SLOVENSKI STANDARD
SIST EN ISO 5495:2007

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Senzoriļ na analiza - Metodologija - Preskus s primerjavo v parih (ISO 5495:2005 in ISO 5495:2005/Cor 1:2006)

Sensory analysis - Methodology - Paired comparison test (ISO 5495:2005 and ISO 5495:2005/Cor 1:2006)

Sensorische Analyse - Prüfverfahren - Paarweise Vergleichsprüfung (ISO 5495:2005 und ISO 5495:2005/Cor 1:2006)

Analyse sensorielle - Méthodologie - Essai de comparaison par paires (ISO 5495:2005 et ISO 5495:2005/Cor 1:2006)

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Sensory analysis - Methodology - Paired comparison test (ISO 5495:2005 and ISO 5495:2005/Cor 1:2006)

Analyse sensorielle - Méthodologie - Essai de comparaison par paires (ISO 5495:2005 et ISO 5495:2005/Cor 1:2006)

Sensorische Analyse - Prüfverfahren - Paarweise Vergleichsprüfung (ISO 5495:2005 und ISO 5495:2005/Cor 1:2006)

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Foreword

The text of ISO 5495:2005 and ISO 5495:2005/Cor 1:2006 has been prepared by Technical Committee ISO/TC 34 "Agricultural food products" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 5495:2007 by Technical Committee CEN/SS C01 "Food Products", the secretariat of which is held by CMC.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2008, and conflicting national standards shall be withdrawn at the latest by January 2008.

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Endorsement notice

The text of ISO 5495:2005 and ISO 5495:2005/Cor 1:2006 has been approved by CEN as EN ISO 5495:2007 without any modifications.

INTERNATIONAL STANDARD

ISO 5495

Third edition
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Sensory analysis — Methodology — Paired comparison test

Analyse sensorielle — Méthodologie — Essai de comparaison par paires

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 5495 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 12, *Sensory analysis*.

This third edition cancels and replaces the second edition (ISO 5495:1983), which has been technically revised.

Sensory analysis — Methodology — Paired comparison test

1 Scope

This International Standard describes a procedure for determining whether there exists a perceptible sensory difference or a similarity between samples of two products concerning the intensity of a sensory attribute. This test is sometimes also referred to as a directional difference test or a 2-AFC test (Alternative Forced Choice). In fact, the paired comparison test is a forced choice test between two alternatives.

NOTE The paired comparison test is the simplest existing classification test since it concerns only two samples.

The method is applicable whether a difference exists in a single sensory attribute or in several, which means that it enables determination of whether there exists a perceptible difference concerning a given attribute, and the specification of the direction of difference, but it does not give any indication of the extent of that difference. The absence of difference for the attribute under study does not signify that there does not exist any difference between the two products.

This method is only applicable if the products are relatively homogeneous.

