ICS 07.080, 13.020.99 SLOVENSKÁ TECHNICKÁ NORMA Január 2016

STN	**Vonkajšie ovzdušie. Monitorovanie účinkov geneticky modifikovaných organizmov (GMO). Monitorovanie peľov. Časť 2: Biologický odber vzoriek peľov pomocou kolónií včiel.**	**STN** **P CEN/TS 16817-2** 83 5808

Ambient air - Monitoring the effects of genetically modified organisms (GMO) - Pollen monitoring - Part 2: Biological pollen sampling using bee colonies

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 12/15

Táto predbežná STN je určená na overenie. Pripomienky zasielajte ÚNMS SR nejneskôr do októbra 2017.

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English Version

Ambient air - Monitoring the effects of genetically modified organisms (GMO) - Pollen monitoring - Part 2: Biological pollen sampling using bee colonies

Air ambiant - Surveillance des effets d'organismes génétiquement modifiés (OGM) - Surveillance du pollen - Partie 2 : Échantillonnage biologique du pollen à l'aide de colonies d'abeilles

Außenluft - Monitoring der Wirkungen von gentechnisch veränderten Organismen (GVO) - Pollenmonitoring - Teil 2: Biologische Pollensammlung mit Bienenvölkern

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (CEN/TS 16817-2:2015) 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*;

— *Part 2: Biological pollen sampling using bee colonies* [the present document].

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 [6; 7]. 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). Hence, a monitoring procedure that involves recording and documentation of input and distribution of GMO via pollen in a monitoring network mirroring the natural environment is required. For this, technical (CEN/TS 16817-1) and biological sampling of pollen as well as PCR-screening (polymerase chain reaction) procedures are employed to provide evidence of GMO-exposure. The biological sampling system using honey bee colonies is described in the present Technical Specification.

VDI/Guideline 4330 Part 1 [3] presents the necessary fundamentals for the understanding of this Technical Specification. The sampling of pollen in the sample matrices honey, pollen load and bee-bread [5] needs to be viewed in conjunction with the technical sampling for the GMO-monitoring [4].

The use of the biological, actively foraging honeybee and the technical passive samplers complement each other in a manifold and positive way for pollen monitoring of GMO. Therefore it is reasonable to use both. The technical sampling (CEN/TS 16817-1) is based on stationary point-samplers [1]. They give a record of pollen exposure in the air at the sample site that correlates with the prevailing wind direction and relative position to the surrounding pollen sources. The biological sampling using honey bee colonies serves as indicator for GMO exposure in an area and for exposure to roaming insects. Bees display a spatially averaging sampling activity, which represents a cross section of the established, blossoming plants in the area according to the bees collection activities. A wide spectrum of pollen species is recorded using both sampling methods with the procedures complementing each other across the vegetation period [21].

1 Scope

This Technical Specification describes a procedure through which pollen – in particular pollen of genetically modified organisms (GMO) – can be sampled by means of bee colonies.

Bee colonies, especially the foraging bees, actively roam an area and are therefore area related samplers. Pollen sampling depends on the collection activity of the bees and the availability of pollen sources within the spatial zone according to the bees' preferences (supply of melliferous plants). A colony of bees normally forages over an area of up to 5 km radius (median 1,6 km, mean 2,2 km), in rare cases some bees may also forage in greater distances up to 10 km and more [26].

Foragers fix the gathered pollen on the outside of their hind legs (pollen loads, also known as pollen pellets). Inside the hive they place these pollen loads into comb cells close to the brood nest (bee bread). Furthermore, foragers gather nectar and honeydew. Nectar contains pollen which fell from the anthers of the blossom into the nectar drop, or pollen which was dispersed by the wind and sticks in the nectar of other blossoms or adheres to the sticky honeydew of plants. Nectar and honeydew are converted to honey and stored by the bees in the beehive.

Honey, pollen load and bee-bread may be used as sample matrices for the subsequent analysis of pollen as it is possible to concentrate sufficient amounts of pollen for microscopic and molecular biological diagnostics.

Microscopic analysis is used to identify the various pollen types and to quantify the exposure to the target pollen types in question. GMO exposure is analysed by molecular-biological methods: For analysis of pollen DNA quantitative PCR methods are used and described here in this Technical Specification. The analysis of GMO specific proteins and toxins in pollen is possible, too, using ELISA, but to this date the method has not been evaluated enough in pollen matrices for standardization in this Technical Specification.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document 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.

DIN 10760, *Analysis of honey — Determination of the relative frequency of pollen*