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FRUIT AND VEGETABLE PRODUCTS

DETERMINATION OF pH

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BRIEF HISTORY

The ISO Recommendation R 1842, *Fruit and vegetable products – Determination of pH*, 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 led to the adoption of Draft ISO Recommendation No. 1842, which was circulated to all the ISO Member Bodies for enquiry in April 1969. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	India	Portugal
Brazil	Iran	Romania
Chile	Israel	South Africa, Rep. of
Czechoslovakia	Italy	Turkey
France	Netherlands	U.A.R.
Germany	New Zealand	United Kingdom
Greece	Peru	
Hungary	Poland	

No Member Body opposed the approval of the Draft.

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

ISO Recommendation | R 1842 | October 1970

FRUIT AND VEGETABLE PRODUCTS

DETERMINATION OF pH

1. SCOPE

This ISO Recommendation describes a potentiometric method of measuring pH in fruit and vegetable products.

2. PRINCIPLE

Measurement of the potential difference between two electrodes dipped in the liquid to be tested.

3. APPARATUS

3.1 *pH meter*, with a scale graduated in units of 0.1 pH or preferably less. If a temperature correction system is not provided, the scale should apply to measurements at 20 °C.

3.2 *Glass electrode*. Glass electrodes of different geometrical shapes may be used. They should be stored in water.

3.3 *Calomel electrode*, containing saturated potassium chloride solution.

Store the calomel electrode according to the instructions of the manufacturer; if these are not available, the electrode should be stored in saturated potassium chloride solution.

NOTE. – The calomel and glass electrodes may also be assembled into a system of combined electrodes. Store this in water. The level of the saturated potassium chloride solution in the calomel electrode should be above the water level.

4. PROCEDURE

4.1 Preparation of sample

4.1.1 *Liquid products and easily filtrable products*. (For example, juices, liquids from compotes or from pickles, brines, fermented liquids, etc.). Mix the laboratory sample * carefully until it is homogeneous.

4.1.2 *Thick or semi-thick products and products from which it is difficult to separate the liquid* (syrups, jams, purées, jellies, etc.). Mix a part of the laboratory sample and grind it in a blender or mortar; if the product obtained is still too thick, add an equal mass of distilled and freshly boiled water.

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

4.1.3 *Frozen products.* After thawing the product and removing stones and hard seed-cavity walls, proceed as described in clause 4.1.1 or 4.1.2, as appropriate.

4.1.4 *Dried products.* Cut a part of the laboratory sample into small pieces, and remove stones and hard seed-cavity walls. Put the pieces into a beaker, add 2 to 3 times their mass of distilled water (or more if required to give a suitable consistency) and heat in a water bath for 30 minutes, mixing from time to time with a rod. Then disintegrate the product in a blender or mortar.

4.1.5 *Freshly prepared products comprising distinct solid and liquid phases.* Proceed as described in clause 4.1.2.

4.2 Test portion

Use as the test portion a volume of the prepared sample sufficient for immersion of the electrodes, according to the apparatus used.

4.3 Calibration of the pH meter

Calibrate the pH meter, using a buffer solution of exactly known pH, as near as possible to the pH of the solution to be determined (see section 6), at the temperature of measurement.

If the pH meter does not include a temperature correction system, the temperature of the buffer solution should be within the range 20 ± 2 °C.

4.4 Determination

Introduce the electrodes into the test portion and set the temperature correction system of the pH meter to the temperature of measurement. If there is no temperature correction system, the temperature of the test portion should be within the range 20 ± 2 °C.

Make the determination using the procedure appropriate to the pH meter used. Read the pH directly from the scale on the instrument, to the nearest 0.05 pH unit, when a constant value has been reached.

Perform at least two determinations on the same prepared sample.

5. EXPRESSION OF RESULTS

5.1 Method of calculation

Take as the result the arithmetic mean of the two determinations, if the requirement concerning repeatability is satisfied. Report the result to the nearest 0.05 pH unit.

5.2 Repeatability

The difference between the results of two determinations carried out in rapid succession by the same analyst should not exceed 0.1 pH unit.

6. NOTE ON PROCEDURE

The following buffer solutions can be used for calibration :

6.1 Buffer solution with pH 3.57 at 20 °C, prepared as follows :

Saturate water at 25 °C with potassium hydrogen tartrate ($KHC_4H_4O_6$) of analytical reagent quality.

The pH of this solution is 3.56 at 25 °C and 3.55 at 30 °C.

6.2 Buffer solution with pH 6.88 at 20 °C, prepared as follows :

Weigh, to the nearest 0.001 g, 3.402 g of potassium dihydrogen orthophosphate (KH_2PO_4) and 3.549 g of disodium hydrogen orthophosphate (Na_2HPO_4) and dissolve in 1000 ml of distilled water at 20 °C.

The pH of this solution is 6.92 at 10 °C and 6.85 at 30 °C.