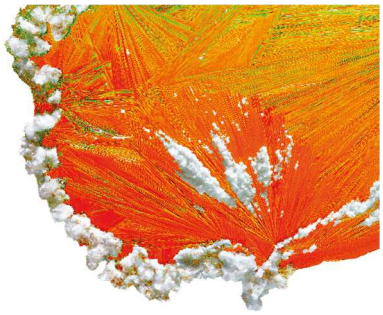
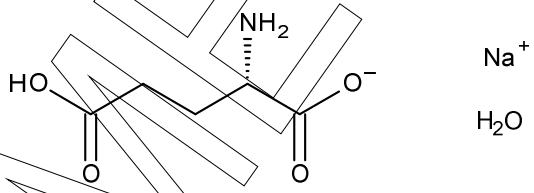


Certificate of Analysis ISO 9001

Reference Material

Product name

Monosodium Glutamate Monohydrate



Product code	**Lot number**
MM3278.00	1067713
CAS number	**Appearance**
6106-04-3	white solid
Molecular weight	**Melting point (DSC)**
187.13	228 °C
Molecular formula	**Long-term storage**
$C_5H_8NO_4$ H_2O Na	2 to 8 °C, dark

Assay "as is"
99.9 %

Date of shipment: **06 Apr 2020**

Producer confirms that this reference material (RM) meets the specification detailed on this Certificate of Analysis for **one year** from the date of shipment, provided the substance is stored under the recommended conditions unopened in the original container.

Release by:	**Date of Release:**		
Dr. Sabine Schröder	Luckenwalde, 13 Mar 2020		Product Release

Product information

For laboratory use only. Not suitable for human or animal consumption.

Before usage of the RM, it should be allowed to warm to room temperature. No drying required, as the certified value is already corrected for the content of water and other volatile materials.

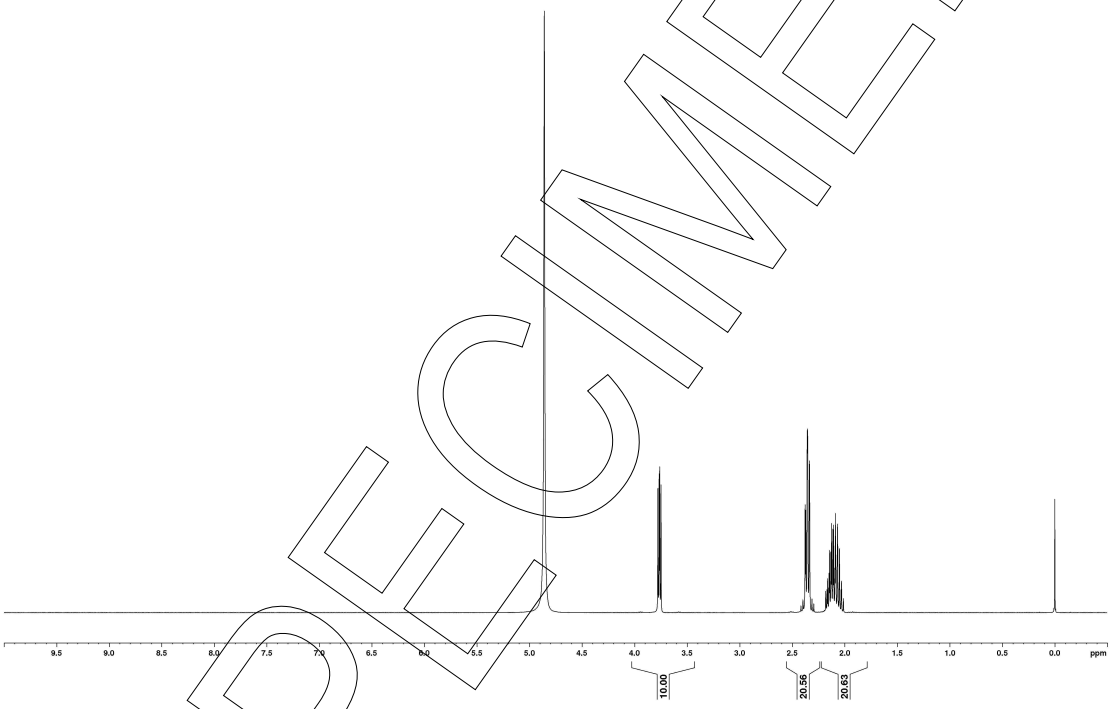
The product quality is controlled by regularly performed quality control tests (retests).

