
**Soil quality — Environmental
availability of non-polar organic
compounds — Determination of the
potentially bioavailable fraction and
the non-bioavailable fraction using a
strong adsorbent or complexing agent**

*Qualité du sol — Disponibilité environnementale des composés
organiques non polaires — Détermination de la fraction
potentiellement biodisponible et de la fraction non biodisponible en
utilisant un agent adsorbant fort ou un agent complexant*

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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Introduction

The solubility of most non-polar organic contaminants is limited and they are sorbed to the soil matrix. They may desorb and become available for organisms, which may result in an effect (toxicity, degradation or bioaccumulation). Not all sorbed (adsorbed and absorbed) contaminants will desorb and become available.

Extractions used in chemical analysis to measure the total concentration, release more contaminants from the soil than are available. It is however also possible that contaminants are so strongly bounded by the soil that they will not be released by chemical extraction. This strong sorption may also be caused by incorporation of the contaminant (or a degradation or reaction product of the contaminant) in the organic soil structure. The distribution of contaminants over sorption sites of varying sorption strength is not constant in time and contaminants will shift, with increasing contact time, to the stronger sorption sites.

[Figure 1](#) shows schematically the differentiation between:

- extractable residues that are also bioavailable (i.e. the potentially bioavailable fraction);
- residues that are extractable by harsher extraction methods but are non-bioavailable;
- residues that are neither extractable nor bioavailable.

If a degradable substance enters a soil, part of it will degrade over time (curve a). The area between curve a and c is extractable by exhaustive chemical procedures. For risk assessments, this part is considered as the “total concentration” for which values are defined in many regulations. However, only a part of this amount is bioavailable. The area between curves a and b is the bioavailable fraction and the area between curves b and c is the non-bioavailable fraction. The method described in this document enables the measurement of the potential bioavailable and the non-bioavailable fraction of a contaminant in soil.

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