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भारतीय मानक मसौदा
खाद्य पदार्थों के संवेदी मूल्यांकन— मार्गदर्शिका
भाग 2 विधियाँ और मूल्यांकन कार्ड
(आई एस 6273 भाग 2 का पहला पुनरीक्षण)

Draft Indian Standard
Sensory Evaluation of Foods — Guide
Part 2 Methods and Evaluation Cards
(First Revision of IS 6273 Part 2)
ICS 67.240

Test Methods for Food Products
Sectional Committee, FAD 28

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FOREWORD

(Formal clause would be added later)

The sensory evaluation of food is an essential aspect of quality control, product development, and consumer research. It encompasses a range of methods designed to assess the characteristics of food as perceived by the senses, including taste, smell, sight, touch, and sound. The growing complexity of the food industry, along with evolving consumer preferences, necessitates the development of standardized methods that ensure consistency, accuracy, and reliability in sensory analysis.

To derive maximum benefits from sensory evaluation, it is necessary to follow the methodology in its full scientific perspective. It is, therefore, necessary to: (a) use standard terminology (*see* IS 5126) (b) select the panel properly; (c) maintain suitable environmental conditions and use standard equipment for the test; (d) obtain representative samples; (e) prepare and present samples suitably and uniformly; and (f) select the methods and statistical techniques carefully. This part of the standard is intended to provide a comprehensive framework for conducting sensory assessments using a variety of methods and evaluation tools. This document offers detailed procedures for qualitative and quantitative analysis, along with templates for evaluation cards designed to facilitate the collection and interpretation of sensory data. It is an extension of Part 1, which covers general guidelines (details on (b), (c), (d) and (e)) for sensory evaluation. Further, Part 3 of this standard covers about the statistical analysis of data for its interpretation.

Two types of analysis are broadly followed in sensory evaluation of foods: (a) laboratory analysis with trained, discriminative and communicative (D and C) panelists for product development and

quality control; and (b) consumer analysis with D and C and untrained panelists for ascertaining acceptability. A summary of all sensory evaluation test methods can be found in Annex A. The tests are grouped for convenience and clarity according to the judgements aimed at, such as qualitative differences (difference tests and ranking tests); quantitative differences (rating tests); and quality attribute analysis (dilution tests or flavour profile tests). The Annex A also includes recommendations on the type and number of panelists, number of samples per test, statistical methods of analysis of data, besides indicating the purpose for which these methods have been used.

This standard was first published in 1971. While bringing out first revision of this standard, a new table (13 B) under **5.3.2.3** for specimen evaluation card for dilution test has been added. In addition, the standard has been brought out in the latest style and format of Indian Standard. Editorial corrections have been made and references to Indian Standards have been updated, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Draft Indian Standard

SENSORY EVALUATION OF FOODS - GUIDE
PART 2 METHODS AND EVALUATION CARDS
(*First Revision*)

1 SCOPE

This standard (Part 2) covers the test methods and specimen evaluation cards which are commonly used in the panel selection and sensory evaluation of foods.

2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

<i>IS No.</i>	<i>Title</i>
IS 5126 : 2016/ ISO 5492 : 2008	Sensory analysis — Vocabulary (<i>second revision</i>)
IS 6273 (Part 1) : 2024	Sensory evaluation of foods — Guide Part 1 Optimum Requirements (<i>first revision</i>)
Doc: FAD 28(xxxxx) WC	Guide for sensory evaluation of foods: Part 3 Statistical analysis of data: Sec 1 Difference/preference tests (<i>second revision</i> of IS 6273 (Part 3/Sec 1))
IS 6273 (Part 3/Sec 2) : 2023	Sensory evaluation of foods — Guide Part 3 Statistical analysis of data Section 2 Ranking and scoring tests (<i>second revision</i>)

3 TERMINOLOGY AND BASIC REQUIREMENTS

3.1 For the purpose of this standard, the terms given in IS 5126/ISO 5492 shall apply.

3.2 The test shall be carried out under the environmental and experimental conditions specified in IS 6273 (Part 1).

4 STATISTICAL ANALYSIS OF DATA

The statistical analysis of data obtained by the following test methods shall be carried out according to IS 6273 (Part3).

5 METHODS OF TEST

The following clauses illustrate the test methods, field of application, the evaluation cards and statistical analysis of data (*see* Annex A).

5.1 Difference Tests

These tests are employed to evaluate qualitative and quantitative differences and preference between test products, and to select panel members. The three basic types of differences are: (a) simple difference; (b) directional and quantitative difference; and (c) quality preference difference. The forced-choice forms of difference tests are sensitive and are used when differences are small. Ranking tests are quicker and useful in screening products especially when single characteristics are evaluated and also when a suitable rating is not available.

5.1.1 Paired Comparison Test

5.1.1.1 Field of application— This test is used to find simple difference and directional difference in a specific characteristic and difference preference in consumer analysis of foods. This is also applicable in training and testing of panelists.

