SLOVENSKI STANDARD
SIST EN 12143:1998

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Sadni in zelenjavni sokovi - Določevanje topnih snovi - Refraktometrijska metoda

Fruit and vegetable juices - Estimation of soluble solids content - Refractometric method

Frucht- und Gemüsesäfte - Bestimmung des Gehaltes an löslicher Trockensubstanz - Refraktometrisches Verfahren

Jus de fruits et de légumes - Estimation des solides solubles - Méthode réfractométrique

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ICS:

67.160.20 Brezalkoholne pijače Non-alcoholic beverages

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English version

Fruit and vegetable juices - Estimation of soluble solids content - Refractometric method

Jus de fruits et de légumes - Estimation des solides solubles - Méthode réfractométrique

Frucht- und Gemüsesäfte - Bestimmung des Gehaltes an löslicher Trockensubstanz - Refraktometrisches Verfarhen

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CEN

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

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Content

Foreword

This European Standard has been prepared by 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of an identical text or by endorsement, at the latest by March 1997, and conflicting national standards shall be withdrawn at the latest by March 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of 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 and the United Kingdom.

1 Scope

This European Standard specifies a refractometric method for the estimation of the soluble solids in fruit and vegetable juices and related products.

2 Normative references

This European Standard incorporates by dated or undated references, 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.

EN ISO 3696:1995	Water for analytical laboratory use - Specification and test methods
ISO 5725:1986	Precision of test methods - Determination of repeatability and reproducibility for a standard test method by inter-laboratory tests
EN 12147:1996	Fruit and vegetable juices - Determination of titratable acidity

3 Definitions

For the purposes of this standard, the following definitions apply :

3.1 refractometric dry extract or °Brix :

Soluble solids measured by refractometry and expressed as a mass fraction, i.e. in grams of sucrose per 100 grams of solution.

3.2 °Brix corrected :

As°Brix (3.1), after applying the acid correction (see clause 8 and Annex A).

4 Principle

The soluble solids content is estimated by refractometry. This is the percentage by mass of sucrose in an aqueous solution of sucrose which, under given conditions, has the same refractive index as the product analyzed. The product's soluble solids content is expressed in grams per 100 g. The refractive index of the product is affected by the presence of other soluble materials e.g. organic acids, minerals, amino acids. Due to the high acid content of citrus juices and citrus juice concentrates a correction to the °Brix value is made in such cases.

5 Reagents

5.1 General

Use only reagents of recognized analytical grade and only degassed water in accordance with at least grade 3 of EN ISO 3696:1995.

5.2 Standard solutions

Prepared following the manufacturer's instructions, for calibration of the refractometer.

6 Apparatus

Usual laboratory apparatus and, in particular, the following :

6.1 Refractometer with scale divisions to at least 0,1 % sucrose and with a temperature measurement facility of ± 0,5 °C.

7 Procedure

7.1 General

The refractometer shall be calibrated before each set of measurements, following the manufacturer's instructions.

The soluble solids value of the sample is normally measured at 20 °C ± 0,5 °C. If the refractometer possesses a temperature compensation facility, the measurement may be made at a temperature other than 20 °C but in any case between 10 °C and 30 °C and according to the instrument manufacturer's instructions.

If the refractometer does not possess a temperature compensation facility, the measurement may be made at a temperature other than 20 °C, but between 15 °C and 25 °C. The values have to be corrected according the table A.2.

Before each measurement or calibration step, rinse the glass surface of the refractometer with water and remove adhering water with a filter paper.

7.2 Preparation of the test sample

Mix the sample well prior to measuring.

Analyse the concentrates without dilution.

7.3 Test procedure

Place a small portion of the sample on the lower prism of the refractometer (6.1). Ensure that the sample covers the glass surface evenly, when the prisms are clamped together. Wait for the sample to reach thermal equilibrium (approximately 30 s) and then take the measurement according to the apparatus instructions. It is important to keep the temperature constant during the measurement.

Read directly the percentage sucrose content to the nearest 0,1 %. At least two determinations should be made on the same sample.

8 Calculation

The content of soluble solids is usually expressed in grams of sucrose per 100 grams of material. The result given is the percentage of sugar according to the refractometric method. The value is read directly.

In citrus juices and citrus juice concentrates a so-called "acid correction" shall be made by making the following addition to the refractometer reading :

$$0{,}012 + 0{,}193 \times m - 0{,}0004 \times m^2$$

where :

m is the total acid expressed in grams per 100 g, at pH = 8,1, expressed as anhydrous citric acid (EN 12147:1996). The calculated values for this expression are given in Annex A.

9 Precision

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

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 limit r in not more than 5 % of the cases.

The values are :

- juices : r = 0,15 °Brix ;

- concentrates : r = 0,2 °Brix ;

9.2 Reproducibility

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

The values are :

- juices : *R* = 0,42 °Brix ;

- concentrates : *R* = 0,6 °Brix ;

10 Test report

The test report shall contain the following data :

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

- a reference to this European Standard ;

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

- 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.