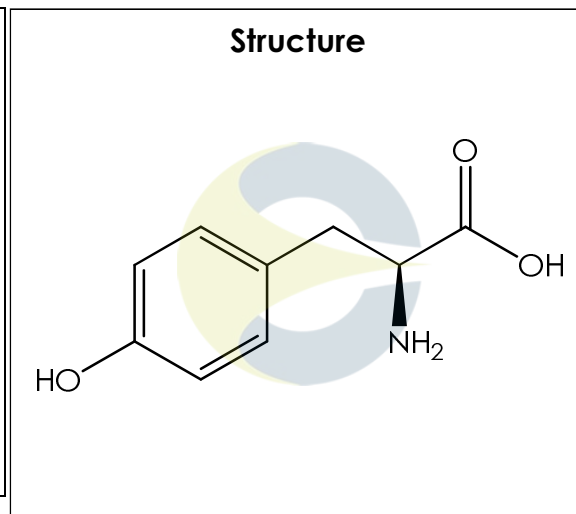


CERTIFICATE OF ANALYSIS

For Laboratory Use Only

PRODUCT NAME	L-Tyrosine
PART NUMBER	00020619
STANDARD TYPE	Primary (P)
LOT NUMBER	00020619-VVF
REPORT NUMBER	CDXA-RSS-5647-01
SAMPLE NUMBER	CDXA-13-4599
DATE OF SAMPLE	07/05/2013
DATE OF RE-EVALUATION	07/27/2017
DATE OF REPORT	08/23/2017



CHEMICAL NAMES	(-)- α -Amino-p-hydroxycinnamic acid; 4-Hydroxy-L-phenylalanine; Therigon; H-L-Tyr-OH
CHEMICAL FORMULA	C ₉ H ₁₁ NO ₃
MOLECULAR WEIGHT (MW)	181.19
CHEMICAL FAMILY	Amino Acids
CAS NUMBER	[60-18-4]
EC#(EINECS)	200-460-4
RTECS	YP2275600

ANALYTICAL RESULTS

TEST	METHOD	SPECIFICATION	RESULT
Adjusted Purity	NA	NA	99.4%
HPLC	CDXA-AM-101-00	NA	99.5%
NMR	99.1-CD-1.0-000122	Conforms to structure	Conforms to structure
Mass Spectrum	Direct Infusion, ESI (+)	Conforms	Conforms
Residual Solvent	99.1-CD-6.0-0000115	NA	ND
Water	99.1-34-8.0-000094	NA	0.1%
Appearance	NA	NA	White Powder

ADJUSTED PURITY: 99.4% IS BASED ON (100 - 0.1 WATER - 0.0 SOLVENTS) X 99.5% HPLC

STORAGE CONDITIONS

STORAGE	Room Temperature in a dry place.
EXPIRATION DATE	07/2022 under the above conditions.

