Red Meat Products

1. Q: What is the sales limit for products prepared at retail for sale to other-than-household consumers?

A: There are two caps on the sales of products prepared at retail for sale to other-than-household consumers, which cannot be exceeded. No more than 25 percent of the total red meat sales of a retail store can be made to other-than-household consumers. In addition, the total red meat sales to other-than-household consumers cannot exceed the dollar limitation per calendar year set by the FSIS Administrator.

2. Q: Where can I obtain the dollar limitation per calendar year set by the FSIS Administrator?

A: The dollar limitation is adjusted during the first quarter of each calendar year. Notice of the adjusted dollar limitation is published in the FEDERAL REGISTER. This information is available on the USDA-FSIS website.

3. Q: Can a retail store produce multi-ingredient meat products for sale to other-than-household consumers?

A: Yes, provided that the operation will not have a definitive effect on the nature or safety of the product, and that the product is properly labeled with all of the ingredients listed.

However, the addition of a curing agent to Italian sausage would affect the nature of the sausage, as well as its safety, and the modified sausage would need to be named to reflect the fact that it is cured, and it would not be eligible for sale to other-than-household consumers.

4. Q: Can a retail store produce a meat product that is cured, cooked, smoked, or rendered or refined livestock fat for sale to other-than-household consumers?

A: No, any of these operations would have a definitive effect on the nature of the product and would have to be produced under either federal or state inspection.

5. Q: Can a retail store produce a meat product that is cured, cooked, smoked, or rendered or refined livestock fat for sale to household consumers?

A: Yes, a retail store can produce and sell these types of meat products to household consumers only and are limited to normal retail quantities.

6. Q: Can a retail store slice inspected ready-to-eat meat products for sale to other-than-household consumers?

A: Yes, this operation would not have a definitive effect on the nature of the product and is allowed under the exemption in 9 CFR § 303.1(d).

7. Q: Do meat products produced at a retail store need to be labeled?

A: Yes, the Federal Meat Inspection Act provides that the adulteration and misbranding provisions of the Act, other than the requirement of the inspection legend, shall apply to articles which are not required to be inspected.

8. Q: Can meat products produced at a retail store be sold to another retail store or to a distributor or wholesaler?

A: No, meat products produced at a retail store can only be sold to household consumers, hotels, restaurants, or similar institutions.

9. Q: Can meat products produced at a retail store be sold on the internet and shipped in interstate commerce?

A: Yes, provided that the sales are to consumers, as defined in 9 CFR § 303.1(d)(2)(vi), and that the meat components used in the products were federally inspected. State inspected meat products can only be distributed intrastate and cannot move in interstate commerce by virtue of the fact that they were further processed in a retail store.

II. Ground Meats

A. Definitions

1. "Beef Pattie Mix" or "Beef Patties" if in pattie form, means chopped, or mechanically separated ground beef, or partially defatted beef fatty tissue with or without the addition of beef fat. Binder or extenders may be used without added water or with added water only in an amount such that the product's characteristics are essentially that of a meat pattie.
2. "Comminuted" means reduced in size by methods including chopping, flaking, grinding, or mincing.
3. "Grinder" means a piece of equipment used to cut meat into small pieces. The meat is fed from a hopper and passed along a cylinder with an auger or worm to a perforated plate where it is sliced away by revolving blades.
4. "Ground Beef" means chopped or ground beef with or without

seasoning and without the addition of beef fat, and as such, shall not contain more than 30 percent fat and shall not contain added water, phosphates, binders, or extenders.

5. "Ground Poultry Meat" means chopped or ground poultry without the addition of water, cereal, soy derivatives, or other extenders and with no more than 15 percent skin.
6. "Hamburger" means chopped fresh or frozen beef with or without the addition of beef fat, and/or seasoning, shall not contain more than 30 percent fat, and shall not contain added water, phosphates, binders, or extenders.

B. Grinding

1. Whenever a grinder is temporarily stored with the intent of using it again in the very near future, the grinder head and hopper must be refrigerated at 41°F or less until used again.
2. Grinding equipment shall be completely disassembled and cleaned by washing, rinsing, and use of an approved sanitizer after each use or at least daily.
3. If the species of meat being ground or comminuted is changed from one batch to the next, the entire grinding assembly must be dismantled and cleaned.
4. When beef cheek meat (trimmed beef cheeks) is used in the preparation of chopped beef, ground beef, or hamburger, the amount of cheek meat shall be limited to 25 percent. If used in excess of natural proportions, it must be identified on the label.

