TECHNICAL REPORT

ISO/TR 18818

First edition
2017-06

Cosmetics — Analytical method — Detection and quantitative determination of Diethanolamine (DEA) by GC/MS

Cosmétique — Méthode analytique — Détection et dosage quantitatif de la diéthanolamine (DEA) par CG/SM

Reference number
ISO/TR 18818:2017(E)

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Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Principle **1**
5 Procedure **2**
5.1 Preparation of calibration solutions 2
5.1.1 Stock solution 2
5.1.2 Standard solution 2
5.1.3 Calibration solutions 2
5.2 Sample preparation 2
5.3 Analysis 2
5.3.1 General 2
5.3.2 Example of instrumental conditions 3
5.3.3 Recovery 3
5.3.4 Calibration curve 3
5.4 Determination 4
6 Limit of quantification **4**
Annex A (informative) **Examples of typical GC-MS chromatogram of standard DEA** **5**
Bibliography **7**

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Foreword

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This document was prepared by Technical Committee ISO/TC 217, *Cosmetics*.

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Introduction

Diethanolamine (DEA) has been restricted for use in cosmetics and personal care products in a number of jurisdictions due to its potential health risk since residual levels of DEA might react with other specific ingredients to form the extremely potent carcinogen nitrosodiethanolamine (NDELA). Therefore, a harmonized method for the screening of DEA in cosmetic raw materials is considered important.

Numerous methods for the trace analysis of alkanolamines including DEA in different sample matrices have been developed and published[1] [2] [3]. Among the methods available for the analysis of alkanolamines, techniques using gas chromatography (GC) or liquid chromatography (LC) with a variety of detector systems have received the most attention[4] [5]. More recent procedures, mass spectrometry (MS) detection in combination with chromatography separation is used to determine analyte content in aqueous solutions with minimal requirements for extraction and cleanup.[6] [7] In some cases, derivatization of alkanolamines has also been used to improve the chromatographic separations and detection[8] [9].

This document describes a rapid and simple method suitable for simultaneously qualitative and quantitative screening of cosmetics and cosmetic raw materials containing residue of above 0,1 % diethanolamine (DEA).

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Cosmetics — Analytical method — Detection and quantitative determination of Diethanolamine (DEA) by GC/MS

1 Scope

This document describes a screening method for rapid sampling and identifying of diethanolamine (DEA) in cosmetics and raw materials used in cosmetics by gas chromatography – mass spectroscopy (GC-MS).

This method is not applicable to the detection and/or quantification of DEA-related ingredients. When this method is used to analyse unfamiliar sample matrices analysts are advised to confirm the applicability and flexibility of the techniques in their matrix.

Under the conditions specified this method is reliable for quantification with DEA level at 1 000 mg/kg (0,1 %).

However, samples with lower concentrations (<0,1 %) or otherwise unusual compositions or characteristics can present difficulties (such as, for example, peak tailing) that preclude the direct use of this method.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

The analyte is extracted with anhydrous ethanol from the sample matrix by ultrasonic extraction. Following ultrasonic treatment, the extract is separated from non-soluble compounds by centrifugation treated with anhydrous sodium sulfate (Na_2SO_4), and filtered. The extract thus obtained is then ready for final identification and the quantification with GC-MS. Qualitative results are based on retention timeand confirmed by mass spectrometry. A calibration curve prepared from external standards is then used for quantitative analysis.

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