SLOVENSKI STANDARD
oSIST prEN 16868:2017

01-november-2017

Zunanji zrak - Vzorčenje in analiza cvetnega prahu in trosov gliv v zraku za alergijsko omrežje - Volumetrična Hirstova metoda

Ambient air - Sampling and analysis of airborne pollen grains and fungal spores for allergy networks - Volumetric Hirst method

Außenluft - Probenahme und Analyse luftgetragener Pollen und Pilzsporen für Allergienetzwerke - Volumetrische Hirst-Methode

Air ambiant - Échantillonnage et analyse des grains de pollen et des spores fongiques aériens pour les réseaux relatifs à l'allergie - Méthode volumétrique de Hirst

Ta slovenski standard je istoveten z: **prEN 16868**

ICS:

13.040.20 Kakovost okoljskega zraka Ambient atmospheres

oSIST prEN 16868:2017 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 16868

September 2017

ICS 13.040.20

Will supersede CEN/TS 16868:2015

English Version

Ambient air - Sampling and analysis of airbone pollen grains and fungal spores for networks related to allergy - Volumetric Hirst method

Air ambiant - Échantillonnage et analyse des grains de pollen et des spores fongiques aériens pour les réseaux relatifs à l'allergie - Méthode volumétrique de Hirst

Außenluft - Probenahme und Analyse luftgetragener Pollen und Pilzsporen für Allergienetzwerke - Volumetrische Hirst-Methode

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. prEN 16868:2017 E

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European foreword

This document (prEN 16868:2017) has been prepared by Technical Committee CEN/TC 264 “Air quality”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 16868:2015.

Introduction

Biological particles (pollen and fungal spores) are present in the air, causing health impacts at various levels. In Europe, nearly 18 % to 20 % of people suffer from pollinosis due to pollen and/or fungal spores. Pollen grains and fungal spores are considered in some Member States as an air pollutant as well as particles suspended in the air ($PM_{10,2,5}$). In Europe, European Aerobiology Society (EAS) in coordination with International Association for Aerobiology (IAA) manage problems of sampling, analysis, quality control, development and information.

Persons and institutions involved in pollen forecasting have a scientific and public health responsibility. A pollen forecast is a guideline for allergen avoidance with a direct influence on pollen allergy sufferers and their behavior. Pollen allergy sufferers are in need of such information since pollen allergy affects their quality of life and pollen and spores are an abundant, environmental allergen. The health state of pollen allergy sufferers should never be risked due to inadequate forecasts, financial interests or deficient working routines applied in the fundamental work such as pollen data evaluation and all involved processes (maintenance of the device, preparation, evaluation, handling and processing of data).

For the sampling and analysis of biological particles different methodology and operating procedures are used.

Sampling equipment is diversified (see Annex A). Analysis is based on optical light microscopy for identification and counting pollen grains and fungal spores.

Elements and reagents used during sampling and analysis have very specific properties and require to be handled carefully.

Information on airborne pollen and spore concentration (counts and analyses) plays an important role in aerobiology, as well as in other disciplines and fields of application, such as biodiversity, agriculture, forestry, phytopathology, meteorology, climatology, paleo-ecology/-climatology, forensic science, bioterrorism and health (sensitization and allergy). The method described in this European Standard is aimed for the purposes of networks related to allergy. Besides, it may also be useful for other applications mentioned above.

1 Scope

This European Standard specifies the procedure to sample continuously and analyses the concentration of airborne pollen grains and fungal spores in ambient air using the volumetric Hirst type sampler [1] [2] [3] (see Annex A) or even equivalent method assuring comparable data.

This European Standard describes both the sampling and the analysis procedures for the purpose of networks related to allergy. For the other tasks mentioned in the introduction, other specifications may be required.

2 Normative references

Not applicable.

3 Terms and definitions

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

3.1
accuracy
closeness of agreement between a measured quantity value and a true quantity value of a measurement

3.2
bench
long work table in a workshop or laboratory

3.3
clockwork
mechanism with a spring and toothed gearwheels, used to drive a mechanical clock, toy or other device

3.4
combined standard measurement uncertainty
obtained using the individual standard measurement uncertainties associated with the input quantities in a measurement model

3.5
defatted
surface conditions after clearing with a fat removing substance

3.6
drum
cylindrical device for the mounting of a sticky tape

3.7
exine
outer wall of pollen grain, also called an exosporium

3.8
eyepiece
lens or combination of lenses in an optical instrument through which the eye views the image formed by the objective lens or lenses; ocular

3.9
flow meter
instrument for measuring the flow rate of a fluid in a pipe

3.10
flow rate
amount of fluid (e.g. air) that flows in a given time

3.11
fungal spore
reproductive unit of a fungi capable of giving rise to a new individual with or without sexual fusion

3.12
hood
metal cover or canopy for a stove, ventilator, etc.

