TECHNICAL SPECIFICATION

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Plant biostimulants - Determination of mycorrhizal fungi

Biostimulants des végétaux - Détermination des champignons mycorhiziens

Biostimulanzien für die pflanzliche Anwendung - Bestimmung von Mykorrhizapilzen

This Technical Specification (CEN/TS) was approved by CEN on 3 January 2022 for provisional application.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (CEN/TS 17722:2022) has been prepared by Technical Committee CEN/TC 455 “Plant Biostimulants”, the secretariat of which is held by AFNOR.

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This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

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Introduction

This document was prepared by the experts of CEN/TC 455 “Plant Biostimulants”. The European Committee for Standardization (CEN) was requested by the European Commission (EC) to draft European standards or European standardization deliverables to support the implementation of Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products (“FPR” or “Fertilising Products Regulation”). This standardization request, presented as M/564, also contributes to the Communication on “Innovating for Sustainable Growth: A Bio economy for Europe”. Working Group 5 “Labelling and denominations” was created to develop a work program as part of this standardization request.

Technical Committee CEN/TC 455 “Plant Biostimulants” was established to carry out the work program that will prepare a series of standards. The interest in biostimulants has increased significantly in Europe as a valuable tool to use in agriculture. Standardization was identified as having an important role in order to promote the use of biostimulants. The work of CEN/TC 455 seeks to improve the reliability of the supply chain, thereby improving the confidence of farmers, industry, and consumers in biostimulants, and will promote and support commercialisation of the European biostimulant industry.

The biostimulants used in agriculture can be applied in multiple ways: on soil, on plants, as seed treatment, etc. A microbial plant biostimulant consists of a microorganism or a consortium of microorganisms, as referred to in Component Material Category 7 of Annex II of the EU Fertilising Products Regulation.

This document is applicable to all biostimulants in agriculture based on live microorganisms belonging to the mycorrhiza.

Table 1 summarizes many of the agro-ecological principles and the role played by biostimulants.

Table 1 — Agro-ecological principles and the role played by biostimulants

Increase biodiversity
By improving soil microorganism quality/quantity
Reinforce biological regulation and interactions
By reinforcing plant-microorganism interactions
— symbiotic exchanges i.e. *Mycorrhiza*
— symbiotic exchanges i.e. *Rhizobiaceae/Fava*
— secretions mimicking plant hormones (i.e. *Trichoderma*)
By regulating plant physiological processes
— e.g. growth, metabolism, plant development
Improve biogeochemical cycles
— improve absorption of nutritional elements
— improve bioavailability of nutritional elements in the soil
— stimulate degradation of organic matter

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably trained staff.

1 Scope

This document was developed to provide a horizontal method for enumeration and genera/species determination [1], [2], [3] of mycorrhizal fungi in plant biostimulants products in accordance with the EU Fertilising Products Regulation.

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 terminological databases for use in standardization at the following addresses:

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

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

3.1
mycorrhiza
symbiotic relationship between a filamentous fungus and a plant

Note 1 to entry: In a mycorrhizal association, the fungus colonizes the plants' root tissues either intracellularly (as with endomycorrhiza) or extracellularly (as with ectomycorrhiza). This beneficial interaction brings several advantages to the plants such as, for instance, enhancement of nutrients and water uptake.

[SOURCE: CEN/TS 17724:2022, 3.2.2.6]

3.2
endomycorrhiza
symbiotic association characterized by a filamentous fungal partner that colonizes the plants' root tissues intracellularly

EXAMPLE Four main groups of endomycorrhizal associations exist like arbuscular, ericoid, orchidoid and sebacinoid mycorrhiza.

[SOURCE: CEN/TS 17724:2022, 3.2.2.6.1]

3.3
arbuscular mycorrhizal fungus
AMF
AM fungus
biotrophic microscopic fungus belonging to the Glomeromycota phylum (synonymous Glomeromycota) that establishes obligate symbiotic associations with more than 70 % of plant species on Earth

Note 1 to entry: Arbuscular mycorrhizal fungi produce structures inside plant roots, such as vesicles and/or endospores, but also specialized nutrient exchange structures called arbuscules.

Note 2 to entry: The hyphae do not penetrate the plant cell protoplast, but instead they invaginate the cortical cell membrane, where they branch dichotomously to develop the arbuscule, which is meant to be the place where the exchange of nutrients and water takes place between the plant and the fungus.

Note 3 to entry: Arbuscular mycorrhizal fungi extraradical mycelium forms an extensive network within the soil, which increases plant nutrient availability and absorption.