C. Time-Temperature Control During Grinding and Trimming—

Trimmings to be used for ground meat shall be held at 41°F or less (product temperature) during the trimming process. Ground beef and ground poultry shall be held at 41°F or less at all times during grinding, storage, or display.

D. Labeling Ground Meat Products

1. The common or usual name of any added ingredient shall be listed on the package label in decreasing order of predominance or on a placard when displayed in bulk. Binders, extenders, and water, if added to beef pattie mix or beef patties, must be clearly identified on the label or placard.
 2. An added descriptive name may be used where the ground meat is prepared entirely from a specific cut such as chuck, round, or sirloin (example: ground beef sirloin). When beef trimmings are used in the mixture, it may only be labeled as ground beef or hamburger.
 3. The fat content or lean content shall be clearly indicated on the label. The fat content shall not exceed 30 percent. Whenever the terms "lean," "extra lean," or "reduced fat" are used, the product and labeling must be in compliance with NLEA requirements listed in the Code of Federal Regulations.
 4. "Previously Frozen" must be labeled on the package, container, or wrapping if a meat/meat food product or poultry/poultry food product has been frozen prior to sale.
 5. The label shall contain a code date to identify the batch or lot.
 6. A "Safe Handling Statement," as defined by USDA Meat and Poultry Regulations §317(2)(1) and §381.125(b), shall be fixed to the package where it is easily visible to the consumer.
- E. Recordkeeping—Records that identify suppliers of source material used in the preparation of each lot of raw ground or chopped beef product shall be maintained by the retail establishment. Records shall include the following information:
1. Retail operation's name and address (city, state, zip code)

2. Product information
 - (a) Date and time product was ground
 - (b) Exact name and type of store-ground product
 - (c) Quantity of product ground
 - (d) Production code of each lot of store-ground product
 - (e) Sell-by or use-by dates
 - (f) Other information used to identify the store-ground product

3. Source (supplier) information
 - (a) Supplier name and address (city, state, zip code)
 - (b) USDA Establishment Number for each source material used
 - (c) Product name
 - (d) Production date and lot number

4. Cleaning/Sanitizing information (example: date/time, especially significant between varied source materials)

F. *E. coli* O157:H7 Sampling by Meat Inspection Investigators—Federal or State Meat Inspection Investigators are instructed to collect a raw ground beef sample, during operating hours, when the retail store is grinding or has ground product that is still available at the retail store, under one or more of the following circumstances:

1. Grinding primal, subprimals, or boxed beef;
2. Grinding store generated bench trim derived from its own operations;
3. Grinding beef that is labeled “natural” or “all-natural”

Samples are not collected from product that is:

- (a) Case ready (example: consumer-sized packages of ground beef, which were packaged at the official establishment);

- (b) Not ground by the retail store but only portioned into retail trays;
 - (c) Reground product (i.e., course ground product from the official establishment which is reground by the retailer into finely ground product);
- 4. Not cleaning and sanitizing the grinder between the use of different source materials;
- 5. Grinding purchased trim that is not accompanied by records of negative test results for *E. coli* O157:H7;
- 6. Using meat cuts (steaks or roasts that the store determines are suitable as an ingredient in raw ground beef) with expired sell-by dates;
- 7. Grinding and failing to keep records of the federal or state establishment numbers of its suppliers;
- 8. Mixing irradiated and non-irradiated beef.

III. Curing and Smoking

A. Definitions

1. "Acceptable Product List" means a list of meat or poultry products for which a HACCP Plan has been validated by a process authority.
2. "Casings" mean natural animal stomachs, intestines or bladders or manufactured casings of cellulose or collagen, which are used to contain comminuted meat, or poultry product mixtures for sausages.
3. "Cold Smoking" means a smoking process used to apply smoke or a smoke flavor at or near ambient temperature to food products not sufficiently darkened or flavored in the original cooking process.

