



SLOVENSKI STANDARD
kSIST-TS FprCEN/TS 17700-2:2021

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[Not translated]

Plant biostimulants - Claims - Part 2: Nutrient use efficiency resulting from the use of a plant biostimulant

Biostimulanzen für die pflanzliche Anwendung - Angaben - Teil 2: Effizienz der Nährstoffverwertung infolge der Verwendung eines Biostimulans für die pflanzliche Anwendung

Biostimulants des végétaux - Allégations - Partie 2 : Efficacité d'utilisation des éléments nutritifs résultant de l'utilisation d'un biostimulant des végétaux

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Ta slovenski standard je istoveten z: FprCEN/TS 17700-2

ICS:

65.080 Gnojila Fertilizers

kSIST-TS FprCEN/TS 17700-2:2021 en,fr,de

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TECHNICAL SPECIFICATION
SPÉCIFICATION TECHNIQUE
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FINAL DRAFT
FprCEN/TS 17700-2

September 2021

ICS 65.080

English Version

**Plant biostimulants - Claims - Part 2: Nutrient use
efficiency resulting from the use of a plant biostimulant**

Biostimulants des végétaux - Allégations - Partie 2 :
Efficacité d'utilisation des éléments nutritifs résultant
de l'utilisation d'un biostimulant des végétaux

Biostimulanzien für die pflanzliche Anwendung -
Angaben - Teil 2: Effizienz der Nährstoffverwertung
infolge der Verwendung eines Biostimulans für die
pflanzliche Anwendung

This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 455.

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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.

Warning : This document is not a Technical Specification. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a Technical Specification.



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

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European foreword

This document (FprCEN/TS 17700-2:2021) has been prepared by Technical Committee CEN/TC 455 “Plant biostimulants”, the secretariat of which is held by AFNOR.

This document is currently submitted to the Vote on TS.

The CEN/TS 17700 series, *Plant biostimulants - Claims*, consists of the following parts:

- *Part 1: General Principles;*
- *Part 2: Nutrient use efficiency resulting from the use of a plant biostimulant;*
- *Part 3: Tolerance to abiotic stress resulting from the use of a plant biostimulant;*
- *Part 4: Determination of quality traits resulting from the use of a plant biostimulant;*
- *Part 5: Determination of availability of confined nutrient in the soil or rhizosphere.*

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Introduction

This document has been developed to provide guidance for a consistent approach to justify the claims associated with the use of plant biostimulants in agriculture.

The definition of plant biostimulants to be used in the regulation on fertilizing materials is claims-based. For this reason, demonstrating that a product is indeed a *bona fide* plant biostimulant depends on a demonstration of its effect.

The placing of a plant biostimulant on the market should never be considered to guarantee effectiveness under all conditions, as many factors may influence the performance of a biostimulant in the field.

Plant biostimulants used in agriculture can be applied in multiple ways: on soil, on plant, as seed treatment, etc. This document is applicable to all application types of plant biostimulants in agriculture.

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1 Scope

This document provides guidance for justifying agronomic nutrient use efficiency claims of Plant biostimulants used in agriculture.

This document is aimed primarily at manufacturers, laboratories, researchers, technical centres, companies that will put the products on market, notifying authorities, notified bodies, and market surveillance authorities.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 17700-1:—¹, *Plant biostimulants - Claims - Part 1: General Principles*

CEN/TS 17724:—², *Plant biostimulants - Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 17724:—, CEN/TS 17701-1:— and the following apply.

3.1

nutrient use efficiency

measure of a plant's ability to acquire and utilize nutrients from the environment for a desired outcome based on (a) nutrient availability (b) uptake efficiency and/or (c) utilization efficiency

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Note 1 to entry: Nutrient use efficiency is a complex trait; it depends on the ability to take up the nutrients from the soil, medium, fertilizers... but also on transport, storage, mobilization, usage within the plant.

3.2

nutrient availability

elements either present in the soil solution or exchangeable on soil colloids

3.3

uptake efficiency

measure of the plant capacity to acquire nutrients from the environment

3.4

utilization efficiency

measure of the plant capacity to transform and valorise acquired nutrients into more complex substances (e.g. organic compounds, plant biomass)

¹ Under preparation. Current stage is: FprCEN/TS 17700-1:2021.

² Under preparation. Current stage is: FprCEN/TS 17724:2021.

FprCEN/TS 17700-2:2021 (E)**3.5****plant nutrient**

chemical element used by the plant for growth and development usually classified as a Primary Macronutrient, Secondary Macronutrient or Micronutrients per the quantity required by the plant

Note 1 to entry: Carbon, hydrogen and oxygen are also essential element for plant growth.

