SLOVENSKI STANDARD
SIST-TP CEN ISO/TR 29263:2021

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Žito in žitni proizvodi - Študije vzorčenja (ISO/TR 29263:2021)

Cereals and cereal products - Sampling studies (ISO/TR 29263:2021)

Getreide und Getreideerzeugnisse - Probenahmestudien (ISO/TR 29263:2021)

Céréales et produits céréaliers - Études sur l'échantillonnage (ISO/TR 29263:2021)

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67.060	Žita, stročnice in proizvodi iz njih	Cereals, pulses and derived products

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Cereals and cereal products - Sampling studies (ISO/TR 29263:2021)

Céréales et produits céréaliers - Études sur l'échantillonnage (ISO/TR 29263:2021)

Getreide und Getreideerzeugnisse - Probenahmestudien (ISO/TR 29263:2021)

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European foreword

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The text of ISO/TR 29263:2021 has been approved by CEN as CEN ISO/TR 29263:2021 without any modification.

TECHNICAL REPORT

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Cereals and cereal products — Sampling studies

Céréales et produits céréaliers — Études sur l'échantillonnage

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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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.

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This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 4, *Cereals and pulses*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 338, *Cereal and cereal products*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Introduction

This document presents the results of three groups of studies which results have been used to elaborate ISO 24333

These studies have been managed by United Kingdom in May 2003, by France in 2004-2005 for the first one and 2006-2007 for the second one and Germany in 2008.

Cereals and cereal products — Sampling studies

1 Scope

This document presents the description and the results of the three studies conducted by United Kingdom, France and Germany related to grain sampling in order to define a harmonized sampling protocol for official controls.

These results had been used to draft ISO 24333.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Context

European directives for official controls of some contaminants such as mycotoxins required methods for sampling and analysis. In order to harmonize sampling procedures necessary for these analysis and to determine the best way to prepare a homogenous and representative laboratory sample, studies had been conducted by United Kingdom, France and Germany.

The results of these 3 studies are presented in this report.

5 Study n°1: extract from "Grain sampling and assessment: sampling grain in lorries" – Project report n° 339"

5.1 General

By J. KNIGHT, R. WILKIN and J. RIVETT

Department of Environmental Science and Technology, Renewable Resources Assessment Group,

Imperial College of Science and Technology, Prince Consort Road, London SW7 2BB

This is the final report of a 13-month project that started in May 2003. The work was funded by HGCA (project 2955).

5.2 Context

This two-year programme was made at the request of HGCA to improve and standardise grain sampling and analysis across the UK cereals industry.

The first phase of the programme was to develop and validate protocols suitable for collecting samples of grain on UK farms at harvest time and to train farmers in their use. The second part was to examine approaches to the collection of samples during storage and to compare the results obtained, wherever possible, with data collected as the store was filled. During the course of earlier sampling work, there was strong interest expressed in the mechanics and effectiveness of sampling loads of grain in lorries. In addition, some of the work done during storage involved sampling grain as it left the store in lorries. This showed up the limitations of some approaches to lorry sampling and highlighted the need for more information. An assessment of lorry sampling was therefore, added and is reported here.

Almost all grain is sampled as it is delivered to end users to confirm its quality and to ensure that contractual obligations are met. This sampling takes the form of collecting one or more samples from a lorry-load on arrival. The equipment used and method of sampling varies between end users and there are no data to show if these variations may cause bias in the representativeness of the sample and, therefore, in the results of quality analysis.

The key aim of end-user sampling is to ensure that the quality of the grain is suitable for its intended use. Therefore, sampling is done before the load is tipped and this limits access to the surface of the load. This access is further constrained by food safety and HSE legislation that prevent the sampler from walking on the load.

A limited assessment of the practicalities of sampling lorries was done in 1992 (HGCA Project Report 79) in which the effects of method of sampling, number and position of sample points, the methods of loading lorries were considered. The wheat sampled was low-grade feed material with a low specific weight and a high level of fine material so was not representative of other grades. The results suggested that loading lorries with a front loader or from a hopper had no effect on the distribution of the quality characteristics within a load. Small differences were noted in the mean values for specific weight between automatic sampling using a Samplex CS90 and a manual spear but overall variability of the grain meant that these differences were not significant. There was significant variability in the results obtained at individual points with either method, although this variability was random and not associated with any part of the load. Fine material appeared to be very difficult to measure. At the time, this work was undertaken there were no restrictions limiting access to the surface of the grain so that a widely disbursed pattern of sampling points could be used with the manual sampling. The conclusions from this work were that it was extremely unwise to base an assessment of lorry load of grain on a single sample and that more work was needed to confirm the results and to assesses other grades of grain. The aim of this project was to establish if there are any inherent problems with the sampling of grain for the determination of quality characteristics in lorries at the point of intake and to establish recommendations in the form of a protocol for the sampling of grain under these conditions.

