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) was produced in accordance with NMIJ’s management system, and in compliance with ISO Guide 34. This CRM is intended for use in controlling the precision of analysis or for confirming the validity of analytical methods or instruments during the analysis of arsenobetaine.

Certified Value
The certified value for arsenobetaine in this CRM 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%.

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Certified value, Mass fraction (mg/kg)</th>
<th>Expanded uncertainty, Mass fraction (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$(CH_3)_3As^{+}CH_2COO^{-}$ 64436-13-1</td>
<td>24.40</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Analysis
The arsenic concentration 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. Directly / ICP-MS
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 determined by the analytical methods using NMIJ CRM 7912-a (As(V) solution) and is traceable to the International System of Units (SI).

Expiration of Certification
This certificate is valid until March 31, 2020, provided that the material remains unopened and is stored in accordance with the instructions given in this certificate.

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

Homogeneity
The homogeneity of this CRM was determined by analyzing 10 bottles hierarchical-randomly selected from 500 bottles. The concentration of arsenobetaine was measured by HPLC-ICP-MS. The homogeneity is reflected in the uncertainty of the certified value.
Instructions for Storage
This CRM should be kept in a clean place at room temperature (15 °C to 35 °C) and shielded from bright lights.

Instructions for Use
1) The bottle should be opened after gently shaking at room temperature.
2) Care should be taken to prevent any contamination after opening the bottle. Once opened, the bottle must be tightly sealed for storage.
3) The CRM should be used up as soon as possible after opening.
4) The minimum sample amount for the determination of arsenobetaine is 0.15 mL.

Precautions for Handling
This CRM is for laboratory use only. Handling, storage, and disposal of this CRM should obey the Poisonous and Deleterious Substances Control Law. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation Method
High-purity arsenobetaine reagent powder was dissolved in water, and the solution was then dispensed into amber glass bottles (10 mL each).

Information
The density of this CRM as measured by a digital density meter with oscillating U-tube was 0.99706 g/cm³ (25 °C). A small concentration of trimethylarsineoxide (0.3 %) against the total arsenic mass function was determined by HPLC-ICP-MS, and no other arsenic impurity than trimethylarsineoxide was found.

NMIJ Analysts
For this CRM, the technical manager is K. Chiba, the production manager is T. Kuroiwa, and the analysts are T. Kuroiwa, T. Narukawa, and K. Inagaki.

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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National Metrology Institute of Japan,
Center for Quality Management of Metrology, Reference Materials Office,
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Phone: +81-29-861-4059; Fax: +81-29-861-4009, https://www.nmij.jp/english/service/C/
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."