BS EN 16343:2013

BSI Standards Publication

Cosmetics — Analysis of cosmetic products — Determination of 3-iodo-2-propynyl butylcarbamate (IPBC) in cosmetic preparations, LC-MS methods

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 16343:2013.

The UK participation in its preparation was entrusted to Technical Committee CW/217, Cosmetics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 76543 8

ICS 71.100.70

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 May 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16343

May 2013

ICS 71.100.70

English Version

Cosmetics - Analysis of cosmetic products - Determination of 3-iodo-2-propynyl butylcarbamate (IPBC) in cosmetic preparations, LC-MS methods

Cosmétiques - Analyse des produits cosmétiques - Détermination quantitative du carbamate 3-iodo-2-propynylbutyle (IPBC), méthodes CL-SM

Kosmetische Mittel - Untersuchung von kosmetischen Mitteln - Bestimmung von 3-Iod-2-propinylbutylcarbamat (IPBC) in kosmetischen Mitteln, LC-MS-Verfahren

This European Standard was approved by CEN on 25 April 2013.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 16343:2013) has been prepared by Technical Committee CEN/TC 392 “Cosmetics”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies a method for the quantitative determination of 3-iodo-2-propynyl butylcarbamate (IPBC) in the concentration range from 0,005 g/100 g to 0,1 g/100 g - Annex V No. 56 in Regulation (EC) No 1223/2009 on cosmetic products.

2 Principle

IPBC is extracted from the cosmetic preparation using methanol. IPBC present in the sample extract is separated using reverse phase HPLC with mass specific detection (LC-MS or LC-MS/MS). Quantitative determination of IPBC is made using the external standard method of calibration or standard addition.

3 Reagents

3.1 General

If not otherwise specified, analytical-grade chemicals shall be used; water shall be distilled or of a suitable purity. “Solution” shall be understood as an aqueous solution unless otherwise specified.

3.2 Iodopropynyl butylcarbamat, CAS number: 55406-53-6 (Supplier : Sigma-Aldrich[1)] (521949), Dr. Ehrenstorfer GmbH[1)] (C 14335000)).

3.3 Methanol, HPLC grade, CAS number: 67-56-1.

3.4 Formic acid, CAS number: 64-18-6.

3.5 Tetrahydrofuran (THF), CAS number: 109-99-9.

3.6 Propan-2-ol, CAS number: 67-63-0.

3.7 Eluents

3.7.1 Eluent A, 1 ml of formic acid (3.4) is mixed with 1 000 ml of water.

3.7.2 Eluent B, Methanol (3.3).

3.8 IPBC stock solution, ρ = 1 mg/ml.

Weigh approximately 0,05 g of IPBC (3.2) into a 50-ml-volumetric flask. Firstly, dissolve in a small amount of methanol (3.3) and then fill up to the calibration mark with methanol. This solution has a shelf life of 8 weeks if it is stored in a refrigerator.

3.9 Calibration solutions (standard solutions)

5,0 ml of the stock solution (3.8) is transferred into a 50-ml-volumetric flask and filled to the calibration mark with methanol (3.3), (ρ = 0,1 mg/ml or 100 µg/ml). From this solution, at least 5 solutions are prepared by dilution to obtain IPBC concentrations of ρ = 0,05 µg/ml to ρ = 1,0 µg/ml. These solutions have a shelf life of 8 weeks if they are stored in a cool place. Examples of dilutions are given in Table 1.

---

1) This is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product. Equivalent products may be used if they can be shown to lead to the same results.

Table 1 —Calibration solutions

No.	Preparation	Dilution	Concentration µg/ml
3.9	5 ml 3.8 filled up to 50 ml	1:10	100
3.10	10 ml 3.9 filled up to 100 ml	1:100	10
3.11	10 ml 3.10 filled up to 100 ml	1:1000	1
3.12	4 ml 3.10 filled up to 50 ml	1:1250	0,8
3.13	5 ml 3.10 filled up to 100 ml	1:2000	0,5
3.14	10 ml 3.11 filled up to 50 ml	1:5000	0,2
3.15	5 ml 3.11 filled up to 50 ml	1:10000	0,1

4 Apparatus and equipment

4.1 Standard laboratory equipment

4.2 Membrane filter, in the form of a disposable syringe filter, pore width: 0,2 µm[2)].

4.3 High-performance liquid chromatograph, suitable for gradient elution with mass-specific detector.

4.4 Analytical separation column, the following parameters have proved useful:

RP 18 Phase, 5 µm, 150 mm × 2 mm, e.g. Zorbax[1)], Spherisorb[1)], Phenomenex-Luna[1)] or equivalent. If a precolumn is used, it shall have the same analytical properties as the separation column.

5 Procedure

5.1 Sample preparation

Weigh approximately 200 mg of the sample to the nearest 0,1 mg into a 20-ml-volumetric flask (alternatively a 50-ml-volumetric flask). Add 1,5 ml of THF (3.5) and shake. Add 10 ml of methanol (3.3), and allow to dissolve or suspend for 5 min in the ultrasonic bath at room temperature. Allow to cool to room temperature and fill to the calibration mark with methanol (3.3). The sample solution is diluted with methanol (3.3) to a ratio of 1:10, filtered through a membrane filter (4.2) and then analysed using LC-MS or LC-MS/MS.

