

INTERNATIONAL STANDARD

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3961**

Second edition
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Animal and vegetable fats and oils — Determination of iodine value

Corps gras d'origines animale et végétale — Détermination de l'indice d'iode
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Reference number
ISO 3961 : 1989 (E)

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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 3961 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*.

This second edition cancels and replaces the first edition (ISO 3961 : 1979), of which it constitutes a technical revision.

[ISO 3961:1989](#)

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International Organization for Standardization

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Animal and vegetable fats and oils — Determination of iodine value

1 Scope

This International Standard specifies a method for the determination of the iodine value of animal and vegetable fats and oils.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 661 : 1989, *Animal and vegetable fats and oils — Preparation of test sample*.

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

ISO 5555 : 1983, *Animal and vegetable fats and oils — Sampling*.

3 Definition

For the purposes of this International Standard, the following definition applies.

iodine value : The mass of iodine absorbed by the sample under the operating conditions specified in this International Standard.

The iodine value is expressed as grams of iodine per 100 g of sample.

4 Principle

Dissolution of a test portion in solvent and addition of Wijs reagent. After a specified time, addition of potassium iodide solution and water, and titration of the liberated iodine with sodium thiosulfate solution.

5 Reagents

All reagents shall be of recognized analytical grade.

5.1 Water, complying with the requirements of ISO 3696, grade 3.

5.2 Potassium iodide, 100 g/l solution, not containing free iodine or iodate.

5.3 Starch, solution.

Mix 5 g of soluble starch in 30 ml of water, add this mixture to 1 000 ml of boiling water, boil for 3 min and allow to cool.

5.4 Sodium thiosulfate, standard volumetric solution $c(\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}) = 0,1 \text{ mol/l}$, standardized not more than 7 days before use.

5.5 Solvent, carbon tetrachloride.

WARNING — Carbon tetrachloride is toxic. A less harmful solvent is being sought.

5.6 Wijs reagent, containing iodine monochloride in acetic acid. Commercially available Wijs reagent shall be used.

6 Apparatus

Usual laboratory apparatus and, in particular, the following.

6.1 Glass weighing scoops, suitable for the test portion and for inserting into the flasks (6.2).

6.2 Conical flasks, of 500 ml capacity, fitted with ground glass stoppers and completely dry.

7 Sampling

Sampling shall be carried out in accordance with ISO 5555.

8 Preparation of the test sample

Prepare the test sample in accordance with ISO 661.

9 Procedure

9.1 Test portion

The mass of the test portion varies according to its expected iodine value as shown in table 1.

Table 1

Expected iodine value	Mass of test portion g
less than 5	3,00
5 to 20	1,00
21 to 50	0,40
51 to 100	0,20
101 to 150	0,13
151 to 200	0,10

Weigh the test portion to the nearest 0,1 mg in a glass weighing scoop (6.1).

9.2 Determination

Place the test portion in a 500 ml flask (6.2). Add 20 ml of the solvent (5.5) to dissolve the fat. Add exactly 25 ml of the Wijs reagent (5.6), insert the stopper, swirl the contents and place the flask in the dark. Do not use a mouth pipette for the Wijs reagent.

Similarly, prepare a blank with the solvent and the reagent but omitting the test portion.

For samples having an iodine value below 150, leave the flasks in the dark for 1 h; for those with an iodine value above 150 and for polymerized products or products oxidized to a considerable extent, leave for 2 h.

At the end of the time, add 20 ml of the potassium iodide solution (5.2) and 150 ml of water (5.1) to each of the flasks.

Titrate with the standard volumetric sodium thiosulfate solution (5.4) until the yellow colour due to iodine has almost disappeared. Add a few drops of the starch solution (5.3) and continue the titration until the blue colour just disappears after very vigorous shaking.

NOTE — Potentiometric determination of the end point is permissible.

9.3 Number of determinations

Carry out two determinations on the same test sample.

10 Expression of results

10.1 Method of calculation

The iodine value is given by the expression

$$\frac{12,69c(V_1 - V_2)}{m}$$

where

c is the numerical value of the exact concentration, in moles per litre, of the standard volumetric sodium thiosulfate solution (5.4) used;

V_1 is the numerical value of the volume, in millilitres, of the standard volumetric sodium thiosulfate solution (5.4) used for the blank test;

V_2 is the numerical value of the volume, in millilitres, of the standard volumetric sodium thiosulfate solution (5.4) used for the determination;

m is the numerical value of the mass, in grams, of the test portion (9.1).

Take as the result the arithmetic mean of the two determinations, provided that the requirement for repeatability (10.2) is satisfied.

10.2 Repeatability

The difference between the values of two determinations carried out in rapid succession (or simultaneously) by the same analyst using the same apparatus on the same test sample shall not exceed 0,5 units of the iodine value.

NOTE — This figure for repeatability has been accepted historically. It will be amended if necessary when the results of collaborative tests are available.

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 (for example, reaction time — see 9.2), as well as any circumstances that may have influenced the result.

The test report shall include all details required for complete identification of the sample.

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