

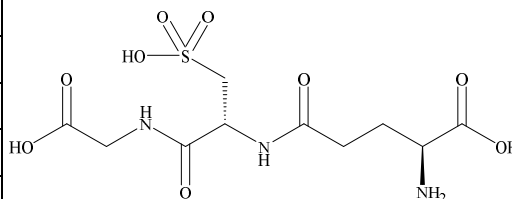
# Certificate of Analysis

Certificate No.: 20190904012

Date: September 4, 2019

Retest date: August 28, 2022

<b>Compound Name:</b> Glutathione Impurity 4	
<b>Synonyms:</b>	<i>N</i> <sup>5</sup> -(( <i>R</i> )-1-((carboxymethyl)amino)-1-oxo-3-sulfopropan-2-yl)-L-glutamine
<b>TLC Catalogue Number:</b>	PG-2521
<b>CAS Number:</b>	3773-07-7
<b>Molecular Weight:</b>	355.32
<b>Molecular Formula:</b>	C <sub>10</sub> H <sub>17</sub> N <sub>3</sub> O <sub>9</sub> S
<b>Source:</b>	TLC Pharmaceutical Standards
<b>Source Lot No.:</b>	3569-058A3
<b>Storage Conditions:</b>	Hygroscopic, store at 2-8 °C.
<b>Solubility:</b>	Methanol, DMSO, Water, DMF



Test Description	Specifications	Results
<b>Visual Description</b>	White to off-white solid	<b>Conforms</b>
<b>Identification</b>		
<b>IR</b>	Conforms to structure	<b>Conforms</b>
<b>MS</b>	Conforms to structure	<b>Conforms</b>
<b><sup>1</sup>H NMR</b>	Conforms to structure	<b>Conforms</b>
<b>Purity (HPLC)</b>	Not less than 95.0%	<b>99.7%</b>
<b>Impurity (HPLC)</b>	RT 12.20, 0.35%	
<b>Water Content (KF)</b>	N/A	<b>6.9%</b>
<b>Optical Rotation</b>	N/A	$[\alpha]_D^{25.0}(c=0.34, H_2O): -17.7^\circ$
<b>Residual Solvents (NMR)</b>	0.2% formic acid	
<b>Assay (%)</b>	Not less than 90.0%	<b>92.6%</b>
<b>Recommendation:</b>	<b>Released.</b>	

Name	Department	Signature	Date
Reviewed and approved by:	Analytical Services		
Approved by:	Quality Assurance		

**Attachments:** HPLC, IR, MS and NMR spectra.