JOINT RESEARCH CENTRE
Institute for Reference Materials and Measurements

# CERTIFICATE OF ANALYSIS

## ERM®- BB184

| BOVINE MUSCLE | | |
|---|---|---|
| | Mass Fraction | |
| | Certified value [1, 2)] [mg/kg] | Uncertainty [2,3)] [mg/kg] |
| As | 0.0234 | 0.0026 |
| Cd | 0.0022 | 0.0004 |
| Cu | 2.31 | 0.09 |
| Fe | 75 | 4 |
| Mn | 0.276 | 0.013 |
| Se | 0.45 | 0.04 |
| Zn | 146 | 7 |

1) 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 value and its uncertainty are traceable to the International System of Units (SI).

2) Certified mass fractions are corrected for the water content of the material (and expressed as dry mass), determined as described in the section "Instructions for use".

3) 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.

This certificate is valid for one year after purchase.

Sales date:

The minimum amount of sample to be used is 200 mg.

**NOTE**

European Reference Material ERM®-BB184 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, 22 August 2012
Latest revision: September 2013

**Signed:**

Prof. Dr. Hendrik Emons
European Commission
Joint Research Centre
Institute for Reference Materials and Measurements
Retieseweg 111
B-2440 Geel, Belgium

## Indicative Values

| | Mass Fraction | |
|---|---|---|
| | Indicative value [1,2,3] [mg/kg] | Uncertainty [4] [mg/kg] |
| Hg | 0.0018 | 0.0010 |

1) 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 indicative value and its uncertainty are traceable to the International System of Units (SI).

2) Indicative mass fractions are corrected for the water content of the material (and expressed as dry mass), determined as described in the section "Instructions for use".

3) The value is not certified as the uncertainty is unsuitably high for the intended use of the material

4) The indicative uncertainty is the expanded uncertainty with a coverage factor $k$ = 2.78 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.

## Additional Material Information

| | Mass Fraction |
|---|---|
| | Value [1,2] [g/kg] |
| Ca | 0.155 |
| Cl | 1.54 |
| K | 15.8 |
| Mg | 1.00 |
| Na | 1.80 |

1) Unweighted mean value of 6 replicate measurements made by the $k$0-NAA technique, with $k$0 values that are traceable to the International System of units (SI).

2) Mass fractions are corrected for the water content of the material (and expressed as dry mass), determined as described in the section "Instructions for use".

### DESCRIPTION OF THE MATERIAL

The sample consists of about 7 g of lyophilised, powdered bovine muscle in a brown-glass vial with rubber insert and aluminium cap.

### ANALYTICAL METHODS USED FOR CERTIFICATION

Atomic Absorption Spectrometry
Hydride-Generation Atomic Absorption Spectrometry
Inductively Coupled Plasma Optical Emission Spectrometry
Inductively Coupled Plasma Mass Spectrometry
Inductively Coupled Plasma Sector-field Mass Spectrometry
Isotope-Dilution Inductively Coupled Plasma Mass Spectrometry
Isotope-Dilution Thermal Ionisation Mass Spectrometry
Neutron Activation Analysis

## PARTICIPANTS

ALS Czech Republic s.r.o., Praha (CZ)
(Measurements performed under ISO/IEC 17025 accreditation; Czech Accreditation Institute 259/2006)

ALS Scandinavia AB, Luleå (SE)
(Measurements performed under ISO/IEC 17025 accreditation; SWEDAC 1087)

Bundesanstalt für Materialforschung und –prüfung, Berlin (DE)
(Measurements performed under ISO/IEC 17025 accreditation; DAP-PL-2614.14)

Ceinal, S.A. (Silliker), Área Análisis Físico-Químicos, Barcelona (ES)
(Measurements performed under ISO/IEC 17025 accreditation; ENAC 257/LE413)

European Commission (EC), Joint Research Centre (JRC), Institute for Reference Materials and Measurements (IRMM), Reference Materials Unit, Geel (BE)
(Work performed under ISO Guide 34 accreditation; BELAC No. 268-RM)

The Food and Environment Research Agency, York (UK)
(Measurements performed under ISO/IEC 17025 accreditation; UKAS 1642)

Fødevareinstituttet, Danmarks Tekniske Universitet, Søborg (DK)
(Measurements performed under ISO/IEC 17025 accreditation; DANAK No 350)

Helmholtz Zentrum München - Deutsches Forschungszentrum für Gesundheit und Umwelt GmbH, München (DE)

LGC Ltd., Teddington (UK)
(Measurements performed under ISO/IEC 17025 accreditation; UKAS 0003)

Minton, Treharne & Davies Ltd., Llanelli (UK)
(Measurements performed under ISO/IEC 17025 accreditation; UKAS 1946)

MTT, Maa- ja elintarviketalouden tutkimuskeskus, Jokioinen (FI)
(Measurements performed under ISO/IEC 17025 accreditation; FINAS T024)

SCK-CEN, Mol (BE)
(Measurements performed under ISO/IEC 17025 accreditation; BELAC 015-TEST)

Solvias AG- Elemental and Microanalytical Services, Basel (CH)

Umweltbundesamt GmbH, Wien (AT)
(Measurements performed under ISO/IEC 17025 accreditation; Wirtschaftsministerium 92714/499-IV/9/01)

## SAFETY INFORMATION

The usual laboratory safety precautions apply.

## INSTRUCTIONS FOR USE AND INTENDED USE

This material is intended to be used for analytical method validation and performance control.

Shake the vial before taking aliquots.

Certified mass fractions are corrected for the water content of the material (dry mass): To determine dry mass, accurately weigh an aliquot of approximately 1 g on an analytical balance and dry the sample in an oven at atmospheric pressure, at 103 °C ± 2 °C, until constant mass is attained. The weighing should be made at the same time as preparation of samples for element measurement.

Dispose in accordance with good laboratory practice.

## STORAGE

The material should be stored at a temperature of 18 °C ± 5 °C. 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

Neither the European Commission, its contractors nor any person acting on their behalf:

(a) make any warranty or representation, express or implied, that the use of any information, material, apparatus, method or process disclosed in this document does not infringe any privately owned intellectual property rights; or

(b) assume any liability with respect to, or for damages resulting from, the use of any information, material, apparatus, method or process disclosed in this document save for loss or damage arising solely and directly from the negligence of the Institute for Reference Materials and Measurements of the European Commission's Joint Research Centre.

## 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.

European Commission – Joint Research Centre
Institute for Reference Materials and Measurements (IRMM)
Retieseweg 111, B - 2440 Geel (Belgium)
Telephone: +32-(0)14-571.722 - Fax: +32-(0)14-590.406