LoGiCal®
produced by LGC

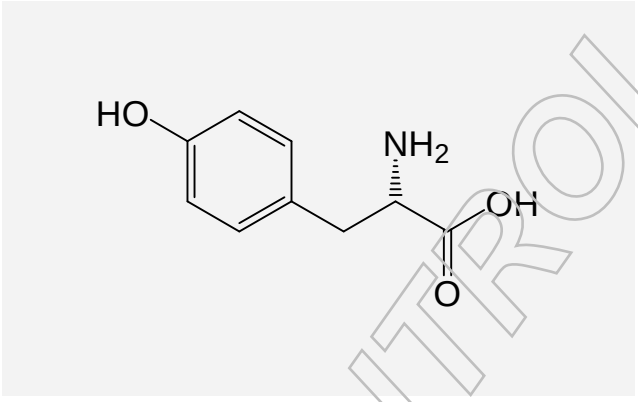
Certificate of Analysis

Reference Substance

Tyrosine (L-Tyrosine)

Catalogue Number:	LGCFOR0634.00
Lot Number:	38898
Molecular Formula:	$C_9H_{11}NO_3$
Molecular Weight:	181.19
CAS Number:	[60-18-4]

Long-term Storage:	2 to 8 °C, dark
Appearance:	white solid
Melting Point:	297 °C (dec.)
Assay 'as is':	99.8 %



Date of shipment: **2017-January-25**

This certificate is valid for two years from the date of shipment provided the substance is stored under the recommended conditions.

