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**Animal and vegetable fats and oils —  
Determination of the deterioration of  
bleachability index (DOBI)**

*Corps gras d'origines animale et végétale — Détermination de la  
détérioration de l'indice de blanchiment (DDIB)*

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## Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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 17932 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 11, *Animal and vegetable fats and oils*.

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# Animal and vegetable fats and oils — Determination of the deterioration of bleachability index (DOBI)

## 1 Scope

This International Standard specifies a method for the determination of the deterioration of bleachability index (DOBI) of crude palm oil. It is not applicable to oils with significant levels of chlorophylls.

## 2 Normative references

The following referenced document is 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 661, *Animal and vegetable fats and oils — Preparation of test sample*

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## 3 Terms and definitions (standards.iteh.ai)

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

### 3.1

#### DOBI value

ratio of the absorbance of the test portion at 446 nm to that at 269 nm, as determined using the method specified in this International Standard

NOTE DOBI value is expressed to one decimal place without a dimension.

## 4 Principle

The absorbance of a sample in solution is measured spectrometrically in a specified ultraviolet and visible wavelength range. The ratio of the absorbance at 446 nm to that at 269 nm measures the DOBI value. The test is a measure of the ease of refining crude palm oil. A low DOBI value may indicate difficulty in refining the oil to a low Lovibond colour.

## 5 Reagents

**WARNING — Attention is drawn to the regulations which specify the handling of dangerous substances. Technical, organizational and personal safety measures shall be followed.**

Use only reagents of recognized analytical grade, unless otherwise stated.

**5.1 Solvent:** isooctane (2,2,4-trimethylpentane), having an absorbance less than 0,12 at 230 nm and less than 0,05 at 250 nm against distilled water, measured in a cell of thickness 10 mm.

If isooctane is not available, cyclohexane or *n*-hexane having the characteristics specified above may be used instead.

## 6 Apparatus

The glassware used for the determination shall be thoroughly cleaned and rinsed with the solvent (5.1) before use, so that it is free from impurities having an absorbance within the wavelength range of 220 nm to 500 nm.

Usual laboratory apparatus and, in particular, the following.

### 6.1 Spectrometer, preferably having a recording instrument.

Before use, it is recommended that the wavelength and absorbance scales of the spectrometer be checked as follows.

- a) **Wavelength scale:** This may be checked using a mercury lamp, in accordance with the instrument manufacturer's instructions. Alternatively, a holmium glass plate which displays sharp absorption peaks at 279,37 nm and 287,5 nm may be used. These can be purchased from the instrument manufacturer.
- b) **Absorbance scale:** Prepare a 200 mg/l solution of analytical grade potassium chromate in 0,05 mol/l potassium hydroxide solution. Transfer 25 ml of this solution to a 500 ml volumetric flask and dilute to the mark with additional 0,05 mol/l potassium hydroxide solution. The absorbance of this solution, measured in a cell 10 mm thick at 275 nm against the 0,05 mol/l potassium hydroxide solution, should be  $0,200 \pm 0,005$ .

NOTE Suitable potassium chromate (NIST 935a) for use as a standard may be obtained from the National Institute of Standards and Technology ([www.nist.gov](http://www.nist.gov))<sup>1)</sup>.

**WARNING — Take care when handling potassium chromate which is a carcinogen by inhalation.**

### 6.2 Quartz cells, of thickness 10 mm, suitable for measurements at ultraviolet wavelengths.

### 6.3 Volumetric flask, of 25 ml capacity.

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## 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 5555.

## 8 Preparation of test sample

Prepare the test sample in accordance with ISO 661.

## 9 Procedure

### 9.1 Test portion and preparation of the test solution

Weigh into a 25 ml volumetric flask (6.3), to the nearest 0,1 mg, about 0,1 g of the test sample (Clause 8), sufficient to obtain absorbance values between 0,2 and 0,8.

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1) This is an example of a suitable product 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 product.

Dissolve the test portion in a few millilitres of the solvent (5.1) at ambient temperature and then make up to the mark with the same solvent. Mix thoroughly.

## 9.2 Determination

Rinse a quartz cell (6.2) three times with the test solution (9.1). Fill the cell with the test solution and measure the absorbance against the solvent used for dilution, by means of the spectrometer (6.1) at wavelengths 446 nm and 269 nm.

If the absorbance value obtained exceeds 0,8, dilute the test solution as appropriate and repeat the determination.

## 10 Calculation

The deterioration of bleachability index (DOBI) is calculated as follows:

$$\text{DOBI} = \frac{A_{446}}{A_{269}}$$

where

$A_{446}$  is the absorbance at 446 nm;

$A_{269}$  is the absorbance at 269 nm.

Express the results to one decimal place.

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## 11 Precision

### 11.1 Interlaboratory test

Details of an interlaboratory test on the precision of the method are summarized in Annex A. The values derived from this interlaboratory test may not be applicable to concentration ranges and matrices other than those given.

### 11.2 Repeatability

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, will in not more than 5 % of cases exceed the value of  $r$  given in Table A.1.

### 11.3 Reproducibility

The absolute difference between two single test results, obtained using the same method on identical test material in different laboratories with different operators using different equipment, will in not more than 5 % of cases exceed the value of  $R$  given in Table A.1.

## 12 Test report

The test report shall specify:

- all information necessary for the complete identification of the sample;
- the sampling method used, if known;
- the test method used, with reference to this International Standard;
- all operating details not specified in this International Standard, or regarded as optional, together with any incident which may have influenced the test result;
- the test result obtained or, if the repeatability has been checked, the final quoted result obtained.

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## Annex A (informative)

### Results of an interlaboratory test

An international collaborative trial using six samples of palm oil was organized by the Department of Standards Malaysia (DSM) in 2003 in accordance with ISO 5725-1 and ISO 5725-2.

**Table A.1 — Precision data for DOBI value**

	CPO1	CPO2	CPO3	CPO4	CPO5	CPO6
No. of laboratories participating	14	14	14	14	14	14
No. of laboratories after eliminating outliers	13	14	13	14	11	12
Number of tests in all laboratories	37	40	38	39	31	34
Mean	2,43	2,42	2,04	2,01	3,49	3,48
Repeatability standard deviation ( $s_r$ )	0,04	0,05	0,04	0,03	0,04	0,06
Repeatability relative standard deviation, %	1,7	2,1	1,9	1,7	1,2	1,8
Repeatability limit ( $r$ )	0,12	0,14	0,11	0,09	0,12	0,18
Reproducibility standard deviation ( $s_R$ )	0,12	0,16	0,09	0,12	0,13	0,12
Reproducibility relative standard deviation, %	4,8	6,7	4,4	5,7	3,6	3,3
Reproducibility limit ( $R$ )	0,32	0,45	0,25	0,32	0,35	0,32