

KYOWA HAKKO KOGYO CO., LTD.

1-6-1 Ohtemachi, Chiyoda-ku, Tokyo, JAPAN

+81-3-3282-0979



CERTIFICATE OF ANALYSIS

Commodity : L-TRYPTOPHAN

Manufacturing date : JUL.23.2008

QUANTITY: 200 KG.

Analysis date : JUL.23.2008

Retest date : JUL.23.2011

SPECIFICATION	ACCEPTANCE CRITERIA	RESULT
APPEARANCE	WHITE TO ALMOST WHITE CRYSTALLINE POWDER	WHITE CRYSTALLINE POWDER
IDENTIFICATION	PASS TEST	PASS TEST
STATE OF SOLUTION (T%)	NOT LESS THAN 95.0 %	NOT LESS THAN 95.0 %
PH	5.5 to 6.4	6.0
SPECIFIC ROTATION (AT 20°C)	-32.5 to -30.5 °	-31.6°
SPECIFIC ROTATION (AT 25°C)	-32.8 to -29.4 °	-31.2°
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 10 PPM	NOT MORE THAN 10 PPM
HEAVY METALS (Pb)	NOT MORE THAN 5 PPM	NOT MORE THAN 5 PPM
LEAD (Pb)	NOT MORE THAN 5 PPM	NOT MORE THAN 5 PPM
ARSENIC (As ₂ O ₃)	NOT MORE THAN 1 PPM	NOT MORE THAN 1 PPM
FOREIGN AMINO ACIDS	NOT MORE THAN 0.5 % (TLC 30µg)	NOT MORE THAN 0.5 % (TLC 30µg)
LOSS ON DRYING	NOT MORE THAN 0.20 %	0.04 %
RESIDUE ON IGNITION	NOT MORE THAN 0.10 %	0.00 %
ASSAY (DRY BASIS)	99.0 to 101.0 %	100.0 %
TOTAL PLATE COUNT	NOT MORE THAN 1000 CFU/g	NOT MORE THAN 1000 CFU/g
FUNGI COUNT	NOT MORE THAN 100 CFU/g	NOT MORE THAN 100 CFU/g
E.COLI	NEGATIVE	NEGATIVE

WE HEREBY CERTIFY THAT THE COMMODITY DESCRIBED ABOVE MEETS THE REQUIREMENTS OF THE CURRENT JP, USP, EP AND FCC, INCLUDING REQUIREMENTS OF RESIDUAL SOLVENTS LISTED IN THE CURRENT JP, USP, AND EP, AND THAT THERE IS NO POTENTIAL RISK FOR CONTAMINATION OF PATHOGENIC MICROBE, INCLUDING STAPHYLOCOCCUS AUREUS.

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

N. Hirata

Bio-Chemicals Business Unit