
**Fermented meat products —
Specification**

Produits fermentés à base de viande — Spécifications

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 6, *Meat, poultry, fish, eggs and their products*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Fermented meat products — Specification

1 Scope

This document specifies the production and sanitary requirements for fermented meat products and establishes a series of test methods to control the quality of fermented meat products. It also specifies the requirements of transport, storage, packaging and labelling.

This document is applicable to fermented meat products (ready-to-eat type), including fermented sausage, fermented dry-cured ham and other fermented meat products. It is also applicable to fermented meat production and trade links.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 937:1978, *Meat and meat products — Determination of nitrogen content (Reference method)*

ISO 1442:1997, *Meat and meat products — Determination of moisture content (Reference method)*

CAC/GL 50:2004, *General Guidelines on Sampling*

CAC/GL 61:2007, *Guidelines on the Application of General Principles of Food Hygiene to the Control of Listeria monocytogenes in Foods*

CAC/MISC 6:2005, *List of Codex Specifications for Food Additives*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

ready-to-eat fermented meat product

ready-to-eat livestock meat or poultry meat product produced by microbial fermentation and enzymatic action under suitable processing conditions

EXAMPLE Fermented sausage, fermented dry-cured ham, other fermented meat products.

3.2

ready-to-eat fermented sausage

sausage comprised of fresh or frozen livestock and poultry meats as the main raw material, together with other ingredients, which has undergone mixing, seasoning, dicing, stranding (or chopping), filling, curing (or not), microbiological fermentation, drying, ripening, molding (or not), smoking (or not), slicing (or not), packaging and other processing technologies, and is which processed into ready-to-eat meat products

3.3

ready-to-eat fermented dry-cured ham

ham comprised of fresh or frozen pork hind legs used as the main raw material, together with other ingredients and starter cultures, which has undergone mixing, seasoning, curing, microbial fermentation, drying, ripening, smoking (or not), molding (or not), slicing (or not), packaging and other processing technologies, and is which processed into ready-to-eat meat products

3.4

other ready-to-eat fermented meat product

meat product comprised of fresh or frozen livestock and poultry meats used as the main raw material, together with other ingredients, which is produced by microbial fermentation and enzymatic action under suitable processing conditions, and which is processed into ready-to-eat meat products

EXAMPLE Fermented jerky.

4 Specification

4.1 General

Fermented meat products shall meet the quality requirements listed in this clause.

4.2 Sensory requirements

4.2.1 Ready-to-eat fermented sausage

Fermented sausage shall meet the following quality requirements:

- a) for products in whole pieces, their casings are not be damaged and are adhered to the filling;
- b) the filling on the cross-section has the appearance of a mosaic of roughly uniform pieces of meat and fat tissue, which are evenly distributed;
- c) there are no cavities and cracks on the section;
- d) the product has a stable colour and a pleasant and characteristic smell and taste;
- e) the product has characteristic consistency.

4.2.2 Ready-to-eat fermented dry-cured ham

Fermented dry-cured ham in production shall meet the following quality requirements:

- a) the surface is dry and clean;
- b) the outer appearance, appearance of the cut, smell, taste, consistency and texture are characteristic of the type of meat and the mature product;
- c) the product has a characteristic shape, neatly edged edges and is without slashes;
- d) the colour of the fleshy parts on the cross-section is characteristic and stable;
- e) the fatty tissue is white, and the surface layers may have a yellowish shade.

4.2.3 Other ready-to-eat fermented meat products

Other fermented meat products in production shall meet the following quality requirements:

- a) the surface is dry;

- b) the outer appearance, appearance of the cut, smell, taste, consistency and texture are characteristic of the type of meat and the ripened product;
- c) the colour of the fleshy parts on the cross-section is characteristic and stable.

4.3 Raw material

The meat from which the product is prepared shall be of a quality suitable for human consumption and free from objectionable odours and off-flavours.

The raw material should conform to the requirements of CAC/GL 52:2003.

4.4 Food additives

The use of food additives shall conform to the requirements of CAC/MISC 6:2005.

4.5 Final products

4.5.1 Ready-to-eat fermented sausage

The final product shall have the smell and taste expected of fermented sausages. The final product shall be substantially free from staining and contamination from the container. Physical and chemical characteristics shall conform to the requirements given in [Table 1](#).

Table 1 — Physical and chemical indexes of fermented sausage

Item	Fermented sausages	Test method
Moisture to protein content ratio <	3,1:1	ISO 1442:1997/ISO 937:1978

4.5.2 Ready-to-eat fermented dry-cured ham

The final product shall have the smell and taste expected of fermented meat products. Physical and chemical characteristics shall conform to the requirements given in [Table 2](#).

