

ALADDIN SCIENTIFIC CORPORATION

14078 Meridian Parkway, Riverside, CA. 92518

## Certificate of Analysis

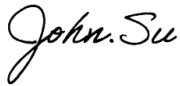
Date of Testing: 2023-03-09 14:03:09  
 Date of Next Testing: 2027-03-08 14:03:09  
 Product Name: **L(+)-Glutamic acid**  
 CAS Number: 56-86-0  
 Specifications & Purity: Ultra pure, ≥99.5%(NT)  
 Lot #: C2301004  
 SKU #: **G103979**  
 Analysis: **066806**

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)	12.06 ppm
Ignition Residue (as sulfate)	0-0.05 (%)	0.01 %
Cadmium(Cd)	0-5 (ppm)	2.03 ppm
Zinc(Zn)	0-5 (ppm)	2.15 ppm
Iron(Fe)	0-5 (ppm)	5.00 ppm
Potassium(K)	0-50 (ppm)	5.38 ppm
UV Absorbance 260nm	0-0.1	0.06
Bismuth(Bi)	0-5 (ppm)	2.17 ppm
UV Absorbance 280nm	0-0.1	0.06
Magnesium(Mg)	0-5 (ppm)	2.54 ppm
Lithium(Li)	0-5 (ppm)	1.39 ppm
Barium(Ba)	0-5 (ppm)	2.64 ppm
Specific Rotation [α] <sub>20</sub> /D(c=5 in 5 M HCl)	30.5-32.5 (°)	31.80°
Purity((NT)	99.5-100.5 (%)	100.10 %
Sulfate(SO <sub>4</sub> <sup>2-</sup> )	0-200 (ppm)	100.00 ppm
Sodium(Na)	0-200 (ppm)	15.18 ppm
Manganese(Mn)	0-5	3.06
Aluminum(Al)	0-5 (ppm)	2.41 ppm
Cobalt(Co)	0-5 (ppm)	2.18 ppm
(Pb)Lead	0-5 (ppm)	1.26 ppm
Molybdenum(Mo)	0-5 (ppm)	1.52 ppm
Chromium(Cr)	0-5 (ppm)	1.38 ppm
Strontium(Sr)	0-5 (ppm)	2.14 ppm
Copper(Cu)	0-5 (ppm)	2.25 ppm

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Parameter	Limit Values	Result
foreign amino acids	0-0.5 (%)	0.25 %
Loss on drying	0-0.05 (%)	0.05 %
Appearance (G103979)	white powder	White powder
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

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

John Su  
QA & QC Manager