4. "Critical Limit" means the maximum or minimum value to which a physical, biological, or chemical parameter must be controlled at a critical control point to minimize the risk that the identified food safety hazard may occur.
5. "Curing" means the development of a characteristic pink color in meat based on the interaction of nitrite and meat pigments or other physical processing.
6. "Cure Accelerator" means compounds, such as ascorbic acid or erythorbic acid or their derivatives, sodium ascorbate and sodium erythorbate, as defined for use in 9 CFR 424.21(c), which shorten the time required for the distinctive pink color to develop in cured meat and poultry products.
7. "Food Safety Hazard" means any biological, chemical, or physical property that may cause a food to be unsafe for human consumption.
8. "HACCP Plan" means a written document that delineates the formal procedures for following the Hazard Analysis and Critical Control Point principles developed by the National Advisory Committee on Microbiological Criteria for Foods.
9. "Injection" means the process of transferring a curing solution into a whole muscle meat using a needle or group of needles connected to a brine source.
10. "Massaging" means subjecting meat chunks to a mechanical treatment to facilitate protein extraction from muscle fibers. This process accelerates the even dispersal of cure solution and increases yield.
11. "Showering" means a potable water spray with or without liquid smoke in the smoke house, which, depending on when the water spray is applied, maintains humidity and flavors, decreases cooking time, promotes rapid cooling, or reduces casing shrinkage.

12. "Smokehouse" means a piece of equipment or room sized enclosure used to conduct the smoking and cooking process which has a smoke source, adequate ventilation, heat and humidity source if necessary, approved plumbing and waste lines if necessary, support structures for the food products to be smoked and a method to determine internal product temperature.
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- B. Trained Employees—All employees engaged in the curing and smoking process shall receive training and demonstrate familiarity with the curing and smoking processes as well as the associated hazards.
 - C. HACCP Plan—Each retail food establishment that engages in the curing and smoking process must have a HACCP plan validated by a process authority. This HACCP plan must be made available to the regulatory authority for review and audit. The HACCP Plan must contain process flows for each category of product, recipe formulations for each product that is cured and/or smoked, critical limits, identified hazards, monitoring procedures, corrective action and verification steps. It must include an acceptable products list, which has received approval under the HACCP Plan. It shall also contain a description of the training course content for employees engaged in the curing and smoking operation.
 - D. Equipment and Materials
 1. A calibrated automatic recording thermometer with internal product temperature probes or calibrated metal-stemmed thermometer shall be available and used when product is smoked.
 2. Calibrated and certified scales shall be used to weigh any curing compound, cure accelerator, or other additive, provided it has not already been premeasured and weighed.
 3. Tumble massagers facilitate the extraction of salt soluble proteins and accelerate the distribution of cure solution in

chunks of meat. Massaging must be done under refrigeration, recommended at 33° to 36°F.

4. All equipment coming in contact with meat products must be fully cleaned by washing, rinsing, and use of an approved sanitizer.
5. A smoke generator attached to a smokehouse may only use materials approved by USDA, FDA, or other regulatory agencies. These materials include non-resinous hardwoods, hardwood sawdust, redwood, mesquite wood, corncobs, and natural liquid smoke.
6. Natural or artificial casings for sausage, loaf, or chub forming must be sanitary and may not be stripped for reuse with another batch or lot. The casings may be salted or unsalted, colored or shirred, that is, pleated or compressed for easy application to the stuffing horn.
7. Curing or smoking may not be used to salvage meat or poultry that has excessive bacterial growth or spoilage.

E. Time-Temperature Control During Curing

1. The curing process, using immersion and injection, shall be done so that product temperature remains at 41°F or less.
2. Meat and poultry products, as well as natural and artificial casings, during soaking shall be stored at 41°F or less.
3. The internal temperature of any smoked meat or poultry or smoked meat or poultry product shall comply with cooking requirements for that product, with the exception that:
 - (a) Cold smoking is a smoking process used only to apply smoke color or flavor at ambient temperature to food products; and
 - (b) When a cold smoking process is used for cosmetic purposes, that is, to add smoke color or flavor to pre-cooked product, it must be of such duration that the

internal product temperature remains at or below 41°F.

