

Cereals - Determination of moisture and protein -  
Method using Near-Infrared-Spectroscopy in whole  
kernels

## EESTI STANDARDI EESSÕNA

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English Version

## Cereals - Determination of moisture and protein - Method using Near-Infrared-Spectroscopy in whole kernels

Céréales - Détermination de la teneur en eau et en  
protéines - Méthode utilisant la spectroscopie dans le  
proche infrarouge sur des grains entiers

Getreide - Bestimmung der Feuchte und des Proteins -  
Verfahren der Nahinfrarot-Spektroskopie bei ganzen  
Körnern

This European Standard was approved by CEN on 5 January 2015.

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## Foreword

This document (EN 15948:2015) has been prepared by Technical Committee CEN/TC 338 "Cereal and cereal products", the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

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.

This document supersedes EN 15948:2012.

The following modifications were made in this new edition:

- Annexes have been enhanced with information on 2 other NIR instruments based on the results of the interlaboratory tests and the models of prediction.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## 1 Scope

This European Standard defines a routine method for the determination of moisture and protein in whole kernels of barley and wheat using a near-infrared spectrophotometer in the constituent ranges:

a) for wheat:

- 1) moisture content minimum range from 8 % to 22 %;
- 2) protein content minimum range from 7 % to 20 %.

b) for barley:

- 1) moisture content minimum range from 8 % to 22 %;
- 2) protein content minimum range from 7 % to 16 %.

This European Standard describes the modalities to be implemented by the supplier (5.3 and 5.4) and the user of the method.

## 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.

EN ISO 12099:2010, *Animal feeding stuffs, cereals and milled cereal products — Guidelines for the application of near infrared spectrometry (ISO 12099:2010)*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12099:2010 apply.

## 4 Principle

The method is based on Near-Infrared (NIR) spectroscopy, an indirect, correlative technique to predict the concentration of various constituents in organic samples. Linear or non-linear regression modelling is used to relate NIR spectra to moisture or protein concentrations determined by officially approved standard methods (e.g. artificial neural network - ANN, Partial Least Square Regression - PLS).

## 5 Method of analysis

### 5.1 General

According to this document, the method of analysis is defined as the association between a NIR instrument and a model of prediction.