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Microbiology of the food chain — Sampling techniques for microbiological analysis of food and feed samples

Microbiologie de la chaîne alimentaire — Techniques de prélèvement pour l'analyse microbiologique d'échantillons d'aliments

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Foreword

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword — Supplementary Information.

ISO/TS 17728 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO/TC 34, *Food products*, Subcommittee SC 9, *Microbiology*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Introduction

Some information on sampling techniques given in this Technical Specification is intended as guidance only; other parts are mandatory.

For some aspects of sampling, agreements and/or contracts with laboratory clients are necessary to ensure the method and extent of sampling to meet their requirements.

Microbiology of the food chain — Sampling techniques for microbiological analysis of food and feed samples

1 Scope

This Technical Specification applies to the collection of samples before submission to the laboratory for microbiological examination. It provides general instructions and specific requirements for obtaining samples and for transport to the laboratory.

Sampling plans are not included in the scope of this Technical Specification.

This Technical Specification applies to all food and feed products, including blocks of frozen products, carcasses (excluding surface sampling of carcasses), meat, and bulk products.

The following sample types are outside the scope of this Technical Specification:

— milk and dairy products (see ISO 707);

— surface sampling of carcasses (see ISO 17604);

— samples from environmental surfaces (see ISO 18593);

— samples from the primary production stage (see ISO 13307).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7218, *Microbiology of food and animal feeding stuffs — General requirements and guidance for microbiological examinations*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7002 and the following apply.

3.1 Sampling

3.1.1
sampling
procedure used to draw and constitute a sample

[SOURCE: ISO 7002:1986, A.41]

3.1.2
sampling plan
predetermined procedure for the selection, withdrawal, and preparation of samples from a lot to yield the required information so that a decision can be made regarding the acceptance of the lot

[SOURCE: ISO 7002:1986, A.43]

3.1.3
sampling technique
procedure used to take the sample

3.1.4
batch
lot
identified quantity of some commodity, manufactured or produced under conditions that are presumed uniform

[SOURCE: ISO 7002:1986, A.21]

3.1.5
lot size
number of items or quantity of material constituting the lot

[SOURCE: ISO 7002:1986, A.22]

3.2 Samples

3.2.1
item
individual
unit
1) actual or conventional object (defined quantity of material) on which a set of observations may be made or 2) observed value, either qualitative or quantitative

[SOURCE: ISO 7002:1986, A.18]

3.2.2
sample (general term)
one or more items (or a proportion of material) selected in some manner from a population (or from a larger quantity of material) intended to provide information representative of the population, and possibly, to serve as a basis for a decision on the population or on the process which had produced it

[SOURCE: ISO 7002:1986, A.39]

Note 1 to entry: In food microbiology, each unit or item is often referred to as a sample when each unit is examined separately. In this Technical Specification, the units are referred to as laboratory samples. Once prepared, following the ISO 6887 series of standards (for example, with homogenization, mincing, grating, etc.), the laboratory sample becomes the test sample. From this test sample, one test portion is taken for examination.

3.2.3
laboratory sample
amount or units of product that arrives in the laboratory to be analysed

[SOURCE: ISO 7218:2007]

3.2.4
representative sample
sample drawn so as to reflect, as accurately as possible, the properties of interest of the lot (the bias of the sample should be a minimum against the lot) from which it is taken

[SOURCE: ISO 7002:1986, A.38]

3.2.5
pooled sample
mixed sample of a number of items of the same type of food, animal feed, animals, or environment where the complete mixture is the test portion and is taken as a whole for examination in the laboratory

3.2.6
composite sample
mixed sample of a number of items of the same type of food, animal feed, animals or environment, from which a test portion is taken for examination in the laboratory

3.2.7
increment
quantity of material taken at one time from a larger body of material

[SOURCE: ISO 7002:1986, A.14]

Note 1 to entry: Parts added to each other to form the pooled or composite sample.

3.2.8
bulk sample
1) collection of increments or groups thereof intended for separate investigation (raw bulk sample) or 2) composite of the increments taken from a bulk lot (bulk sample in a proper sense) or 3) combined aggregation of the items or portions of items taken from a lot of pre-packed products (bulked sample)

[SOURCE: ISO 7002:1986, A.5]

3.2.9
test sample
sample prepared from the laboratory sample according to the procedure specified in the method of test and from which test portions are taken

[SOURCE: ISO 7002:1986, A.47]

Note 1 to entry: Preparation of the laboratory sample before the test portion is taken is infrequently used in microbiological examinations.

3.2.10
test portion
measured (volume or mass) representative sample taken from the laboratory sample for use in the preparation of the initial suspension

[SOURCE: ISO 6887]

Note 1 to entry: Sometimes preparation of the laboratory sample (3.2.3) is required before the test portion is taken, but this is infrequently used in microbiological examinations.