Release Date: 2013-10-02

LGC GmbH

Dr. Sabine Schröder
Product Release

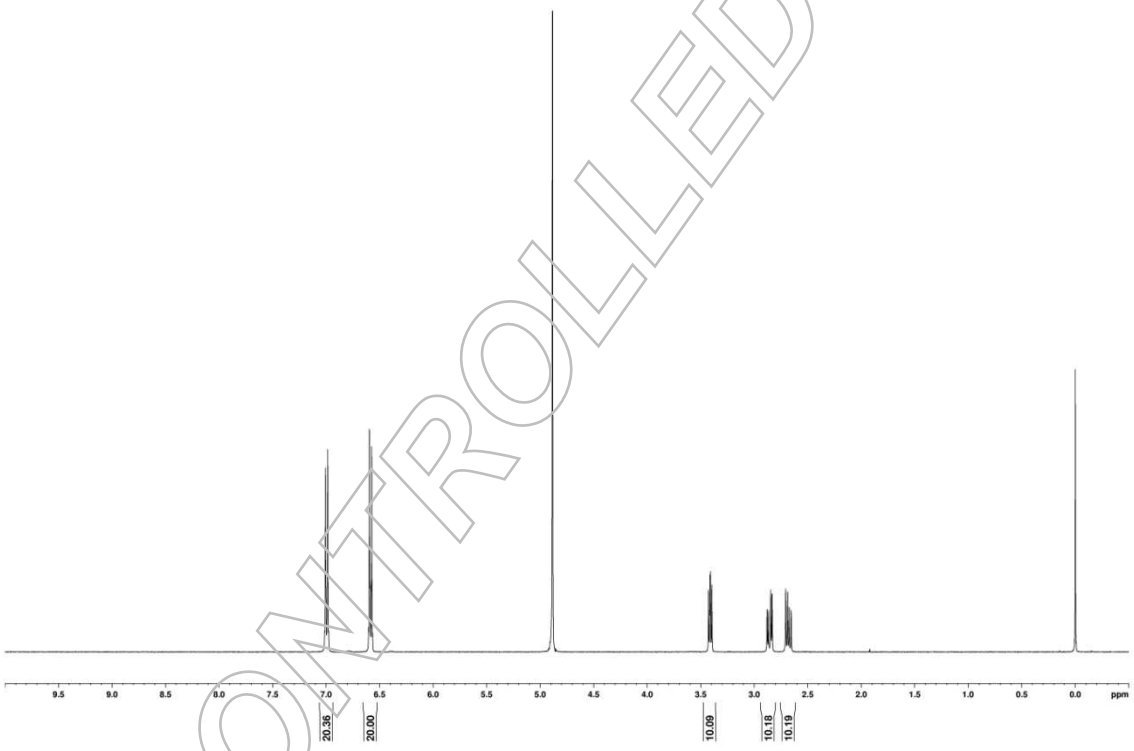
I. Identity

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

Ia. ^{1}H-NMR Spectrum

Conditions: 400 MHz, D_2O/NaOD

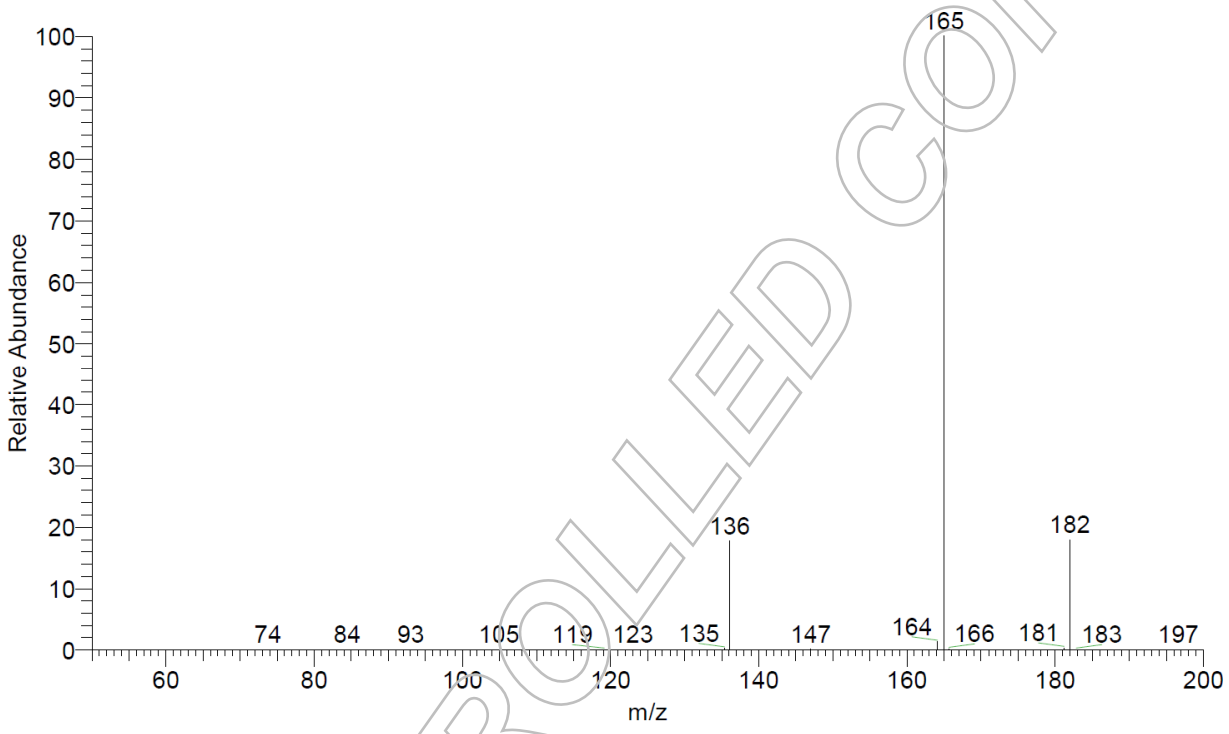
The structure is confirmed with the signals of the spectrum and their interpretation.



LGC Standards
Excellence through measurement

Ib. Mass Spectrum

Method: 4.5 kV ESI; vaporization temperature: 200 °C, direct inlet



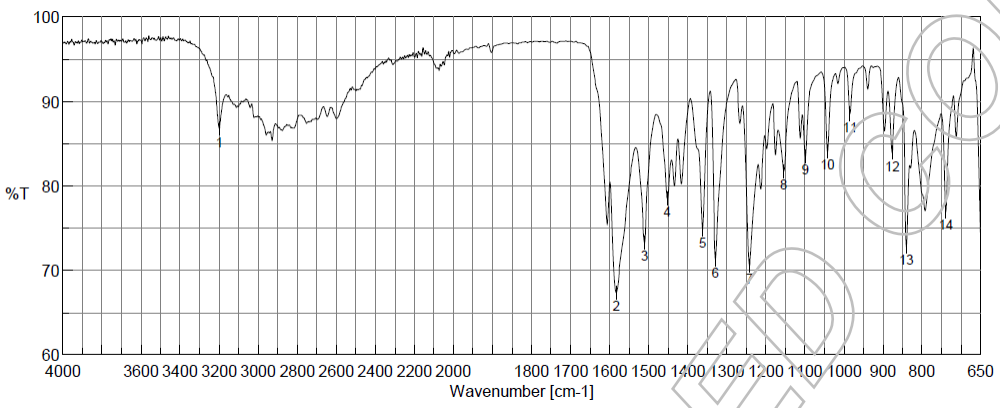
m/z	fragments
182	[MH]
165	[MH – NH_3]
136	[M – COOH]

The signals of the mass spectrum and their interpretation are consistent with the structural formula.

LGC Standards
Excellence through measurement

Ic. IR Spectrum

Method: Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy



Result of Peak Picking

No.	Position	Intensity
1	3199.33	86.7591
2	1583.27	67.336
3	1509.99	73.2621
4	1452.14	78.5123
5	1362.46	74.8079
6	1328.71	71.2992
7	1241.93	70.573
8	1154.19	81.7289
9	1099.23	83.4726
10	1042.34	84.0468
11	984.482	88.5179
12	876.488	83.9133
13	839.847	72.7957
14	738.603	76.9523

The signals of the IR spectrum and their interpretation are consistent with the structural formula.

