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Milk and milk products — Sensory analysis —

Part 3: Method for evaluation of compliance with product specifications for sensory properties by scoring

Lait et produits laitiers — Analyse sensorielle —

Partie 3: Méthode d'évaluation de la conformité aux spécifications de produit pour les propriétés sensorielles par notation

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Forewords

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 5, *Milk and milk products*, and the International Dairy Federation (IDF). It is being published jointly by ISO and IDF.

This second edition cancels and replaces the first edition (ISO 22935-3 | IDF 99-3:2009), which has been technically revised.

The main changes are as follows:

— the Normative references have been updated;

— procedures have been adjusted to align with ISO 20613:2019 in that there is now an opening for using variation in scale definitions, and not only using the 1 to 5 point scale.

A list of all parts in the ISO 22935 series can be found on the ISO website.

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

IDF (the International Dairy Federation) is a non-profit private sector organization representing the interests of various stakeholders in dairying at the global level. IDF members are organized in National Committees, which are national associations composed of representatives of dairy-related national interest groups including dairy farmers, dairy processing industry, dairy suppliers, academics and governments/food control authorities.

ISO and IDF collaborate closely on all matters of standardization relating to methods of analysis and sampling for milk and milk products. Since 2001, ISO and IDF jointly publish their International Standards using the logos and reference numbers of both organizations.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. IDF shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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This document was prepared by the IDF *Standing Committee on Statistics and Automation* and ISO Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products.* It is being published jointly by ISO and IDF.

The work was carried out by the IDF/ISO Action Team S17 of the *Standing Committee on Statistics and Automation* under the aegis of its project leader Dr H. Kraggerud (NO).

Introduction

The purpose of the ISO 22935 | IDF 99 series is to give guidance on methodology for sensory analysis and the use of a common nomenclature of terms for milk and milk products.

To achieve that, the ISO 22935 | IDF 99 series is divided into three parts.

ISO 6658 should be consulted for an overview of sensory methods other than the one provided in this document.

The principles described are largely derived from various International Standards on the topic.

Milk and milk products — Sensory analysis —

Part 3:
Method for evaluation of compliance with product specifications for sensory properties by scoring

1 Scope

This document specifies a general method for evaluation of compliance with product specifications for sensory properties based on sensory scoring and the use of a common nomenclature of terms.

The method is especially applicable in process and quality control performed regularly on a larger number of samples and/or with some time pressure and/or with a limited number of expert assessors available.

The results from the method can be part of product classification systems for domestic and international trade. This document does not apply to classification systems.

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 4121, *Sensory analysis — Guidelines for the use of quantitative response scales*

ISO 5492, *Sensory analysis — Vocabulary*

ISO 5496, *Sensory analysis — Methodology — Initiation and training of assessors in the detection and recognition of odours*

ISO 6658, *Sensory analysis — Methodology — General guidance*

ISO 8586, *Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors*

ISO 8589, *Sensory analysis — General guidance for the design of test rooms*

ISO 22935-1 | IDF 99-1, *Milk and milk products — Sensory analysis — Recruitment, selection, training and monitoring of assessors*

ISO 22935-2 | IDF 99-2, *Milk and milk products — Sensory analysis — Methods for sensory evaluation*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4121, ISO 5492, ISO 5496, ISO 6658, ISO 8586, ISO 8589, ISO 22935-1 | IDF 99-1 and the following apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
property
<sensory analysis of milk products> overall appearance, consistency or odour/flavour of a sample

4 Principle

Sensory properties of individual samples of milk and milk products are analysed under standardized conditions by a panel of expert milk and milk product assessors. Each assessor evaluates the samples independently of the other assessors and uses a defined scale to estimate the magnitude of a possible deviation in a product from a pre-established sensory product specification. When assessors score a significant difference, the score is supplemented by common terms which describe the character of the sensory deviation. The mean values of the panel, supplemented with the representative terms, gives the result of the method.

5 General test requirements

5.1 General

The method shall be used in conjunction with ISO 22935-1 | IDF 99-1 and ISO 22935-2 | IDF 99-2. Follow also the general guidance on the methodology of sensory analysis given in ISO 6658. When relevant, it is also recommended that the general requirements for the competence to carry out tests given in ISO/IEC 17025 with supplemental documents specific for sensory-testing laboratories (such as EA-4/09[8]) be followed.