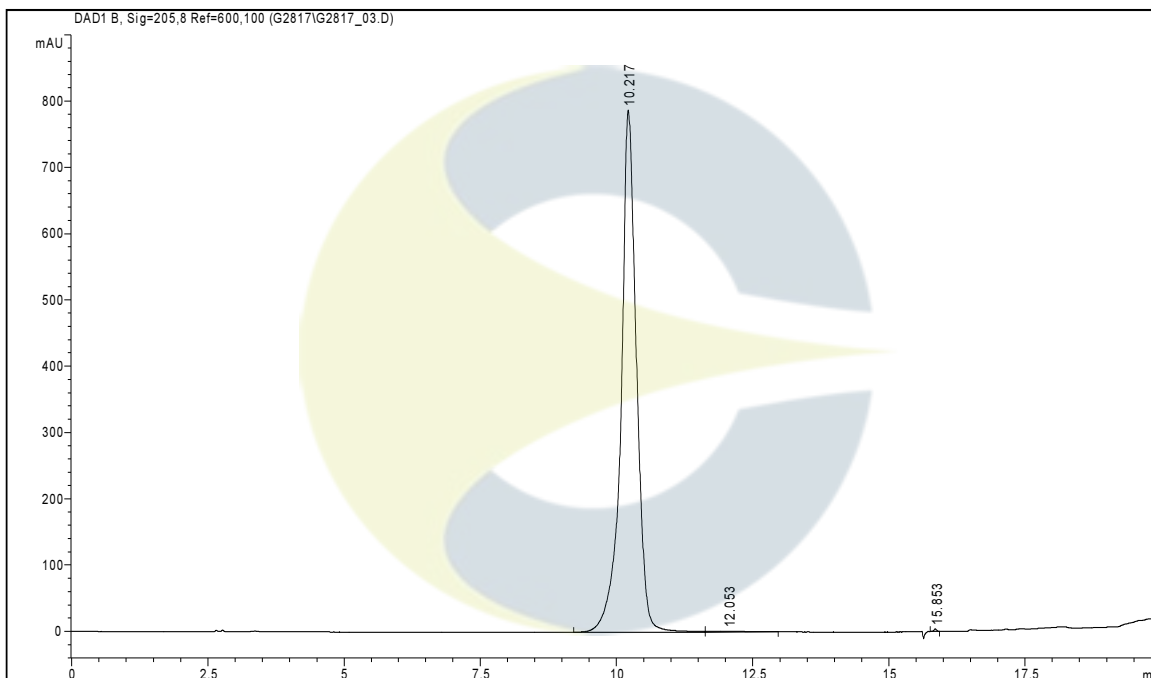
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ANALYTICAL CONDITIONS

INSTRUMENT	AGILENT 1100 HPLC UV-VIS (DAD) DETECTOR, AGILENT 6510 QTOF
COLUMN	Phenomenex Synergi Hydro-RP 250 x 4.6 mm, 4 µm particle size
MOBILE PHASE	A – 10 mM Monopotassium phosphate (pH = 2.9), B – Acetonitrile; Hold 