International Standard 7238

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Butter — Determination of pH of the serum — Potentiometric method

Beurre — Détermination du pH de la phase aqueuse — Méthode potentiométrique

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 7238 was developed by Technical Committee ISO/TC 34, *Agricultural food products*, and was circulated to the member bodies in July 1982.

It has been approved by the member bodies of the following countries :

Australia	India	Portugal
Austria	Iran	Romania
Belgium	Iraq	South Africa, Rep. of
Czechoslovakia	Israel	Spain
Egypt, Arab Rep. of	Korea, Rep. of	Thailand
Ethiopia	Mexico	Turkey
France	Netherlands	United Kingdom
Germany, F. R.	New Zealand	USA
Hungary	Poland	USSR

No member body expressed disapproval of the document.

NOTE — The method specified in this International Standard has been developed jointly with the International Dairy Federation (IDF) and the Association of Official Analytical Chemists (AOAC) and will also be published by these organizations.

Butter — Determination of pH of the serum — Potentiometric method

1 Scope and field of application

This International Standard specifies a potentiometric method for the determination of the pH of the serum from all types of butter.

2 References

ISO 707, *Milk and milk products — Methods of sampling.*[1]

ISO 3696, *Water for laboratory use — Specifications.*[2]

3 Definition

pH of butter serum: The potential difference at the measuring temperature between two electrodes immersed in butter serum, determined by the procedure specified in this International Standard, and expressed in pH unit.

4 Principle

Measurement of the potential difference between a glass electrode and a reference electrode in the serum separated from melted butter.

5 Reagents

The reagents shall be of recognized analytical quality and the water used in their preparation shall be recently distilled water that has been protected from absorption of carbon dioxide and that complies with the requirements for grade 1 water specified in ISO 3696.

5.1 Buffer solutions, for calibration of the pH meter.

Two standard buffer solutions, having pH values known to the second decimal place at the measuring temperature, and which will bracket the pH value of the serum obtained from the test portion, shall be used, for example a buffer solution of pH approximately 4 and another of pH approximately 7.

NOTE — The following buffer solutions may be used:

a) **Buffer solution of pH 4,00 at 20 °C and 4,01 at 25 °C:**

Dissolve, in water, 10,12 g of potassium hydrogen phthalate ($KHC_8H_4O_4$), which has been previously dried to constant mass at 120 °C. Make up to 1 000 ml with water at the measuring temperature and mix well.

Preserve the solution by adding approximately 2 ml of chloroform or carbon tetrachloride.

b) **Buffer solution of pH 6,88 at 20 °C and 6,86 at 25 °C:**

Dissolve, in water, 3,388 g of potassium dihydrogenorthophosphate (KH_2PO_4) and 3,533 g of disodium hydrogenorthophosphate (Na_2HPO_4), both compounds having been previously dried to constant mass at 120 °C. Make up to 1 000 ml with water at the measuring temperature and mix well.

Preserve the solution by adding approximately 2 ml of chloroform or carbon tetrachloride.

6 Apparatus

Usual laboratory apparatus, and in particular:

6.1 pH meter, minimum sensitivity 0,01 pH unit, with a glass electrode and a suitable reference electrode, and with temperature compensation.

NOTE — The glass and reference electrodes may be assembled into a system of combined electrodes.

6.2 Centrifuge (if required), of the vertical-loading type[3], capable of attaining a relative radial acceleration of approximately 375 *g*.

6.3 Centrifuge tubes (if required), of capacity approximately 50 ml with suitable stoppers.

6.4 Test tubes, of capacity approximately 12 ml, internal diameter 16 to 20 mm.

6.5 Water bath (if required), capable of being controlled at 65 °C.

1) At present at the stage of draft. (Revision of ISO/R 707-1968.)

2) At present at the stage of draft.

3) For details of a suitable centrifuge, reference should be made to clause 6.6 of ISO 2446, *Milk — Determination of fat content (Routine method).*

6.6 Ice-water bath (if required).

6.7 Calibrated thermometer, accurate to 1 °C.

7 Sampling

See ISO 707.

8 Procedure

8.1 Test portion

Take approximately 50 g of the sample.

8.2 Separation of the serum

Separate the serum from the butter by an appropriate method (see the note). Transfer the serum (including the protein) to a test tube (6.4), and bring it to the measuring temperature.

NOTE — There are many methods for the separation of the serum from the butter, one of which is as follows.

Transfer the test portion to a centrifuge tube (6.3), and place the centrifuge tube in the water bath (6.5). Two layers will be formed by the melting butter.

As soon as the butter has melted (after 3 to 5 min), close the centrifuge tube with the stopper, place it, with the stoppered end downwards, in the tube holder and centrifuge for 5 min at a relative radial acceleration of approximately 375 *g*.

Immediately immerse the centrifuge tube, with the stoppered end downwards, in the ice-water bath (6.6) and leave until the fat has completely congealed.

8.3 Calibration of the pH meter

Adjust the temperature of the buffer solutions (5.1) to the measuring temperature and calibrate the pH meter in accordance with the manufacturer's instructions.

NOTE — If a series of samples is being tested, check the calibration of the pH meter with one or both buffer solutions at least every 30 min.

8.4 Determination

Introduce the electrodes into the serum at the measuring temperature.

Carry out the determination using the procedure appropriate to the pH meter used. When the reading becomes constant, read the pH directly from the scale of the instrument, to the nearest 0,01 pH unit.

Introduce the thermometer (6.7) into the serum and read the measuring temperature.

8.5 Cleaning the electrodes

Clean the electrodes by rinsing consecutively with acetone at room temperature and water at 30 to 35 °C.

Dab them with a clean paper tissue.

9 Expression of results

Record the measured pH to the nearest 0,01 pH unit together with the measuring temperature.

10 Precision

10.1 Repeatability

The difference between two single results obtained on identical test material by one operator using the same apparatus within a short time interval will exceed 0,03 pH unit on average not more than once in 20 cases in the normal and correct operation of the method.

10.2 Reproducibility

The difference between two single and independent results obtained by two operators working in different laboratories on identical test material will exceed 0,10 pH unit on average not more than once in 20 cases in the normal and correct operation of the method.

11 Test report

The test report shall show the method used and the result obtained. It shall also mention any operating conditions not specified in this International Standard, or regarded as optional, as well as any incidents that may have influenced the result.

The test report shall include all the information necessary for the complete identification of the sample.