SLOVENSKI STANDARD
SIST-TS CEN/TS 15465:2008

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Ģito in proizvodi iz ģita - Pģeniļ na moka durum (T. durum Desf.) - Sploģne smernice za doloļ anje barve zdroba z instrumentalnimi metodami

Cereals and cereal products - Durum wheat (T. durum Desf.) - General guidelines for instrumental methods measurement of semolina colour

Getreide und Getreideerzeugnisse - Hartweizen (T.durum Desf.) - Allgemeine Leitlinien für die Messung der Grießfarbe mit instrumentellen Verfahren

Céréales et produits céréaliers - Blé dur (T. durum Desf.) - Lignes directrices pour la mesure de la couleur des semoules par des méthodes instrumentales

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English Version

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Foreword

This document (CEN/TS 15465:2008) has been prepared by Technical Committee CEN/TC 338 “Cereals and cereal products”, the secretariat of which is held by AFNOR.

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Introduction

The colour measurement of a milled product like semolina is an important characteristic for its end use; it is the ability of a durum wheat or a semolina to give a coloured final product. The indirect measurement of potential colour of semolina by chemical determination of carotenoid pigments (see EN ISO 11052) is not the same colour perceived by the human eye. The instrumental measure of yellow index and lightness allows to obtain a better evaluation of colour.

1 Scope

This standard defines general guidelines for the instruments used to determine colorimetric characteristics of semolina samples in the dry or wet form.

2 Terms and definitions

2.1
colour of semolina
result of measurement performed by using a spectrocolorimeter or colorimeter in the conditions indicated in this European Standard

2.2
colour space
expression of the colour of an object or of a light source by some parameters expressed by figures

NOTE Among the different systems, two are considered here:

a) the tri-stimulus values x, y, z: which are at basis of existing colour space of CIE (Commission Internationale de l'Eclairage - International Commission on Illumination). These values reproduce the theory of colour perception by the human eye based on three components.

b) the colour space CIELAB (1976) : this system is the most used for measuring the colour of objects.
L* indicates the lightness and extend from 0 (black) to 100 (white);
a* and b* are chromaticity indexes, respectively:
- +a* towards red and – a* towards green;
- +b* towards yellow and – b* towards blue/

2.3
illuminants
light source characterized by a spectral curve, whose energy relative distribution is defined in the field of wavelengths which are able to influence the object colour vision

NOTE The illuminants normalized by the CIE [1], are the following:

a) Illuminant A: representing the light emitted by the integral radiator at the absolute temperature of 2856 K (approximately);

b) Illuminant B: representing the direct light of sun of a proximal colour temperature similar to 4874 K;

c) Illuminant C: representing a medium day-light with a proximal colour temperature similar to 6774 K;

d) Illuminant D65: representing one of the relative spectral distribution of the day-light energy which corresponds to a proximal colour temperature similar to 6504 K;

It is recommended for obtaining the results to select colour space CIE LAB and illuminant D65.

3 Apparatus

3.1 General

There are two different types of instruments: spectrocolorimeters and filter colorimeters.

NOTE The word "colorimeter" is also a generic appellation which can be applied to any colour measuring instrument based on any principle.

3.2 Spectrocolorimeters

Spectrocolorimeters enable the measuring of the luminance spectral factor, of reflection or transmission, and the determination of the colorimetric characteristics. They provide, in function of wavelength, the properties of reflection or transmission of considered materials. A dispersive device position related to the sample defines two lighting ways:

- lighting by monochromatic light (monochromator placed between source and sample);
- lighting by polychromatic light (monochromator placed between sample and detector).

3.3 Colorimeters

The filter colorimeters, as indicated by the name, use some appropriate filters, generally three, whose spectral transmission band covers a great part of the visible domain. These filters are determined by the manufacturer to obtain a measuring result corresponding to that which should be obtained if the object was lighted by the light source specified.

4 Procedure for sample preparation

4.1 General

4.1.1 Introduction

Colorimetric measurements are very sensitive to semolina granulometry and to the instrument used. The preparation protocol shall be clearly defined and controlled.

4.1.2 Dry semolina

Before the analysis, the samples shall be homogenised.

The measure may be made either on semolina as received or on a defined fraction of the semolina. In this last case, by sieving adequately the sample, a better homogeneity for a defined semolina sample can be obtained, reducing the variability of particle size range.

4.1.3 Wet semolina

With the aim of reducing the interferences on the colour measures due to the normal particle size distribution of semolina, it is possible to wet the semolina to obtain a sheet of fresh pasta and to perform colour measures on the surface of this sheet.

5 Measurements

5.1 General

Before every measures series, the apparatus shall be calibrated.

The colorimeter calibration shall be made through opaque stable materials (as ceramics, glaze, …) sampled and supplied by manufacturers. When the colorimeter is used, a further calibration for better measure accuracy can be performed using references next to the colour of samples to be measured.

5.2 Dry semolina

The semolina sample shall be posed in a container with a plane surface, optically neutral, equal or greater than the measurement surface of the instrument. The measure will be performed on this plane surface against which the semolina is posed, and to avoid any parasite light source, a black opaque screen shall cover both the sample-holder and the measure window of instrument. Sample-holders for the measure of granular material are provided as attachment by apparatus manufacturers.

5.3 Wet semolina

The pasta obtained from wet semolina will be posed directly in front of the measure window of instrument on a black background. To avoid the dehydration of surface sample, the time between the pasta preparation and the colour measurement should be limited as much as possible (it should not exceed 60 s).

6 Test report

The test report (colorimetric characteristics of a sample) shall contain the following information.

a) apparatus : trade-mark, type, diameter of opening of measure window;

b) sample :

for dry semolina: milling process, particle size, conditions used for obtaining sample;

for wet semolina: conditions used for obtaining pasta, hydration rate of the fresh pasta, time elapsed between pasta making and measure;

c) general conditions of measurements: illuminant used (illuminant D65 is recommended), type of references used for calibration, room temperature;

d) values obtained :

colorimetric system (L*, a*, b*);

number of measures and relative standard deviation.

The test report shall include all information necessary for a complete description of the sample and the measurement details which could affect the final result.