The method is effective

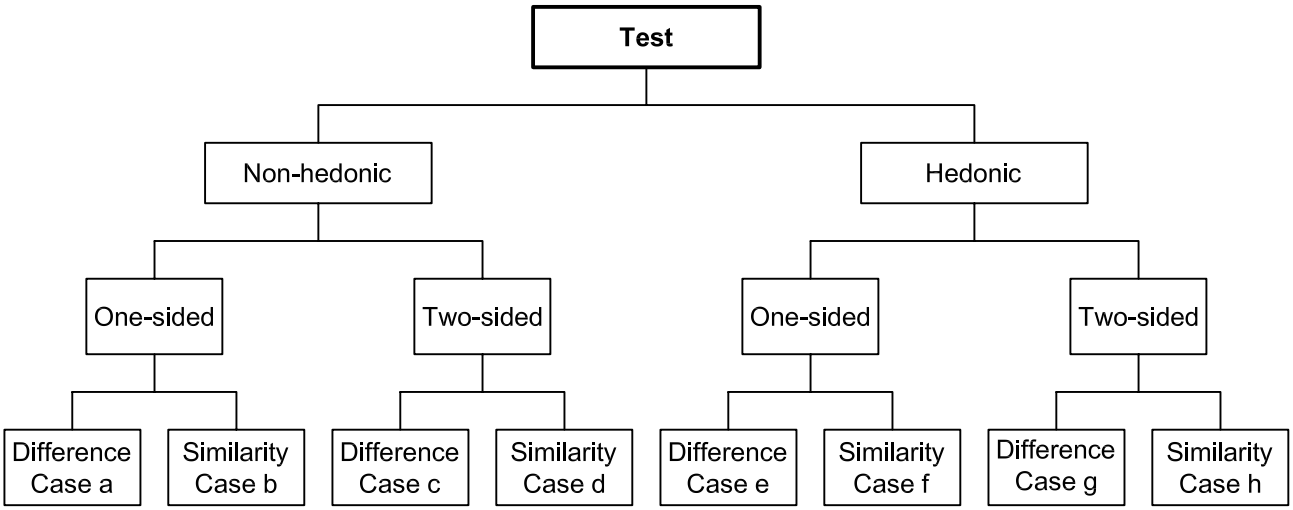
a) for determining

- whether a perceptible difference exists (paired difference test), or
- whether no perceptible difference exists (paired similarity test) when, for example, modifications are made to ingredients, processing, packaging, handling or storage operations, or

b) for selecting, training and monitoring assessors.

It is necessary to know, prior to carrying out the test, whether the test is a one-sided test (the test supervisor knows a priori the direction of the difference, and the alternative hypothesis corresponds to the existence of a difference in the expected direction) or a two-sided test (the test supervisor does not have any a priori knowledge concerning the direction of the difference, and the alternative hypothesis corresponds to the existence of a difference in one direction or the other).

The paired test can also be used in order to compare two products in terms of preference. The different cases of use of the paired test are summarized in Figure 1.



NOTE Only non-hedonic tests are dealt with in this International Standard.

Figure 1 — Possible different cases of use of the paired comparison test

EXAMPLE 1 (Case a) The production of a biscuit has been modified in order to render it more crisp. It is desired to check whether this increase is perceptible. Therefore it is necessary to try to highlight a difference to see whether the new product is perceived as being crispier than the usual product (control).

EXAMPLE 2 (Case b) A manufacturer knows that the product may contain traces of an ingredient which imparts an off-flavour to the product. He therefore wishes to determine the maximum acceptable quantity so that the flavour difference with a reference product without this ingredient is barely perceptible and therefore without any regrettable consequences.

EXAMPLE 3 (Case c) It is desired to produce a new soup and to compare two ingredients which will provide the salty flavour. For cost-intensive reasons, the ingredient which, at the same concentration, will provide the strongest salty flavour is sought. Therefore it is necessary to try to highlight a difference. It is not known a priori which ingredient will produce the strongest salty flavour.

EXAMPLE 4 (Case d) A manufacturer of plastics used, in particular, by car manufacturers for dashboards is seeking, for economic reasons, to replace the usual lubricant by a new one, but does not wish that the new plastics formula be perceived as presenting less or more surface slip than the usual one. It is a question of determining whether, for a same concentration, the new lubricant provides the same “surface slip” level as the usual product. It is necessary to show that both lubricants are similar in terms of “surface slip”, but it is not known a priori which lubricant can produce the highest surface slip characteristics.

2 Normative references

The following referenced documents are indispensable for the application 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 5492 1992, *Sensory analysis — Vocabulary*

ISO 6658:1985, *Sensory analysis — Methodology — General guidance*

ISO 8586-1:1993, *Sensory analysis — General guidance for the selection, training and monitoring of assessors — Part 1: Selected assessors*

ISO 8586-2:1994, *Sensory analysis — General guidance for the selection, training and monitoring of assessors — Part 2: Experts*

ISO 8589:1988, *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 5492 and the following apply.