5.1.1.2 Procedure— Present coded sample in pair(s), in each pair one being the reference and the other the test sample. Identical samples in a few pairs may be given to test the individual's discriminative ability as a panelist. In simple difference test, ask the panelists to test whether the samples in each pair are the same or different. In directional difference test, ask them to indicate which sample in the pair has greater or lesser degree of intensity of a specified sensory attribute. In the difference preference test, ask them to indicate, if the pair is different and if different whether the preferred sample is for the specified attribute or overall quality or acceptability.

5.1.1.3 Evaluation card— Use the evaluation cards given in Tables 1A and 1B.

5.1.1.4 Analysis of data

- a) Adopt-sequential procedure for panel selection;
- b) Analyse the data by binominal or multinominal distribution (probability tables) for panel selection, product difference and preference; and
- c) When number of observations exceeds the table value, use X^2 -test or f-test for percentage for product difference or preference.

5.1.2 Duo-Trio Test

5.1.2.1 Field of application— This test, used to detect difference between samples, has an orientation factor through a reference supplied. It is especially used in situations where different products or flavours are tested in the same session for same quality attributes. The test may be used only when the inter-sample carry-over effects are absent or if present, are only slight. This is also used for training and testing of panelists.

5.1.2.2 Procedure— This test involves three samples – two identical and one different. Any one of the samples – the reference or the test may be duplicated. Give first one of the identical samples as known reference and then the other two as coded. Ask the panelists (trained) to pick out the sample in the coded pair matching with the reference sample.

5.1.2.3 Evaluation card— Use the evaluation card given in Table 2.

5.1.2.4 Analysis of data—see 5.1.1.4.

5.1.3 Triangle Test

5.1.3.1 Field of application— This test is used to detect differences between samples as well as for training and testing panelists. Statistically, this test is more efficient than other difference tests. This test is used where inter-sample effects are minimum.

5.1.3.2 Procedure— Present each panelist (trained) with three coded samples – two identical (reference) samples and one test sample. Ask the panelist to indicate which of the three is the odd sample. Obtain a positive answer. Two samples *A* and *B* may be presented in two combinations *AAB* and *BBA* (which may be given in six arrangements *AAB*, *BBA*, *BAA*, *BAB*, *ABB* and *ABA*). In general, it is preferable to give the sample which is stronger in odour or taste as the odd sample.

5.1.3.3 Evaluation card— Use the evaluation card given in Table 3.

5.1.3.4 Analysis of data—see 5.1.1.4.

5.1.4 Ranking Test

5.1.4.1 Field of application— This test is used to rank several samples for identity of a single attribute (intensity ranking) or for preference of overall quality (preference ranking).

5.1.4.2 Procedure— Present each panelist (trained or *D* and *C*) with all samples simultaneously including the un-identified reference sample (if any, as predetermined control) as coded samples. Ask the panelists to rank all samples in the order according to the intensity of the specified attribute. In overall quality analysis, ask the panelists (*D* and *C* or untrained) to rank the coded samples according to their preference.

5.1.4.3 Evaluation card—Use the evaluation card given in Table 4.

5.1.4.4 Analysis of data

- a) For panel agreement, calculate coefficient of concordance. If the number of samples exceeds 7 adopt X^2 -test;
- b) Adopt rank sum analysis for product difference/preference when the number of observations is within 20;
- c) Use X^2 -test for product difference/preference;

- d) Adopt analysis of variance for the ranks converted to normal scores for multiple comparison; and
- e) Adopt Bradley-Terry Method for multiple comparisons when the samples are ranked two by two.

5.2 Rating Tests

These tests are difference tests with a quantitative aspect through direction and degree of judgement using suitable defined scales or scores.

5.2.1 Single Sample (Monadic) Test

5.2.1.1 Field of application— This test is used to test foods that have a pronounced after-effect or flavour carry-over which precludes testing a second sample at the same session. To compare the results of several samples, each sample has to be evaluated singly in different sessions.

5.2.1.2 Procedure— Ask each panelist (trained) to indicate presence or absence and intensity or both of a particular quality attribute on a given sample. Compare the results of two or more samples evaluated at different times.

5.2.1.3 Evaluation card— Use the evaluation card given in Table 5.

5.2.1.4 Analysis of data— Convert the data on intensity to numerical score and analyse by analysis of variance.

5.2.2 Two Stage Triangle Test

5.2.2.1 Field of application — This test is a variation of the triangle test with similar application but additionally measures the direction and degree of difference in a specific quality attribute or measures the preference between the odd and identical samples.

5.2.2.2 Procedure— Present each panelist (trained) with three coded samples - two identical (reference) samples and one test sample. Ask the panelists first to indicate which of the three is odd sample. Obtain a positive answer. Next ask the panelists to indicate the direction of difference between the odd and the identical samples and the degree of difference on a 5-point scale - ‘very slight difference’ (1) to ‘extreme difference’ (5). Instead of direction and degree of difference, ask the panelists to indicate their preference between the odd and identical samples.