3.3 Products

3.3.1
bulk products
products that are not separated into individual items or units

3.3.2
packaged product
products separated into units or items, sealed or wrapped by the manufacturer

3.3.3
open products
products in unpackaged units

3.4 Sample handling

3.4.1
transport
care and handling of the sample from when it was taken until arrival at the laboratory to ensure that microbiological integrity is maintained

3.4.2
refrigeration
cold chain
maintenance of samples at cold temperatures to minimize changes in microbial load

3.4.3
receipt
procedures adopted by the laboratory when the samples arrive

3.4.4
acceptance criteria
sample characteristics required upon arrival at the laboratory and before the acceptance for examination (e.g. size, weight, integrity of wrapping, correct temperature for physical state, etc.)

4 Principles and general requirements

Representative samples shall be taken when sampling all products.

Sampling techniques shall not modify the intrinsic microbial flora of the product (such as via contamination from sampling implements or the environment or death/growth of this microbial flora during transport to the laboratory).

Before sampling, the minimum quantity required for examination and any instructions on pooling or compositing on site shall be agreed with the client.

Other necessary details should also be agreed with the client before sampling to ensure the correct interpretation of test results. For example:

— what kind of product and which batches are to be sampled;

— the purpose of testing (monitoring the production or examination of a particular batch, checking the microbiological quality of the product or quality of the product as presented to the consumers);

— protective clothing required for samplers (for example, in accordance with factory safety requirements);

— whether sterile or clean, but non-sterile sampling implements are to be used.

Criteria for sample acceptance and any permitted deviations on receipt at the laboratory shall be defined (in accordance with client requirements).

Unique identification of samples and labelling requirements shall be defined.

Sufficient information shall be recorded in the sampling report to give full traceability of the samples and allow interpretation of the results of analysis.

It is important to cause minimum disruption at the sampling site and follow any security instructions.

All samples shall be handled, packaged, and transported to the laboratory in such a way so as to prevent compromising the identity or integrity of the sample.

Sample handling procedures, including transport, shall not affect the microbiological quality of the samples in any way. In all cases, it is important to retain the original microbiological quality of the product. Samples which were not frozen before sampling shall not be frozen after sampling (see ISO 7218). Freezing samples can affect the viability of the intrinsic microbial flora and lead to false negatives in pathogen testing and reduced counts in quantitative methods.

Exceptionally, if freezing of samples is necessary due to high ambient temperatures or protracted transport times, this shall first be agreed with the client and also recorded by the laboratory.

5 Sampling plan

When sampling bulk products, locations for taking the increments (and the sampling techniques) shall be included in the sampling plan. All interested parties shall agree upon the sampling plan to be used

and on the size of increments taken if samples are to be composited or pooled before testing. Further information about sampling plans is available in the ISO 2859 series.

6 Personnel

6.1 General arrangements

The parties concerned, or their representatives, shall be given the opportunity to be present when sampling is performed.

Whenever special requirements are given for the sampling and/or are necessary for specific testing, these requirements shall be followed.

6.2 Sampling personnel (samplers)

Sampling for microbiological examination shall always be undertaken by personnel trained and experienced in the techniques of sampling for microbiological purposes.

All sampling personnel shall have training in aseptic techniques and experience with the types of products being sampled. They should also be aware of the requirement to minimize changes in the normal microbial flora of the products during sampling and transport.

7 Sampling techniques

7.1 Equipment

Some or all of the following equipment may be necessary for sampling food and feed from different environments.

Equipment and the implements used to take the samples shall be clean, as a minimum and sterile where required, depending on the aim of testing. For example, if testing is to check the intrinsic microbial flora of the product, then the equipment shall be sterile; if testing is to check the hygienic conditions of catering or of food manufacturing, then use the catering equipment or the equipment that is used by the food manufacturer.

Similarly, the packaging for samples may or may not be sterile depending on the purpose of the testing.

7.1.1 Materials for decontamination of packaging, instruments, and surfaces of certain samples:

— ethanol 70 % v/v or other bactericidal agents;

— wipes or pads impregnated with alcohol or other bactericidal agents.

7.1.2 Plastic bags of appropriate size, grade, and capacity suitable for containing the samples, sterile or not, depending on the sample and purpose of testing; if possible, with waterproof labels.

7.1.3 Boxes, egg boxes or other containers for fragile samples, sterile or not, depending on the sample and purpose of testing.

7.1.4 Bottles or tubes, of appropriate materials and capacities to contain liquid samples, sterile or not, depending on the sample and purpose of testing. These are useful for spoiled samples, especially if they have wide openings.

7.1.5 Thermometers, electronic and surface probes, infrared probes, calibrated.

7.1.6 Labelling systems (labels, permanent ink pens, etc.).