SLOVENSKI STANDARD
SIST ISO 6886:1998

01-december-1998

Ģivalske in rastlinske maģļ obe in olja - Doloļ evanje oksidativne stabilnosti (metoda s pospeģeno oksidacijo)

Animal and vegetable fats and oils -- Determination of oxidation stability (Accelerated oxidation test)

Corps gras d'origines animale et végétale -- Détermination de la stabilité à l'oxydation (Test d'oxydation accéléré)

Ta slovenski standard je istoveten z: ISO 6886:1996

ICS:

67.200.10	Rastlinske in ģivalske maģļ obe in olja	Animal and vegetable fats and oils

SIST ISO 6886:1998 **en**

INTERNATIONAL STANDARD

ISO 6886

First edition
1996-09-01

Animal and vegetable fats and oils — Determination of oxidation stability (Accelerated oxidation test)

Corps gras d'origines animale et végétale — Détermination de la stabilité à l'oxydation (Test d'oxydation accéléré)

Reference number
ISO 6886:1996(E)

Contents

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 6886 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*.

Annexes A and B of this International Standard are for information only.

This page intentionally left blank

Animal and vegetable fats and oils — Determination of oxidation stability (Accelerated oxidation test)

1 Scope

This International Standard specifies a method for the determination of the oxidation stability of fats and oils. It is applicable to refined animal and vegetable fats and oils.

NOTE 1 The presence of volatile fatty acids and volatile acidic oxidation products makes accurate measurement impossible.

2 Definitions

For the purposes of this International Standard, the following definitions apply.

2.1 induction period: Time which passes between the moment when the sample reaches the desired temperature and the moment when the formation of oxidation products rapidly begins to increase.

2.2 oxidation stability: Induction period determined according to the procedure specified in this International Standard. Oxidation stability is expressed in hours.

NOTE 2 A temperature of 100 °C is usually applied in the determination of oxidation stability. Depending on the oxidation stability of the sample under test, the determination may be carried out at a higher temperature, for example 110 °C. The temperature should be chosen so that an induction period of at least 5 h and at most 10 h is obtained.

3 Principle

A stream of purified air is passed through the sample which has been brought to a specified temperature. The gases released during the oxidation process, together with the air, are passed into a flask containing water which has been demineralized or distilled and contains an electrode for measuring the conductivity. The electrode is connected to a measuring and recording device. It indicates the end of the induction period when the conductivity begins to increase rapidly. This accelerated increase is caused by the dissociation of volatile carboxylic acids produced during the oxidation process and absorbed in the water.

4 Reagents and materials

Use only reagents of recognized analytical grade, and distilled or demineralized water.

4.1 Molecular sieve, with moisture indicator, 2 mbar, pore size 0,3 mm. The molecular sieve should be dried in an oven set at 150 °C and cooled down to room temperature in a siccative.

4.2 Potassium dichromate solution (optional), 20 g/l in 1 % sulfuric acid (*V/V*).

4.3 Petroleum ether, boiling range 40 °C to 60 °C, or **acetone**.

4.4 Cleaning agent, i.e. non-alkaline detergent with strong fat removal qualities.

NOTE 3 Dodecyl benzene sulfonate meets these requirements.

4.4.1 Cleaning solution A, for aeration vessels and connecting pipes, prepared from 100 g of cleaning agent (4.4) in 1 litre of water.

4.4.2 Cleaning solution B, for measurement cells, prepared from 20 g of cleaning agent (4.4) in 1 litre of water.

4.5 Glycerol

5 Apparatus

Usual laboratory equipment and, in particular, the following.

5.1 Appliance for the determination of oxidation stability

See figures 1 and 2 for diagrammatic representations.

NOTE 4 An appliance for determining oxidation stability can be obtained commercially under the tradename Rancimat, model 679, from Methrom-Herisau AG, Switzerland[1].

5.1.1 Air filter, comprising a tube fitted with filter paper at the ends and filled with a molecular sieve (4.1), connected to the suction end of a pump.

