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Animal and vegetable fats and oils — Determination of polyunsaturated fatty acids with a *cis,cis* 1,4-diene structure

Corps gras d'origines animale et végétale — Dosage des acides gras polyinsaturés ayant une configuration cis-cis diénique-1,4

Reference number
ISO 7847:1987 (E)

Foreword

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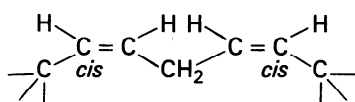
International Standard ISO 7847 was prepared by Technical Committee ISO/TC 34, *Agricultural food products*.

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Animal and vegetable fats and oils — Determination of polyunsaturated fatty acids with a *cis,cis* 1,4-diene structure

1 Scope and field of application

This International Standard specifies an enzymic method for the determination in animal and vegetable fats and oils of polyunsaturated fatty acids with a *cis,cis* 1,4-diene structure, in practice those of the linoleic (9,12-octadecadienoic) and linolenic (9,12,15-octadecatrienoic) acid series having $\omega 3$ and $\omega 6$ unsaturation. The structure is



It is not applicable to fats and oils containing polyunsaturated fatty acids of the $\omega 8$ and $\omega 9$ series or containing branched chain fatty acids.

2 References

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

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

3 Definition

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

***cis,cis* 1,4-diene fatty acids** : Fatty acids determined by the procedure specified in this International Standard.

They are expressed as a percentage by mass of the sample.

4 Principle

Saponification of a test portion at ambient temperature followed by liberation of the fatty acids. Enzymic oxidation of the fatty acids containing a *cis,cis* 1,4-diene structure. Measurement, at the wavelength of maximum absorbance (about 235 nm) of the absorbance due to these oxidized acids, while compensating for the absorbance due to any dienoic conjugated acids initially present in the sample.

5 Reagents and materials

All reagents shall be of recognized analytical quality, and the water used shall be distilled water or water of equivalent purity.

5.1 *n*-Hexane.

5.2 Hydrochloric acid, solution, $c(\text{HCl}) \approx 0,5 \text{ mol/l}$.

5.3 Potassium hydroxide, solution in ethanol, $c(\text{KOH}) \approx 0,5 \text{ mol/l}$.

5.3.1 Stock solution

Dissolve 65 g of potassium hydroxide (86 % KOH) in about 80 ml of water. Cool and make up to 100 ml.

5.3.2 Preparation

Dilute 5 ml of the stock solution (5.3.1) to 100 ml with 95 % (V/V) ethanol.

This solution shall be freshly prepared.

5.4 Potassium borate, buffer solution, $c(\text{K}_3\text{BO}_3) = 1,0 \text{ mol/l}$ (pH = 9,0).

Dissolve 61,9 g of boric acid (H_3BO_3) and 25,0 g of potassium hydroxide (86 % KOH) in about 800 ml of water with heating and stirring. Allow to cool to room temperature, then check the pH and, if necessary, adjust the pH to 9,0 with hydrochloric acid or potassium hydroxide solution. Dilute to 1 000 ml with water.

5.5 Potassium borate, buffer solution, $c(\text{K}_3\text{BO}_3) = 0,2 \text{ mol/l}$ (pH = 9,0).

Dilute 200 ml of 1,0 mol/l potassium borate buffer solution (5.4) to 1 000 ml with water. Cool on ice.

5.6 Lipoxidase, dilute solution.

5.6.1 Lipoxidase, with an activity of at least 50 000 units per milligram (1 unit of activity is defined as the amount of enzyme which oxidizes $1,2 \times 10^{-4} \mu\text{mol}$ of linoleic acid per minute under the conditions of the test).