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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

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 7238|IDF 104 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF), in collaboration with AOAC International. It is being published jointly by ISO and IDF and separately by AOAC International.



This edition of ISO 7238|IDF 104 cancels and replaces ISO 7238:1983, of which it constitutes a minor revision. Only editorial changes have been made.

# Foreword

**IDF (the International Dairy Federation)** is a worldwide federation of the dairy sector with a National Committee in every member country. Every National Committee has the right to be represented on the IDF Standing Committees carrying out the technical work. IDF collaborates with ISO and AOAC International in the development of standard methods of analysis and sampling for milk and milk products.

Draft International Standards adopted by the Action Teams and Standing Committees are circulated to the National Committees for voting. Publication as an International Standard requires approval by at least 50 % of the National Committees casting a vote.

ISO 7238|IDF 104 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 5, *Milk and milk products*, and the International Dairy Federation (IDF), in collaboration with AOAC International. It is being published jointly by ISO and IDF and separately by AOAC International.

All work was carried out by the Joint ISO/IDF/AOAC Group of Experts, *pH of butter* (E36), under the aegis of its project leader, Mr L.J. Pootvliet (NL).

This edition of ISO 7238|IDF 104 cancels and replaces IDF 104A:1984. Only editorial changes have been made.

# Butter — Determination of pH of the serum — Potentiometric method

## 1 Scope

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

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*



## 3 Terms and definitions



For the purposes of this document, the following terms and definitions apply.

**3.1**
**pH of butter serum**
potential difference at the measuring temperature between two electrodes immersed in butter serum, determined by the procedure specified in this International Standard

NOTE It is expressed in pH units.

## 4 Principle

The potential difference is measured between a glass electrode and a reference electrode in the serum separated from melted butter.

## 5 Reagents

Use only reagents of recognized analytical grade, unless otherwise specified, and 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 3696:1987.

**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.

EXAMPLES 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 dihydrogen orthophosphate ($KH_2PO_4$) and 3,533 g of disodium hydrogen orthophosphate ($Na_2HPO_4$), 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, the following.

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



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

**6.2 Centrifuge** (if required), of the vertical-loading type[1)], 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 mm to 20 mm.

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

**6.6 Ice-water bath** (if required).

**6.7 Calibrated thermometer**, accurate to 1 °C.

## 7 Sampling

A representative sample should have been sent to the laboratory. It should not have been damaged or changed during transport or storage.

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 707 [1].

1) For details of a suitable centrifuge, reference should be made to ISO 2446:1976, 6.6.

# 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 min 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.

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 °C to 35 °C.

Dab them dry 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.