Note 2 to entry: Primary Macronutrients – Nitrogen, Phosphorus, Potassium,

Secondary Macronutrients – Sulphur, Calcium, Magnesium, Sodium,

Micronutrients – Iron, Molybdenum, Boron, Copper, Manganese, Zinc, Cobalt.

4 Terminology of the claim

The label shall clearly indicate the effect of the Plant biostimulant. For the case of the claim Nutrient Use Efficiency, the effect shall be written on the label like mentioned below:

- Improvement of the use efficiency of [Plant Nutrients]

The Plant Nutrients indicated shall be one of those demonstrated during the trials.

For terminology of the crops, refer to General Principles Technical Specification (CEN/TS 17700-1:—).

5 Assessment indices to validate the claims

Agronomic indices have been proposed for the short-term assessment of Nutrient Use Efficiency and its components. These indices are reported in Table 1, adapted from Dobermann A. 2007 [1].

They can be used independently to justify the claim. These indices are based on the following measurements:

F: Amount of nutrient made available to the plant

U: Amount of nutrient acquired by the plant biomass (total biomass or biomass in the part of interest.) Concentration of each nutrient measured in the plant.

Y: Crop yield. Could be interpreted in different manners: Harvested part or total biomass.

C: Concentration of the plant nutrient in the part of interest.

In order to justify the claims, these indices shall be calculated in presence and absence of plant biostimulants.

U and Y can also be measured for the control treatment without Fertilizers and noted U₀ and Y₀.

Table 1

Index	Calculation	Interpretation
RE = Apparent crop recovery efficiency of supplied nutrient	$RE = (U - U_0) / F$	RE depends on the congruence between plant demand and nutrient made available to the plant by fertilizers and/or other environment resources. RE is affected by the application method (amount, timing, placement, N (<i>or nutrients</i>) form) and factors that determine the size of the

Index	Calculation	Interpretation
		crop nutrient sink (genotype climate, plant density, abiotic /biotic stresses)
PE = Physiological efficiency of acquired Nutrient(s) Kg yield increase per kg increase in Nutrient Uptake from fertilizer or/and environment	$PE = (Y - Y_0) / (U - U_0) -$	Ability of a plant to transform nutrients acquired from fertilizer or environment into economic yield.
IE=Internal utilisation efficiency of a nutrient (kg yield per kg nutrient uptake)	$IE = (Y/U)$	Ability of a plant to transform nutrients acquired from all sources (soil, fertilizer) into economic yield (grain). Depends on genotype, environment and management.
AE = Agronomic efficiency if supplied nutrient (kg yield increase per kg nutrient applied)	$AE = (Y - Y_0) / F$ or $AE = RE \times PE$	Product of nutrient recovery from mineral or organic fertilizer (RE) and the efficiency with which the plant uses each additional unit of nutrient (PE). AE depends on management practices that affect RE and PE.
PFP = Partial factor productivity of supplied nutrient (kg Harvest product per kg nutrient applied)	$PFP = Y/F$ or $PFP = (Y_0/F) + AE$	More important for farmers because it integrates the use efficiency of both indigenous and applied nutrients. High indigenous soil nutrient supply (Y_0) and high AE are equally important for PFP.
NE = Nutrient export of a plant nutrient in a plant (plant part or total plant)	$NE = Y \times C$	Calculates the quantity of nutrient exported in the part of interest, with same level of nutrition in all treatments (through fertilizers and/or environment) Evaluates how much nutrients are indeed recovered into the part of interest.

Other indices or methods not listed in Table 1 and officially recognized by scientific community (peer review publications) could be used to justify the claim Nutrients Use Efficiency.

FprCEN/TS 17700-2:2021 (E)**6 Specifications for the performance of the trials****6.1 General specifications****6.1.1 Control**

Control is defined in Technical Specification CEN/TS 17700-1:—.

The different treatments in the test should be:

- Controls: substrate/soil with or without fertilizer,
- Treatments: substrate/soil with or without fertilizer + Plant Biostimulants.

The same substrate/soil should be used in each treatment and in case of field trials a characterization of the substrate/soil should be done.

6.1.2 Under controlled conditions

In the case that certain parameters or technical operations cannot be implemented in the open field, the conduction of the respective trials to prove the Plant Biostimulants claims should take place under controlled conditions.

EXAMPLE to have a measure of the total nutrient content in the substrate

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