BAM
Bundesanstalt für Materialforschung und -prüfung

CERTIFICATE

CERTIFIED REFERENCE MATERIAL BAM-A001

Polycyclic Aromatic Hydrocarbons (PAH) in Olive Oil

Certified Values

Characteristic [1]	Value [2] in µg kg^{-1}	Uncertainty U [3] in µg kg^{-1}
Benz[*a*]anthracene	1.72	0.13
Chrysene	2.87	0.31
Benzo[*b*]fluoranthene	1.30	0.14
Benzo[*a*]pyrene	1.44	0.09

1) PAH congener determined by sample preparation (extraction, clean-up) and gas chromatographic separation with mass spectrometric detection (GC-MS) using stable isotopic dilution analysis as specified on Page 2 of this certificate.

2) Unweighted mean value of 3 BAM workplace means (60 individual results in total).

3) Estimated expanded uncertainty U with a coverage factor of $k = 2$, corresponding to a level of confidence of approx. 95%, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO/IEC Guide 98-3:2008.

End of Validity

This certificate is valid for 2 years after dispatch from BAM.

Material Description

The certified reference material (CRM) BAM-A001 is available as extra virgin olive oil from a commercial product contaminated with polycyclic aromatic hydrocarbons (PAH). Each unit of BAM-A001 contains 14 mL of olive oil in a 20 mL amber glass vial, which was prefilled with argon. After bottling, the vial was sealed with a crimp cap with butyl/PTFE inlet. Further details on the production and characterization of BAM-A001 are described in the certification report, which is available from BAM.

Sample No.: **Date of Dispatch:**

Recommended Use

BAM-A001 is intended to be used for performance control and validation of analytical methods for the determination of PAHs in olive oils. This CRM may also be applicable for other similar vegetable edible oils. BAM-A001 is explicitly meant only to be used in analytical laboratories. Before taking a subsample, the vial must have reached ambient temperature. The minimum sample intake for one determination is 0.5 mL.

Handling and Safety Instructions

Any use other than intended should be avoided. The personnel handling the material must be trained adequately and follow the regular safety precautions of the laboratory. It is recommended to handle and dispose of the reference material in accordance with the guidelines for analytical food samples legally in force at the site of end use and disposal. The usual laboratory safety precautions have to be applied. No hazardous effects are to be expected when the material is used under conditions usually adopted for the analysis of food samples which are low or moderately contaminated with PAHs.

Transport and Storage

BAM-A001 can be shipped at ambient temperature. On receiving, the material must be stored at a temperature equal to or lower than +4 °C. The stability of the CRM is not affected by short periods of handling at ambient temperature during transport and use. However, BAM cannot be held responsible for any alteration of the material occurring during handling and storage at the customer's premises, especially of opened units.

Analytical Methods

Two different methods have been used for sample preparation including extraction of PAHs from the olive oil matrix and clean-up of the sample extracts: i) Molecularly imprinted polymer (MIP) cartridges intended for PAH analysis, and ii) L/L extraction using acetonitrile followed by gel permeation chromatography (GPC). Instrumental analysis of the PAHs was performed by gas chromatography mass spectrometry (GC-MS) using the corresponding isotopically labelled PAHs as internal standards.

Metrological Traceability

All certified values refer to the extractable and measurable amounts of the PAH congeners from the olive oil material. Two different sample preparation methods (MIP and L/L-extraction combined with GPC) have been used to cancel out (at least partially) systematic biases. Both methods were successfully applied by BAM in the CCQM-K146 study (2018) to quantify benzo[*a*]pyrene in olive oil. To ensure traceability of the PAHs contents as defined above, the gravimetrically prepared certified calibration standard SRM 2260a (NIST) was employed for the in-house certification study. Traceability was further established by using stable isotope dilution analysis using isotopically labeled PAHs internal standards for GC-MS measurements.

Literature

A detailed technical report describing the analysis procedures and the treatment of the analytical data used to certify BAM-A001 is available on request or can be downloaded from BAM website (https://rrr.bam.de).

Accepted as a BAM-CRM on September 29, 2023

Bundesanstalt für Materialforschung und -prüfung (BAM)

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BAM holds an accreditation as a reference material producer according to ISO 17034. This accreditation is valid only for the scope as specified in the certificate D-RM-11075-01-00. DAkkS is a signatory of the multilateral agreement (MLA) between EA, ILAC and IAF for mutual acceptance.	DAkkS Deutsche Akkreditierungsstelle D-RM-11075-01-00

This Certified Reference Material is offered by:

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