
**Fertilizers — Determination of
urea condensates using high-
performance liquid chromatography
(HPLC) — Isobutylidenediurea and
crotonylidenediurea (method A) and
methylen-urea oligomers (method B)**

*Engrais — Dosage des condensats d'urée par chromatographie
liquide haute performance (CLHP) — Isobutylidène diurée et
crotonylidène diurée (méthode A) et oligomères de méthylène-urée
(méthode B)*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

ISO 25705 was prepared by CEN/TC 260 (as EN 15705:2010) and was adopted by Technical Committee ISO/TC 134, *Fertilizers and soil conditioners*. The following modifications were made.

- The references to EN 1482-1 and EN 1482-2 were changed to ISO 14820-1 and ISO 14820-2.
- In 5.2.1 and 6.2.1, the general text (not related to the water) was moved directly under 5.2 and 6.2, respectively.
- In Table 1, the word “approximate” was added to the column headers for IBDU and CDU.
- In 5.4.3 and 6.4.3, “the sample grounded” was changed to “the ground sample”.
- In 6.4.3, “pieces of glass” and “pieces” were replaced by “boiling stones”.
- In 6.4.2.1, 6.4.2.2, 6.4.2.3, and 6.4.2.4, “by placing the flask in the” was added before “ultrasonic bath”.
- In 6.4.2.1, 6.4.2.2, 6.4.2.3, 6.4.2.4, 6.4.2.5 and 6.4.3, “homogenize” was changed to “mix thoroughly”.
- In 6.4.2.5, “before transferring into” was changed to “before transferring in” three times.
- In the keys for Figures B.2, B.3, B.4, C.2, C.3, C.4 and C.5, the units for the areas were added.

Introduction

Fertilizers containing the condensates of urea and specified aldehydes (with crotonaldehyde called crotonyliden diurea or CDU, with isobutyraldehyde called isobutylidene diurea or IBDU, with formaldehyde called urea formaldehyde or methylene urea or MU) are covered by Regulation (EC) 2003/2003, Annex I^[4] as nitrogenous fertilizers. The methods described in this International Standard enable the quantitative determination of these condensates and the determination of the solubility of the MU-oligomers according to the Regulation.

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Fertilizers — Determination of urea condensates using high-performance liquid chromatography (HPLC) — Isobutylidenediurea and crotonylidenediurea (method A) and methylen-urea oligomers (method B)

1 Scope

This International Standard specifies methods for the determination of isobutylidene diurea (IBDU), Crotonylidene diurea (CDU) (method A) and methylene-urea oligomers (MU) (method B) in fertilizers using high-performance liquid chromatography (HPLC).

The method is applicable to all fertilizers which do not contain interfering organic compounds.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

ISO 14820-2, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

EN 12944-1, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 1: General terms*

EN 12944-2, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 2: Terms relating to fertilizers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1 and EN 12944-2 apply.

4 Sampling and sample preparation

Sampling is not part of the method specified in this International Standard. A recommended sampling method is given in ISO 14820-1.

Sample preparation shall be carried out in accordance with ISO 14820-2.

5 Method A: Determination of CDU and IBDU

5.1 Principle

The sample is extracted with water and, after appropriate dilution, analysed using a suitable HPLC system.

5.2 Reagents

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

5.2.1 Water, distilled or demineralized water (grade 3 according to ISO 3696).