5.1.2 Gas diaphragm pump, with an adjustable flowrate of between 3 l/h and 30 l/h and a maximum deviation of ± 0,03 l/h from the set value.

5.1.3 Needle valve

5.1.4 Wash bottles (four), of capacity 250 ml, connected as shown in figure 1.

Wash bottle A shall be empty. Wash bottles B, C and D shall be filled with 150 ml potassium dichromate solution (4.2), 150 ml water and cotton wool, respectively, together with the molecular sieve (4.1).

NOTE 5 Rancimat 679 uses a molecular sieve prior to purification of the pumped air, and wash bottles are not used. The application of wash bottles is, however, strongly recommended.

5.1.5 Air-relief cock

5.1.6 Air circulator at each of the circulation points (usually six), fitted with a capillary tube of 5 mm external diameter, 0,6 mm internal diameter and 60 mm length.

5.1.7 Flowmeters (usually six), measuring range 0 l/h to 20 l/h, for connection to the air circulator (5.1.6).

5.1.8 Cylindrical aeration vessels of borosilicate glass (usually six), of 25 mm external diameter and 200 mm height, connected to a sealing cap by means of a conical joint.

The sealing cap shall be fitted with a gas inlet and outlet tube with a 13/5 spherical joint. The cylindrical part of the vessel shall preferably be narrower a few centimetres below the top in order to break any emerging foam. An artificial glass ring may also be used for this purpose.

5.1.9 Measurement cells (usually six), of approx. 150 ml capacity, total height approx. 120 mm and external diameter approx. 56 mm, with a conical neck and gas inlet tube extending to the bottom inside of the vessel and fitted with a 13/5 spherical joint outside. The bottle shall be provided at the top with ventilation holes having a diameter of approx. 2 mm.

5.1.10 Electrodes (usually six), for measuring conductivity, comprising double platinum electrodes with a measuring range of 0 µS/cm to 300 µS/cm, fitted with a 14/15 conical joint and aligned with the dimensions of the measurement cell (5.1.9).

5.1.11 Measuring and recording apparatus, comprising

a) switches for connecting each electrode (5.1.10) to a calibration potentiometer for setting the measuring signal at zero;

b) an amplifier;

c) a recorder for registering the measuring signal of each of the electrodes (5.1.10).

5.1.12 Thyristor and contact thermometer, with 150 mm insertion depth and attachments for relay connection and an adjustable heating element; temperature scale 0 °C to 150 °C, graduated in 0,2 °C.

5.1.13 Heating block, made of cast aluminium, of 200 mm height, adjustable to a temperature of 150 °C ± 0,2 °C. The block shall be provided with holes (usually six) for the aeration vessels (5.1.8), of 27 mm diameter and 140 mm depth, and an aperture for the contact thermometer (5.1.12) of 10 mm diameter and 140 mm depth.

Alternatively, a **heating bath** may be used, filled with oil suitable for temperatures up to 150 °C and adjustable to the nearest 0,2 °C.

