

ALADDIN SCIENTIFIC CORPORATION

14078 Meridian Parkway, Riverside, CA. 92518

## Certificate of Analysis

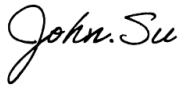
Date of Testing: 2022-10-09 11:36:24  
 Date of Next Testing: 2026-10-08 11:36:24  
 Product Name: **L(+)-Glutamic acid**  
 CAS Number: 56-86-0  
 Specifications & Purity: Ultra pure, ≥99.5%(NT)  
 Lot #: I2224402  
 SKU #: **G103979**  
 Analysis: **107515**

Parameter	Limit Values	Result
Nickel(Ni)	0-5 (ppm)	2.10 ppm
Ammonia (NH <sub>4</sub> )	0-0.02 (%)	0.01 %
Chloride (Cl <sup>-</sup> )	0-0.02 (%)	0.01 %
Calcium(Ca)	0-200 (ppm)	55.00 ppm
Ignition Residue (as sulfate)	0-0.05 (%)	0.01 %
Cadmium(Cd)	0-5 (ppm)	1.70 ppm
Zinc(Zn)	0-5 (ppm)	2.30 ppm
Iron(Fe)	0-5 (ppm)	2.40 ppm
Potassium(K)	0-50 (ppm)	23.40 ppm
UV Absorbance 260nm	0-0.1	0.05
Bismuth(Bi)	0-5 (ppm)	3.10 ppm
UV Absorbance 280nm	0-0.1	0.04
Magnesium(Mg)	0-5 (ppm)	3.20 ppm
Lithium(Li)	0-5 (ppm)	2.10 ppm
Barium(Ba)	0-5 (ppm)	2.20 ppm
Specific Rotation [α] <sub>20</sub> /D(c=5 in 5 M HCl)	30.5-32.5 (°)	32.00°
Purity((NT)	99.5-100.5 (%)	99.60 %
Sulfate(SO <sub>4</sub> <sup>2-</sup> )	0-200 (ppm)	20.00 ppm
Sodium(Na)	0-200 (ppm)	104.00 ppm
Manganese(Mn)	0-5	2.20
Aluminum(Al)	0-5 (ppm)	2.30 ppm
Cobalt(Co)	0-5 (ppm)	2.41 ppm
(Pb)Lead	0-5 (ppm)	5.00 ppm
Molybdenum(Mo)	0-5 (ppm)	2.60 ppm
Chromium(Cr)	0-5 (ppm)	3.30 ppm
Strontium(Sr)	0-5 (ppm)	1.90 ppm
Copper(Cu)	0-5 (ppm)	3.00 ppm

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Parameter	Limit Values	Result
foreign amino acids	0-0.5 (%)	0.40 %
Loss on drying	0-0.05 (%)	0.05 %
Infrared spectrum	Conforms to Structure	Conforms to Structure
Insoluble matter	pass	Pass
Solubility 1M HCl, soluble 1 M at 20°C, clear, colorless	pass	Pass
$\lambda$ , 1 M in 1 M HCl	Pass	Pass
Appearance (G103979)	white powder	White powder

A handwritten signature in black ink that reads "John Su".

John Su  
QA & QC Manager