



BSI Standards Publication

Ambient air — Monitoring the effects of genetically modified organisms (GMO) — Pollen monitoring

Part 1: Technical pollen sampling using pollen
mass filter (PMF) and Sigma-2-sampler

National foreword

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English Version

**Ambient air - Monitoring the effects of genetically
 modified organisms (GMO) - Pollen monitoring - Part 1.
 Technical pollen sampling using pollen mass filter (PMF)
 and Sigma-2-sampler**

Air ambiant - Surveillance des effets d'organismes
 génétiquement modifiés (OGM) - Surveillance du
 pollen - Partie 1 : Échantillonnage technique du pollen
 à l'aide d'un filtre de masse à pollen (PMF) et d'un
 échantillonneur Sigma-2

Außenluft - Monitoring der Wirkungen von
 gentechnisch veränderten Organismen (GVO) -
 Pollenmonitoring - Teil 1: Technische Pollensammlung
 mit Pollenmassenfilter (PMF) und Sigma-2-Sammler

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Contents

Page

European foreword.....	5
Introduction	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions	7
4 Basic principle of the procedure	9
5 Sampling.....	9
5.1 Instruments and materials.....	9
5.1.1 General.....	9
5.1.2 Sigma-2 passive sampler	10
5.1.3 Pollen mass filter PMF.....	10
5.2 Technical implementation.....	12
6 Sampling procedure.....	13
6.1 General.....	13
6.2 Sampling design.....	13
6.2.1 General.....	13
6.2.2 Exposure assessment of pollen input in the vicinity of fields with genetically modified crop (gm-fields) related to a specific GMO and region.....	14
6.2.3 Exposure assessment of pollen input for validating and/or calibrating dispersal models.....	15
6.2.4 General monitoring of pollen exposure at larger scales.....	15
6.2.5 Assessment of standardized and accentuated specific pollen deposition	15
6.3 Site conditions.....	15
6.4 Installing the equipment	16
6.5 Exposure time.....	17
6.6 Sampling at site.....	17
6.6.1 Sigma-2 passive sampler	17
6.6.2 PMF.....	17
6.7 Sample preparation.....	18
6.7.1 Preparation of slices for microscopy.....	18
6.7.2 Preparation of PMF samples	19
7 Microscopic pollen analysis	20
7.1 General.....	20
7.2 Sigma-2 passive sampler	20
7.2.1 Microscopic imaging methods.....	20
7.2.2 Qualitative analysis of the pollen diversity	21
7.2.3 Quantitative analysis of the pollen	21
7.3 PMF.....	21
7.3.1 Microscopic analysis	21
7.3.2 Qualitative analysis of the pollen (diversity).....	21
7.3.3 Quantitative microscopic analysis of pollen	21
8 Molecular-biological analyses of GMO.....	23

9	Determination of the target parameters for GMO monitoring and representation of the results.....	24
9.1	General	24
9.2	Sigma-2 passive sampler.....	24
9.2.1	Determination of pollen deposition per sampling period.....	24
9.2.2	Determination of the daily mean pollen deposition rate per sampling period	25
9.2.3	Determination of yearly pollen deposition	25
9.2.4	References to pollen dispersal models	25
9.3	PMF	26
9.3.1	Pollen count per sample $N_{i,PMF}$	26
9.3.2	Relative frequency of pollen species i	26
9.3.3	Determination of pollen flux per sampling period.....	26
9.3.4	Determination of the daily mean pollen flux rate per sampling period.....	26
9.3.5	Determination of the yearly pollen flux	27
9.3.6	Assessment of results from molecular-biological analyses	27
9.3.7	References to pollen dispersal models	28
10	Performance characteristics of the methods.....	28
10.1	General	28
10.2	Validation	28
10.3	Distribution of measured values.....	29
10.4	Methodical approach and determination of basic parameters.....	29
10.5	Sigma-2 passive sampler.....	31
10.5.1	Sensitivity, detection limit and reproducibility	31
10.5.2	Detection confidence level and required numbers of cases	33
10.6	PMF	35
10.6.1	Sensitivity, detection limit and reproducibility	35
10.6.2	Detection confidence level and required numbers of cases	38
10.7	Parallel measurements.....	40
10.8	Comparative measurements using a standard volumetric pollen trap (Hirst type).....	42
10.9	Pollen diversity	43
11	Quality assurance and quality control.....	44
11.1	General monitoring strategy and terms of reference of pollen monitoring with technical samplers	44
11.2	Site protocol.....	44
11.3	Accompanying documentation for samples.....	45
11.4	Parallel measurements.....	45
11.5	Comparative measurements using active samplers as calibration bases.....	45
11.6	Quality assurance and reference materials	45
11.7	Qualification	46
Annex A (informative)	Maize-specific requirements	47
A.1	Scope	47
A.2	Basic principles	47
A.3	Sampling	48
A.4	Sample preparation	49
A.5	Quantitative microscopic pollen analysis.....	50
A.6	Molecular-biological analysis of maize DNA using PCR.....	51
A.6.1	General	51
A.6.2	DNA extraction.....	51

A.6.3	Real-time PCR analysis.....	51
A.7	Determination of the target parameters for GMO monitoring and assessment of the results.....	52
	Bibliography.....	53

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European foreword

This document (CEN/TS 16817-1:2015) has been prepared by Technical Committee CEN/TC 264 "Air quality", the secretariat of which is held by DIN.