5.2 Thermometer, with a temperature scale of 70 °C to 150 °C, graduated in 0,2 °C.

5.3 Measuring pipettes (two), of capacity 50 ml.

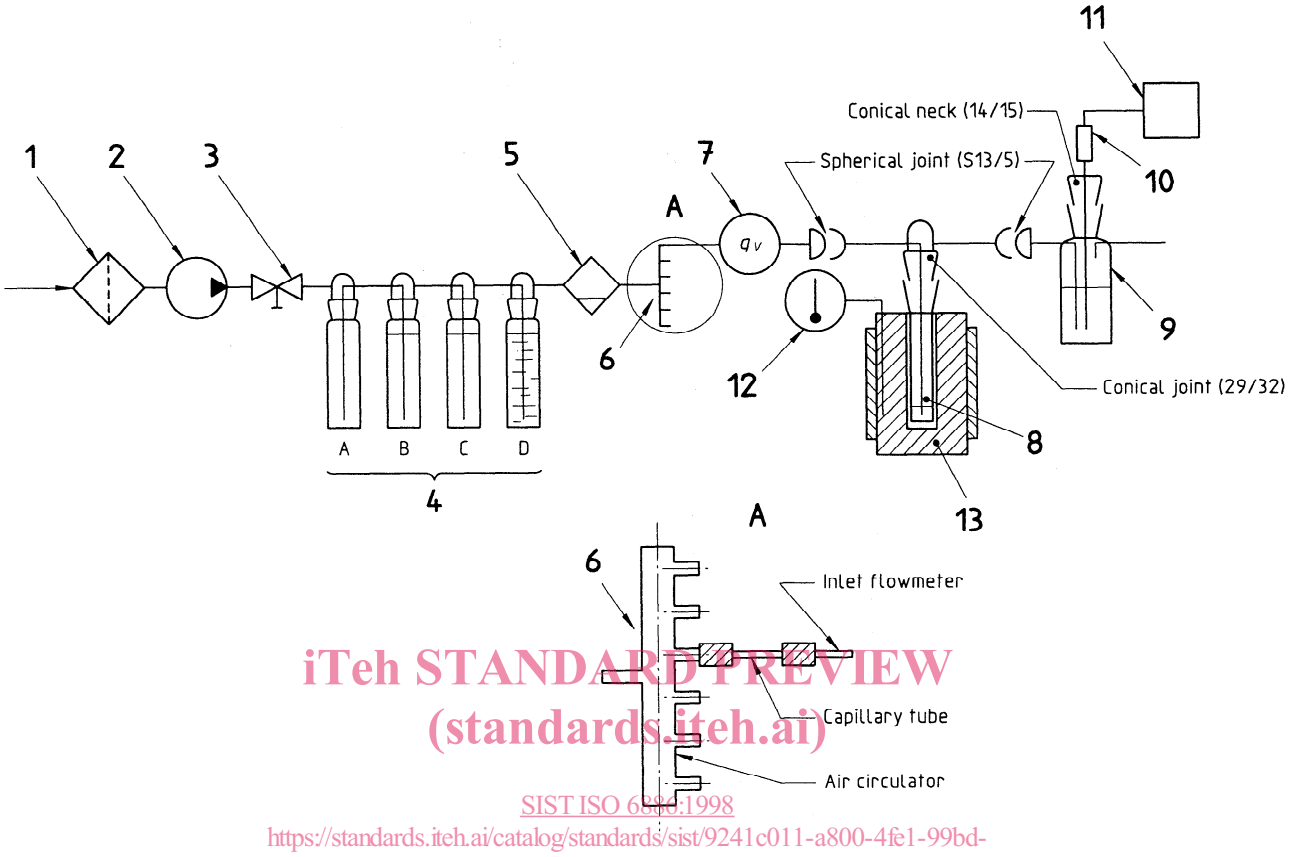
5.4 Oven, capable of being maintained at 150 °C ± 3 °C.

5.5 Oven, capable of being maintained at 500 °C (optional).

5.6 Cooling bath, capable of being maintained at a steady temperature of approx. 15 °C, using tap water for example.

5.7 Connecting hoses, flexible and made of inert material [polytetrafluoroethylene (PTFE) or silicone].

1) Rancimat, model 679, is an example of suitable equipment available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of this equipment.



Key

1 Air filter (5.1.1)
2 Gas diaphragm pump (5.1.2)
3 Needle valve (5.1.3)
4 Wash bottles A, B, C, D (5.1.4)
5 Air-relief cock (5.1.5)
6 Air circulator (5.1.6)
7 Flowmeter (5.1.7)
8 Aeration vessel (5.1.8)
9 Measurement cell (5.1.9)
10 Electrode (5.1.10)
11 Measuring and recording apparatus (5.1.11)
12 Thyristor and contact thermometer (5.1.12)
13 Heating block (5.1.13)

Figure 1 — Diagrammatic representation of the apparatus