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Milk and milk products — Sensory analysis —

Part 1: Recruitment, selection, training and monitoring of assessors

Lait et produits laitiers — Analyse sensorielle —

Partie 1: Recrutement, sélection, entraînement et contrôle des sujets

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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 22935-1 | IDF 99-1:2009), which has been technically revised.

The main changes are as follows:

— the Normative references have been updated;

— a few changes have been made to reference materials.

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.

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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 ISO 22935-3 | IDF 99-3.

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

It is important that safety issues are handled during sensory evaluations (see ISO 20613).

Milk and milk products — Sensory analysis —

Part 1:
Recruitment, selection, training and monitoring of assessors

1 Scope

This document gives general guidance for the recruitment, selection, training, and monitoring of assessors for sensory analysis of milk and milk products.

It specifies criteria for the selection, and procedures for the training and monitoring, of selected assessors and expert sensory assessors for milk and milk products. It supplements the information given in ISO 8586 that deals with expert assessors.

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 4120, *Sensory analysis — Methodology — Triangle test*

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 8586:2012, *Sensory analysis — General guidelines for the selection, training and monitoring of selected assessors and expert sensory assessors*

ISO 8587, *Sensory analysis — Methodology — Ranking*

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

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 and ISO 8589 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
sensory analysis
science involved with the assessment of the sensory attributes of a product by the senses

[SOURCE: ISO 5492:2008, 1.1, modified — "sensory" replaced "organoleptic" in the definition.]

3.2
expert sensory assessor
selected assessor with a demonstrated sensory sensitivity and with considerable training and experience in sensory testing, who is able to make consistent and repeatable sensory assessments of various products

Note 1 to entry: Examples of "various products" are "dairy products".

[SOURCE: ISO 5492:2008, 1.8, modified — Note 1 to entry added.]

3.3
appearance
all the visible attributes of a substance or object

Note 1 to entry: For a dairy product, the visual attributes are both internal and external, and include shape, colour, loose liquid, phase separation, wanted or unwanted particles, and openings.

[SOURCE: ISO 5492:2008, 3.1, modified — Note 1 to entry added.]

3.4
fingerfeel
mixed experience derived from sensations on the fingers that relate to physical properties of a stimulus

3.5
flavour
complex combination of the olfactory, gustatory and trigeminal sensations perceived during tasting

[SOURCE: ISO 5492:2008, 3.20, modified — Note 1 to entry deleted.]

4 Recruitment

Assessors can be recruited from within a company (laboratory staff, production staff, administration staff, etc.), who are not involved with project work, or from outside a company. Outside assessors can be recruited by advertisement or by word of mouth. The panel candidates should have an understanding of the amount of time that will be required for the screening process and for actual panel work. A large enough pool of available candidates should be screened in order to have enough assessors available to select from when forming a panel. The trainee assessor should have satisfactory personal qualifications for assessments and should be pre-selected by:

a) the use of screening tests to assess the ability of candidates to perceive, discriminate and describe sensory attributes;

b) a general understanding of the concepts of sensory evaluation;

c) a general liking or interest in dairy products.

5 Screening

5.1 Screening form and requirements

Potential applicants should go through two forms of screening via an interview and sensory screening tests. During the interview, the applicants should fill out a pre-screening form which indicates the times that they are available for panels and any health issues they can have, e.g. arthritis which can interfere

with the evaluation of product texture in-hand (fingerfeel), lactose intolerance, food allergies, wearing of dentures, smoking status, and any other issues of concern.

Flavoured water solutions and dairy products should be used to indicate if the potential assessor can recognize specific tastes or flavours at different intensities. The potential evaluator shall be able to detect certain flavours within complex dairy products. The following three sessions each take assessors approximately 45 min to 1 h to complete. These screening exercises are suggestions only and may be adapted to the application area of the assessors. The sessions described in Tables 1 to 3 may be broken down into smaller or larger sessions depending on how much time is available.

Table 1 — Session 1 — Basic odour and taste recognition

Test	Reference	Result
1	5.3.2	Odour recognition
2	5.3.3	Basic taste recognition
3	5.3.4, Table 8	Ranking of basic taste — sweet
4	5.3.4, Table 9	Ranking of basic taste — sour
5	5.3.4, Table 10	Ranking of basic taste — salty
6	5.3.4, Table 11	Ranking of basic taste — bitter

Table 2 — Session 2 — Milk powder and cream products

Test	Reference	Result
7	5.3.5, Table 14	Triangle test — milk powder
8	5.3.5, Table 15	Triangle test — butter
9	5.3.5, Table 16	Triangle test — salted butter
10	5.3.6.3	Round table discussion — cream evaluation
11	5.3.4, Table 12	Ranking of texture — body/creaminess
12	5.3.5, Table 13	Triangle test — aged milk powder

Table 3 — Session 3 — Cheese

Test	Reference	Result
13	5.3.5, Table 16	Triangle test — cheese
14	5.3.6.2	Round table discussion — cheese evaluation
15	5.3.5, Table 16	Triangle test — bitter cheese
16	5.3.5, Table 17	Triangle test — cheese firmness
17	5.3.5, Table 17	Triangle test — cheese smoothness

Mark each section as per each marking schedule. Other examples of screening exercises can be found in ISO 8586.