Grain was sampled using automated systems (Samplex CS90) and manual spearing to see if the method of sampling influenced the grain quality measurements. A key part of the process was to assess the influence that the number of samples taken from each load had on the likely accuracy of the results. Samples were collected at 4 different locations; on two occasions 10 lorries were sampled and on two occasions 8 lorries were sampled. At three locations, CS90 samplers were used and 8 samples were withdrawn from each load and at the other location samples were taken manually with a multi-compartmented spear with 5 samples being taken from each lorry. A comparison of different ways of sample handling was obtained by comparing the individual results from the 8 samples against an analysis of samples withdrawn from a composite sample formed from 8 samples. The latter method reflects more accurately the procedure followed at most stores.

Results indicated that there were no statistically significant differences between results from the individual samples or from the composite samples. Monte Carlo simulation of the impacts of using 2, 3, 5 or 8 samples per load revealed that the greater the number of samples used the greater the reliability of the result and the more likely it was to represent the true mean of the load. It was noted that automatic sampling equipment can no longer sample the entire length of a trailer and this could cause problems with obtaining the ideal sample. Manual sampling also had severe limitations due to the lack of safe access for sampling of trailers.

A sampling protocol for lorries is presented which emphasises the need for 8 samples to be taken from each load in order to get a good representation of the quality of the entire load.

5.3 Studies conducted and objectives

The study was conducted to assess the effectiveness of different approaches to sampling loads of grain in lorries.

The specific objectives were:

— To assess if the method of collecting samples influences grain quality measurement;

— To assess if the number and position of sampling points influences grain quality measurement;

— To provide guidelines for sampling lorries giving reliable information about grain quality.

5.4 Methodology

5.4.1 Conducting tests

5.4.1.1 Collection of data relating to current sampling practice

In November 2002 the HGCA circulated a questionnaire to commercial grain stores and end-users of grain requesting information about their methods of analysis and methods of intake sampling. The information that was collected was used to assist with the design of the assessment of lorry sampling.

5.4.1.2 Sample collection

5.4.1.2.1 Store 1

The work was done at a store specialising in the storage of malting barley. Lorries were loaded with malting barley, variety Pearl, of a quality representative of that delivered to central storage from farms. The lorries, all 28 t articulated units, were loaded with a front loader fitted with a 2 t bucket.

Ten loads were sampled over a 2-day period. Sampling was done using the store's Samplex CS90 automated vacuum sampler. Initially, it had been expected to re-programme the CS90 to take 10 samples/load in a pre-set pattern. However, observation of the method of operation and sampling pattern achieved by the CS90 suggested that there was no advantage in using more than the 8 points provided by one of the standard sampler programmes.

During the setting up and initial testing of the CS90, the slide on the sample spear was opened to its maximum to increase the sample size. The system was set to collect grain only during the withdrawal as is recommended by the manufacturer for granular materials.

Each of the eight points was sampled three times. On the first occasion, individual samples were held separately. During the second and third samplings, all samples were bulked into single batches. One of these bulk samples was held as a composite sample and the other was used to provide samples of 1, 2 and 3 litres (small medium and large) collected at random with a 1-litre jug.

A small sub-sample from each of the individual samples was tested on the spot by store staff for screenings and germinative capacity. Screenings were tested by sieving a 100 g sub-sample with a motorised shaker fitted with a 2,25 mm mesh screen for 2 minutes. The germinative capacity was tested using the standard tetrazolium test.

5.4.1.2.2 Store 2

Work was done at a commercial store during the normal out-loading of feed wheat. The lorries were loaded from an on-floor bulk using a front-bucket loader and were sampled as they left the store. Normal sampling practice was to collect a single spear sample/load using a manual, multi-compartmented spear of about 1,7 m in length. Access to the load was via a small sampling platform that only allowed samples to be taken from less than half the length of the loaded trailer and from only one side of the load.