5.2.2.3 Evaluation card—Use the evaluation card given in Tables 6A and 6B.

5.2.2.4 Analysis of data— The odd sample identification is analysed by binominal distribution. Discard the data of the panelists whose odd sample identification is incorrect. Treat the difference scores by analysis of variance. If preference data is collected at the second stage, use binominal distribution.

5.2.3 Two Sample Difference (for a Specified Attribute) Test

5.2.3.1 Field of application— This test is a variation of the paired comparison test and additionally measures the direction and degree of difference in a specified quality attribute.

5.2.3.2 Procedure— Serve each panelist (trained or *D* and *C*) four pairs of samples. Each part shall consist of a reference and a test sample. In two pairs the, test sample shall be a duplicate of the reference. In the other two pairs the test sample shall be the test variable. Ask the panelist to evaluate each pair independently for the direction and degree of difference between the test sample and the reference on a scale of ‘no difference’ (0) to ‘extreme difference’ (5).

5.2.3.3 Evaluation card— Use the evaluation card given in Table 7.

5.2.3.4 Analysis of data— Reject the data from the panelists whose score between coded duplicate differs by more than two points. The scores assigned to the coded duplicate reference sample is deducted from the scores assigned to the test samples. Treat the difference scores by analysis of variance.

5.2.4 Multiple Sample Difference (for Quality Attributes) Test

5.2.4.1 Field of application—In this test more than one quality attribute is evaluated per session for direction and degree of difference and for comparing a number of test samples but with reduced reliability.

5.2.4.2 Procedure— Present a reference sample to each panelist (trained or *D* and *C*). Give 3 to 6 coded samples depending upon the number of quality attributes and ask the panelists to compare each one of the samples with the reference. Ask the panelists to test the direction and degree of difference in each quality attributes of each coded sample compared to the reference sample, on a 6 point scale ‘no difference’ (0) to ‘extreme difference’ (5). To test the discriminative ability of panelists duplicate the reference sample as one of the coded samples.

5.2.4.3 Evaluation card— Use the evaluation card given in Table 8.

5.2.4.4 Analysis of data—Reject the data from panelist whose score between two coded duplicates differ by more than two points. Whatever the panelist assigns to the coded duplicate reference sample is subtracted from the score he assigns to the test samples. Treat the difference scores by the analysis of variance.

5.2.5 Hedonic Rating Test

5.2.5.1 Field of application— Hedonic rating is used to measure the degree of pleasurable or unpleasurable experiences with foods. In general this test measures the overall quality of foods and is used in consumer analysis for a new product acceptability and in pilot consumer analysis with *D* and *C* panelists.

Food action (FACT) rating scale is a modified hedonic form having usually a 9 point successive category scale verbally anchored to reflect the action the panelist will take in response to -food. This is used to measure food preferences and is applicable to evaluation of general attitude to the stimulus but not for individual quality attributes.

5.2.5.2 Procedure—Present each panelist (*D* and *C* or untrained) with one or more samples in one session. Ask the panelists to rate the acceptability of each sample on a 7/9-point or food action rating scale (hedonic) (ranging from ‘dislike extremely’ to ‘like extremely’ or ranging from ‘I would eat this if I were forced to’ to ‘I would eat this every opportunity I had’). In testing foods which have pronounced after-effect or flavour carry-over which precludes testing a second sample at the same session, carry out the test with single sample on different days with the same panelists or with different groups of panelists and compare the results.

5.2.5.3 Evaluation card—Use the evaluation card given in Tables 9A and 9B. *Use separate cards for each sample.* When two or more samples are being compared or in consumer preference for different foods, use evaluation card containing two or more columns of the scale as required.

5.2.5.4 Analysis of data

- a) For quick analysis, convert the hedonic or FACT rating to ranks and adopt rank sum or chi-square analysis;
- b) For rigorous analysis, convert the ratings to numerical scores and use analysis of variance.

5.2.6 Facial Hedonic (Smiley) Test

5.2.6.1 Field of application—The facial hedonic test is a type in which faces are used to portray graphically the degree of pleasurable or unpleasurable experience with food acceptability rather than word descriptions. The number of faces range from five to seven. The test is not affected by individual intelligence level, education or ability to communicate.

5.2.6.2 Procedure—Ask each panelist to check the box under the face which describes how he or she feels about the sample. *Use separate card for each sample.*

5.2.6.3 Evaluation card—Use the evaluation card given in Table 10.

5.2.6.4 Analysis of data

- a) For quick analysis convert the facial hedonic scales to ranks and adopt rank sum analysis, and
- b) For rigorous analysis convert to numerical scores and adopt analysis of variance.

5.2.7 Numeral Scoring Test

5.2.7.1 Field of application—This test, usually on a 10-point scale, is designed to evaluate the quality of a set of similar products, new product development, quality maintenance for determining

the contribution coefficients for a composite scoring scale. This test is also used for assessing the consistency of and between the panelists during training and evaluation.