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CEN/TS 16817, *Ambient air — Monitoring the effects of genetically modified organisms (GMO) — Pollen monitoring*, is composed of the following parts:

- Part 1: *Technical pollen sampling using pollen mass filter (PMF) and Sigma-2-sampler* [this present document];
- Part 2: *Biological pollen sampling using bee colonies*.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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.

Introduction

The European Parliament and the European Council require an environmental risk assessment and a post-marketing monitoring for any GMO released to the environment [5; 6]. This had to be implied in national law in any member state of the EC by date.

Pollen dispersal plays a significant role in the dissemination of genetically modified organisms (GMO). A procedure is described for GMO monitoring that enables quantification and documentation of GMO input and spread through pollen in a nationwide monitoring network which represents natural landscapes. Technical and biological pollen sampling (the present Technical Specification and CEN/TS 16817-2) and molecular biological analysis methods (polymerase chain reaction (PCR) for DNA; Enzyme-linked immunosorbent assay (ELISA) for proteins) are used for the detection of GMO input.

It is reasonable to use both technical and biological sampling of pollen, thus they supplement each other in manifold ways. The technical sampling (i.e. the present document) is conducted with stationary point-samplers. They give a record of pollen input at the sample site that correlates with the prevailing wind direction and relative position to the surrounding pollen sources. Bee colonies actively roam an area and are therefore area related samplers. Further, pollen sampling depends more on the collection activity of the bees and the availability of pollen sources within the roaming area according to the bees' preferences and supply of melliferous plants [32].

Presently known pollen traps are only partially suited for GMO monitoring, since they can neither be standardized nor is the instrumentation designed for exposure times that are suitable for this purpose. Another limitation of commonly used pollen samplers is the requirement for a power supply, e.g. as for the Hirst type trap. The use of these instruments is therefore restricted to a limited exposure area.

For these reasons, a new type of passive pollen sampler, the pollen mass filter (PMF), was developed. The PMF is used either in combination with the Sigma-2 passive sampler or solely.

The present Technical Specification is largely based on German VDI/Guideline 4330 Part 3 [31].

1 Scope

This Technical Specification describes a procedure for the use of the passive samplers Sigma-2 and PMF to sample airborne pollen. Both are designed to sample coarse aerosol particles. Collected samples are used to analyse pollen input with regard to pollen type and amount, and input of transgenic pollen. The Sigma-2 passive sampler here provides a standardized sampling method for direct microscopic pollen analysis and quantifying the input of airborne pollen at the site. The PMF yields sufficient amounts of pollen to additionally carry out molecular-biological diagnostics for detection of GMO.

Essential background information on performing GMO monitoring is given in VDI/Guideline 4350 Part 1 [4], which is based on an integrated assessment of temporal and spatial variation of GMO cultivation (sources of GMO), the exposure in the environment and biological/ecological effects. Locally, the pollen sampling using technical samplers for GMO monitoring should be undertaken in combination with the biological collection of pollen by bees (CEN/TS 16817-2).

The application of technical passive samplers and the use of honey bee colonies as active biological collectors complement each other in a manifold way when monitoring the exposure to GMO pollen. Technical samplers provide results regarding the pollen input at the sampling site in a representative way, whereas with biological sampling by honey bee colonies, pollen from flowering plants in the area is collected according to the bees' collection activity. Thus, this method represents GMO exposure to roaming insects. By combining the two sampling methods these two main principles of exposure are represented. Furthermore, a broad range of pollen species is covered.

The sample design depends on the intended sampling objective. Some examples are given in 6.2.

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.

VDI 2119:2013-06¹⁾, *Ambient air measurement — Sampling of atmospheric particles > 2,5 µm on an acceptor surface using the Sigma-2 passive sampler — Characterisation by optical microscopy and calculation of number settling rate and mass concentration*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

acceptor surface

natural or manmade collection surface for airborne particles

3.2

concentration

number concentration

number of particles per unit air volume; here number of pollen per m³ air

3.3

deposition

pollen deposition

deposition of atmospheric particles; here pollen on an acceptor surface

1) For application of the Sigma-2.