

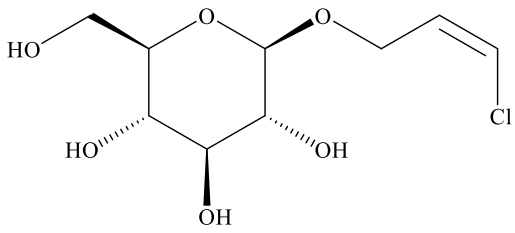
## Certificate of Analysis

Certificate No.: 20200903007

Date: September 3, 2020

Retest date: July 31, 2023

<b>Compound Name:</b> Clethodim Impurity 19	
<b>Synonyms:</b>	(2R,3R,4S,5S,6R)-2-(((Z)-3-chloroallyl)oxy)-6-(hydroxymethyl)tetrahydro-2H-pyran-3,4,5-triol
<b>TLC Catalogue Number:</b>	C-9828
<b>CAS Number:</b>	N/A
<b>Molecular Weight:</b>	254.66
<b>Molecular Formula:</b>	C <sub>9</sub> H <sub>15</sub> ClO <sub>6</sub>
<b>Source:</b>	TLC Pharmaceutical Standards
<b>Source Lot No.:</b>	4012-024A3
<b>Storage Conditions:</b>	Store at 2-8 °C
<b>Solubility:</b>	Methanol, DMSO, Water



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>Elemental Analysis</b>	Conforms to structure	<b>Conforms</b>
<b>Purity (HPLC)</b>	Not less than 95.0%	<b>99.8%</b>
<b>Impurity (HPLC)</b>	RT 6.28, 0.25%	
<b>Optical Rotation</b>	N/A	$[\alpha]_D^{25.0}$ (c=0.50, H <sub>2</sub> O): <b>-17.9°</b>
<b>Residual Solvents (NMR)</b>	No residual solvent	
<b>Assay (qNMR)</b>	Not less than 90.0%	<b>98.6%</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.