5.2.7.2 Procedure— Train the panelists to follow the sensory attributes corresponding to the agreed quality and grade description and scores. Present each panelist (trained) with one or more samples in random order or on the basis of a statistical design. Ask the panelists to evaluate each sample on a 10 point uniform scale for one or more quality attributes. Use different score cards for each attribute when the score for one attribute is likely to affect the score of others. Use separate card for overall quality.

5.2.7.3 Evaluation card— Use the evaluation card given in Tables 11A and 11B.

5.2.7.4 Analysis of data

- a) Adopt *t*-test to compare two samples,
- b) Adopt Dunnett’s test for comparison of samples against a predetermined control,
- c) Adopt range method for multiple comparison, and
- d) Adopt Duncan’s Multiple Range Test for multiple comparison.

5.2.8 Composite Scoring Test

5.2.8.1 Field of application— This test is used for product comparison and overall quality grading by a trained panel following the weighted score scheme for quality attributes prepared for each product type.

5.2.8.2 Procedure—Provide a weighted rating scale for individual quality attributes based on their relative importance contributing to overall quality of the product. Train the panelists in use of this weighted scoring scheme by following a quality description and grading of the product. Present the panelists one to four samples individually. Ask the panelists to evaluate each sample and to rate individual quality attributes on a weighted scale which they are trained to use. Compound the scores assigned for individual quality attributes by any one panelist and the composite score indicates the overall quality on a maximum of 100 points.

5.2.8.3 Evaluation card— Use the evaluation card given in Table 12.

5.2.8.4 Analysis of data—see 5.2.7.4.

5.3 Sensitivity Tests

These tests measure the ability of the individuals to smell, taste or feel specific characteristics in food or beverage. They are used most frequently in selecting panel members for evaluation in product research and development; these tests are most frequently used in selecting panel members.

5.3.1 Threshold Tests

5.3.1.1 Field of application— Threshold tests with basic tastes and odours are employed for panel selection. These tests are used where minimum detectable difference, known as ‘just noticeable difference’(jnd) of an additive or of an off-flavour is to be established by trained-panel. For selection of a reasonably homogeneous panel, the data from homogeneous panel is used in product evaluation.

5.3.1.2 Procedure— Give each panelist (trained or untrained) in increasing concentration of the taste or odour substances in a series. One or two blanks are introduced in the beginning of the series. Ask the panelists to test all the samples one by one in the given order and record if the sample is like water or different from water. When taste/odour is clearly recognized ask him to evaluate the remaining samples for their degree of intensity of the flavour. Inform the panelists that the series is in increasing intensity and retesting is prohibited.

5.3.1.3 Evaluation card— Use the evaluation card given in Table 13A.

5.3.1.4 Analysis of data— The identification threshold concentrations (sensitivity of individual panelists) and just noticeable difference values are found from the panel data. The data from the homogeneous panel is used for product evaluation by finding arithmetic or geometric mean according to concentration series given.

5.3.2 Dilution Test

5.3.2.1 Field of application — The dilution test is devised to establish intensity of sensory responses of a food or food components. The test establishes the smallest amount of an unknown that can be detected when it is mixed with a diluent or standard material, for instance, margarine in butter. Sensitivity and reproducibility of the test depends on the screening and training of panel member in respect of identification and intensity differences of flavour with suitable standard. This test is used effectively in determining quality of dried whole milk, dried egg powders, perfume, spices, etc.

5.3.2.2 Procedure— Select a suitable reference. Establish an upper limit of the concentration of test substance(s) in a mixture for the series, that is, the highest concentration which is reasonably to be subjected to formal testing. Decide on a lower limit of concentration for the series such that it is very unlikely that any panelist will be able to detect a difference between it and the reference reliably. Define a series of concentrations including those which represent the upper and lower limits. Usually six are enough, although eight may be used if greater precision is desired. A log series is more efficient in most cases, although a series based on arithmetic progression may be used. Test the series of concentrations against the reference using the threshold tests or difference tests. Obtain 15 to 20 judgements for each member of the series.

5.3.2.3 Evaluation card— Use the evaluation card given in Table 13B.

5.3.2.4 Analysis of data— Find the arithmetic or geometric mean for the group and express as dilution number or dilution index which is defined as the percentage or ratio of the test substance into one mixture, when the substance is just identifiable. When expressing it as single mean value is not satisfactory, give it as one or two sigma range.

5.4 Descriptive Tests

These tests identify the perceptual characteristics of a product and define them with suitable descriptive terminology to determine their relative intensities. They record the impact of all quality attributes in a total perspective but not the single attribute judgement with precision for statistical analysis.

5.4.1 Quality Attribute and Description Check List— This is an exploratory method used to develop information for attributes of product that may be important to the consumers. This is done through round table discussion. The overall quality of product is broken down to recognizable parts and appropriate verbal description developed to enable qualitative and semi quantitative variations between products to be evaluated. Flavour profile and texture profile methods are further developments in this line.

5.4.2 Flavour Profile Test

5.4.2.1 Field of application — This test is used to describe the aroma and flavour characteristics of food products. It may be used in its entirety to provide a complete description of a sample-or to show differences among a group of samples; also it may be used to identify the specific note, such as off-flavour, or to show changes in intensity of a particular quality.