5.2 Test room

Conduct the sensory analysis in a special test room with standardized conditions which are monitored regularly when testing.

See ISO 22935-2 | IDF 99-2 and ISO 8589 for the characteristics of the room in which the tests are to be performed.

5.3 Assessors

Assessors shall be recruited, selected, trained and monitored to satisfy the criteria for expert milk and milk product assessors.

See ISO 22935-1 | IDF 99-1, ISO 8586 and ISO 5496 for general guidance.

5.4 Panel

The number of assessors in the panel shall be at least three.

See also ISO 22935-1 | IDF 99-1 for additional requirements for assessors in the panel, and ISO 22935-2 | IDF 99-2 for general guidelines for the preparation of a panel.

5.5 Panel leader

A panel leader familiar with sensory evaluation of the products shall be responsible for the entire procedure and shall normally not participate in the panel. The panel leader may, however, be a panel member in regular process or quality control situations (e.g. at processing dairy plants) if the number of assessors at the site is limited and the panel leader satisfies the criteria for expert milk and milk product assessors.

See also ISO 22935-2 | IDF 99-2, ISO 13300-1 and ISO 13300-2 for additional requirements for the panel leader.

5.6 Documents

5.6.1 General

Necessary documents for the sensory evaluation of the various products shall be available. The documents shall be standardized and common to all comparable sensory evaluations utilizing this method, e.g. in a specific process or quality control in a company or region.

5.6.2 Specific methods for specific milk and milk products

Specific methods shall supplement this document and shall specify in detail necessary apparatus, sampling procedure, the preparation of samples for sensory analysis, and the sensory evaluation of specific milk and milk products.

See also ISO 22935-2 | IDF 99-2 for recommended methods.

5.6.3 Product specifications

A pre-established sensory product specification shall describe the sensory requirements to be fulfilled to establish the fitness of the product for purpose in a specific market. For example, the description may be a sensory profile (see ISO 13299) obtained by profiling products that have been found fit for purpose by consumer testing. A control sample may, if available, supplement the sensory product specification.

5.6.4 Nomenclature of terms

A nomenclature of terms shall include all terms relevant for objectively describing the character of sensory deviations in a specific milk or milk product from the description in the sensory product specification.

See also ISO 22935-2 | IDF 99-2:2023, Annex A, for recommended terms for specific product groups.

In some cases, where the character of the deviation is described by a term which is also a part of the sensory product specification, and it is difficult to find an alternative objective description which covers the actual deviation, it can be necessary to add “low intensity” or “high intensity” to the term in the nomenclature of the specific product (e.g. “low intensity of sweetness” or “high intensity of sweetness”).

The nomenclature may include guidelines for the assessors to give information regarding the significance of the specific terms, and their combinations, for estimating the magnitude of the deviation from the sensory product specification.

6 Apparatus

Select the apparatus according to the nature of the milk or milk products to be analysed. The selected apparatus shall not affect the test samples or the assessors in an undesired manner and the functioning and use shall, when relevant, be monitored regularly when testing.

See also ISO 22935-2 | IDF 99-2 for recommended apparatus for sensory evaluation of specific milk and milk products.

7 Sampling

Sampling is not part of the method specified in this document. Unless special requirements are given for the sampling, a recommended sampling method is given in ISO 707 | IDF 50 (see also ISO 22935-2 | IDF 99-2 for sampling of specific milk and milk products).

The laboratory shall receive a test sample which is truly representative and which has not been damaged or changed during sampling, transport or storage.

Precautions, therefore, shall be taken during sampling, transportation and storage of the samples so that the sensory properties are not affected by these factors.

8 Preparation of test samples

Prepare test samples for assessment as specified in ISO 22935-2 | IDF 99-2 for individual milk and milk products.

During the preparation of test samples, take precautions to ensure that the sensory properties are not affected in an undesired manner.

Arrange the assessment so that the identity of each sample to be assessed is not known to the assessors.

