

National Institute of Advanced Industrial Science and Technology

## National Metrology Institute of Japan



## Reference Material Certificate

NMIJ CRM 7901-a

No. +++



Arsenobetaine Solution

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 instruments, and validation of analytical methods and instruments used for the quantification of arsenobetaine.

**Certified Value**

The certified value of this CRM 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)
Arsenobetaine (CH <sub>3</sub> ) <sub>3</sub> As <sup>+</sup> CH <sub>2</sub> COO <sup>-</sup>	64436-13-1	24.40	0.62

**Analysis**

The certified value in the CRM was determined by the following analytical methods:

- (1) Microwave-assisted digestion / Inductively coupled plasma mass spectrometry (ICP-MS)
- (2) Microwave-assisted digestion / High-resolution ICP-MS
- (3) Microwave-assisted digestion / High-performance liquid chromatography-ICP-MS (HPLC-ICP-MS)
- (4) ICP-MS without an acid digestion

The certified value for arsenobetaine was the weighted mean of results obtained by the analytical methods listed above. The concentration of impurities due to arsenic compounds, which was predetermined by HPLC-ICP-MS, was deducted from the weighted mean of arsenic concentration. The obtained value was converted to arsenobetaine concentration.

**Metrological Traceability**

The certified value was converted to the arsenobetaine from arsenic concentration, which was determined by the analytical methods based on NMIJ CRM 7912-a (As(V) solution). The certified value of As(V) of NMIJ CRM 7912-a was determined by arsenic standard solution guaranteed by JCSS (Japan Calibration Service System), and is traceable to the International System of Units (SI).

**Mutual Recognition Arrangement under Metre Convention**

The certified value of this CRM 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 is stored in accordance with the instructions given in this certificate.

### Description of the Material

This CRM is in the form of a colorless and transparent liquid at room temperature. It was filled in amber glass bottles (10 mL each).

### Instructions for Storage

This CRM should be kept in a clean place at a temperature between 5 °C and 35 °C and shielded from light.

### Instructions for Use

- 1) Be careful to a disassembly of a cap with the opening.
- 2) The bottle should be opened after gently shaking at room temperature.
- 3) After opening, take care to avoid contamination. Also, it is desirable to use up this CRM as quickly as possible.
- 4) The minimum sample amount is 0.15 mL for the determination of arsenobetaine.
- 5) The bottle must be sealed as tightly as possible for storage after opening. However, the stability of this CRM after opening has not been confirmed.

### Precautions for Handling

Wear a mask, gloves, and other protective equipment during handling. Handling, storage, and disposal of this CRM must obey all relevant laws. Refer to the safety data sheet (SDS) on this CRM before use.

### Preparation

High-purity arsenobetaine reagent powder was dissolved in water, and the solution was then dispensed into amber glass bottles (10 mL each). The processes of dilution, homogenization, subdivision, bottling, labeling and packing of arsenobetaine solution were carried out by Tri Chemical Laboratories Inc. (Yamanashi, Japan).

### Technical Information

At October 2005, the density of this CRM as measured by a digital density meter with oscillating U-tube was 0.99706 g/cm<sup>3</sup> (25 °C). A small concentration of trimethylarsineoxide (0.3 %) against the total arsenic mass function was determined by using HPLC-ICP-MS, and no other arsenic impurity than trimethylarsineoxide was found.

### NMIJ Analysts

The technical manager for this CRM is CHIBA K., the production manager is KUROIWA T., and the analysts are KUROIWA T., NARUKAWA T. and INAGAKI K.

### 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.

April 1, 2020

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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National Metrology Institute of Japan,  
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Revision history

August 4, 2009: Revised the certified value for arsenobetaine on the basis of the results used to characterize arsenobetaine concentration.

March 30, 2010: Expiration date was extended to March 31, 2015, from March 31, 2010.

October 29, 2013: Expiration date was extended to March 31, 2020, from March 31, 2015.

April 1, 2015: "Metrology Management Center" was renamed to "Center for Quality Management of Metrology."

March 12, 2019: The description on "Mutual Recognition Arrangement under Meter Convention" was added.

The description in "Expiration of Certification" was changed to "one year from the date of shipment."