0% B for 10 minutes, then increasing to 40% B over 5 minutes. Hold at 40% B for 4.9 minutes.
COLUMN TEMP.	22°C
FLOW RATE	1.0 mL/minute
INJECTION VOL.	2.0 µL
INJECTION CONC.	3.4 mg/mL in 1M Potassium hydroxide
DETECTION	205 ± 4 nm

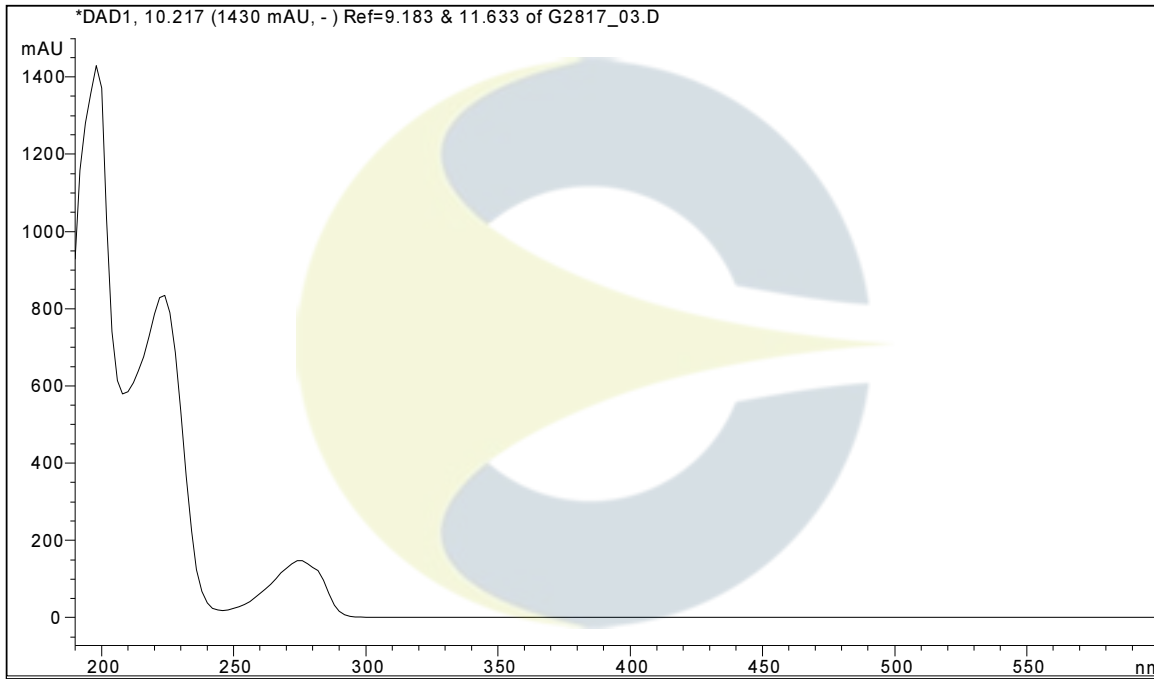
HPLC CHROMATOGRAM OF L-TYROSINE (CDXA-13-4599)



