
**Soil quality — Laboratory methods for
determination of microbial soil
respiration**

*Qualité du sol — Méthodes de laboratoire pour la détermination de
la respiration microbienne du sol*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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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Introduction

This International Standard is derived from the German standard DIN 19737 (see [1]). It describes methods for the determination of microbial soil respiration in the laboratory.

Microbial soil respiration results from the mineralization of organic substances. In this process, organic substances are oxidized to the end products carbon dioxide and water, with concurrent uptake of O₂ for aerobic microorganisms. The soil respiration is measured by the determination of O₂ consumption and/or by CO₂ release. Respiration is a measure of the overall activity of soil microorganisms.

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Soil quality — Laboratory methods for determination of microbial soil respiration

1 Scope

This International Standard describes methods for the determination of soil microbial respiration of aerobic, unsaturated soils. The methods are suitable for the determination of O₂ uptake or CO₂ release, either after addition of a substrate (substrate-induced respiration), or without substrate addition (basal respiration).

This International Standard is applicable to the measurement of soil respiration in order to:

- determine the microbial activity in soil (see [3]);
- establish the effect of additives (nutrients, pollutants, soil improvers, etc.) on the metabolic performance of microorganisms;
- determine the microbial biomass (see [4]);
- determine the metabolic quotient $q\text{CO}_2$.

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 10381-6:1993, *Soil quality — Sampling — Guidance on the collection, handling and storage of soil for the assessment of aerobic microbial processes in the laboratory*

ISO 11274:1998, *Soil quality — Determination of the water-retention characteristic — Laboratory methods*

ISO 11465:1993, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method*

3 Terms and definitions

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

3.1

basal respiration

microbial soil respiration without addition of nutrients

3.2

substrate-induced respiration

SIR

microbial soil respiration after addition of nutrients

NOTE Glucose is an example of an added nutrient.