3.1
α (alpha) risk
probability of concluding that a perceptible difference exists when one does not exist

NOTE This is also called a type I error, significance level or false-positive rate.

3.2
β (beta) risk
probability of concluding that no perceptible difference exists when one does exist

NOTE This is also called a type II error or false-negative rate.

3.3
difference
situation in which samples can be distinguished based on their sensory attributes

NOTE The proportion of assessments during which a perceptible difference is detected between the products for the sensory attribute under study is given by the symbol p_d.

3.4
one-sided test
test in which the test supervisor has a priori knowledge concerning the direction of difference

NOTE The null hypothesis is H_0, the products are not different; the proportion of correct responses observed, p, is equal to 1/2. The alternative hypothesis is H_1, $p > 1/2$.

3.5
two-sided test
test in which the test supervisor does not have any a priori knowledge concerning the direction of difference

NOTE The null hypothesis is H_0, the products are not different; the proportion of responses observed for one of the samples, p, is equal to 1/2. The alternative hypothesis is H_1, $p \neq 1/2$.

3.6
correct responses
expected responses
number of assessors, in the case of a one-sided test, having selected the sample expected by the test supervisor to be the most intense for the sensory attribute under study

3.7
consensual responses
highest value, in the case of a one-sided test, of the number of assessors having selected sample A and those having selected sample B

NOTE This is calculated as above since there are not any correct responses.

3.8
product
material to be evaluated

3.9
sample
unit of product prepared, presented and evaluated during the course of the test

3.10
sensitivity
general term employed to summarize the performance characteristics of the test

NOTE In statistical terms, the sensitivity of the test is defined by the values of α, β and p_d.

3.11
similarity
situation in which any perceptible differences between the samples are so small that the products can be used interchangeably

4 Principle

The number of assessors is chosen on the basis of the sensitivity desired for the test (See 6.2 and the footnote that accompanies Tables A.4 and A.5).

The assessors receive a set of two samples (i.e. a pair). They designate the sample which they consider to be the most intense regarding the sensory attribute under consideration, even if this choice is based only on a guess.

NOTE One of the samples may be a control.

The number of times that each sample is selected is counted and the significance is determined by reference to a statistical table, taking into consideration the results obtained for the expected sample (one-sided test) or the highest number of responses obtained for either of the samples (two-sided test).

5 General test conditions

5.1 Define the objective of the test in a clear way to determine if the attempt is to be a one-sided or a two-sided test, if it is a difference or similarity test, and which is the most appropriate sensitivity.

5.2 Carry out the test under conditions that prevent all communication among assessors until the evaluations have been completed, using facilities and booths complying with ISO 8589.

5.3 Prepare the samples out of sight of the assessors and in an identical manner for each one of them; i.e. same apparatus, same vessels.

5.4 Assessors shall not be able to draw any conclusions regarding the intensity of the attribute from the manner in which the samples are presented to them. For example, for a tactile test, any differences in appearance shall be avoided. Mask all colour differences if the test objective does not concern the colour by using light filters and/or subdued lighting. The samples may also be presented successively and non-simultaneously in the case of slight differences in appearance.

5.5 Code the samples or the vessels containing the samples in a uniform manner, preferably using 3-digit numbers chosen at random for each test. Each pair is composed of two samples, each with a different code. Preferably, different codes should be used for each assessor during a session. However, the two same codes may be used for all assessors within a test, provided that each code is used only once per assessor during a test session (e.g. if several paired tests on different products are being conducted during the same session).

5.6 The quantity or volume served shall be identical for the two samples constituting each pair, just as that of all the other samples in a series of tests on a given type of product. The quantity or volume to be assessed can be imposed. If it is not, it should however be specified to the assessors to take quantities or volumes that are always similar whatever the sample.

5.7 The temperature of the samples constituting each pair shall be identical just as that of all the other samples in a series of tests on a given type of product. It is preferable to present the samples at the temperature at which the product is generally consumed.