SLOVENSKI STANDARD
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Papir, karton in lepenka v stiku z živili - Umerjanje za preskus neprimernega vonja ali okusa - 2. del: Maščobna živila

Paper and board intended to come into contact with foodstuffs - Calibration of the off flavour test - Part 2: Fatty food

Papier und Pappe vorgesehen für den Kontakt mit Lebensmitteln - Kalibrierung für die Geschmacksprüfung - Teil 2: Fettende Lebensmittel

Papiers et cartons destinés en entrer en contact avec les denrées alimentaires - Étalonnage des essais de flaveur atypique - Partie 2 : Aliments gras

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This Technical Report was approved by CEN on 13 August 2007. It has been drawn up by the Technical Committee CEN/TC 172.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (CEN/TR 15645-2:2008) has been prepared by Technical Committee CEN/TC 172 “Pulp, paper and board”, the secretariat of which is held by DIN.

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Introduction

Paper and board, intended to be in contact with food, may have characteristic off-flavours that can migrate via airspace to the food packed in it. The purpose of testing the off-flavour of food in contact with paper and board is to establish whether the material to be tested possesses an inherent off-flavour when kept at room temperature.

In order to gain reliable results from the sensory evaluation, the performance of a sensory panel assessing the off-flavour within test material needs to be validated. This can be implemented through a training procedure by using spiked calibration samples prepared according to the given instructions.

This document consists of:

— protocol to prepare the calibration samples (spiked coconut fat) for sensory evaluation of off-flavour;

— description of the training procedure for a sensory panel in the use of the calibration samples;

— instructions for sensory evaluation of calibration samples before and after training.

This guide is meant to be used in connection with the European Standard EN 1230-2. The guidance given in this document is only a recommendation. Please note that the calibration samples in which preparation is described, can be applied also other ways than described in this document.

This guide has been devised and collaboratively tested in the context of the EU research project CALIBSENSORY (Growth programme, Measurement and Testing activity, GRD2-2000-30015) and it is the sole responsibility of its authors. It does in no way represent the views of the Commission or its services. Published results of the project are available at http://www1.kcl.fi/euproj/calib.html .

1 Scope

This Technical Report specifies a written protocol to prepare calibration samples for assessing off-flavour (given by benzaldehyde) in a test substance representative of fatty food products (coconut oil). Essentially, this is meant to simulate the transfer of off-flavours from paper and board to a fatty food product.

This Technical Report also specifies how to train the panel in the use of the calibration samples.

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 6658, *Sensory analysis – Methodology – General guidance*

ISO 8586-1, *Sensory analysis – General guidance for the selection, training and monitoring of assessors – Part1: Selected assessors*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
assessor
any person taking part in a sensory test

[see ISO 5492:1992]

3.2
calibration procedure
protocol of calibration samples and written instructions to train selected assessors with calibration samples i.e. calibrate the panel

3.3
control sample
a hidden reference sample served blind coded to the assessors among the calibration samples, and prepared according the procedure of the calibration samples but without the spiking compound

3.4
flavour
complex combination of the olfactory, gustatory and trigeminal sensations perceived during tasting

NOTE The flavour may be influenced by tactile, thermal, painful and/or kinaesthesic effects

[see ISO 5492:1992]

3.5
multicomparison test
test where the assessor is asked to give a rating of the intensity of the difference in taste between test portions for analysis and a known reference sample

3.6
off-flavour
a typical flavour often associated with deterioration or transformation of the product

[see ISO 5492:1992]

3.7
reference sample
calibration sample without any spiking compound, i.e. pure coconut oil

NOTE This is presented to the assessors labelled as "Reference" and served to the assessors before the calibration samples.

3.8
selected assessor
assessor chosen for his/her ability to perform a sensory test

[see ISO 5492:1992]

3.9
spiking compound
a volatile chemical compound having a specific flavour

NOTE In this case benzaldehyde is the selected spiking compound

3.10
spiking method
a method for spiking the test substance with spiking compounds

3.11
taint
taste or odour foreign to the product

[see ISO 5492:1992]

3.12
taste
sensations perceived by the taste organ when stimulated by certain soluble substances

[see ISO 5492]

NOTE For simplicity, taste and flavour are used as synonyms in the European standard 1230-2, though this is not exactly in accordance with ISO 5492. The same regards taint and off-flavour.

3.13
test portion
portion of the test sample, which is directly tested by the assessor

[see ISO 5492:1992]

3.14
test substance
substance to be assessed by the assessor

NOTE It may be the food product intended to be packed, or a suitable simulant that may absorb compounds from the packaging materials. In this case coconut oil is the selected test substance.

4 Principle

A validation of the training process has to be conducted with calibration samples. The calibration samples have to be prepared by spiking the test substance (coconut oil) with direct addition of the spiking compound (benzaldehyde) followed by dilution in pure coconut oil until required concentrations are reached. From these calibration samples, test portions have to be made and evaluated by the panel. The panel performance in evaluating the off-flavour intensity is determined before and after a formal training step. The effectiveness of training can then be determined.

The test procedure consists of 3 steps:

a) first step: assessment of calibration samples before training;

b) second step: training procedure;

c) third step: assessment of calibration samples after training.

Detailed instructions for general test procedure, sample preparation and sensory evaluation are provided within this Technical Report, and must be carefully followed to ensure validity of results.

