National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 6017-a

No. +++

L-Arginine

National Institute of Advanced Industrial Science and Technology
AIST

This certified reference material (CRM) was produced in accordance with NMIJ's management system, and in compliance with ISO GUIDE 34:2000 and ISO/IEC 17025:2005. This CRM is primarily intended for use in calibrating the analytical instruments or reagents used in amino acid analysis. It is also intended for controlling the precision of analysis and for confirming the validity of analytical methods or instruments.

Certified Value

The certified value for the purity (in mass fraction) of L-arginine is given in the following table. The quoted uncertainty is the half-width of the expanded uncertainty interval calculated using a coverage factor (k) of 2, which gives a level of confidence of approximately 95 %.

	CAS No.	Certified value, Mass fraction (kg/kg)	Expanded uncertainty, Mass fraction (kg/kg)
L-Arginine ((*S*)-5-guanidino-2-aminopentanoic acid)	74-79-3	0.998	0.002

The certified value and expanded uncertainty of arginine without enantiomeric separation is given in the following table, where the mass fraction of D-arginine is negligible.

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

Analysis

The certified value is based on the results of acidimetric titration, nitrogen determination by the Kjeldahl method, and impurity determination by high-performance liquid chromatography (HPLC). Impurities of amino acids were quantified by LC with fluorescence detection after derivatization using o-phthalaldehyde (OPA) and by liquid chromatography mass spectrometry (LC/MS). Unidentified impurities were quantified by LC with a charged aerosol detector (LC-CAD). D-arginine was quantified by LC/MS using a chiral resolution column.

Metrological Traceability

The certified value was determined by titrimetry as a primary method of measurement with NMIJ CRM 3001-a (potassium hydrogen phthalate) and NMIJ CRM 3005-a (sodium carbonate) as primary standards and by impurity determination using HPLC calibrated with purity-evaluated amino acids. The certified value is traceable to the International System of Units (SI).

Expiration of Certification

This certificate is valid until March 31, 2016, provided that the material remains unopened and stored in accordance with the instructions given in this certificate.

Sample Form

This CRM is a white powder. 0.5 g of the material is bottled in a glass vial and kept in an aluminum-laminated bag.

Homogeneity

The homogeneity of this CRM was measured by acidimetric titration, analyzing 10 vials randomly selected from 400 vials. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage

This CRM should be kept in a clean desiccator at room temperature (15 °C to 25 °C) and shielded from light.

Instructions for Use

From the homogeneity, a minimum sample mass of 100 mg should be used. Because of the hygroscopicity of the material, it should be used under dry conditions immediately after opening. Opening and usage at a relative humidity of less than 70 % are strongly recommended. This CRM is for laboratory use only and not for in vivo use. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation Method

Preparation of the material was performed by Wako Pure Chemical Industries, Ltd. Highly purified L-arginine provided by AJINOMOTO Co., Inc. was dried and bottled into vials under argon atmosphere. Each vial was sealed in an aluminum-laminated bag.

Additional Information

Moisture was determined by Karl Fischer titration to be 0.49 g/kg. The mass fraction of D-arginine determined by LC/MS using a chiral resolution column was less than 0.1 mg/kg.

NMIJ Analysts

The technical manager for this CRM is A. Takatsu and the production manager is M. Kato. The analysts are M. Kato, T. Yamazaki, H. Kato, S. Eyama, M. Goto, and M. Yoshioka.

Technical Information

Customer registration on the NMIJ Website (given below) will facilitate notification of any revision of the information given above. 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.

April 1, 2015

Ryoji Chubachi
President
National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact:
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Revision history
April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."