Table 2 — Physical and chemical indexes of fermented dry-cured ham

Item	Fermented dry-cured ham	Test method
Moisture content % <	63,5 %	ISO 1442:1997
Moisture to protein content ratio <	2,5:1	ISO 1442:1997/ISO 937:1978
Proteolysis index ≥	20	Annex B

4.5.3 Hygiene

The products should conform to any microbiological criteria established in accordance with the principles for the establishment and application of microbiological criteria for foods (see CAC/GL 21:1997). Pathogenic bacterium and indicator of contamination limit shall conform to the requirements given in [Table 3](#). The relevant International Standards for microbiological analysis shall be used as reference methods, refer to the documents of ISO/TC 34/SC 9. Other methods that provide equivalent sensitivity, reproducibility and reliability can be employed if they have been appropriately validated in accordance with ISO 16140-2:2016 or other internationally accepted similar protocols.

Table 3 — Pathogenic bacterium/ indicator of contamination limit

Pathogenic bacterium /indicator of contamination	Sampling plan and limit			
	<i>n</i>	<i>c</i>	<i>m</i>	<i>M</i>
<i>Salmonella</i>	5	0	Not detected in 25 g	
<i>Listeria monocytogenes</i> ^a	5	0	Not detected in 25 g	
<i>Listeria monocytogenes</i> ^b	5	0	100 CFU/g	—
<i>Escherichia coli</i> O157:H7 ^c	5	0	Not detected in 25 g	
<i>Escherichia coli</i>	5	2	10 CFU/g	100 CFU/g

Key
n = the number of collected samples of the same batch products.
c = maximum number of samples allowed to exceed *m*.
m = the acceptable limit value of pathogenic bacteria indicators.
M = the highest safety limit value of the pathogenic bacteria indicators.
^a & ^b Different types of fermented meat products present different risks from *Listeria monocytogenes*, hence different microbiological criteria can apply.
^a These criteria apply to fermented products in which the growth of *Listeria monocytogenes* can occur.
^b These criteria apply to fermented meat products in which the growth of *Listeria monocytogenes* will not occur. They shall conform to the following criteria in accordance with CAC/GL 61:2007: products with pH < 4,4 or aw < 0,92, products with pH < 5,0 and aw < 0,94. Other categories of products can also belong to this category, subject to scientific justification.
^c Only for beef products.

5 Sampling

The sampling of the fermented meat products shall use the method specified in [Annex A](#) and CAC/GL 50:2004.

6 Labelling, packaging, transportation and storage

6.1 Labelling

At least the following information shall be marked on each package or on a label:

- a) the name of the product, the ingredients of the product, the trade name or brand name, if any;
- b) the name and address of the producer or packer;
- c) the net weight for those products with hermetic packaging;
- d) the producing date if required;
- e) the shelf life of the product;
- f) the storage mode and instructions;
- g) the batch or code number;
- h) any other information (e.g. nutritional information, health mark) requested by the purchaser.

6.2 Packaging

Packaging material in contact with fermented meat products shall be of food grade.

6.3 Transportation

The products shall be transported in suitable conditions according to the characteristics and hygiene requirements of fermented meat products. If necessary, insulation, refrigeration and fresh-keeping facilities should be provided. The products shall be protected from exposure to sunlight and rain, and shall not be transported with toxic, corrosive material or material that can have a negative effect on the quality.

6.4 Storage

Suitable storage and transportation conditions should be selected according to the characteristics and hygiene requirements of fermented meat products. If necessary, insulation, refrigeration and fresh-keeping facilities should be provided.

The products should be stored in a hygienic and odour-free warehouse.

The products should not be stored with toxic, corrosive material or material that can volatilize.

Products in storage should be protected from direct sunlight, rain, significant changes in temperature, humidity and violent impact, and should also be prevented from being subject to adverse effects.

Store the products away from the walls and the ground. Put the products in order and leave a channel in the middle.

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Annex A (normative)

Sampling

A.1 Microorganism

A.1.1 Sampling principle

Sampling should follow the principle of randomness and representativeness.

The sampling process should follow aseptic techniques to prevent any possible external contamination.

A.1.2 Sampling programme

Determine the sampling programme according to the purpose of the inspection, the characteristics of food, the batch, the inspection method and the degree of damage caused by the microorganism.

