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Animal feeding stuffs – Determination of nitrogen content and calculation of crude protein content –

Part 1: Kjeldahl method (EN ISO 5983-1:2005)

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Animal feeding stuffs - Determination of nitrogen content and calculation of crude protein content - Part 1: Kjeldahl method (ISO 5983-1:2005)

Aliments des animaux - Détermination de la teneur en azote et calcul de la teneur en protéines brutes - Partie 1: Méthode Kjeldahl (ISO 5983-1:2005)

Futtermittel - Bestimmung des Stickstoffgehaltes und Berechnung des Rohproteingahaltes - Teil 1: Kjeldahl-Verfahren (ISO 5983-1:2005)

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Foreword

This document (EN ISO 5983-1:2005) has been prepared by Technical Committee ISO/TC 34 "Agricultural food products" in collaboration with Technical Committee CEN/TC 327 "Animal feeding stuffs - Methods of sampling and analysis", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2006, and conflicting national standards shall be withdrawn at the latest by January 2006.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 5983-1:2005 has been approved by CEN as EN ISO 5983-1:2005 without any modifications.

Animal feeding stuffs — Determination of nitrogen content and calculation of crude protein content —

Part 1: Kjeldahl method

1 Scope

This part of ISO 5983 specifies a method for the determination of the nitrogen content of animal feeding stuffs by the Kjeldahl process, and a method for the calculation of the crude protein content.

The method does not measure oxidized forms of nitrogen or heterocyclic nitrogen compounds.

This method does not distinguish between protein nitrogen and non-protein nitrogen. If it is important to determine the content of non-protein nitrogen, an appropriate method should be used.

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 6498, *Animal feeding stuffs — Preparation of test samples*

3 Principle

The organic matter is digested by sulfuric acid in the presence of a catalyst. The reaction product is rendered alkaline, then the liberated ammonia is distilled and titrated. The nitrogen content is calculated and the result is multiplied by the conventional factor to obtain the crude protein content.

4 Reagents and materials

Use only reagents of recognized analytical grade, unless otherwise specified, and distilled or deionized water or water of equivalent purity.

The reagents [except the standard materials (4.6)] shall be practically free from nitrogenous compounds.

4.1 Potassium sulfate.

4.2 Catalyst, either 4.2.1 or 4.2.2.

4.2.1 Copper(II) oxide (CuO).

4.2.2 Copper(II) sulfate pentahydrate ($CuSO_4 \cdot 5H_2O$).

4.3 Sulfuric acid, $c(H_2SO_4) = 18$ mol/l, $\rho_{20}(H_2SO_4) = 1{,}84$ g/ml.

4.4 Paraffin wax.

4.5 Saccharose.

4.6 Standard materials, either 4.6.1 or 4.6.2.

4.6.1 Acetanilide, with melting point 114 °C; nitrogen (N) content 103,6 g/kg.

4.6.2 Tryptophan, with melting point 282 °C; nitrogen (N) content 137,2 g/kg.

Dry before use.

4.7 Sodium hydroxide solution, $w(\mathrm{NaOH}) = 33$ % (mass fraction).

4.8 Collecting liquid, either 4.8.1 or 4.8.2.

4.8.1 Sulfuric acid, standard volumetric solution, $c(\mathrm{H_2SO_4}) = 0{,}05$ mol/l or $c(\mathrm{H_2SO_4}) = 0{,}125$ mol/l.

4.8.2 Boric acid, $\rho(\mathrm{H_3BO_3}) = 40$ g/l.

4.9 Solutions for titration.

4.9.1 Sodium hydroxide, standard volumetric solution, $c(\mathrm{NaOH})$ 0,1 mol/l or $c(\mathrm{NaOH}) = 0{,}25$ mol/l.

4.9.2 Sulfuric acid, standard volumetric solution, $c(\mathrm{H_2SO_4}) = 0{,}05$ mol/l or $c(\mathrm{H_2SO_4}) = 0{,}125$ mol/l.

The molarity of standard volumetric solutions should be known to the fourth decimal point.

4.10 Mixed indicator, neutral point at pH 4,4 to 5,8.

Dissolve 2 g of methyl red and 1 g of methylene blue in 1 000 ml of ethanol [$\varphi(\mathrm{C_2H_5OH}) = 95$ % (volume fraction)].

4.11 pH indicator paper.

4.12 Boiling aids, such as granulated pumice stone, or glass beads of diameter 5 mm to 7 mm, or carborundum chips, washed in hydrochloric acid and in distilled water, and ashed.

5 Apparatus

Usual laboratory apparatus and, in particular, the following.

5.1 Analytical balance.

5.2 Digestion, distillation and titration apparatus.

6 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 part of ISO 5893. A recommended sampling method is given in ISO 6497.

Store the sample in such a way that deterioration and change in its composition are prevented.