5.4.2.2 Description— With suitable training of panelists, the flavor profile method may be developed into a qualitative and semi-quantitative method -describing the flavour complex by the following:

- a) Character notes – aroma, taste, mouthfeel described in qualitative and associative terms;
- b) Intensity – rated on a scale of anchored points, for example, slight, moderate and strong;
- c) Order of appearance -time sequence in which the aroma components are detected;
- d) After-taste – sensory impression left in the mouth after removal of stimulus from mouth; and
- e) Amplitude – initial overall intensity impression of the different factors, reflecting the degree of blending, quality of individual factors detected, appropriateness of the observed factors and the fullness of the product.

5.4.2.3 Procedure — A frame of reference shall be developed by examining representative samples of the product type. The panel leader shall arrange for the orientation and formal panel sessions and the open panel session to sort out problems of semantics and disputed points and shall interpret- the panel results to the others in a meaningful way. Panel members shall be carefully

selected and rigorously trained before these methods are used. One or more samples shall be evaluated at several test sessions. Reference samples shall be used for clarification of description and intensity of flavour attributes. The records shall be made on agreed profile pattern for each product. Each session shall be followed by around table discussion.

5.4.3 Texture Profile Test

5.4.3.1 Field of application—This is used to describe the texture -sensory manifestation of structure or inner make up of foods, comprising popular concepts of texture, body, and consistency- of foods. In its entirety, the texture profile like flavour profile provides a descriptive analysis of the texture complex in terms of its component parts or to show differences among samples qualitatively or quantitatively in one or more component parts.

5.4.3.2 Description— The texture profile test determines the texture complex of a food in terms of its mechanical (related to reaction of foods to stress); geometrical (related to size, shape and arrangements of particle within foods); and other characteristics related to fat and moisture content. The degree or intensity of each present and the order of appearance from first bite through complete mastication is also determined.

In the order of appearance, texture characteristics follow a definite pattern:

a)	Initial (Perceived on first bite)	1. Mechanical - hardness, viscosity, fracturability. 2. Geometrical - depending on product structure.
b)	Masticatory (Perceived during Chewing)	1. Mechanical - gumminess, chewiness, adhesiveness. 2. Geometrical - depending on product structure.
c)	Residual (Changes perceived during mastication)	1. Rate of break-down. 2. Type of break-down. 3. Moisture absorption. 4. Mouth coating.

The evaluation of the mechanical characteristics is qualitative and could be quantified by the use of selected reference samples representing a point on a standard scale. Standard rating scales are devised for each of the mechanical characteristics, such as hardness, fracturability, viscosity, gumminess, chewiness and adhesiveness by selection of foods from major brands with good quality control, requiring minimum preparations and having good shelf-life. The food samples are standardized with respect to size, temperature, preparation for use as standards in tests for stabilizing the scale points.

The standard rating scales and reference standards also provide a method for correlating sensory and instrumental evaluations of texture. The exact technique for evaluating each of these characteristics needs to be standardized with an understanding of the force involved and is learned during training with the use of the standards. Strict observance of the agreed technique is followed during evaluation of product.

Geometrical characteristics are evaluated qualitatively as gritty, grainy or coarse relating to shape of particles and as fibrous, cellular and crystalline relating to shape and orientation. Selected food items are used as examples for the different characteristics. Semi-quantitative evaluations of the amount or intensity could also be done.

Residual characteristics are related to perception of moisture and fat content of a food. The effects vary in different foods and evaluations are to be standardized for product types.

5.4.3.3 Procedure — The panel leader shall arrange for the orientation and formal sessions and the open panel sessions to sort out problems of uniform understanding of definitions and procedures, resolve disagreements and arrive at an average rating. The panel leader should also be responsible for selecting and maintaining reference standards. The evaluation should be individually on an agreed pattern and procedure and the results should be finalized in a round table discussion.

Select the panel carefully and train them in definitions, the texture classification system, the evaluation procedure for each characteristic, an appreciation of reference standards in relation to the scale. In practice sessions several products should be used with varying make up of textural characteristics and components for orientation as to quality and magnitude and to establish standard procedures with respect to the product under test.

**Table 1A Specimen Evaluation Card for Paired Comparison
Test (Simple Difference)
(Clause 5.1.1.3)**

Name _____

Date _____

Product _____

Time _____

You are given several pairs of samples

Evaluate the two samples in the pair for difference in* _____

Indicate your judgement by crossing out words not applicable.

PAIR NO.	CODE NO. OF PAIRS		YOUR JUDGEMENT
1			Different/Not different
2	_____	_____	Different/Not different
3	_____	_____	Different/Not different
4	_____	_____	Different/Not different

*The panel organizer should indicate quality attributes to be evaluated.

Signature

**Table 1B Specimen Evaluation Card for Paired Comparison
Directional Difference/Preference)**
(Clause 5.1.1.3)

Name _____ Date _____

Product _____ Time _____

You are given several pairs of samples.