3.13
impaction
sampling of airborne particles by inertial separation on any surface (e.g. of an adhesive)

3.14
magnetic stirrer
object or mechanical device used for stirring something

3.15
magnification
magnifying power of an instrument, e.g. this microscope should give a magnification of about × 100

3.16
microscope
optical instrument having a magnifying lens or a combination of lenses for inspecting objects too small to be seen or too small to be seen distinctly and in detail by the unaided eye

3.17
objectives
optics (in a telescope, microscope, camera, or other optical system), the lens or combination of lenses, that first receive the rays from the object and form the image in the focal plane of the eyepiece, as in a microscope, or on a plate or screen as in a camera

Note 1 to entry: Also called object glass, object lens, objective lens.

3.18
orifice
opening or aperture, as of a tube or pipe; a mouthpiece with a slotlike opening on the side of the trap

3.19
particle
minute portion of matter

3.20
pollen
male gametophyte of flowering plants, consisting of microscopic grain discharged from the anthers (*Angiosperms*) or from a male cone (*Gymnosperms*)

Note 1 to entry: Each pollen grain contains two male gametes (only one can fertilize the female ovule).

Note 2 to entry: Pollen are transported by wind, water, animals (e.g. insects).

3.21
precision
closeness of agreement between indications or measured quantity values obtained by replicate measurements on the same objects under specified conditions

3.22
repeatability
condition of measurement, out of a set of conditions that includes the same measurement procedure, same operators, same measuring system, same operating conditions and same location, and replicate measurements on the same objects over a short period of time

3.23
reproducibility
condition of measurement, out of a set of conditions that includes different locations, operators, measuring systems, and replicate measurements on the same objects

3.24
sensitivity
in aerobiology, measurement of the proportion of search particle which is correctly identified

3.25
slide
rectangular piece of glass on which an object is mounted or placed for examination under a microscope

3.26
specificity
in aerobiology, measurement of the proportion of non-searched particles which are correctly identified as different from the searched particles

3.27
standard measurement uncertainty
measurement uncertainty expressed as a standard deviation

3.28
suction
production of a negative pressure by the removal of air to force fluid into a vacant space

3.29
taxon/taxa
taxonomic group of any rank, such as a species, genus, family or other rank

3.30
trap
device used to collect something

3.31
vacuum
space from which the air has been completely or partly removed

3.32
vacuum pump
pump or device by which a partial vacuum can be produced

3.33
wind vane
mechanical device attached to an elevated structure; rotates freely depending on the direction of the wind

4 Principle

Ambient air is sampled by a volumetric suction system and directed towards a suitably coated sampling surface through a specific orifice oriented towards the wind; the particles contained in the sampled air are deposited by impaction on a continuously moving adhesive acceptor surface. The sampling surface is then examined with an optical microscope in order to identify and count the pollen and fungal spores per area (deposition rates). Using this method allows to calculate concentrations as a daily mean or a 2-hour mean. The sampling is usually done at low-volume rate (10 l/min). It allows a continuous sampling for up to seven days [4] [5] [6].

5 Sampling

5.1 Equipment

5.1.1 Apparatus

5.1.1.1 Motorised suction pump

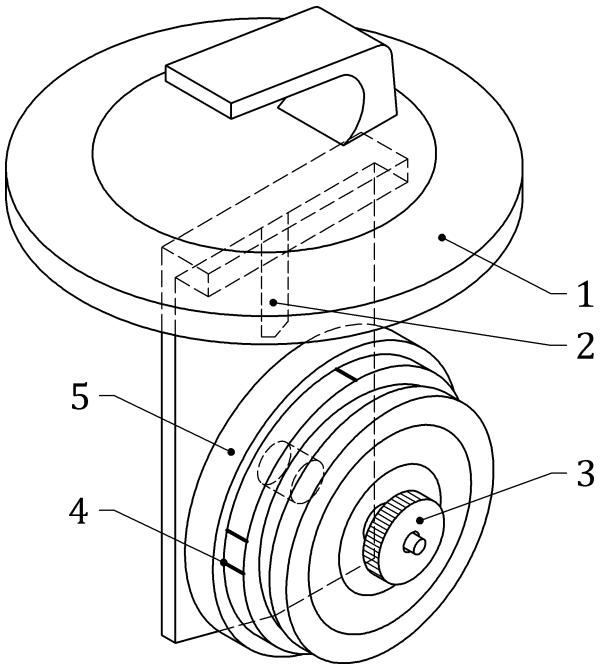
The motorised suction pump shall work 24 h a day and continuously throughout the year at the same flow rate. The power supply may be either mains or battery driven (solar panels). The electric motor shall be capable of continuous operation.

The suction system is, for instance, a vacuum pump. The flow rate of suction shall be adjusted by a flow control valve.

The recommended flow rate is 10 l/min with an acceptable error in precision and accuracy of less than 10 % (± 1 l/min).

The validity of the calibration method recommended with an error of less than 10 % in the accuracy of flow rate between calibration and operation shall be certified by the manufacturer. As the accuracy of the calibration depends on the air resistance and characteristic curves of the individual trap, vacuum pump and flow meter used [19], the validity has to be certified accordingly, i.e. specifically for the trap / vacuum pump / flow meter combination delivered by the manufacturer.

The flow rate shall be checked at every change of the impaction support with a validated method.



Key

1 lid
2 start reference pointer
3 lock nut
4 orifice start position
5 trapping surface

Figure 1a) — The Hirst volumetric trap showing 7-day lid assembly with drum