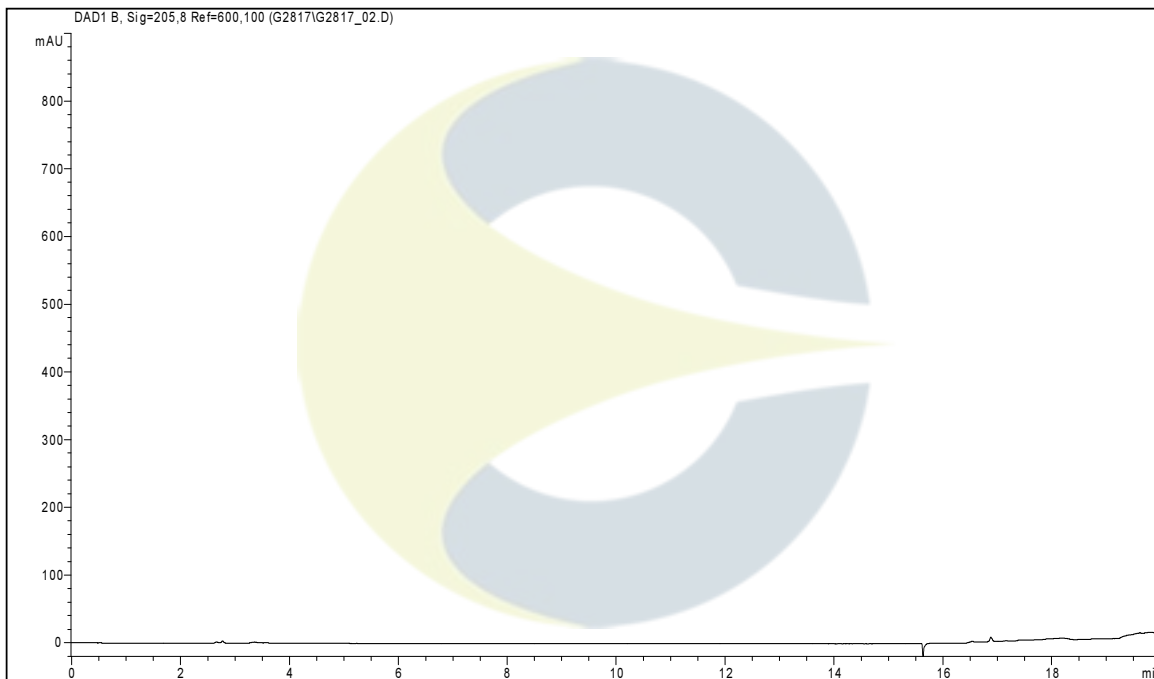
CERTIFICATE OF ANALYSIS

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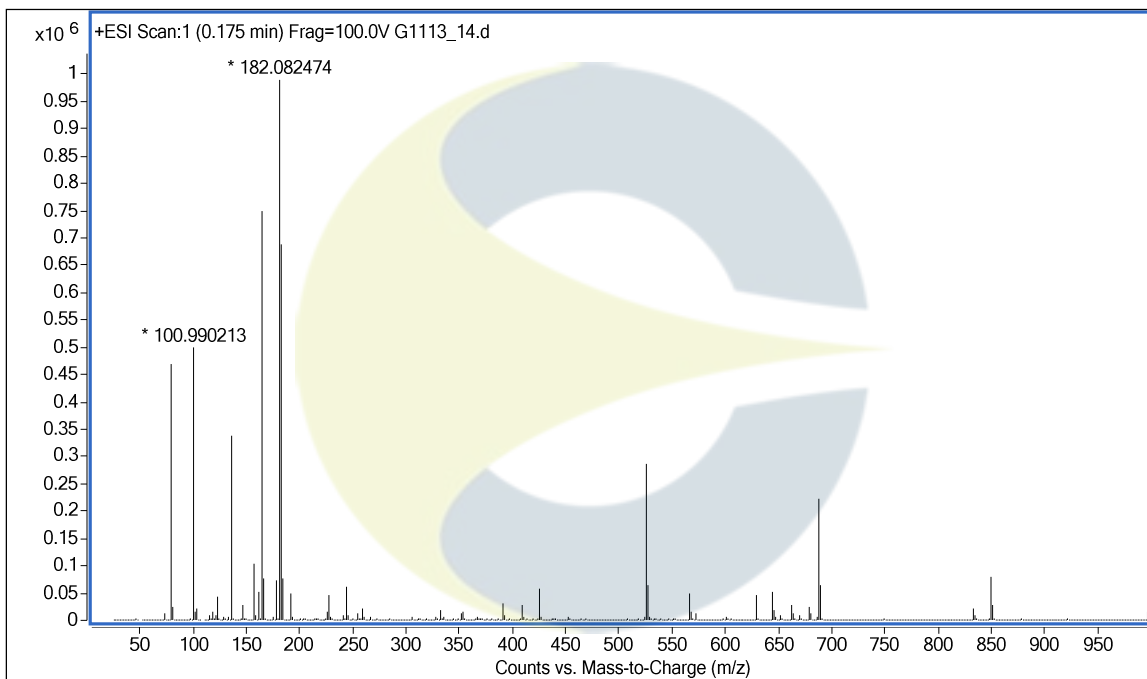
UV SPECTRUM AT RT = 10.2 MINUTES