5 Materials an reagents

5.1 General

Coconut oil is the test substance used to absorb different concentrations of the spiking compound diluted with itself (coconut oil). In this Technical Report, benzaldehyde shall be used as the spiking compound.

Every substance and reagent shall be certified for use in foodstuffs in accordance with European Standards.

5.2 Test substance

Coconut oil obtained from coconut followed by purification and deodorisation is used as the test food. Specifications for the coconut oil are presented in Annex A.

5.3 Spiking compound

Benzaldehyde for food purpose with purity of $\geq$ 99%. Benzaldehyde is a flavouring. Risk assessments have been carried out on the levels within the samples, and the results ensure the safety of participants.

6 Equipment

6.1 General

All equipment used shall be free from odour and only in use for sensory analysis (see ISO 6658). Minimum-odour cleaning agents for cleaning and left to dry at room temperature shall be used. Any glassware used shall be washed with minimum-odour cleaning agents and dried by placement in oven at a temperature >100 °C and left to evaporate for at least 2 h.

6.2 Aluminium foil

Aluminium foil used for wrapping shall be free from odour and introduce no off-taste into the test food. (i.e. the foil shall not be varnished or coated).

6.3 Petri dishes

At least 5 Petri dishes are required, preferably with a diameter of approximately 200 mm made of glass and equipped with lid. The dishes should be used for storing the test portions.

6.4 Plates for serving the test portions

The test portions should be served to the assessors using glassware, or plates that do not alter the sensory characteristics of the test portions. Example of proper equipment: glass plates, small Petri dishes or plates made of polystyrene.

6.5 Plastic spoons or plastic toothpicks

Assessors should use plastic spoons or plastic toothpicks to evaluate test portions.

6.6 Glass flasks

Glass flask, 500 ml, equipped with ground glass cap has to be used for melting coconut oil (50 ^{o}C).

Glass flasks, 100 ml, equipped with effective sealing (e.g. screw cap) have to be used for preparation and storage of spiked coconut oil.

6.7 Moulds for preparation of test portions

Moulds made of inert plastic intended for preparing test portions (see an example in Figure 1).

6.8 Other laboratory equipment

— balance suitable for weighing the test portions (approximately 0,3 g);

— freezer (< -18 °C) for solidifying and storing test portions;

— refrigerator (< 8 °C) for cooling Petri dishes;

— oven (50 °C) to melt the calibration samples.

7 Preparation of calibration samples

7.1 General

After preparation the calibration samples may be stored in glass bottles for up to four weeks at room temperature or in a refrigerator. During a period of four weeks there is no significant (5 %) decrease in benzaldehyde concentration and no significant (5 %) sensory difference neither when stored at room temperature nor when stored in refrigerator.

NOTE 5 % comes from the statistical tables to evaluate the results.

In general, six samples are needed to be prepared. These are summarised, along with their concentrations of benzaldehyde, in Table 1.

During the assessment sessions (first and third step), all six calibration samples are needed to be prepared. During the training session (second step), only four of the samples are needed to be prepared (reference, C1, C2 and C4). This will impact on the amount of test portions that is needed to be prepared.

Table 1 — Samples and their concentrations of benzaldehyde (ppm = µg benzaldehyde/g coconut oil sample)

sample	**benzaldehyde concentration,** ppm	**first step**	**second step**	**third step**
reference	0	x	x	x
C0 (control sample)	0	x		x
C1	10	x	x	x
C2	40	x	x	x
C3	160	x		x
C4	660	x	x	x

7.2 Preparation of the calibration samples

To prepare each desired calibration sample, the following scheme has to be followed:

1) Melt the pure coconut oil in a glass bottle, 500 ml, at 50 °C (oven);

2) Prepare the calibration samples using the following procedure:

— add 30 g to 40 g melted coconut oil into an empty glass bottle, 100 ml, on a balance (0,01 g).

— move the bottle to a precision balance (0,1 mg) and tare off the weight to zero.

— add ***W*** g of solution ***S***.

— move the bottle back to the first balance (0,01 g).

— add melted coconut oil up to 100,0 g achieving the calibration sample ***c***.

— seal the bottle and homogenise by handshaking.

In this way, prepare sequentially the calibration samples C4, C3, C2 and C1:

Table 2 — Preparation of calibration samples

W g	Solution ***S***	calibration sample ***c***
6,7[a)]	benzaldehyde	Stock solution
1,0	stock solution	C4
24,3	C4	C3
25,0	C3	C2
25,0	C2	C1
[a)]provided that the purity is assumed to be 99 %.		

7.3 Preparation of test portions from a calibration sample

7.3.1 General

Prepare the test portions from calibration samples using the moulds.

For preparing test portions, the following procedure shall be applied.

7.3.2 Take the glass flask containing the actual calibration sample out of the refrigerator and gently heat it until the content has melted (use an oven maximum temperature of 50 °C for approximately 45 min in the case of a filled up flask). Keep the cap tightly screwed.

7.3.3 Take the sealed glass flask out of the oven, carefully mix the melted oil by gently turning the flask upside down two to three times and let it stand at room temperature for 5 min to 10 min.

7.3.4 Unscrew the cap and gently pour melted calibration sample into the holes of the mould (see Figure 1). Hold the edge of the flask in contact with the mould. Do not overfill but see to it that all holes are filled up (approximately 15 ml will be used).