Further content

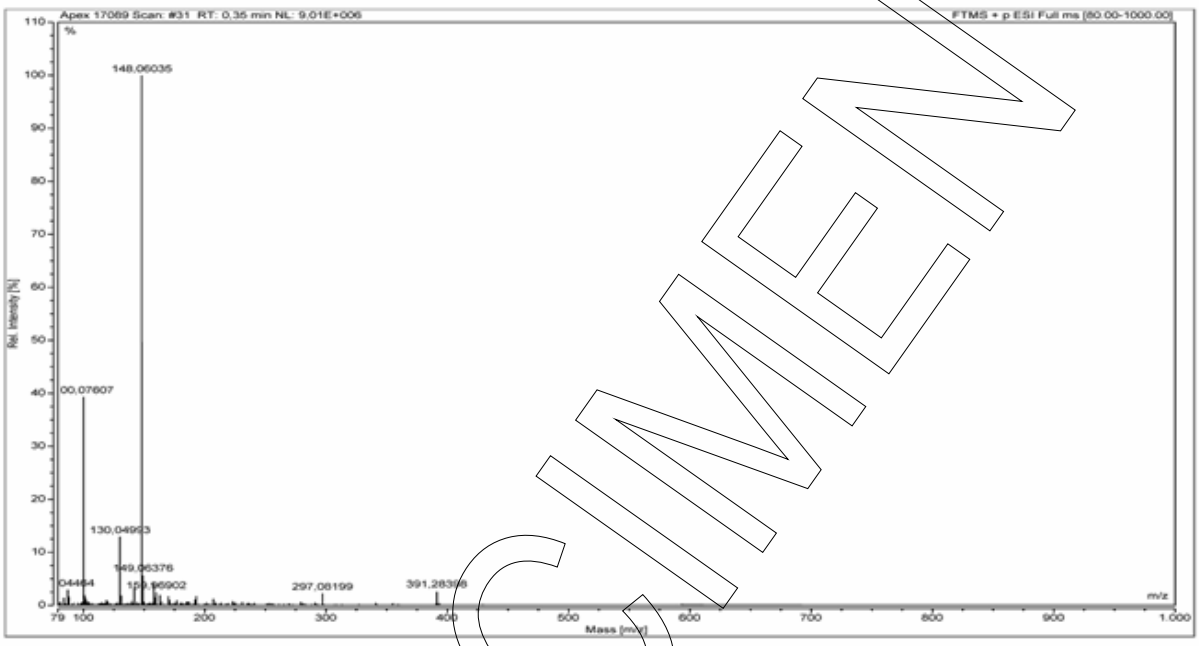
Identity

The identity of the reference material was established by following analyses.

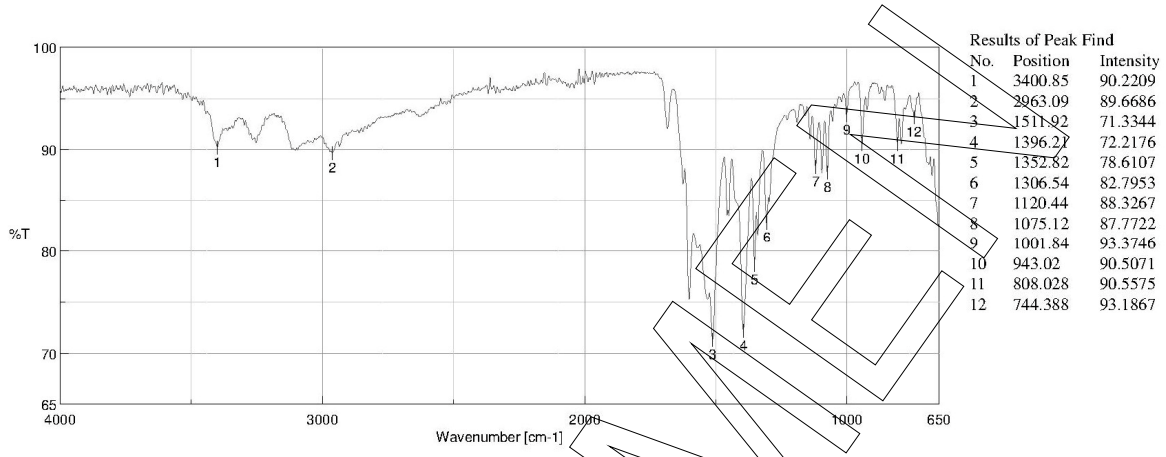
Method	Conditions	Result
^{1}H-NMR	400 MHz, D_2O	Structure confirmed



Method	Conditions	Result
MS	3.5 kV ESI+; capillary temperature: 269 °C Theoretical value: 148.06043	Structure confirmed



Method	Conditions	Result
IR	Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy	Structure confirmed



Results of Peak Find

No.	Position	Intensity
1	3400.85	90.2209
2	2963.09	89.6686
3	1511.92	71.3344
4	1396.21	72.2176
5	1352.82	78.6107
6	1306.54	82.7953
7	1120.44	88.3267
8	1075.12	87.7722
9	1001.84	93.3746
10	943.02	90.5071
11	808.028	90.5575
12	744.388	93.1867

Method	Conditions	Result
Optical Rotation	c = 10.0 in 2N HCl	$[\alpha]_D^{20}$ = + 25°

Purity

The purity of the reference material was assessed by following analyses.

