

**Väetised. Komplekseerunud mikroelementide ionide  
määramine väetistes. Lignosulfonaatide tuvastamine**

**Fertilizers - Determination of complexed micro-nutrient  
ions in fertilizers - Identification of lignosulfonates**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 16109:2011 sisaldab Euroopa standardi EN 16109:2011 ingliskeelset teksti.	This Estonian standard EVS-EN 16109:2011 consists of the English text of the European standard EN 16109:2011.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 09.11.2011.	Date of Availability of the European standard is 09.11.2011.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 65.080

### Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:  
Aru 10, 10317 Tallinn, Eesti; [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

### The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:  
Aru 10, 10317 Tallinn, Estonia; [www.evs.ee](http://www.evs.ee); phone 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

ICS 65.080

English Version

**Fertilizers - Determination of complexed micro-nutrient ions in  
fertilizers - Identification of lignosulfonates**

Engrais - Dosage des oligo-éléments complexés dans les  
engrais - Identification des lignosulfonates

Düngemittel - Bestimmung der in Düngemitteln  
komplexgebundenen Spurennährstoffionen - Identifizierung  
von Ligninsulfonaten

This European Standard was approved by CEN on 1 October 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

Foreword.....	3
1 Scope .....	4
2 Normative references .....	4
3 Terms and definitions .....	4
4 Sampling and sample preparation .....	4
5 Method A: Determination of phenolic hydroxyl content and 232,5 nm absorption for the identification of lignosulfonates .....	4
6 Method B: Determination of organic sulfur content for the identification of lignosulfonates .....	8
7 Expression of the results .....	11
8 Precision .....	12
9 Test report .....	13
Annex A (informative) Statistical results of the inter-laboratory test .....	14
A.1 General.....	14
A.2 Test Samples.....	14
A.3 Inter-laboratory test procedure .....	14
A.4 Results and statistical interpretation.....	14
Bibliography.....	17

## Foreword

This document (EN 16109:2011) has been prepared by Technical Committee CEN/TC 260 “Fertilizers and liming materials”, the secretariat of which is held by DIN.

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 May 2012, and conflicting national standards shall be withdrawn at the latest by May 2012.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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

## 1 Scope

This document specifies two complementary methods (method A and method B) that allow lignosulfonates to be identified as soluble complexing agents in fertilizers.

**NOTE** Lignosulfonate, as a complexing agent, is a natural polymer produced as a by-product of the sulfite method for manufacturing paper from wood pulp in the paper industry. As a natural polymer, it presents a poorly defined and variable chemical structure. It is an intricate mixture of small- to moderate-sized polymeric compounds with sulfonate groups attached to the molecule, and diverse complexing capacity.

The methods are applicable to EC fertilizers covered by Regulation (EC) No 2003/2003 [1].

## 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.

EN 1482-2, *Fertilizers and liming materials — Sampling and sample preparation — Part 2: Sample preparation*

EN 12944-1:1999, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 1: General Terms*

EN 12944-2:1999, *Fertilizers and liming materials and soil improvers — Vocabulary — Part 2: Terms relating to fertilizers*

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

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12944-1:1999 and EN 12944-2:1999 apply.

## 4 Sampling and sample preparation

Sampling is not part of the method specified in this document. A recommended sampling method is given in EN 1482-1.

Sample preparation shall be carried out in accordance with EN 1482-2.

## 5 Method A: Determination of phenolic hydroxyl content and 232,5 nm absorption for the identification of lignosulfonates

### 5.1 Principle

The method for the determination of the phenolic hydroxyl content is based on the ultraviolet absorption of phenols in alkaline solution (phenolate). The absorbance of an alkaline solution of the sample is measured directly against an acid solution of the same sample. The phenolic hydroxyl content of the sample is calculated from the molar extinction coefficient maximum of the resulting curve and the molar extinction coefficient of reference compounds determined in the same way.