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Cereal and cereal products - Technical report of the interlaboratory study for the determination of impurities content in maize (Zea mays, L.) and sorghum (Sorghum bicolor, L.)

Céréales et produits céréaliers - Rapport technique de l'étude interlaboratoires pour la détermination de la teneur en impuretés dans le maïs (Zea mays, L.) et le sorgho (Sorghum bicolor, L.)

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European foreword

This document (CEN/TR 16875:2015) has been prepared by Technical Committee CEN/TC 338 “Cereal and cereal products”, the secretariat of which is held by AFNOR.

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Introduction

The principle of the determination of impurities is to separate all the groups of impurities from the normal basic cereal grains of unimpaired quality by sieving and manual selection out of a subsample and to quantify them. The amount of impurities and its constituent groups is important for health, cleaning, milling and further processing aspects. For these reasons impurities content is a part of contracts in grain trade and also of the grain intervention system of the EU.

At present a European standard for the determination of impurities in maize and sorghum (EN 16378) has been developed.

An international interlaboratory trial for the determination of impurities in maize and sorghum was accomplished in order to get information on the intra- and interlaboratory variability of the determination of impurities content.

The technical report here describes the preparation and evaluation of the results of this interlaboratory test.

1 Scope

The term impurities applies to all components of a grain sample that differ from the normal basic cereal. It includes the following groups: broken grains, other cereals, grains damaged by pests, grains overheated during drying, sprouted grains, extraneous seeds, unsound grains, extraneous matter and impurities of animal origin.

The principle of the determination of impurities content is to separate all the groups of impurities from the normal basic cereal grains of unimpaired quality by sieving and manual selection out of a subsample and to quantify them. There are various problems in the determination of impurities:

Firstly, the identification of the different groups of impurities depends strongly on the experience and the knowledge of the investigator.

Also experienced investigators can differ in their characterization of grains.

Finally, one is faced with the fact that grain, even after mixing, is rarely homogenous. In other words, if a sample was divided by a sample divider into a number of portions, the amount of a specific group of impurities in each portion could be different, even if absolutely no human or machine error occurred in each determination.

These problems will result in variation of the results of the determination.

An international interlaboratory test for the determination of impurities, according to this standard and involving 14 laboratories in 4 countries, was carried out with 5 maize and 3 sorghum samples. It was asked to participants to make determination in duplicate.

Ten laboratories reported results for the complete sample set and two only for corns.

The test materials ranged between:

— 0,0 % and 2,7 % for broken grains;

— 0,2 % and 3,5 % for grain impurities;

— 0,0 % and 0,1 % for sprouted grains;

— 0,5 % and 3,3 % for miscellaneous impurities;

— 1,8 % and 8,7 % for total impurities.

The aim of the study is to determine the precision, repeatability and reproducibility of the method of determination of impurities content in maize and sorghum samples.

The analyses were realized in March - April 2011.

It occurs according to ISO 5725:1994.

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 16378, *Cereals - Determination of impurities content in maize (Zea mays, L.) and sorghum (Sorghum bicolor, L.)*