

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 750

FRUIT AND VEGETABLE PRODUCTS
DETERMINATION OF TITRATABLE ACIDITY

1st EDITION
June 1968

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Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

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BRIEF HISTORY

The ISO Recommendation R 750, *Fruit and vegetable products – Determination of titratable acidity*, was drawn up by Technical Committee ISO/TC 34, *Agricultural food products*, the Secretariat of which is held by the Magyar Szabványügyi Hivatal (MSZH).

Work on this question by the Technical Committee began in 1960 and led, in 1964, to the adoption of a Draft ISO Recommendation.

In October 1966, this Draft ISO Recommendation (No. 1020) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Argentina	Germany	Portugal
Australia	Hungary	Romania
Brazil	India	South Africa,
Bulgaria	Iran	Rep. of
Chile	Ireland	Thailand
Colombia	Israel	Turkey
Czechoslovakia	New Zealand	United Kingdom
France	Poland	U.S.S.R.

One Member Body opposed the approval of the Draft :

Netherlands

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in June 1968, to accept it as an ISO RECOMMENDATION.

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FRUIT AND VEGETABLE PRODUCTS
DETERMINATION OF TITRATABLE ACIDITY

1. SCOPE

This ISO Recommendation describes two methods for the determination of the titratable acidity of fruit and vegetable products :

- potentiometric reference method,
- visual method for routine control.

2. PREPARATION OF SAMPLE

2.1 Apparatus

Usual laboratory apparatus, and in particular

- 2.1.1 *Blender or mortar.*
- 2.1.2 *Conical flask, fitted with reflux condenser.*
- 2.1.3 *Volumetric flask, 250 ml.*
- 2.1.4 *Analytical balance*

2.2 Procedure

- 2.2.1 *Liquid or easily filtered products* (juices, canned fruit syrups, pickling liquids, brines, liquids from fermented products, etc.).

Mix thoroughly a part of the laboratory sample* and filter through cotton wool or filter paper. Pipette 25 ml of the filtrate into the 250 ml volumetric flask (2.1.3) and dilute to the mark with distilled water which has been freshly boiled and cooled. Mix thoroughly.

- 2.2.2 *Thick products and products difficult to filter* (syrups, marmalades, jams, jellies, etc.).

Mix a part of the laboratory sample and then disintegrate it in the blender or mortar (2.1.1). Weigh at least 25 g of the disintegrated product to the nearest 0.01 g and transfer it to the conical flask (2.1.2), with 50 ml of hot, distilled water which has been freshly boiled, cooled and neutralized. Mix well, until the liquid is uniform. Fit the reflux condenser to the conical flask (2.1.2) and heat the contents on a boiling-water bath for 30 minutes. Cool, transfer the contents of the conical flask quantitatively to the volumetric flask (2.1.3) and dilute to the mark with distilled water which has been freshly boiled and cooled. Mix well and then filter.

* Pending the completion of an ISO Recommendation on the sampling of fruit and vegetable products, the term *laboratory sample* is used to in the English text denote the sample as delivered to the laboratory.

2.2.3 Frozen and dried products

Cut into small pieces a part of the laboratory sample, previously thawed in the case of deep-frozen products. Remove stalks, stones, seed pockets and, whenever possible, pips. Disintegrate the product in the blender or mortar (2.1.1), in the presence of liquid produced by thawing if the product was frozen. Weigh at least 25 g, to the nearest 0.01 g, and continue as indicated in clause 2.2.2.

2.2.4 Freshly prepared products comprising distinct solid and liquid phases

Mix a part of the laboratory sample and proceed as indicated in clause 2.2.2.

3. POTENTIOMETRIC METHOD**3.1 Principle**

Potentiometric titration by means of sodium hydroxide solution.

3.2 Reagents

3.2.1 *Sodium hydroxide*, 0.1 N standard volumetric solution.

3.2.2 *Buffer solutions*, of known pH.

3.3 Apparatus

Ordinary laboratory apparatus, and in particular

3.3.1 *Potentiometer*, with glass electrodes.

3.3.2 *Electromagnetic or mechanical stirrer*.

3.4 Procedure

3.4.1 *Test portion*. Pipette into a beaker 25 to 100 ml of the prepared sample (see section 2), according to the acidity expected.

3.4.2 *Determination*. Check the correct operation of the potentiometer by means of the buffer solutions (3.2.2).

With stirring, add from a burette 10 to 50 ml of the sodium hydroxide solution (3.2.1) fairly quickly, to reach pH 6 approximately. Then slowly add the sodium hydroxide solution until the pH is 7. Subsequently, add the solution four drops at a time; after each addition read the volume of sodium hydroxide solution and the pH value until a pH of at least 8.3 is reached. By interpolation, deduce the exact volume of sodium hydroxide solution corresponding to pH 8.1.

Carry out two determinations on the same prepared sample.

3.5 Expression of results

3.5.1 *Method of calculation*. Express the results in milli-equivalents (i.e. in millilitres of normal alkali solution) per 100 g or 100 ml of the product.

It is also possible to express the titratable acidity in grammes of conventionally adopted acids, calculated per 100 g or 100 ml of the products. The appropriate acids are :

- (a) malic acid for products derived from pip and stone fruits,
- (b) citric acid for products derived from berried and citrus fruits,
- (c) tartaric acid for grape products,
- (d) oxalic acid for products derived from spinach and sorrel,
- (e) lactic acid for fermented lactic products,
- (f) acetic acid for pickled products.