

JOINT RESEARCH CENTRE
Institute for Reference Materials and Measurements

CERTIFICATE OF ANALYSIS

ERM[®] - BC211

| RICE | | |
|---|--|--------------------------------------|
| | Mass fraction based on dry mass | |
| | Certified value ³⁾ [µg/kg] | Uncertainty ⁴⁾ [µg/kg] |
| Total arsenic | 260 | 13 |
| Dimethylarsinic acid ^{1,2)} | 119 | 13 |
| The sum of arsenite and arsenate ¹⁾ | 124 | 11 |
| <p>1) Expressed as arsenic 2) As obtained by extraction and subsequent quantification <i>via</i> HPLC-ICP-MS 3) Unweighted mean value of the means of accepted sets of data, each set being obtained in a different laboratory and/or with a different method of determination. The certified values are traceable to the SI. 4) The certified uncertainty is the expanded uncertainty with a coverage factor $k = 2$ corresponding to a level of confidence of about 95 % estimated in accordance with ISO/IEC Guide 98-3, Guide to the Expression of Uncertainty in Measurement (GUM:1995), ISO, 2008.</p> | | |

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used for total arsenic and dimethylarsinic acid is 50 mg. The minimum amount of sample to be used for the sum of arsenite and arsenate is 100 mg.

NOTE

European Reference Material ERM[®]-BC211 was produced and certified under the responsibility of the Institute for Reference Materials and Measurements of the European Commission's Joint Research Centre according to the principles laid down in the technical guidelines of the European Reference Materials[®] co-operation agreement between BAM-IRMM-LGC. Information on these guidelines is available on the internet (<http://www.erm-crm.org>).

Accepted as an ERM[®], Geel, January 2013

Signed: _____



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DESCRIPTION OF THE MATERIAL

The amber glass vial contains a minimum amount of 10 g of rice powder.

ANALYTICAL METHODS USED FOR CERTIFICATION

k_0 Neutron Activation Analysis (k_0 NAA)

Hydride generation-atomic absorption spectrometry (HG-AAS)

Hydride generation-atomic fluorescence spectrometry (HG-AFS)

Hydride generation-inductively coupled plasma-mass spectrometry (HG-ICP-MS)

Inductively coupled plasma-quadrupole mass spectrometry (ICP-QMS)

Inductively coupled plasma-sector field mass spectrometry (ICP-SFMS)

High performance liquid chromatography-inductively coupled plasma-quadrupole mass spectrometry (HPLC-ICP-QMS)

High performance liquid chromatography-inductively coupled plasma-sector field mass spectrometry (HPLC-ICP-SFMS)

High performance liquid chromatography-hydride generation-atomic fluorescence spectrometry (HPLC-HG-AFS)

PARTICIPANTS

Bavarian Health and Food Safety Authority (LGL), Erlangen, DE

(measurements under the scope of ISO/IEC 17025 accreditation, SAL No. SAL-BY-L20-04-03)

Bavarian Health and Food Safety Authority (LGL), Oberschleissheim, DE

(measurements under the scope of ISO/IEC 17025 accreditation, SAL No. SAL-BY-L20-04-03)

Danish Veterinary and Food Administration (DVFA), Region West, Lystrup, DK

(measurements under the scope of ISO/IEC 17025 accreditation, DANAK 424)

European Commission, Joint Research Centre, Institute for Reference Materials and Measurements (IRMM), Geel, BE

(accredited to ISO Guide 34 for production of certified reference materials, BELAC No. 268-RM)

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(measurements under the scope of ISO/IEC 17025 accreditation, DACH No. DAC-PL-0029-97-20)

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(measurements under the scope of ISO/IEC 17025 accreditation, COFRAC No. 1-0245)

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Karl-Franzens University Graz, Institute of Chemistry, Analytical Chemistry, Graz, AT

Lab Salud Publica Vizcaya, Bilbao, ES

(measurements under the scope of ISO/IEC 17025 accreditation, ENAC No. 132/LE326)

Laboratory of the Public Health Agency of Barcelona (ASPB), Barcelona, ES

(measurements under the scope of ISO/IEC 17025 accreditation, ENAC No. 227/LE459 and No. 227/LE1338)

University of Aberdeen, Trace Element Speciation Laboratory, Aberdeen, UK

University of Barcelona, Analytical Chemistry Department, Barcelona, ES

University of Corvinus, Analytical Laboratories, Budapest, HU

(measurements under the scope of ISO/IEC 17025 accreditation, Hungarian Accreditation Board NAT-1-1462/2006)

Studiecentrum voor Kernenergie, SCK, Mol, BE

(measurements performed under ISO/IEC 17025 accreditation; BELAC No. 015-TEST)

Veterinary and Agrochemical Research Centre (CODA-CERVA), Tervuren, BE

(measurements under the scope of ISO/IEC 17025 accreditation, BELAC No. 172-TEST)

SAFETY INFORMATION

The usual laboratory safety precautions apply.

INSTRUCTIONS FOR USE AND INTENDED USE

Preparation and use of the material

The unit shall be thawed before use. Prior to use, invert and shake for at least two minutes.

Minimum sample intake

The minimum amount of sample to be used for total arsenic and dimethylarsinic acid is 50 mg. The minimum amount of sample to be used for the sum of arsenite and arsenate is 100 mg.

Dry mass correction

Dry mass determination shall be carried out on a separate portion of at least 0.2 g, by drying in an oven at 103 ± 2 °C until constant mass is attained (separate weighings should not differ by more than 5 mg). Weighing of the samples for dry mass determination and weighing for the analysis shall be done at the same time to avoid differences due to possible take up of moisture by the material.

Intended use

The main purpose of the material is to assess method performance, i.e. for checking accuracy of analytical results/calibration. Moreover, it can be used for validation purposes and trueness determination.

Comparing an analytical result with the certified value

A result is unbiased if the combined standard uncertainty of measurement and certified value covers the difference between the certified value and the measurement result (see also ERM Application Note 1, www.erm-crm.org).

For assessing the method performance, the measured values of the CRM are compared with the certified values. The procedure is described here in brief:

- Calculate the absolute difference between mean measured value and the certified value (Δ_m).
- Combine measurement uncertainty (u_m) with the uncertainty of the certified value (u_{CRM}): $u_{\Delta} = \sqrt{u_m^2 + u_{CRM}^2}$
- Calculate the expanded uncertainty (U_{Δ}) from the combined uncertainty (u_{Δ}) using an appropriate coverage factor, corresponding to a level of confidence of approximately 95 %
- If $\Delta_m \leq U_{\Delta}$ then there is no significant difference between the measurement result and the certified value at a confidence level of about 95 %.

Use as a calibrant

It is not recommended to use this matrix material as calibrant. If used nevertheless, the uncertainty of the certified value shall be taken into account in the estimation of the measurement uncertainty.

Use in quality control charts

The material can be used for quality control charts. Different CRM-units will give the same results as heterogeneity was included in the uncertainties of the certified values.

STORAGE

The material shall be stored at -20 ± 5 °C in the dark. Care shall be taken to avoid moisture uptake once the vials are open.

However, the European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

LEGAL NOTICE

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NOTE

A detailed technical report is available on www.irmm.jrc.be. A paper copy can be obtained from the Joint Research Centre, Institute for Reference Materials and Measurements on request.