COMMISSION REGULATION (EEC) No 543/86

of 28 February 1986

laying down methods of measuring sugar in products processed from fruit and vegetables

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community,

Having regard to Council Regulation (EEC) No 426/86 of 24 February 1986 on the common organization of the market in products processed from fruit and vegetables [1], and in particular Article 10 (10) thereof,

Whereas Article 10 (7) of Regulation (EEC) No 426/86 lays down that added sugar content for the products listed in Annex III of the Regulation means the reading obtained by using a refractometer, multiplied by a coefficient and reduced by a specific figure;

Whereas to ensure uniform determination of the sugar content, the methods of using the refractometer should be defined;

Whereas the methods so determined replace those previously provided for in Annex III of Council Regulation (EEC) No 516/77 [2], this Regulation being repeated by Regulation (EEC) No 426/86;

Whereas the measures provided for in this Regulation are in accordance with the opinion of the Management Committee for Products Processed from Fruit and Vegetables,

HAS ADOPTED THIS REGULATION:

Article 1

The refractometer method to be used for determining sugar content for the products listed in Annex III of Regulation (EEC) No 426/86 shall be as indicated in the Annex.

Article 2

References to Annex III of Regulation (EEC) No 516/77 shall be construed as references to the Annex to this Regulation.

Article 3

This Regulation shall enter into force on 1 March 1986.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 28 February 1986.

For the Commission

Frans ANDRIESSEN

Vice-President

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[1] OJ No L 49, 27. 2. 1986, p. 1.
[2] OJ No L 73, 21. 3. 1977, p. 1.

ANNEX

METHOD OF MEASURING DRY SOLUBLE RESIDUE IN PRODUCTS PROCESSED FROM FRUIT AND VEGETABLES BY REFRACTOMETRY

I. Field of application

Application of this method is related to the quantity of sugar present in the product analyzed. The presence of amino acids, salts of organic acids, flavonoids and mineral substances alters the refractive index.

II. Definition

Dry soluble residue (determined by refractometry) means the percentage weight of sucrose in an aqueous solution of sucrose which, under given conditions of preparation and a given temperature, has the same refractive index as the product analyzed. This percentage is expressed in grams per 100 grams.

III. Principle

Deduction of the dry soluble residue content of a product from its refractive index.

IV. Apparatus

Abbe-type refractometer

This apparatus must have a scale indicating the percentage weight of sugar to the nearest 0,1 %. It must be so constructed that samples can be introduced easily and quickly. It must be easy to clean.

The refractometer must have a thermometer with a scale extending from at least + 15 °C to + 25 °C. It must also have a water circulator enabling measurements to be made at a temperature of + 20 °C ± 5 °C.

Operating instructions for this apparatus, and in particular those dealing with calibration and light source, must be strictly followed.

V. Method

1. *Preparation of sample*

1.1. Liquid and limpid products

Mix carefully and proceed to determination

1.2. Semi-dense products, purées, fruit juices with matter in suspension.

Carefully mix an average laboratory sample and then homogenize. Strain part of the sample through dry gauze folded in four, remove the first drops and proceed to determination on the filtrate.

1.3. Dense products (jams and jellies)

If the homogenized product cannot be used directly, weigh 40 g of the product to the nearest 0,01 g in 250 ml beaker and add 100 ml of distilled water.

Boil gently for two or three minutes, stirring with a glass rod.

Cool, decant contents of the beaker into a graduated 200 ml flask, bring up to the required level with distilled water and mix carefully. Allow to stand for 20 minutes, then strain through a folded filter or a Büchner funnel.

Make determination on the filtrate

1.4. Frozen products

Defrost and remove stones or pips and cores. Mix the product with the liquid formed during defrosting and proceed as in 1.2 or 1.3.

1.5. Dry products containing whole fruit or pieces of fruit

Cut part of the laboratory sample into small pieces, remove stones or pips and cores and mix carefully.

Weigh 10 to 20 g of the product to the nearest 0,01 g in a beaker. Add distilled water to at least five times the weight of the product. Heat in a water bath for 30 minutes, stirring occasionally with a glass rod. When cool homogenize contents of the beaker and pour into a graduated 100 to 250 ml measuring flask (depending on the size of the sample). Bring to the required level and mix carefully. After 20 minutes filter into a dry container and make determination on the filtrate.

2. *Determination*

Bring the sample to the measurement temperature (+ 20 °C) by immersing the container in a water bath of the required temperature.

Place a small sample on the lower prism of the refractometer, taking care to ensure that the sample covers the glass surface uniformly when the prisms are pressed against each other. Measure in accordance with the operating instructions for the apparatus used.

Read the percentage weiht of sucrose to the nearest 0,1 %.

Make at least two determinations on the same prepared sample.

VI. Expression of results

Calculation and formulation

The dry soluble residue content, conventionally expressed in grams of sucrose per 100 grams of product, is calculated as follows : The percentage sucrose content indicated by refractometry is used direct. If the reading is made at a temperature other than + 20 °C, correct as indicated in the attached table.

If measurement has been made on a dilute solution, the dry soluble residue is equal to

$$M \times \frac{100}{E}$$

M being the weight (in grams) of dry soluble residue per 100 grams of product indicated by the refractometer and E the weight (in grams) of product per 100 ml of solution.

Corrections when determination is made at a temperature other than 20 °C

Temperature °C	Sucrose in grams per 100 grams of product									
	5	10	15	20	30	40	50	60	70	75
	Subtract									
15	0,25	0,27	0,31	0,31	0,34	0,35	0,36	0,37	0,36	0,36
16	0,21	0,23	0,27	0,27	0,29	0,31	0,31	0,32	0,31	0,23
17	0,16	0,18	0,20	0,20	0,22	0,23	0,23	0,23	0,20	0,17
18	0,11	0,12	0,14	0,15	0,16	0,16	0,15	0,12	0,12	0,09
19	0,06	0,07	0,08	0,08	0,08	0,09	0,09	0,08	0,07	0,05
	Add									
21	0,06	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07	0,07
22	0,12	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,14
23	0,18	0,20	0,20	0,21	0,21	0,21	0,21	0,22	0,22	0,22
24	0,24	0,26	0,26	0,27	0,28	0,28	0,28	0,28	0,29	0,29
25	0,30	0,32	0,32	0,34	0,36	0,36	0,36	0,36	0,36	0,37

The temperature may not vary by more than ± 5 °C from 20 °C.