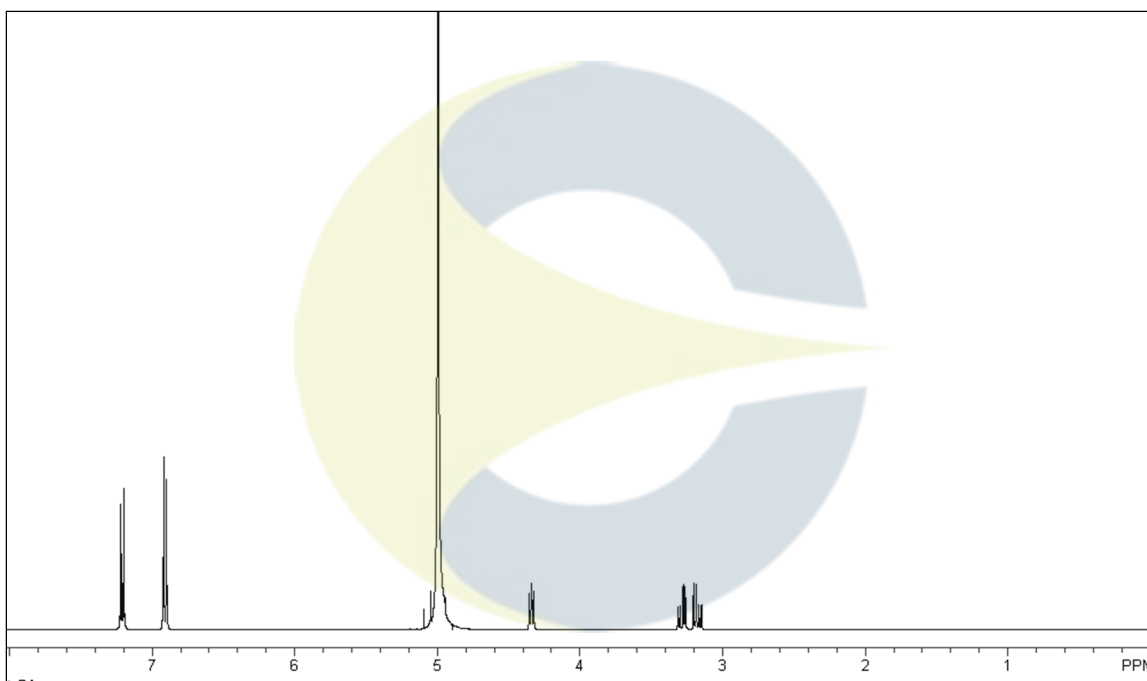
HPLC CHROMATOGRAM OF DILUENT BLANK



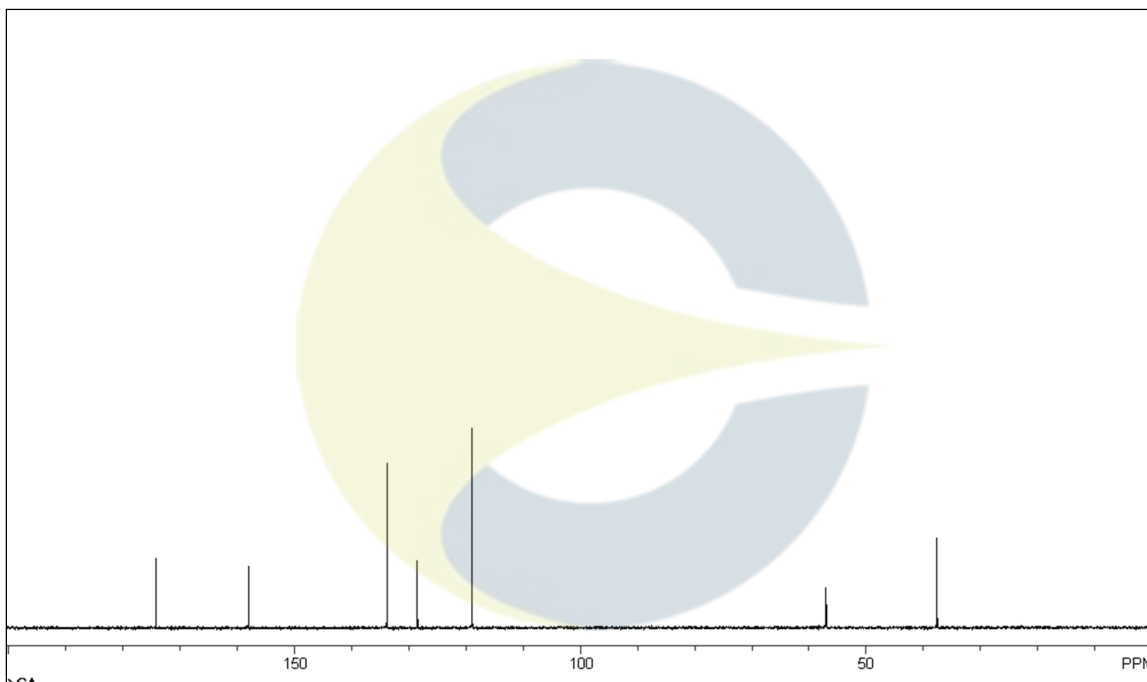
MASS SPECTRUM OF L-TYROSINE (CDXA-13-4599)