F. Curing Process

1. Use of curing agents, curing accelerators, and other additives shall be according to 9 CFR 424.21(c), Use of Food Ingredients and Sources of Radiation.
2. The formulation and preparation procedure must be documented by lot.

G. Curing Methods

1. "Dry curing" means all surfaces of the meat are rotated and rubbed at intervals of sufficient frequency to assure cure penetration.
2. "Dry salt curing" is a modification of the dry curing method where the product may be injected with cure solution directly into the muscle tissue before the dry salt cure is rubbed onto the surface.
3. "Immersion curing" introduces the cure solution by osmosis. The pickle or brine solution requires periodic mixing to facilitate uniform curing. Immersion curing solutions shall be discarded after each use except when they remain with the same batch or lot during the entire curing process.
4. "Injection curing" introduces the curing solution into the muscle meat through hollow needles.
 - (a) "Stitch pumping" injects the curing solution deep into the muscle with a single orifice needle.
 - (b) "Spray pumping" injects the curing solution using a needle with many orifices to allow more uniform distribution of the solution.
 - (c) "Artery pumping" injects the curing solution into the

natural circulatory system of the meat.

- (d) "Machine pumping", similar to "stitch pumping," injects the curing solution using 10 or more needles.
- (e) Sometimes spring-loaded needles are used for bone-in products to prevent breaking the needles.

H. Time-Temperature Control During the Smoking Process

1. The smoking process shall be considered equivalent to a cooking process and be required to meet all internal time-temperature cooking requirements. This information shall be documented for each lot.
2. Cold smoked meat and poultry products shall be processed at or near ambient temperature so that the internal product temperature does not rise above 41°F. The product and air temperature shall be monitored at all times.
3. Hot smoked meat and poultry products shall be cooled to 70°F within 2 hours and to 41°F or less within an additional 4 hours. Or, as an alternative, The Stabilization Guidelines for 9 CFR 318.17(b) can be strictly followed. These guidelines are available on the FSIS web site.
 - (a) If cold water showering is used to rapidly drop product temperature after smoking, it must be potable water, contain a chlorine residual, may not be recirculated unless by an approved method, and if reclaimed, must be discarded daily.
 - (b) Cooling times and temperatures must be documented for each lot, but in all cases, it must reach 140°F to 70°F internal product temperature within 2 hours and from 70°F to 41°F or below within and additional 4 hours.

- I. Storage of Smoked Product. Ready-to-eat smoked product must be stored in a manner and location to prevent cross- contamination or

adulteration.

IV. Dry and Semi-Dry Fermented Sausage

A. Definitions

1. "Dry Fermented Sausage" means a product made of chopped or ground meat products that, as a result of bacterial action, reaches a pH of 5.3 or less and is then dried to remove 25-50 percent of the moisture to have a moisture/protein ratio in compliance with USDA requirements. Dry fermented sausages include summer sausages, salamis, and pepperonis.
2. "Fermentation Culture" means an active and pure culture of one or more bacteria, which effects the rapid pH drop in dry and semi-dry fermented sausages.
3. "Process Authority" means a person or institution with expert knowledge and experience to make determinations about the safety of a food process and formulation.
4. "Semi-Dry Fermented Sausage" means a product made of chopped or ground meat products that, as a result of bacterial action, reaches a pH of 5.3 or less and undergoes up to 15 percent removal of moisture during the fermentation/heating process. Semi-dry fermented sausages include thuringer, cervelat, and Lebanon bologna.

B. Validation of Processing Procedure for Dry and Semi-Dry Fermented Sausages—In light of foodborne outbreaks of *E.coli* O157:H7 linked to dry fermented ready-to-eat sausage products, all procedures for dry and semi-dry fermented sausages must be validated to show products achieve a 5-log reduction of *E.coli* O157:H7. Full documentation is required. This can be accomplished by using one or more of the following options:

1. Submit the processing procedure to a recognized process authority for validation.

2. Design and conduct validation studies utilizing a laboratory that is certified for testing pathogenic bacteria in meat and poultry products including any non-food manufacturing biosafety level II facility.
3. Modify processing procedures to include a moist heating step after fermentation but prior to drying. The moist heating can be accomplished by using a sealed oven or steam injection to raise the relative humidity above 90 percent throughout the cooking process and meet one of the following time-temperature requirements:

Min. °F Internal Temp.	Min. Holding Time at that Temp.
130	121 min.
131	97 min.
132	77 min.
133	62 min.
134	47 min.
135	37 min.
136	32 min.
137	24 min.
138	19 min.
139	15 min.
140	12 min.
141	10 min.
142	8 min.
143	6 min.
144	5 min.
145	4 min.

