

**SHANGHAI KYOWA AMINO ACID CO.,LTD.**

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CERTIFICATE OF ANALYSIS

Commodity: L-SERINE
Lot No.: 21121002
Manufacturing date: Dec-21-2021
Analysis date: Jan-13-2022
Retest date: Dec-21-2024

SPECIFICATION	ACCEPTANCE CRITERIA	RESULT
APPEARANCE	WHITE CRYSTALS OR CRYSTALLINE POWDER	WHITE CRYSTALS
IDENTIFICATION [IR]	PASS TEST	PASS TEST
STATE OF SOLUTION	COLORLESS AND CLEAR	COLORLESS AND CLEAR
STATE OF SOLUTION (T%)	NOT LESS THAN 98.0%	99.9%
pH	5.2 ~ 6.2	5.8
SPECIFIC ROTATION (AT 20°C)	+14.4 ~ +15.5°	+15.3°
SPECIFIC ROTATION (AT 25°C)	+14.0 ~ +15.6°	+14.9°
AMMONIUM (NH ₄)	NOT MORE THAN 0.020%	NOT MORE THAN 0.020%
CHLORIDE (Cl)	NOT MORE THAN 0.020%	NOT MORE THAN 0.020%
SULFATE (SO ₄)	NOT MORE THAN 0.020%	NOT MORE THAN 0.020%
IRON (Fe)	NOT MORE THAN 10ppm	NOT MORE THAN 10ppm
HEAVY METALS (as Pb)	NOT MORE THAN 5ppm	NOT MORE THAN 5ppm
LEAD (Pb)	NOT MORE THAN 5ppm	NOT MORE THAN 5ppm
ARSENIC (As ₂ O ₃)	NOT MORE THAN 1ppm	NOT MORE THAN 1ppm
LOSS ON DRYING	NOT MORE THAN 0.20%	0.00%
RESIDUE ON IGNITION	NOT MORE THAN 0.10%	0.00%
RELATED SUBSTANCES		
UNSPECIFIED IMPURITY	NOT MORE THAN 0.2%	NOT DETECTED
TOTAL IMPURITIES	NOT MORE THAN 0.5%	NOT DETECTED
ASSAY (DRY BASIS)	99.0 ~ 101.0%	99.9%
TOTAL PLATE COUNT	NOT MORE THAN 100 CFU/g	NOT MORE THAN 100 CFU/g
FUNGI COUNT	NOT MORE THAN 10 CFU/g	NOT MORE THAN 10 CFU/g
E.COLI	NEGATIVE/g	NEGATIVE/g
ENDOTOXIN	LESS THAN 3.0EU/g	LESS THAN 3.0EU/g

NOT FOR API USE.

THIS SPECIFICATION MEETS THE QUALITY REQUIREMENTS OF THE CURRENT CP, JP, USP, EP AND FCC PRODUCT MONOGRAPHS AND THE CURRENT RESIDUAL SOLVENTS REQUIREMENT AS PER USP AND EP. NO ANIMAL ORIGIN RAW MATERIALS/ADDITIVES ARE USED THROUGHOUT THE MANUFACTURING PROCESS. MADE IN CHINA.

The undersigned affirms that contents mentioned above are truly reported in accordance with the analysis by Quality Control Department.

Date of issue: Apr-10-2023

Lu Yazhou

QA Manager