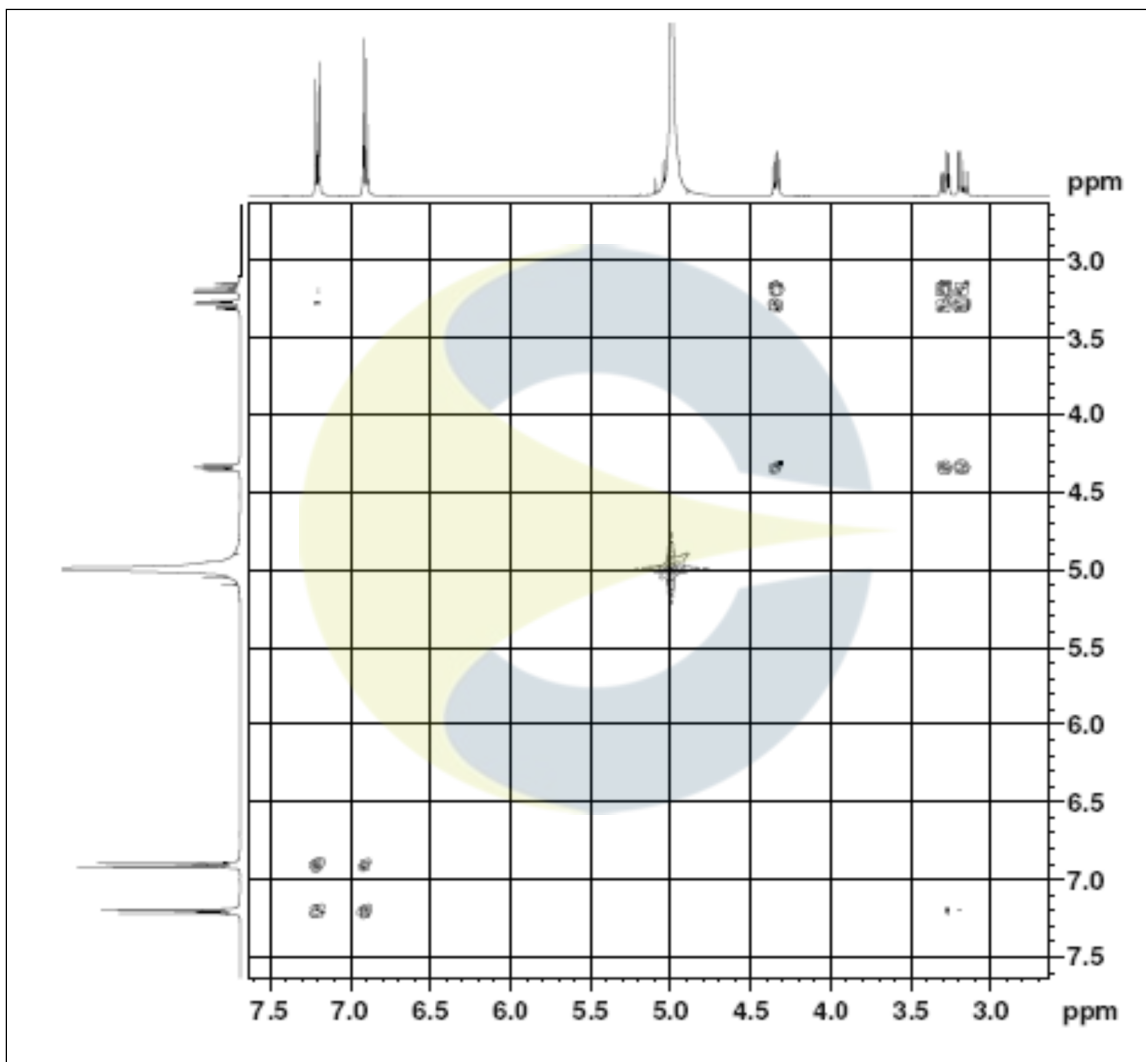
¹H-NMR SPECTRUM OF L-TYROSINE (CDXA-13-4599) IN D₂O + HCl



¹³C-NMR SPECTRUM OF L-TYROSINE (CDXA-13-4599) IN D₂O + HCl



COSY-NMR SPECTRUM OF L-TYROSINE (CDXA-13-4599) IN D₂O + HCl



REVISION HISTORY

<u>Revision History</u>	<u>Date of Revision</u>	<u>Document/Changes</u>
00	07/30/2013	New report
01	08/23/2017	Passed re-evaluation by HPLC and KF. Updated analytical conditions, results, chromatograms, spectra, chemical names, and expiration dates. Removed melting point.