For poorly soluble or suspendable matrices it is recommended to partially dissolve the sample by adding 2 ml of 2-propanol (3.6) instead of THF (3.5) or to stir it with a magnetic stirrer for 30 min prior to the treatment in the ultrasonic bath.

5.2 Liquid chromatography (LC) conditions

When using the apparatus (4.3) and column (4.4), the following conditions have shown to be useful (see Table 2):

2) The ring test was performed using 0,2 µm filter.

Table 2 — Gradient programme

Time min	Fraction eluent A %	Fraction eluent B %
0	85	15
8	10	90
12	10	90
13	85	15
25	85	15

Column: RP 18 Phase, 5 µm, 150 mm × 2 mm

Injection volume: 1 µl to 10 µl

Flow rate: 0,2 ml/min

Column oven temperature: 25 °C

5.3 Detection

5.3.1 General

The detection and quantitative determination can be performed by evaluating the mass traces of IPBC or by evaluating the fragment ions. To avoid false low results by adduct formation occurring in the MRM mode of the Electrospray (ESI) method, the APCI (Atmospheric Pressure Chemical Ionisation) method should be used for ionisation.

5.3.2 MS detection in Selected Ion Monitoring (SIM) mode

Mass traces: m/z 282 $[M+H]^+$ and m/z 304 $[M+Na]^+$.

Evaluation is based on the total ion current (from the sum of the two masses).

5.3.3 MS detection in Multiple Reaction Monitoring (MRM) mode

Protonated molecule ion: 282 $[M+H]^+$

Fragment ion 1: 57

Fragment ion 2: 165

Evaluation is based on the most sensitive fragment ion.

Since the analyte may form adducts with sodium ions, false low results can be obtained if larger amounts of sodium ions are present in the sample. If ESI ionisation is used, standard addition should therefore be performed using the MRM mode so as to ensure reliable quantification results.

When performing the standard addition, the content of the added IPBC should not exceed the content expected in the sample.

6 Evaluation

6.1 Identification and quantitative determination

The IPBC is identified by comparing the retention times of the sample with those of calibration solutions.

The quantitative determination of the analyte is performed based on a calibration function or the standard addition. The calibration solutions are chromatographed in accordance with the conditions given in 5.2. The IPBC concentration is calculated from the calibration by linear regression on the basis of the obtained peak area.

6.2 Calculation

The preservative content w in g/100 g, with respect to the sample, is calculated using the following formula:

$$w = \frac{c \cdot V \cdot 100 \cdot F}{m \cdot 1000 \cdot 1000} \quad (1)$$

where

w is the IPBC content, in g/100 g;

c is the IPBC concentration in the sample solution, in µg/ml, determined from the calibration function;

m is the initial weight of the sample, in g;

V is the volume of the sample measurement solution, in ml;

F is the dilution factor, if required.

The result is given in g/100 g, rounded to three decimal places.

7 Test report

The test report shall contain the following data:

a) information necessary for the identification of the sample (type, origin and designation of the sample);

b) a reference to this European Standard;

c) name of the laboratory performing the test;

d) the date and type of sampling procedure (if known);

e) the date of receipt and date of analysis;

f) the date of test;

g) the test results and the units in which they have been expressed;

h) justification of any deviations from this official method;

i) operations not specified in the method or regarded as optional, which might have affected the results.

Annex A
(informative)

Results of the inter-laboratory test

This method has been developed by the working group “Cosmetics” of the German Federal Office of Consumer Protection and Food Safety (BVL) for the purpose of implementing Section 64 of the Food and Feed Code (LFGB). It has been tested in an inter-laboratory test with a total of 13 participants.

The following statistical data presented in Table A.1 have been determined for shower gel and cream in an inter-laboratory test with 13 participating laboratories using external quantification.

Table A.1 — Statistical data of the inter-laboratory test

Parameter	LC-MS method IPBC content, in g/100 g	
	Shower gel	**Cream**
Number of participating laboratories	13	13
Number of outliers	3	2
Number of laboratories after elimination of the outliers	10	11
Mean value $\bar{x}$, g/100 g	0,013	0,019
Repeatability r, g/100 g	0,003	0,003
Repeatability standard deviation s_r, g/100 g	0,001	0,001
Reproducibility R, g/100 g	0,006	0,005
Reproducibility standard deviation s_R, g/100 g	0,002	0,002
Recovery, %	101,4	103,7

Bibliography

[1] Frauen M, Steinhart H, Rapp C, Hintze U. (2001): *Rapid quantification of iodopropynyl butylcarbamate as the preservative in cosmetic formulations using high-performance liquid chromatography-electrospray mass spectrometry*. J Pharm Biomed Anal. 25 (5-6):965-70

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™