Volatile content

Water content	
Method	Karl Fischer titration
Result (n = 3)	11.55 %; SD = 0.24 %
Theoretical value	9.63 %
Result (content of excessive water)	1.92 %

Residual solvents	
Method	^{1}H-NMR
Result (n = 1)	No significant amounts of residual solvents were detected (< 0.05 %).

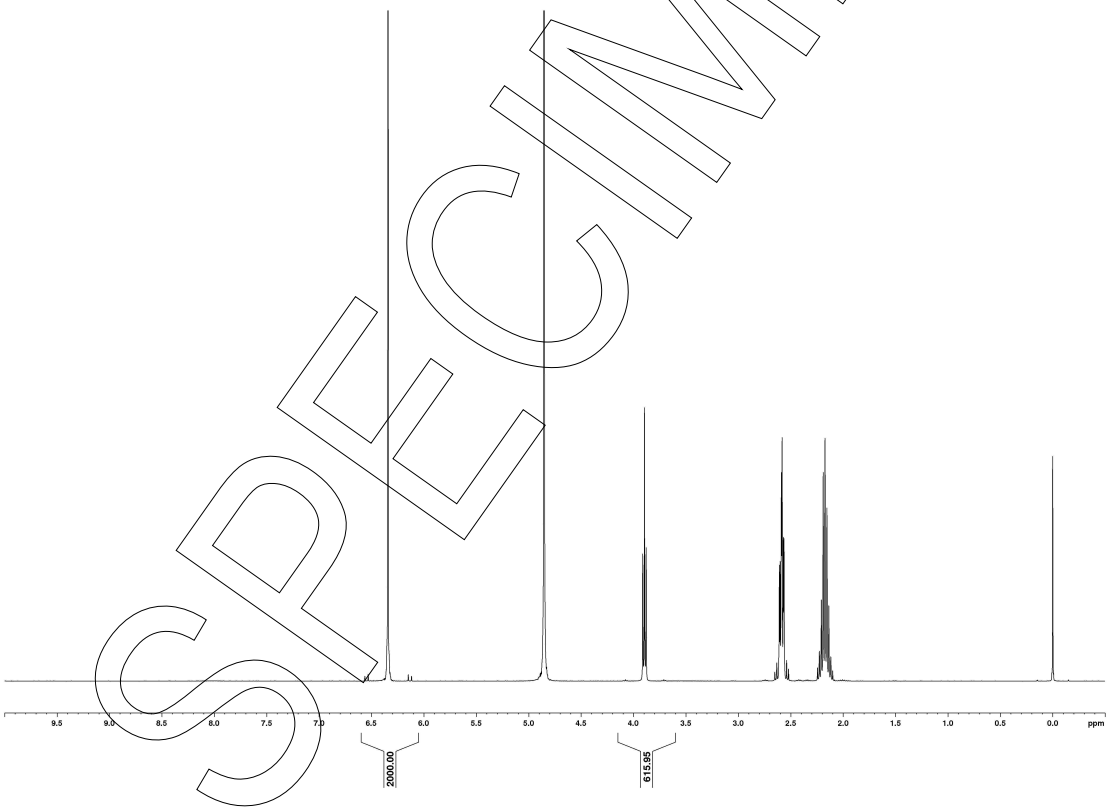
Final result

Assay "as is": **99.94 %**

The assay "as is" is assessed by quantitative NMR spectroscopy and is equivalent to the assay based on the not anhydrous and not dried substance respectively.

Method: Value assigning technique - quantitative NMR spectroscopy	
Conditions	400 MHz, D_2O
Internal standard	Maleic acid (certified reference material), signal 6.1 – 6.6 ppm, 2 H
Result (mass fraction, **n = 6**)	99.94 %; SD = 0.02 %

Quantitative NMR spectrum



Revision table

Revision	Date	Reason for revision
00	13 Mar 2020	Release of the Certificate of Analysis – initial version

Product warranties for the RM are set out in the terms and conditions of purchase.