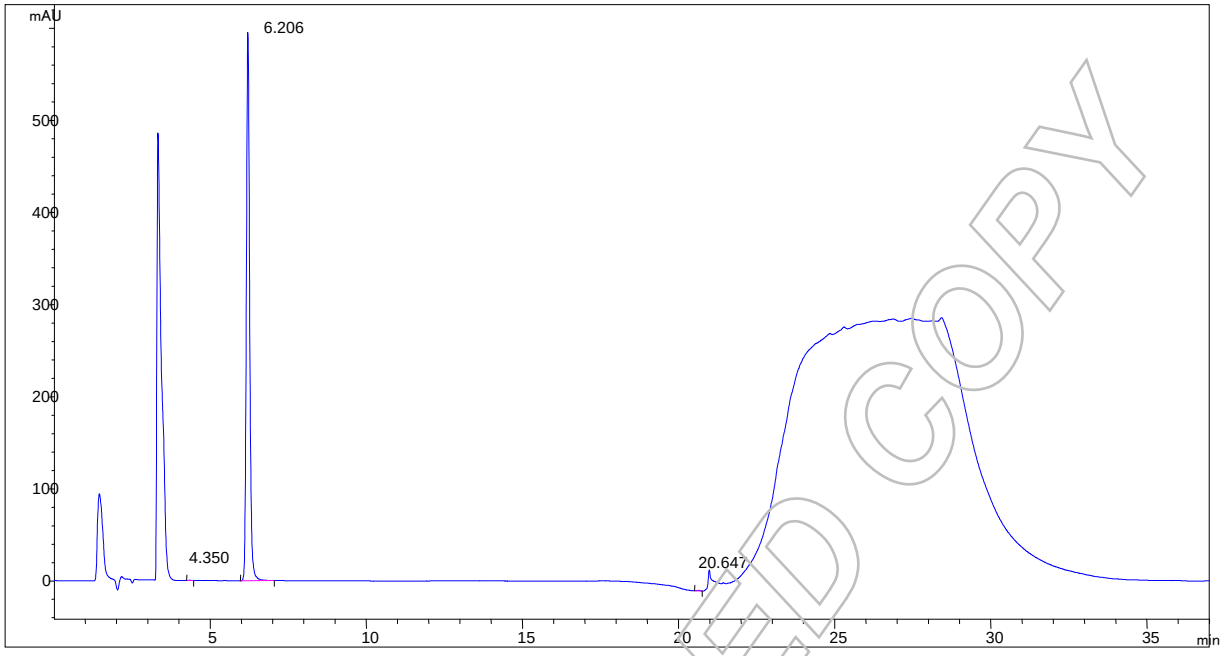
II. Purity

The purity of the reference substance was analysed by high performance liquid chromatography (HPLC).

HPLC Conditions:

Column:	**Conditions:**			**Detector:**	**Injector:**
Discovery HS F5	0.5 ml/min, 40 °C			DAD	Auto
3 µm, 150 x 4 mm	mob. Phase A: 4.7 g/l NaH_2PO_4, pH 7.8			225 nm	2 µl; 0.08178 mg/ml in Water/TFA 9/1 (v/v)
	mob. Phase B: Acetonitrile/Methanol/Water 45/45/10 (v/v)				
	0 – 14 min	A/B	100/0		
	14 – 19 min	A/B	to 60/40		
	19 – 24 min	A/B	60/40		
	24 – 29 min	A/B	to 100/0		
	29 – 37 min	A/B	100/0 (v/v)		

LGC Standards
Excellence through measurement



Area Percent Report - Sorted by Signal

Pk #	Retention Time	Area	Area %
-	1.45	solvent peak	-
-	3.33	solvent peak	-
1	4.35	1.50	0.03
2	6.21	4357.61	99.85
3	20.65	4.84	0.11
Totals		4363.94	100.00

For the calculation the solvent peaks and the system peaks were ignored. The content of the analyte was determined as ratio of the peak area of the analyte and the cumulative areas of the purities, added up to 100 %.

Results:

Average	99.83 %
Number of results	n=6
Standard deviation	0.05 %

LGC Standards
Excellence through measurement

III. Loss on Drying

Conditions: 105 °C for 4 h, EP 6.0 (2.2.32)

No significant amounts of volatile contents were detected (< 0.05 %).

IV. Final Result

Total impurities (HPLC)	0.17 %
Loss on drying	n. d. (not detected)
Assay (100 % method) [1]	99.83 %

The assay is assessed to be 99.8 % 'as is'

The assay 'as is' is equivalent to the assay based on the not anhydrous and not dried substance respectively.

[1] The calculation of the 100 % method follows the formula:

$$\text{Assay (\%)} = (100\ \% - \text{LOD}) * \frac{\text{Purity HPLC (\%)}}{100\ \%}$$

LGC Standards
Excellence through measurement

The sum of Water and Residual solvents (LOD) is considered as absolute contributions, HPLC purity is considered as relative contribution.