4. Examples of processes that yield a 5 D or more reduction of *E. coli* O157:H7:
 - (a) Ferment at 90°F to pH 5.3 and apply cook, then dry for ≥7 days (large casing).
 - (b) Ferment at 90°F to pH 4.6 and hold at 90°F for ≥6 days (small casings).

- (c) Ferment at 90°F pH 4.6 and apply cook (small and large casings).
 - (d) Ferment at 110°F to pH 4.6 and hold at 110°F for ≥4 days (small and large casings).
5. Initiate a hold and test program, unless the source of the ingredients as been certified pathogen free. This involves the holding and testing of all batches of dry and semi-dry sausages. Samples must be submitted to a laboratory that is certified for testing pathogenic bacteria in meat and poultry products.
6. Implement a HACCP plan combined with Good Manufacturing Practices (GMPS) for fermented sausage, including raw batter testing and documentation of at least a 2 D lethality of *E. coli* O157:H7 between stuffing and shipping.
- (a) An acknowledged analytical method equivalent to that used by USDA/FSIS must be implemented in the raw batter testing.
 - (b) The sample size and composting procedure must ensure a detection level of 1-gm. (It is recommended that fifteen 25-gm. samples be taken from across the lot. These could then be composited into fived, 75-gm. analytical samples.)
 - (c) The definition of a "lot," for the purposes of sampling, must be statistically sound.
 - (d) GMPs must be applied throughout the process.
 - (e) The HACCP plan must also address pathogen issues concerning *Salmonella*, *Trichinella*, *E. coli* O157:H7, and *Staphylococcus*.
 - (f) A procedure for dealing with lots from positive batter samples must be defined in the HACCP plan. At a minimum, all positive lots must be subjected to conditions that will provide a total 5 D process.

C. Fermentation Cultures

1. If a commercially prepared fermentation culture is used, any special handling instructions specified by the manufacturer regarding frozen or refrigerated storage and other factors must be observed.
2. If a back inoculum from a previously fermented and controlled mother batch is used, the mother batch shall have attained a pH of 5.3 and shall be monitored on a regular basis for lactic acid producing bacteria and coagulase positive staphylococci.

D. Fermentation Time-Temperature Control—Once the pH reaches 5.3 or less during fermentation by lactic acid bacteria, the potential for *Staphylococcus aureus* growth is effectively controlled, thus minimizing the ability for growth to a dangerous level. During fermentation of sausages, it is necessary to limit the time during which the sausage meat is exposed to temperatures exceeding 60°F or higher which is the critical temperature at which staphylococcal growth effectively begins.

1. Degrees/Hours Defined*

- (a) Fewer than 1200 degree/hours when the highest fermentation temperature is less than 90°F.
- (b) Fewer than 1000 degree/hours when the highest fermentation temperature is between 90°F and 100°F.
- (c) Fewer than 900 degree/hours when the highest fermentation temperature is greater than 100°F.

***Note:** Degrees are measured as the excess over 60°F at which staphylococcal growth effectively begins. Degree/Hours are the product of time in hours at a particular temperature and the "degrees."

Degree/Hours are calculated for each temperature used in the process. The limitation of the number of degree/hours indicated in a, b, and c, depend upon the highest temperature in the fermentation process prior to the time that a pH of 5.3 or less is attained. Processes exceeding 89°F prior to reaching a pH of 5.3 are limited to 1000 degree/hours; processes exceeding 100°F prior to reaching pH 5.3 are limited to 900 degree/hours.

