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Indoor air —

Part 22: Detection and quantification of fungal biomass by fungal β-N-acetylhexosaminidase enzyme activity

Air intérieur —

Partie 22: Détection et quantification de la biomasse fongique par caractérisation de l'activité de l'enzyme fongique β-N-acétyl-hexosaminidase

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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 146, *Air quality*, Subcommittee SC 6, *Indoor air*.

A list of all parts in the ISO 16000 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

Fungi from different taxonomic groups form filamentous cells (mycelium) and asexual spores (conidia). Most spores are in the size range of 2 µm to 10 µm, some up to 30 µm and only few up to 100 µm. Spores of some fungi genera are small and become airborne very easily (e.g. *Aspergillus*, *Penicillium*) while others are bigger and/or embedded in a slime matrix (e.g. *Stachybotrys*, *Fusarium*) and less mobile.

Fungi spores are widely distributed in the outdoor environment and, therefore, also occur in varying concentrations indoors. The growth of fungi in indoor environments, however, is considered to be a hygiene problem because epidemiological studies have revealed that dampness and/or mould growth in homes is closely related to health problems affecting the occupants.

Harmonized methods for sampling, detection and enumeration of moulds, including standards for sampling strategies, are important for the comparative assessment of indoor mould problems. Before doing any measurements, a plan for the measurement strategy (on the basis of ISO 16000-19[14]) should be made.

This document describes the measurement of fungal material by enzymatic biochemical analysis.

It describes a rapid quantitative method to determine the total fungal material in air, on surfaces or in material samples by measuring a naturally occurring enzyme found in the chitinolytic system of all filamentous fungi (β-N-acetylhexosaminidase or NAHA (EC 3.2.1.52)).[1][2][3][4][5][6][7][8][9][10]11]

It describes the analytical procedure that can be performed on-site or in a laboratory and refers to applicable sampling procedures for air, surfaces and material samples.

This method does not enumerate or differentiate genera or species of fungi such as those found in ISO 16000-17[12], ISO 16000-18[13] and ISO 16000-20[15].

It is a quantitative method used to rapidly assess conditions found in indoor spaces or post-remediation.

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Indoor air —

Part 22: Detection and quantification of fungal biomass by fungal β-N-acetylhexosaminidase enzyme activity

1 Scope

This document specifies requirements for the sampling and analysis of air, surface or bulk material samples analysed by fluorometric detection of an enzyme activity present in filamentous fungi[1] (US Patent No. 6,372,446) to quantitatively determine the total fungal biomass density. It describes the analytical procedure that can be performed on-site or in a laboratory. This method does not enumerate or differentiate genera or species of fungi.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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

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

3.1
enzyme
substance, produced by living cells that acts as a catalyst to bring about a specific biochemical reaction

3.2
filamentous fungus
fungus growing in the form of filaments of cells known as hyphae

Note 1 to entry: The term “filamentous fungi” differentiates fungi with hyphal growth from yeasts.

[SOURCE: ISO 16000-20:2014, 2.3[15]]

3.3
mould
<air quality> *filamentous fungi* (3.2) from several taxonomic groups; namely Ascomycota, Basidiomycota, Mucoromycota, and their asexual states

Note 1 to entry: Mould form different types of spores depending on the taxonomic group they belong to, namely conidiospores (conidia), sporangiospores, basidiospores or ascospores.

[SOURCE: ISO 16000-20:2014, 2.6[15], modified — “Basidiomycota, Mucoromycota, and their asexual states” replaced “Zygomycota, and their anamorphic states former known as Deuteromycota or fungi imperfecti”. “basidiospores” added to Note 1 to entry.]

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