SLOVENSKI STANDARD
SIST EN 1131:1996

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Sadni in zelenjavni sokovi - Ugotavljanje relativne gostote

Fruit and vegetable juices - Determination of the relative density

Frucht- und Gemüsesäfte - Bestimmung der relativen Dichte

Jus de fruits et de légumes - Détermination de la densité relative

Ta slovenski standard je istoveten z: **EN 1131:1994**

ICS:

67.160.20 Brezalkoholne pijače Non-alcoholic beverages

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English version

Fruit and vegetable juices - Determination of the relative density

Jus de fruits et de légumes - Détermination de la densité relative

Frucht- und Gemüsesäfte - Bestimmung der relativen Dichte

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Foreword

This European Standard has been prepared by the Technical Committee CEN/TC 174 "Fruit and vegetable juices - Methods of analysis", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 1995, and conflicting national standards shall be withdrawn at the latest by April 1995.

Annexes designated "informative" are given only for information. In this standard annexes A and B are informative.

According to the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 Scope

This European Standard specifies a method for the determination of the relative density $d_{20°C/20°C}$ of fruit and vegetable juices and related products.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ISO 5725:1986 Precision of test methods - Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests

ISO 3696:1987 Water for analytical laboratory use - Specification and test methods

3 Definition

For the purposes of this standard, the following definition applies :

Relative density, $d_{20°C/20°C}$: The mass of a known volume of the test sample at 20 °C divided by the mass of an equal volume of air-free water at 20 °C (pure number without units).

4 Principle

The relative density is determined using a pyknometer.

5 Reagents

5.1 General

Use only degassed water in accordance with at least grade 3 of ISO 3696:1987.

5.2 Potassium dichromate-sulfuric acid solution, to clean the pyknometer (6.4).

SAFETY WARNING : Extreme care should be exercised when using and transporting potassium dichromate-sulfuric acid solution, which is a strong acid and oxidant. Take appropriate measures to protect skin, eyes and clothing. Never add water to this solution, since a large amount of heat will be generated locally, resulting in danger of sputtering. Take appropriate measures when disposing of used solutions.

5.3 Appropriate glass cleaning agent, with cleansing effect comparable to (5.2) (alternative to 5.2).

6 Apparatus

Usual laboratory apparatus and, in particular, the following :

6.1 Desiccator with drying agent.

6.2 Water-bath, adjustable to 20 °C ± 0,05 °C.

6.3 Analytical balance, accurate to 0,1 mg.

6.4 Reischauer pyknometer, nominal capacity 50 ml, with ground glass stopper, with a neck 6 cm long and not more than 3,5 mm internal diameter, provided in the middle third with a mark or scale.

6.5 Wide-mouthed pyknometer, if the relative density of a concentrated product and fruit pulp is to be determined (alternative to 6.4).

6.6 Funnel, diameter 10 cm.

6.7 Fluted filter paper

6.8 Watch-glass, diameter 12 cm to15 cm.

6.9 Wicks of filter paper

6.10 Bent glass capillary tube

7 Procedure

7.1 Preparation of test sample

If the sample contains appreciable quantities of carbon dioxide, degas it using vacuum or ultrasound, followed by filtration through a fluted filter paper (6.7) in a funnel (6.6) covered by a watch-glass (6.8). In the case of a cloudy sample, homogenize by vigorous shaking to suspend any precipitate. Do not perform any filtration or clarification of the sample in this case.

7.2 Weighing of the empty pyknometer

If necessary, clean the pyknometer (6.4) with hot potassium dichromate-sulfuric acid-solution (5.2) or a proprietary cleansing agent (5.3).

SAFETY WARNING : See safety warning in (5.2).

Rinse the pyknometer (6.4) several times with water and dry gently. Avoid drying conditions that might influence the volume of the pyknometer. After allowing the pyknometer to cool to ambient temperature in the desiccator (6.1) place it in the balance-case and allow to equilibrate in the balance-case for 15 min. weigh the pyknometer (6.4) to an accuracy of 4 decimal places. Carry out the rinsing, drying and weighing procedure a total of three times and then determine the mean mass value (m_a).

7.3 Weighing of the pyknometer filled with water

Fill the pyknometer (6.4 or 6.5) to above the mark with freshly boiled air-free water, stopper and place in the water bath (6.2) at 20 °C ± 0,05 °C for 30 min.

While still keeping it in the water bath, bring the volume of the water to the mark by means of the bent glass capillary tube (6.10).

Ensure that the adjustment of the liquid level is always carried out by the same method.

The surface of the water forms a curved area in the neck of the pyknometer. Adjust the liquid so that in transmitted light, the lower edge of the surface just touches the pyknometer mark. Then dry the empty part of the pyknometer neck using the filter paper wicks (6.9). Replace the stopper, remove the pyknometer from the water-bath, dry well on the outside and place in the balance-case for 15 min.

Weigh the pyknometer to an accuracy of 4 decimal places. Carry out this procedure of filling and weighing three times and then determine the mean mass (m_b).

7.4 Weighing of the pyknometer filled with test sample

Empty the pyknometer after weighing it (7.3), then either dry as in 7.2 or rinse repeatedly with the sample to be examined. Fill the pyknometer with the sample and proceed as in 7.3 to determine the mean mass (m_c).

8 Calculation

Calculate the relative density $d_{20°C/20°C}$ of the sample as follows :

$$d_{20\,°C/20\,°C} = \frac{m_c - m_a}{m_b - m_a}$$

where :

m_a is the mean mass of the empty pyknometer in grams ;

m_b is the mean mass of the pyknometer filled with water at 20 °C, in grams ;

m_c is the mean mass of the pyknometer filled with test sample at 20 °C, in grams.

Express the relative density $d_{20°C/20°C}$ of the test sample to four decimal places.

9 Precision

Details of the interlaboratory test on the precision of the method are summarized in annex B. The values derived from the interlaboratory test may not be applicable to analyte concentration ranges and matrices other than given in annex B.

9.1 Repeatability

The absolute difference between two single test results found on identical test material by one operator using the same apparatus within the shortest feasible time interval will exceed the repeatability value r in not more than 5 % of the cases.

The value is : r = 0,00018.

9.2 Reproducibility

The absolute difference between two single test results on identical test material reported by two laboratories will exceed the reproducibility value R in not more than 5 % of the cases.

The value is : R = 0,00029.

10 Test report

The test report shall contain the following data :

- all information necessary for the identification of the sample (kind of sample, origin of sample, designation) ;

- a reference to this European Standard ;

- the date and type of sampling procedure (if possible) ;

- the date of receipt ;

- the date of test ;

- the test results and units in which they have been expressed ;

- whether the repeatability of the method has been verified ;

- any particular points observed in the course of the test ;

- any operations not specified in the method or regarded as optional, which might have affected the results.