Evaluate the two samples in the pair for difference in* _____

Indicate your judgement by crossing out words not applicable.

If different, indicate the Code No. of the sample which is more* _____ /preferred.

Pair No.	Code No. of Pairs	Your Judgement	If Sample in a Pair are Different, Code No. of Sample Which is More* ____/Preferred
1		Different/Not different	
2	_____	Different/Not different	_____
3	_____	Different/Not different	_____
4	_____	Different/Not different	_____
	_____		_____

*The panel organizer should indicate quality attributes to be evaluated.

Signature

Table 2 Specimen Evaluation Card for Duo-Trio Test
(Clause 5.1.2.3)

Name _____

Date _____

Product _____

Time _____

The first sample ' R ' is the reference sample.

Test it carefully.

From the pair of coded samples next given, judge which sample is the same as 'R'.

Pair No.	Code No. of Pairs		Code No. of Sample Matching With ' R '
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____

Signature



Table 3 Specimen Evaluation Card for Triangle Test
(Clause 5.1.3.3)

Name _____

Date _____

Product _____

Time _____

Two of the three samples are identical.

Determine the odd sample.

Pair No.	Code No. of Sample	Code No. of Sample	Code No. of Sample
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____

Signature

Table 4 Specimen Evaluation Card for Ranking Test

(Clause 5.1.4.3)

Name _____

Date _____

Product _____

Time _____

Please rank the samples in numerical order according to intensity of quality attribute under test of the product or your preference.

Intensity/Ranking Preference

Code No. of Sample

FIRST

SECOND

THIRD

FOURTH

Signature

Table 5 Specimen Evaluation Card for Single Sample (Monadic) Test
(Clause 5.2.1.3)

Name _____

Date _____

Product _____

Time _____

Please sniff and taste the sample carefully.

Can you detect off-flavour in the product?

Circle one

Yes

No

If you detect off-flavour; please describe it below by checking appropriate boxes for any of the intensity and characteristics.

INTENSITY

OFF-FLAVOURIS DUE TO

None

Off-odour

Trace

Off-taste

Small

Residual taste

Moderate

Other defects

Strong

Signature

Table 6A Specimen Evaluation Card for Two Stage Triangle Test (Preference Between Odd and Identical Samples)

(Clause 5.2.2.3)

Name _____

Date _____

You receive three samples in each-set, two of them are identical.

Check the odd sample for difference only.

The odd samples differs in* _____

Specify whether you prefer odd sample or the identical.

Experiment No.	Code No. of the Samples	Code No. of Odd Samples	Your Preference
1	_____	_____	Odd/Identical
2	_____	_____	Odd/Identical
3	_____	_____	Odd/Identical
4	_____	_____	Odd/Identical

*Specify the quality of attributes.

delete inappropriate words.

Signature

Table 6B Specimen Evaluation Card for Two Stage Triangle Test (Degree and Direction of Odd and Identical Samples)

(Clause 5.2.2.3)

Name _____

Date _____

Product _____

Time _____

You receive three samples for evaluation.

Two of them are identical.

Check the odd sample for difference only.

The odd sample differs in* _____.

Determine the direction and degree of difference of the odd sample compared to the identical samples on the following scale:

Direction of Difference	Degree of Difference	Score
Odd superior to	Very slight difference	1
Odd superior to	Slight difference	2
	Moderate difference	3
	Large difference	4
	Extremely large difference	5

Experiment No.	Code No. of The Samples	Code No. of Odd Samples	Direction	Degree
1	_____	_____	_____	_____
2	_____	_____	_____	_____
3	_____	_____	_____	_____
4	_____	_____	_____	_____
5	_____	_____	_____	_____

*Specify the quality attribute.

Signature

Table 7 Specimen Evaluation Card for Two Sample Difference Test

(Clause 5.2.3.3)

Name_____

Date_____

Product_____

Time_____

You receive four pairs of samples.

The first sample in each pair is ‘reference sample’.

Determine the direction and degree to the second sample on the following scale for each pair;

Direction of Difference		Direction Of Difference	Score
Superior to reference (S)		No difference	1
Equal to reference (E)		Very slight difference	2
Inferior to reference (I)		Slight difference	3
		Large difference	4
		Extremely large difference	5

PAIR No.	CODE No. OF PAIRS	JUDGEMENT	DIRECTION	DEGREE (SCORE)	DIFFERENCE IS DUE TO*
1	_____	Different/Not different	_____	_____	_____
2	_____	Different/Not different	_____	_____	_____
3	_____	Different/Not different	_____	_____	_____
4	_____	Different/Not different	_____	_____	_____

NOTE – If there is no difference there is no direction or degree.

*Mention odour, taste, texture, etc.

Signature

Table 8 Specimen Evaluation Card for Multiple Sample Difference Test for Quality Attributes
(Clause 5.2.4.3)

Name_____

Date_____

Product_____

Time_____

You are given a reference sample (R),

Test it carefully for the quality attribute to be evaluated

You are next given a number of samples which are to be compared with ‘ R ’ for* _____.

