

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 6026-b

No. +++

L-Glutamic Acid



This certified reference material (CRM) is produced in accordance with the NMIJ's management system and is in compliance with ISO 17034 and ISO/IEC 17025. This CRM is intended for the calibration of analytical instruments, preparation of standard solutions, and validation of analytical methods and instruments used for the amino acid analysis.

Certified Values

The certified value of the purity (in mass fraction) of L-glutamic acid is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Certified value Mass fraction (mg/kg)	Expanded uncertainty Mass fraction (mg/kg)
L-Glutamic acid ((2S)-2-aminopentanedioic acid)	56-86-0	0.998	0.002

The certified value of the purity (in mass fraction) of glutamic acid without enantiomeric separation is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	Certified value, Mass fraction (kg/kg)	Expanded uncertainty, Mass fraction (kg/kg)
Glutamic acid (without enantiomeric separation)	0.998	0.002

Analysis

The certified value of this CRM was weighted mean of the results of the following analytical methods:

- (1) Acidimetric titration corrected the bias due to the amount of amino acid-related impurities
 - (2) Nitrogen determination by Kjeldahl method corrected the bias due to the amount of amino acid-related impurities
- Amino acid-related impurities were identified and quantified by high performance liquid chromatography (HPLC) with fluorescence detection after derivatization using *o*-phthalaldehyde (OPA). D-glutamic acid was determined by the liquid chromatography/mass spectrometry (LC/MS) using a chiral resolution column.

Metrological Traceability

The certified value was determined by titrimetry which was one of the primary methods of measurement with NMIJ CRM 3001-c (potassium hydrogen phthalate) or NMIJ CRM 3012-a (tris(hydroxymethyl)aminomethane) and by amino acid-related impurity determination using HPLC calibrated with NMIJ CRM or commercially available SI traceable amino acid standard materials. The certified values, therefore, are traceable to the International System of Units (SI).

Mutual Recognition Arrangement under Metre Convention

The certified value of this CRM without enantiomeric separation (mass fraction) is recognized for international equivalence based on the Mutual Recognition Arrangement under the Metre Convention (CIPM MRA). The calibration measurement capability (CMC) of NMIJ related to this CRM is registered in the Key Comparison Database (KCDB) (see <https://www.bipm.org/kcdb/>) of the International Bureau of Weights and Measures (BIPM).

Expiration of Certification

This certificate is valid for one year from the date of shipment, provided that this CRM remains unopened and is stored in accordance with the instructions given in this certificate.

Description of the Material

This CRM is in the form of a white powder of L-glutamic acid and 1 g in net volume is kept in a brown glass vial and the vial is sealed in an aluminum-laminated plastic bag.

Instructions for Storage

This CRM should be stored at a temperature between 15 °C and 25 °C in a clean desiccator and shielded from light.

Instructions for Use

Considering the homogeneity, a minimum sample mass of 36 mg should be used. The CRM is for laboratory use only and not for *in vivo* use. The CRM should be used promptly once the vial is opened.

Precautions for Handling

Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

Preparation of the material was performed by FUJIFILM Wako Pure Chemical Corporation, Ltd. Highly purified L-glutamic acid produced by Ajinomoto Co., Inc. was bottled into vials under argon atmosphere. Each vial was sealed in an aluminum-laminated bag.

Technical Information

At the time of certification, more than 0.1 g/kg amino acid-related impurities were not detected. The molar mass of glutamic acid used to calculate the certified value is 147.129 g/mol.

NMIJ Analysts

The technical manager for this CRM is KATO M., the production manager is MIYAMOTO A., and the analysts are MIYAMOTO A. and EYAMA S.

Information

If substantive technical changes occur that affect the certification before the expiration of this certificate, NMIJ will notify the registered customers. Customer registration on the NMIJ Website (given below) will facilitate notification. Technical reports regarding this CRM can be obtained from the contact details given below.

Reproduction of Certificate

In reproducing this certificate, it should be clearly indicated that the document is a copy.

Date of Shipment: Xxxxx xx, 20xx

6026b00-240125-240527

January 25, 2024

ISHIMURA Kazuhiko
President

National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact:
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