

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 6019-b

No. +++

L-Tyrosine



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 preparation of standard solutions, calibration of analytical instruments, 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-tyrosine 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 (kg/kg)	Expanded uncertainty Mass fraction (kg/kg)
L-Tyrosine ((2S)-2-amino-3-(4-hydroxyphenyl) propanoic acid)	60-18-4	0.999	0.002

The certified value of the purity (in mass fraction) of tyrosine 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)
Tyrosine (without enantiomeric separation)	0.999	0.002

Analysis

The certified value of this CRM was based on the results of nonaqueous acidimetric titration and nitrogen determination by the Kjeldahl method, taking into consideration of the amount of amino acid-related impurities by high performance liquid chromatography (HPLC) with fluorescence detection after derivatization using *o*-phthalaldehyde (OPA). In addition, the corrected amount of amino acid-related impurities was as described in the "Technical Information" and did not affect the certified value.

Metrological Traceability

The certified value was determined by nonaqueous acidimetric titration with NMIJ CRM 3001-c (potassium hydrogen phthalate) and nitrogen determination by the Kjeldahl method with NMIJ CRM 3012-a (tris(hydroxymethyl)aminomethane). The certified values, therefore, are traceable to the International System of Units (SI).

Mutual Recognition Arrangement under Metre Convention

The certified value of the purity (in mass fraction) of this CRM without enantiomeric separation is recognized for international

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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-tyrosine and 1 g of material 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 44 mg should be used to ensure valid results. 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. Highly purified L-tyrosine produced by Ajinomoto Co., Inc. was bottled into vials under argon atmosphere. Each vial was sealed in an aluminum-laminated bag.

Technical Information

Impurity of amino acid which was detected over 0.1 g/kg was phenylalanine at the time of certification and its mass fraction was 0.418 g/kg. The molar mass of L-tyrosine used to calculate the certified value is 181.188 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.

May 30, 2025

ISHIMURA Kazuhiko
President

National Institute of Advanced Industrial Science and Technology

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