The test sample may or may not be different from ‘R’.

Rate direction and degree of difference in each sample according to following scale:

Direction of Difference	Direction of Difference	Score
Superior to reference (S)	No difference	0
Equal to reference (E)	Very slight difference	1
Inferior to reference (I)	Slight difference	2
	Moderate difference	3
	Large difference	4
	Extremely large difference	5

SAMPLE CODE No.	ODOUR		TASTE		TEXTURE	
	Direction	Degree	Direction	Degree	Direction	Degree
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

*Mention odour, taste, texture, etc.

Signature

Table 9A Specimen Evaluation Card for Hedonic Rating Test
(Clause 5.2.5.3)

Name _____

Date _____

Product _____

Time _____

Test this sample and check appropriate box how much you like or dislike.

Use the appropriate scale to show your attitude by checking at the point that best describes your feeling about the sample

Please give your reason for this attitude.

Remember you are the only one who can tell what you like.

An honest expression of your personal feeling will help us.

CODE No. _____

Like extremely

Like very much

Like moderately

Like slightly

Neither like nor dislike

Dislike slightly

Dislike moderately

Dislike very much

Dislike extremely

Comments.

Signature

Table 9B Specimen Evaluation Card for Food Action Rating Scale
(Clause 5.2.5.3)

Name _____

Date _____

Product _____

Time _____

Indicate in appropriate box which of nine statements on the following scale best represent your attitude towards the product

CODE No. _____

I would eat this every opportunity I had	<input type="checkbox"/>
I would eat this very often	<input type="checkbox"/>
I would frequently eat this	<input type="checkbox"/>
I like this and would eat it now and then	<input type="checkbox"/>
I would eat this if available but would not go out of my way	<input type="checkbox"/>
I don't like it would eat it on an occasion	<input type="checkbox"/>
I would hardly ever eat this	<input type="checkbox"/>
I would eat this only if there were no other food choices	<input type="checkbox"/>
I would eat this only if I were forced to	<input type="checkbox"/>

Comments.

NOTE - The word ' eat ' may be replaced by ' drink ', ' buy ' or ' use '.

Signature

Table 10 Specimen Evaluation Card for Facial Hedonic (Smiley Test)

(Clause 5.2.6.3)

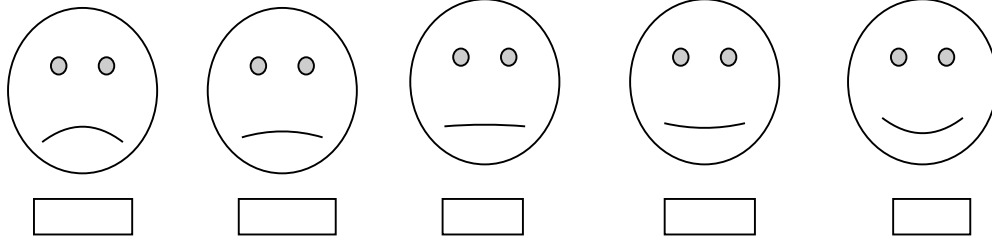
Name _____

Date _____

Product _____

Time _____

Please check the box under the figure which best describes how you feel about this product.



Signature

Table 11A Specimen Evaluation Card for Numerical Scoring Test for Quality Attributes
(Clause 5.2.7.3)

Name _____

Date _____

Product _____

Time _____

Please rate these samples for quality attributes according to the following grade descriptions and scoring:

QUALITY GRADE DESCRIPTION	SCORE
Excellent	9-10
Good	6-8
Fair	4-5
Poor	1-3

Code No. of Sample	Colour	Appearance	Texture	Taste	Odour
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Signature

Table 11B Specimen Evaluation Card for Numerical Scoring for Overall Quality
(Clause 5.2.7.3)

Name _____

Date _____

Product _____

Time _____

Please rate the Sample for overall quality according to the following grade description and scoring:

QUALITY GRADE DESCRIPTION	SCORE
Excellent	9-10
Good	6-8
Fair	4-5
Poor	1-3

Code No.	Colour	Appearance	Texture	Taste	Odour	Overall Quality
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Signature

Table 12 Specimen Evaluation Card for Composite Scoring Test
(Clauses 5.2.8.3)

Name_____

Date_____

Product*_____

Time_____

Assign scores for each sample for various characteristics.

Quality Attribute	Maximum Score	Code No. of Samples			
Colour	20	_____	_____	_____	_____
Consistency	20	_____	_____	_____	_____
Flavour	40	_____	_____	_____	_____
Absence of defects	20	_____	_____	_____	_____
Total score	100	_____	_____	_____	_____

comments

*The weighted rating is a typical score applicable to arrange marmalades. For other products similar scales have to be worked out.

Signature

Table 13A Specimen Evaluation Card for Threshold Test
(Clause 5.3.1.3)

Name _____ Date _____

Product _____ Time _____

You receive a series of samples with increasing concentrations of one of the 4 taste qualities (sweet, salty, sour, bitter)*.