2. Temperature measurements should be taken at the surface of the product. Where this is not possible, fermentation room temperatures should be utilized.
3. Constant Temperature Processes—The time-temperature relationships for constant temperature processes, predicated on fermentation room temperatures, are as follows:

Degree/Hour	Temperature (°F)	Allowed Hours
1200	75	80
1200	80	60
1200	85	48
1000	90	33
1000	95	28
1000	100	25
900	105	20
900	110	18

EXAMPLES OF CONSTANT TEMPERATURE PROCESSES

Process A. Constant 80°F temperature for 55 hours with pH decline to 5.3

Degrees: $80 - 60 = 20$

Hours: 55

Degree/Hours: $(20) \times (55) = 1100$ degree/hours

Process A Passes

Process B. Constant 90°F temperature for 40 hours with a pH decline to 5.3

Degrees: 90 – 60 = 30

Hours: 40

Degree/Hours: (30) x (40) = 1200 degree/hours

Process B Fails (Limit: 1000 degree hours)

4. Variable Temperature Processes—In testing each process, each step-up in the progression is analyzed for the number of degree/hours it contributes, with the highest temperature used in the fermentation process determining the degree/hour limitation as follows:

Process C.

Hours	Temp.(°F)	Critical Temp. Adjustment	Degrees	Degree/Hours
10	75	75-60	15	150
10	85	85-60	25	250
16	95	95-60	35	560
pH = 5.3				Total = 960

Process C Passes

Process D.

Hours	Temp.(°F)	Critical Temp. Adjustment	Degrees	Degree/Hours
10	75	75-60	15	150
10	85	85-60	25	250
18	98	98-60	38	684
pH = 5.3				Total = 1084

Process D Fails because the limit is set at 1000 degrees/hours for times and temperatures and it has taken 1084 degrees/hour to attain pH 5.3.

5. Lots Falling Outside Limitations—Once a processing schedule has been developed which meets these criteria, pH readings from each lot produced must be taken to assure that the product pH continues to develop normally. It is important that

all pH readings are recorded before the product surface temperature reached 110°F and/or before the degree/hour limitations have been reached. If the pH has not reached 5.3 by the time the limitations are met, samples should be taken from the fermentation room before the temperature is advanced. It is recommended that one sample be obtained from each mixer/batch of product.

V. Jerky

A. Definitions

1. "Jerky" means a product made from animal flesh that has been cut into long slices or strips and dried.
2. "Formed Jerky" means a product made from animal flesh that has been shredded or ground and molded into its final shape before drying, which may or may not contain extenders.
3. "Extenders" are any materials, such as textured soy protein or cereals, that are added to the ground or shredded animal flesh and must be properly declared in the labeling of the product.
4. "Marinate" means to soak meat in a sauce to enrich its flavor, to tenderize, or enhance its shelf life
5. "Species Name" jerky shall be manufactured solely from the flesh of the named animal species; otherwise, "Species Name Flavored" jerky shall be the product label.

B. Processing Methods

1. If the same rooms and equipment are used for preparation and packaging, all process ware and food contact surfaces used for slicing of meat and poultry and placing in drying room or dehydrators shall be cleaned and sanitized before any finished product is packaged.

2. The establishment shall facilitate the inspection and monitoring of the treatment process by providing appropriate time and temperature recording equipment.
3. The establishment shall record the time, temperature, and other critical process parameters for each lot of product produced.
4. The establishment shall have, on file on site, a description of the current processing method for each product produced. The processing method description shall include a description of:
 - (a) Handling procedures for meat ingredients, including maximum time and temperature exposures during thawing, trimming, curing, slicing, grinding, shredding, marinating, curing, and any other preparation steps or other applicable product factors;
 - (b) A procedure for identifying a product lot during processing, its lot identification codes, and how the finished product package codes can be identified with a specific production lot. The establishment shall divide production lots into one day time increments or less;
 - (c) Procedures used to comply with the treatment process;
 - (d) The drying procedures and methods used to prevent recontamination of the treated product; and
 - (e) The equipment and procedures used for measuring and recording time and temperature required by the treatment used by the establishment. The measuring devices shall be both readable and accurate within plus or minus 3°F and 1 minute.
5. All product shall receive a lethality treatment that, at a minimum, meets the recommendations contained in the April 2007 USDA-FSIS “Quick Guide on Processing Jerky” and “Compliance Guideline for Meat and Poultry Jerky Produced by Small and Very Small Plants.”

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