INTERNATIONAL STANDARD

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Water quality — Determination of selected plant treatment agents — Method using high performance liquid chromatography with UV detection after solid-liquid extraction

Qualité de l'eau — Dosage de certains agents de traitement des plantes — Méthode par chromatographie en phase liquide à haute performance (CLHP) avec détection UV après extraction solide liquide

Reference number
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Contents

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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.

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.

International Standard ISO 11369 was prepared by Technical Committee ISO/TC 147, *Water quality*, Subcommittee SC 2, *Physical, chemical and biochemical methods.*

Annexes A and B of this International Standard are for information only.

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Water quality — Determination of selected plant treatment agents — Method using high performance liquid chromatography with UV detection after solid-liquid extraction

1 Scope

This International Standard describes a method for the determination of organic plant treatment agents in drinking and ground water using high performance liquid chromatography (HPLC) with UV detection after solid-liquid extraction.

The method described in this International Standard is applicable to the determination of selected plant treatment agents and some of their main degradation products (metabolites) in drinking water with a validated reporting limit of about 0,1 µg/l. Limited additional data indicate that it can be extended to 0,05 µg/l (see table 1 for examples). The method may be extended to include additional substances and ground water, provided the method is validated for each individual case.

The selection of the plant treatment agents and main degradation products in table 1 has been made according to the knowledge at the time of the interlaboratory trial (1992). Data for some other substances are given in annex A.

Table 1 — Plant treatment agents to which this International Standard applies

Name	Molecular formula	Molar mass	CAS No.[1]	Substance family[2]
Atrazine	$C_8H_{14}ClN_5$	215,7	001912-24-9	T
Chlorotoluron	$C_{10}H_{13}ClN_2O$	212,7	015545-48-9	H
Cyanazine**	$C_9H_{13}ClN_6$	240,7	021725-46-2	T
Desethylatrazine *	$C_6H_9ClN_5$	186,6	006190-65-4	T
Diuron	$C_9H_{10}Cl_2N_2O$	233,1	000330-54-1	H
Hexazinone**	$C_{12}H_{20}N_4O_2$	252,3	051235-04-2	T
Isoproturon	$C_{12}H_{18}N_2O$	206,3	034123-59-6	H
Linuron	$C_9H_{10}Cl_2N_2O_2$	249,1	000330-55-2	H
Metazachlor	$C_{14}H_{16}ClN_2O_3$	277,8	067129-08-2	A
Methabenzthiazuron	$C_{10}H_{11}N_3OS$	221,3	018691-97-9	H
Metobromuron**	$C_9H_{11}BrN_2O_2$	259,1	003060-89-7	H
Metolachlor	$C_{15}H_{22}ClNO_2$	283,8	051218-45-2	A
Metoxuron**	$C_{10}H_{13}ClN_2O_2$	228,7	19937-59-8	H
Monolinuron	$C_9H_{11}ClN_2O_2$	214,6	1746-81-2	H
Sebutylazine**	$C_9H_{15}ClN_5$	228,7	00728-69-3	T
Simazine	$C_7H_{12}ClN_5$	201,7	000122-34-9	T
Terbutylazine	$C_9H_{16}ClN_5$	229,7	005915-41-3	T

1) CAS No.: Chemical abstracts number
2) Substance family: T: Triazine; H: Phenylurea herbicide; A: substituted anilide
*: Main degradation product of atrazine
**: Not included in the performance data

2 Interferences

2.1 Interferences with the enrichment

The commercially available RP (reversed phase)-C18 materials are often of varying quality. Considerable batch-to-batch differences regarding quality and selectivity of this material even from one manufacturer are possible. The recovery may vary with the concentration. Co-extractants eluted from the sorbent material can affect the blank and the recovery. Therefore the calibration and analysis are performed on exactly the same batch of sorbent. Also any UV-absorbing material occurring in the water which passes through the procedure and has a retention time similar to the standard will interfere. Suspended matter in the water sample may clog the packing. In this case the water sample is filtered through a glass fibre filter prior to the enrichment.

2.2 Interferences with the HPLC measurement

Substances which absorb at the wavelengths of detection and have retention times similar to those of the compounds to be investigated will interfere with the determination. This shall especially be taken into account when examining samples other than ground- and drinking water.

3 Normative references

The following standards contain provisions which, through reference to this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possiblity of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5667-1 :1980, *Water quality - Sampling — Part 1: Guidance on the design of sampling programmes*

ISO 5667-2 :1991, *Water quality - Sampling — Part 2: Guidance on sampling techniques*

ISO 5667-3: 1994, *Water quality - Sampling — Part 3: Guidance on the preservation and handling of samples*

ISO 8466-1: 1990, *Water quality — Calibration and evaluation of analytical methods and estimation of performance characteristics — Part 1: Statistical evaluation of the linear calibration function.*

ISO/TR 13530:—[1)], *Water quality - General guidance to analytical quality control for water analysis*

4 Principle

The plant treatment substances in the water sample are extracted by solid-liquid extraction on RP-C18 material (RP = reversed phase), eluted with a solvent and then separated, identified and quantified by high performance liquid chromatography (HPLC) using UV detection.

5 Reagents

5.1 General requirements

Water, solvents and reagents shall be of sufficient purity (e.g. residue grade or HPLC grade) as far as available and shall not contain any measurable UV absorbing substances interfering with the compounds of interest.

5.2 Nitrogen, high purity, for drying solvents and, if need be, for concentration by evaporation of the eluates.

5.3 Helium, high purity , for degassing HPLC solvents (see also 6.13)

1) To be published.