5.2 Preparation of test samples for screening

5.2.1 If possible, prepare test samples on the day of the evaluation.

5.2.2 For screening purposes, it is easier to serve test samples in the same order to all assessors.

5.2.3 If appropriate, use test sample questionnaires for all screening exercises found in ISO 4120 (triangle test), ISO 8587 (ranking test), ISO 6658 and ISO 4121 (scales).

5.3 Screening tests, materials and methods

5.3.1 General

The screening tests, materials and methods presented in this clause are recommendations only. They can be adapted to suit the needs of an individual company.

5.3.2 Odour recognition

Follow the instructions outlined in ISO 8586:2012, 5.4.1, for details on how to prepare the test samples and conduct this test. Table 4 suggests other aromas that can be used.

Table 4 — Examples of olfactory materials for odour description test

Blind code (example)	Sample preparation
981	Citronella oil (lemon, cleaning fluid)
194	Orange
229	Caramel
371	Butyric acid
926	Acetic acid
174	Ammonia
746	(*Z*)-hex-3-en-1-ol[a]
831	Oct-1-en-3-ol
556	Vanilla

[a] In older literature, known as *cis*-hex-3-en-1-ol.

Candidates are graded according to performance, as shown in Table 5. For each sample, a total of three points can be achieved. If the assessor uses words other than those listed in Table 5, score appropriately.

Table 5 — Marking schedule for odour recognition

Sample	Correct answer		
	3 points	2 points	1 point
Citronella oil	Citronella oil	Lemony, cleaning fluid	Citrus, fruity
Orange	Orange	Lemon	Citrus, fruity
Caramel	Caramel	Vanilla, malt, toasted	Sweet
Butyric acid	Rancid butter	Parmesan cheese	Vomit, baby burp
Acetic acid	Acetic acid	Vinegar	Sour/off milk
Ammonia	Ammonia	Cleaning fluid, urine	Pungent
(*Z*)-hex-3-en-1-ol	Green grass	Green beans	Green vegetable
Oct-1-en-3-ol	Mushroom	Cellar, musty	Mouldy
Vanilla	Vanilla	Custard, dessert	Sweets, candy

5.3.3 Basic taste recognition

The solutions can be prepared as shown in Table 6. Present the solutions to the assessors in the same order, and one of the solutions twice. Ask the assessor to identify the basic taste that is represented by the solution.

Table 6 — Basic taste solutions

Blind code (examples)	Answer	Concentration	Sample preparation
683	Sweet	10 g/l sucrose (1 % mass fraction)	10 g sucrose + 1 l water
429	Salty	2 g/l NaCl (0,2 % mass fraction)	2 g NaCl + 1 l water
662	Sour	0,3 g/l citric acid (0,03 % mass fraction)	0,3 g citric acid + 1 l water
353	Bitter	0,3 g/l caffeine (0,03 % mass fraction)	0,3 g caffeine + 1 l water
768	Umami (optional)	0,6 g/l monosodium glutamate (0,06 % mass fraction)	0,6 g monosodium glutamate or 0,18 g umami mixture (50 % mass fraction monosodium glutamate, 25 % mass fraction 5′- guanylic acid, 25 % mass fraction inosinic acid) + 1 l water with 0,5 g NaCl
418	Water		water

Candidates are graded according to performance on the scale shown in Table 7.

Table 7 — Gradation scale I

Points	Result
6	all correct
5	five correct
4	four correct
3	three correct
2	two correct
1	one correct
0	none correct

5.3.4 Ranking tests

A minimum of four test samples should be ranked in order of increasing intensity. This test will indicate whether the assessor can tell the difference between samples for certain basic tastes.

Samples for ranking of sweetness, sourness, saltiness, bitterness and creamy flavour are given in Tables 8, 9, 10, 11 and 12, respectively.

This test can also indicate the threshold levels of assessors (i.e. if the assessor did not correctly identify the order of the lower intensities, that would indicate that this assessor cannot taste at lower levels for this particular attribute).

NOTE All samples are randomized, but are presented to all the assessors in the same order.

Table 8 — Sweet ranking

Blind code (examples)	Correct ranking	Concentration	Sample preparation
478	3	10 g/l sucrose (1 % mass per volume)	10 g sucrose + 1 l water
753	1	Water	Water
578	4	15 g/l sucrose (1,5 % mass per volume)	15 g sucrose + 1 l water
248	2	5 g/l sucrose (0,5 % mass per volume)	5 g sucrose + 1 l water