

STN	Kvalita pôdy. Stanovenie mikrobiálnej diverzity pôdy. Časť 1: Analýza fosfolipidových mastných kyselín (PLFA) a analýza éterových lipidov vo fosfolipidoch (PLEL) (ISO/TS 29843-1:2010).	STN P CEN ISO/TS 29843-1 46 5290
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Soil quality - Determination of soil microbial diversity - Part 1: Method by phospholipid fatty acid analysis (PLFA) and phospholipid ether lipids (PLEL) analysis (ISO/TS 29843-1:2010)

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. 03/15

Táto predbežná STN je určená na overenie. Pripomienky zasielajte ÚNMS SR najneskôr do októbra 2016.

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ICS 13.080.30

English Version

Soil quality - Determination of soil microbial diversity - Part 1:
Method by phospholipid fatty acid analysis (PLFA) and
phospholipid ether lipids (PLEL) analysis (ISO/TS 29843-1:2010)

Qualité du sol - Détermination de la diversité microbienne
du sol - Partie 1: Méthode par analyse des acides gras
phospholipidiques (PLFA) et par analyse des lipides éther
phospholipidiques (PLEL) (ISO/TS 29843-1:2010)

Bodenbeschaffenheit - Bestimmung der Diversität von
Bodenmikroorganismen - Teil 1: Verfahren mittels
Phospholipidfettsäure(PLFA)-Analyse und
Phospholipidetherlipid(PLEL)-Analyse (ISO/TS 29843-
1:2010)

This Technical Specification (CEN/TS) was approved by CEN on 11 August 2014 for provisional application.

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Foreword

The text of ISO/TS 29843-1:2010 has been prepared by Technical Committee ISO/TC 190 "Soil quality" of the International Organization for Standardization (ISO) and has been taken over as CEN ISO/TS 29843-1:2014 by Technical Committee CEN/TC 345 "Characterization of soils" the secretariat of which is held by NEN.

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Endorsement notice

The text of ISO/TS 29843-1:2010 has been approved by CEN as CEN ISO/TS 29843-1:2014 without any modification.

**Soil quality — Determination of soil
microbial diversity —**

Part 1:

**Method by phospholipid fatty acid
analysis (PLFA) and phospholipid ether
lipids (PLEL) analysis**

Qualité du sol — Détermination de la diversité microbienne du sol —

*Partie 1: Méthode par analyse des acides gras phospholipidiques
(PLFA) et par analyse des lipides éther phospholipidiques (PLEL)*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
- an ISO Technical Specification (ISO/TS) represents an agreement between the members of a technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

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ISO/TS 29843-1 was prepared by Technical Committee ISO/TC 190, *Soil quality*, Subcommittee SC 4, *Biological methods*.

ISO/TS 29843 consists of the following parts, under the general title *Soil quality — Determination of soil microbial diversity*:

- *Part 1: Method by phospholipid fatty acid analysis (PLFA) and phospholipid ether lipids (PLEL) analysis*
- *Part 2: Method by phospholipid fatty acid analysis (PLFA) using the “simple PLFA extraction method”*

Introduction

Phospholipids are essential components of membranes of all living cells, and their fatty acid (PLFA: phospholipid fatty acids) or ether-linked isoprenoid side chains (PLEL: phospholipid ether lipid) allow for taxonomic differentiation within complex microbial communities (References [5] and [7]). This approach is now well established in soil ecology and serves as a phenotypic and thus complementary tool to genotypic (molecular genetic) approaches for determining microbial diversity.

Different methodologies for determination of soil fatty acids are available. These methodologies present different levels of complexity when applied and provide different levels of resolution in the description of soil microbial communities.

The determination of total PLFA and PLEL provides a quantitative measure of the viable biomass of soil: microorganisms of all three domains of the biosphere (bacteria, fungi and archaeobacteria). Viable microbes have an intact membrane, which contains phospholipids. Cellular enzymes hydrolyze and release the phosphate group within minutes or hours following cell death (Reference [6]).

Apart from taxonomic descriptions, the PLFA technique enables the determination of physiological changes within microbial consortia. For instance, the monoenic PLFA 16:1 ω 7c and 18:1 ω 7c are increasingly converted to the cyclopropyl fatty acids cy17:0 and cy19:0 in Gram-negative bacteria in response to environmental stress (Reference [2]).

Besides the method described in this part of ISO/TS 29843, other methods for the determination of PLFA are available (References [3] and [6]). With these methods, only bacterial and fungal PLFA can be estimated; the determination of hydroxy-substituted fatty acids (PLOH), non-ester-linked (NEL) fatty acids and PLEL is not possible.

Soil quality — Determination of soil microbial diversity —

Part 1: Method by phospholipid fatty acid analysis (PLFA) and phospholipid ether lipids (PLEL) analysis

1 Scope

This part of ISO/TS 29843 specifies an extended method for the extraction and determination of both phospholipid fatty acids (PLFA) and phospholipid ether lipids (PLEL) from soils.

ISO/TS 29843-2 specifies a simple method for the extraction of only PLFA from soils.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 10381-6, *Soil quality — Sampling — Part 6: Guidance on the collection, handling and storage of soil under aerobic conditions for the assessment of microbiological processes, biomass and diversity in the laboratory*

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