Take precautions to ensure that assessors are not influenced by the size and shape of the samples or by the mode of presentation.

9 Procedures

9.1 Evaluate the overall appearance, overall consistency and/or overall odour/flavour of each test sample separately. One total score across attributes can also be used.

See ISO 22935-2 | IDF 99-2 for recommended methods for the sensory evaluation of specific milk and milk products.

9.2 In scoring, use a scale which represents the magnitude of the deviation in a product from the pre-established sensory specification. ISO 20613 presents some alternative scales to be used The number of points and direction of the scale can vary, but it shall always follow the principle of deviation from specification. An example of a recommended scale is given in Table 1.

Table 1 — Numerical discrete interval scale giving the magnitude of deviation in the scoring

Points	Verbal description
5	No deviation from the pre-established sensory specification
4	Minimal deviation from the pre-established sensory specification
3	Noticeable deviation from the pre-established sensory specification
2	Considerable deviation from the pre-established sensory specification
1	Very considerable deviation from the pre-established sensory specification

9.3 Each of the assessors shall score the test samples of a specific milk or milk product in a random order. In regular process or quality control situations (e.g. at processing dairy plants) it is, however, sufficient that all the assessors score the test samples of a specific milk or milk product in the same order.

9.4 Serve highly flavoured types of specific milk and milk products and/or products with a high fat content after less highly flavoured products and/or products with lower fat content.

9.5 Adjust the maximum number of test samples for each assessment to the type of product to be assessed, so that the assessment is carried out consistently for each sample. If necessary, carry out the assessment at adequate intervals.

9.6 Present the test samples in such a way that assessors cannot mix them up.

9.7 Instruct assessors to do the technical performance of the sensory evaluation in an appropriate and repeatable way (size of the sample in the mouth, time of chewing, etc.).

9.8 Use a suitable cleanser (e.g. mouth rinse with pure, room-temperature water; heated water for products with high fat content to be able to melt the fat) to prevent carry-over of any stimuli that can affect the score of the next sample.

9.9 In order to calibrate and coordinate assessors, assess at least two samples for each type of product and discuss the results obtained before starting the assessment of a product. Preferably, at least one of the calibration samples shall be expected to conform to the sensory specification (a control sample). Calibration samples shall be available during the assessment.

9.10 Individual assessors shall analyse test samples independently of each other, without intercommunication, and only utilize whole points.

9.11 If an assessor scores a significant difference, a description of the deviation shall be given. In doing so, the assessor shall use the nomenclature of terms (5.6.4) for the specific milk or milk product and list the terms according to the significance of the magnitude of deviation from the product specification.

9.12 When the scoring by the assessors for a particular property is spread over adjacent points only, the mean value for the panel shall be calculated to one decimal place.

9.13 If the differences between the individual scoring for a property are wider than adjacent points (e.g. wider than 3 and 4), perform a reassessment of this property. Individual assessors shall reassess independently of each other, preferably without knowing which test sample and property they are reassessing. The results from the reassessment are final and the mean value for the panel shall be calculated to one decimal place based on these results.

9.14 If the mean value for the panel represents a significant difference, list the description of the deviation from the product specification. Assessors in the panel may, if necessary, discuss and agree on the terms to be stated.

9.15 The mean value of the panel, supplemented with the representative deviation term(s) gives the result of the method. The decision criteria depend on the established quality control requirement in the company.

10 Precision

This document specifies a method which shall be supplemented with specific methods for different specific milk and milk products (see 5.6.2), different product specifications made by different companies, region, countries, etc. for different specific markets (see 5.6.3), and a nomenclature of terms for the specific milk and milk products (see 5.6.4).

This leads to a very broad range of parameter combinations which have to be covered by a large and very expensive interlaboratory test to give any relevance to precision figures (repeatability and reproducibility) for users of this document. For that reason, it was not found appropriate to arrange a general interlaboratory test for this method.

Instead it is recommended that different companies, regions, countries, etc. using this method and having specified the above mentioned supplements for their own specific products, arrange an interlaboratory test carried out in accordance with ISO 5725-1 and ISO 5725-2, relevant for their products and their use of the method, to find their own precision figures.