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# Water quality — Determination of the dissolved fraction of selected active pharmaceutical ingredients, transformation products and other organic substances in water and treated waste water — Method using high performance liquid chromatography and mass spectrometric detection (HPLC-MS/MS or -HRMS) after direct injection

*Qualité de l'eau — Détermination de la fraction dissoute des ingrédients pharmaceutiques actifs sélectionnés, des produits de la transformation et d'autres substances organiques dans l'eau et dans l'eau résiduaire — Méthode par chromatographie en phase liquide à haute performance et détection par spectrométrie de masse (CLHP-MS/MS ou -HRSM) après l'injection directe*



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# Contents

Page

**Foreword** ... **iv**
**Introduction** ... **v**
**1 Scope** ... **1**
**2 Normative references** ... **4**
**3 Terms and definitions** ... **4**
**4 Principle** ... **4**
**5 Interferences** ... **4**
5.1 During sample preparation ... 4
5.2 During high performance liquid chromatography and mass spectrometry ... 4
**6 Reagents** ... **5**
6.1 General ... 5
6.2 Preparation of solutions ... 5
**7 Apparatus** ... **7**
**8 Sampling** ... **8**
**9 Procedure** ... **8**
9.1 General ... 8
9.2 Sample preparation ... 8
9.3 High performance liquid chromatography (HPLC) ... 9
9.4 Detection ... 9
9.4.1 General ... 9
9.4.2 Tandem mass spectrometry (MS/MS) ... 10
9.4.3 High-resolution mass spectrometry (HRMS) ... 10
9.5 Blank value measurements ... 10
**10 Calibration** ... **10**
10.1 General ... 10
10.2 Calibration with external standard ... 12
10.3 Calibration with internal standard ... 12
**11 Calculation of recovery** ... **13**
11.1 General ... 13
11.2 Calculation of analyte recovery using samples ... 13
11.3 Recovery of internal standards ... 14
**12 Evaluation** ... **14**
12.1 Verification of individual substances ... 14
12.2 Calculation of the individual results using calibration with an external standard ... 15
12.3 Calculation of the individual results using calibration with an internal standard ... 15
**13 Expression of results** ... **16**
**14 Test report** ... **16**
**Annex A** (informative) **Performance data** ... **17**
**Annex B** (informative) **Examples of recovery** ... **22**
**Annex C** (informative) **Examples of HPLC columns and chromatograms** ... **24**
**Annex D** (informative) **Examples of detection** ... **30**
**Annex E** (informative) **Examples of extension of the method** ... **33**
**Bibliography** ... **34**

# Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.



 

# Introduction

Pharmaceutical ingredients are essential for human and animal health. Through application or improper disposal, active pharmaceutical ingredients enter the water cycle unchanged or transformed. This can happen via municipal waste water, treated at treatment plants. There, some active pharmaceutical ingredients and transformation products cannot be removed completely from the waste water by conventional treatment techniques. Active pharmaceutical ingredients and their transformation products also travel through sludge to the soil and subsequently enter water bodies via leachate, depending on the nature of the ground and the active ingredients. Active pharmaceutical ingredients and their transformation products are therefore found in treated waste water, as well as in surface and ground water. This document specifies a liquid chromatography method with mass spectrometric detection for the determination of selected active pharmaceutical ingredients and their transformation products in the dissolved fraction.

# Water quality — Determination of the dissolved fraction of selected active pharmaceutical ingredients, transformation products and other organic substances in water and treated waste water — Method using high performance liquid chromatography and mass spectrometric detection (HPLC-MS/MS or -HRMS) after direct injection

**WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.**

**IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.**



## 1 Scope

This document specifies a method for the determination of the dissolved fraction of selected active pharmaceutical ingredients and transformation products, as well as other organic substances (see Table 1) in drinking water, ground water, surface water and treated waste water.

The lower application range of this method can vary depending on the sensitivity of the equipment used and the matrix of the sample. For most compounds to which this document applies, the range is ≥ 0,025 µg/l for drinking water, ground water and surface water, and ≥ 0,050 µg/l for treated waste water.

The method can be used to determine further organic substances or in other types of water (e.g. process water) provided that accuracy has been tested and verified for each case, and that storage conditions of both samples and reference solutions have been validated. Table 1 shows the substances for which a determination was tested in accordance with the method. Table E.1 provides examples of the determination of other organic substances.

**Table 1 — Substances for which a determination was tested in accordance with this method**

| Common name<br>Chemical name (IUPAC[a]) | Molecular formula | Molar mass<br>g/mol | CAS-RN[b] |
|---|---|---|---|
| 4-Acetylaminoantipyrine<br>N-(2,3-Dimethyl-5-oxo-1-phenyl-3-pyrazolin-4-yl)acetamide | $C_{13}H_{15}N_3O_2$ | 245,28 | 83-15-8 |
| N4-Acetyl sulfamethoxazole<br>N-{4-[(5-Methyl-1,2-oxazol-3-yl)sulfamoyl]phenyl}-acetamide | $C_{12}H_{13}N_3O_4S$ | 295,32 | 21312-10-7 |
| Diatrizoic acid (amidotricoic acid)<br>3,5-Bis(acetamido)-2,4,6-triiodobenzoic acid | $C_{11}H_9I_3N_2O_4$ | 613,91 | 117-96-4 |
| Atenolol<br>(RS)-2-[4-[2-Hydroxy-3-(1-methylethylamino) propoxy]phenyl] ethanamide | $C_{14}H_{22}N_2O_3$ | 266,34 | 29122-68-7 |

[a] IUPAC: International Union of Pure and Applied Chemistry.

[b] CAS-RN: Chemical Abstracts System Registration Number.