The sampling programme can be divided into a secondary and a tertiary sampling programme. The secondary sampling programme has n , c and m values, and the tertiary sampling programme has n , c , m and M values.

n = the number of collected samples of the same batch products.

c = maximum number of samples allowed to exceed m .

m = the acceptable limit value of pathogenic bacteria indicators.

M = the highest safety limit value of the pathogenic bacteria indicators.

According to the index setting of secondary sampling programme, it is allowed to have no more than c samples among n samples with the corresponding microbial index value larger than the m value.

According to the index setting of tertiary sampling programme, it is allowed to have all the samples with the corresponding microbiological index value no more than the m value. No more than c samples are allowed to have the corresponding microbial index value between the m value and the M value. No sample is allowed to have the corresponding microbiological indicators larger than the M value.

A.1.3 Sampling method

A.1.3.1 Pre-packaged fermented meat product

Samples should be collected from the same batch of individually packaged products in the appropriate quantities. The amount of each sample should meet the requirements for microbiological index testing.

A package of independently packaged fermented meat products weighing no more than 1 000 g should be collected from the same batch.

For independently packaged fermented meat products weighing more than 1 000 g, an aseptic sampler should be used to take the appropriate amount of samples from different parts of the same package and they are placed into the same sterile sampling container as one sample of fermented meat.

A.1.3.2 Bulk fermented meat products

Samples should be collected from n different parts of the fermented meat product by using a sterile sampling tool and placed in n sterile sampling containers as n samples. The amount of each sample should meet the requirements of the microbiological indicator inspection unit.

A.1.4 Sample labelling

The collected samples should be recorded and marked in a timely and accurate manner, including the sampler, sampling location, time, sample name, source, batch number, quantity and storage conditions.

A.1.5 Storage and transportation of collected samples

Samples should be sent to the laboratory for inspection as soon as possible.

Samples should be kept in completed status during transportation.

Samples should be stored close to the original storage temperature or taking necessary measures to prevent any change of microorganism amount in the sample.

A.2 Physical and chemical index detection

A.2.1 Sampling principle

Sampling should follow the principle of randomness and representativeness.

A.2.2 Sampling method

The samples should be collected within same batch. The amount of sample should not be less than 2 kg and from no less than three samples.

A.2.3 Sample labelling

The sampling should be recorded and marked timely and accurately, including the operator, location, time, sample name, source, batch number, quantity and storage conditions.

A.2.4 Storage and transportation of samples

Samples should be sent to the laboratory for inspection as soon as possible.

Samples should maintain their original integrity during transportation.

Samples should be stored at an appropriate storage temperature.

Annex B (normative)

Determination of proteolysis index in fermented meats

B.1 Reagents

B.1.1 Perchloric acid (HClO₄).

B.1.2 Sodium hydroxide solution, carbonate-free, containing approximately 33 g of sodium hydroxide (NaOH) per 100 g of solution.

B.1.3 Perchloric acid solution, 0,6 mol/l.

Dissolve 0,047 ml of concentrated perchloric acid (HClO₄) in water and dilute to 1 000 ml.

B.1.4 Hydrochloric acid, 0,1 mol/l standard volumetric solution, the normality being known to four decimal places.

B.2 Determination of non-protein nitrogen content in fermented dry-cured ham

For sampling, the insoluble surface oxide layer of fermented dry-cured ham (about 5 mm) should be removed, then about 200 g lean meat in the biceps femoris should be taken and stored in a vacuum for later use.

All reagents should be of recognized analytical quality. The water used should be distilled water.

The non-protein nitrogen content (C_{npn}) directly reflects the extent of protein degradation in the meat by using the Kjeldahl method.

Weigh 5 g of the test sample (biceps femoris muscle) into a 50 ml centrifugal tube. Add 25 ml 0,6 mol/l HClO₄ and homogenize in a commercial homogenizer for 3 min at maximum speed. Then, centrifuge the mixture for 10 min at 6 000 r/min in a commercial centrifuge, remove the supernatant into a 100 ml beaker and add 25 ml 0,6 mol/l HClO₄ into the residue. Repeatedly homogenize and centrifuge the supernatant and merge into the same beaker as before. Next, neutralize the combined supernatant by adding NaOH solution. Finally, remove the extraction solution into a 100 ml volumetric flask and make up to volume.

Determine the non-protein content by using the Kjeldahl method in accordance with ISO 937:1978.

The non-protein nitrogen content of the sample, expressed as a percentage by mass, is equal to [Formula \(B.1\)](#):

$$C_{\text{npn}} = 0,001 \ 4 \times (V_1 - V_0) \times \frac{100 \times 10}{w} \quad (\text{B.1})$$

where