Start with sample No. 1 and continue with sample No. 2, No. 3, etc.

Retesting of already tested solutions is not allowed.

Describes the taste and the feeling factors and give intensity scores.

Use the following intensity scale:

- 0 = None or pure water taste
- ? = Different from water, but taste quality not identifiable
- X = Threshold very weak (identify the taste)
- 1 = Weak
- 2 = Medium
- 3 = Strong
- 4 = Very strong
- 5 = Extremely strong

SAMPLE No.	DESCRIPTION OF TASTE AND FEELING FACTORS
------------	---

1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
9	_____
10	_____
11	_____
12	_____

*To be modified for odour analysis.

Signature

Table 13B Specimen Evaluation Card for Dilution Test
(Clause 5.3.2.3)

Name _____ Date _____

Product _____ Time _____

You receive a series of samples for evaluation.

The first sample 'R' is the reference sample.

Start with sample 'R' and continue with sample No.1, 2, 3, etc.

Retesting of already tested solutions is not allowed.

Evaluate the given samples, identify the taste*, if any, and assign appropriate indicator in the parentheses using the following intensity scale:

0 – No taste (similar to 'R')

? – Some taste (different from 'R'), but not identifiable

X – Weak taste (Identify the taste)

R	1	2	3	4	5	6	7	8
()	()	()	()	()	()	()	()	()

Name/Description of the weak taste:

Signature

*To be modified for aroma/odour analysis.

ANNEX A

(Clauses foreword and 5)

SUMMARY OF SENSORY TEST METHODS

Method (Clause No.)	Panelists		No. of Sample Per Test	Table No. for Evaluati on Card	Statistica l Analysis of Data	Field of Application
	Type	Number				
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Difference Tests (Qualitative)</i>						
A Paired Compariso n test (5.1.1)	Trained	5-12	2	1	See5.1.1.4	Finding simple difference, directional difference, and testing and training panelists. Preference testing and consumer analysis.
	Untraine d	72-80				
B Duo-trio test (5.1.2)	Trained	5-12	3 (2 identical 1. different)	2	See5.1.1.4	Detecting difference when carry-over after- taste if present is only slight. Also for training and testing panels.
C Triangle Test (5.1.3)	Trained	5-12	3	3	See5.1.1.4	Detecting differences when inter-sample effects (aftertaste, etc) are minimum. Also for training and testing panels.

D Ranking Test (5.1.4)	Trained <i>D</i> and <i>C</i> Untrained	5-12 10-25 72-80	2-7	4	See 5.1.1.4	Determining preference and process improvement; selection of best sample. Pilot consumer analysis. Consumer preference analysis.
II Rating tests (Difference test) (Quantitative test)						
A Single sample test (5.2.1)	Trained	5-12	1	5	Analysis of variance	Detecting difference from normal product, off-flavour, off-taste and direction when after-taste and carry-over are present.
B Two stage triangle test (5.2.2)	Trained	5-12	1-4sets	6	see 5.2.2.4	Difference between samples in direction and in degree in specified characteristic.
C Two sample difference (for quality attribute) test (5.2.3)	Trained	5-12	4 pairs and control	7	Analysis of variance	Difference between samples, quantitatively and directionally in a specified characteristic.
D Multiple sample difference (for specified attributes) test (5.2.4)	Trained <i>D</i> and <i>C</i> Untrained	5-12 10-25 72-80	3-6 - 1-4	 8	Analysis of Variance or Rank Analysis	Comparing samples with more than one variable in the same session (reduced reliability) Consumer analysis for preference
E Hedonic rating test (5.2.5)	<i>D</i> and <i>C</i> Untrained	10-25 72-80	1-10 1-4	9 9	See 5.2.5.4	Pilot consumer analysis for screening by reference. consumer analysis for preference
F Facial hedonic test (5.2.6)	Untrained	72-80	1-5	10	Analysis of Variance	consumer analysis for preference

G Numerical scoring (5.2.7)	Trained	5-12	1-10	11	See 5.2.7.4	Screening of quality, new product development maintenance, workout quality, contribution coefficients for composite scoring also to test the consistency of and among panelists during training and evaluation.
Composite scoring test (5.2.8)	Trained	5-12	1-4	12	See 5.2.3.4	Comparing several products of same type overall quality grading.
III Sensitivity Tests						
A Threshold tests (5.3.1)	Untrained		5-10	13	See 5.3.1.4	Selecting panel members for evaluation of ingredients, packaging material and maintaining quality.
B Dilution test (5.3.2)	Trained		5-12	-	See 5.3.2.4	Odour and flavor evaluation of foods; ingredients; product development; quality control. Specially useful for spices.
IV Descriptive Tests						
A Flavour profile test (5.4.2)	Trained	3-6	1-5	-	-	Sample characteristics expressed in common terms, sequence, intensity expressed on agreed scale. Used in new product development; product improvement and storage studies.

B Texture profile test (5.4.3)	Trained	3-6	1-5	-	-	Texture evaluation of foods used in new product development, product improvement and storage studies.
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