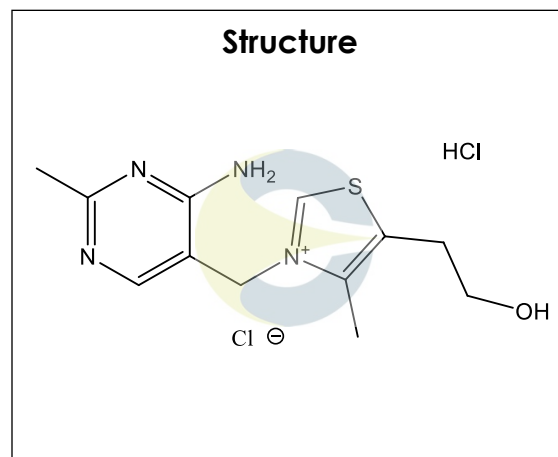


**Certificate of Analysis**
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<b>PRODUCT NAME</b>	Vitamin B1 HCl
<b>PART NUMBER</b>	00022719
<b>STANDARD TYPE</b>	Primary (P)
<b>LOT NUMBER</b>	00022719-801
<b>REPORT NUMBER</b>	CDXA-RSS-8818-00
<b>SAMPLE NUMBER</b>	CDXP-20-00025
<b>DATE OF SAMPLE</b>	01/24/2020
<b>DATE OF REPORT</b>	03/26/2020



<b>CHEMICAL NAMES</b>	3-[[4-amino-2-methyl-5-pyrimidinyl)methyl]-5-(2-hydroxyethyl)-4-methyl-thiazolium chloride (1:1) hydrochloride (1:1); Beatine; Thiadoxine; Thiamine chloride
<b>CHEMICAL FORMULA</b>	C <sub>12</sub> H <sub>17</sub> N <sub>4</sub> O <sub>2</sub> SCl • HCl
<b>MOLECULAR WEIGHT (MW)</b>	337.26
<b>CHEMICAL FAMILY</b>	Vitamins
<b>CAS NUMBER</b>	[67-03-8]
<b>EC#(EINECS)</b>	200-641-8
<b>RTECS</b>	XI7350000

**ANALYTICAL RESULTS**

TEST	METHOD	SPECIFICATION	RESULT
Adjusted Purity	NA	NA	96.4%
HPLC	0.700.10.2.METH60	NA	99.9%
NMR	0.700.12.4	Conforms to structure	Conforms to structure
Mass Spectrum	0.700.12.27	Conforms	Conforms
Residual Solvent*	TM6740 V1	NA	ND
Water	0.700.12.37	NA	3.5%
Appearance	NA	NA	White powder

\*Testing performed at an ISO 17025 accredited subcontracted laboratory.  
 ADJUSTED PURITY: 96.4% IS BASED ON (100 - 0.0 SOLVENTS - 3.5 WATER) X 99.9% HPLC

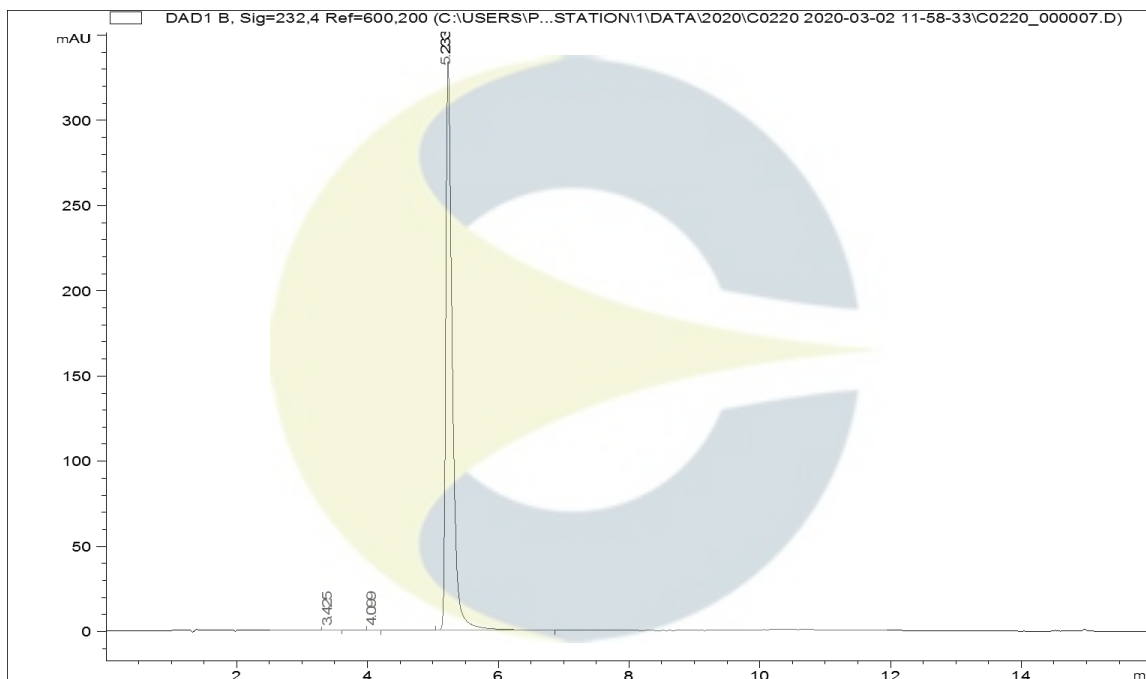
**STORAGE CONDITIONS**

<b>STORAGE</b>	Room Temperature in a dry place.
<b>EXPIRATION DATE</b>	01/2025 under the above conditions.

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**ANALYTICAL CONDITIONS**

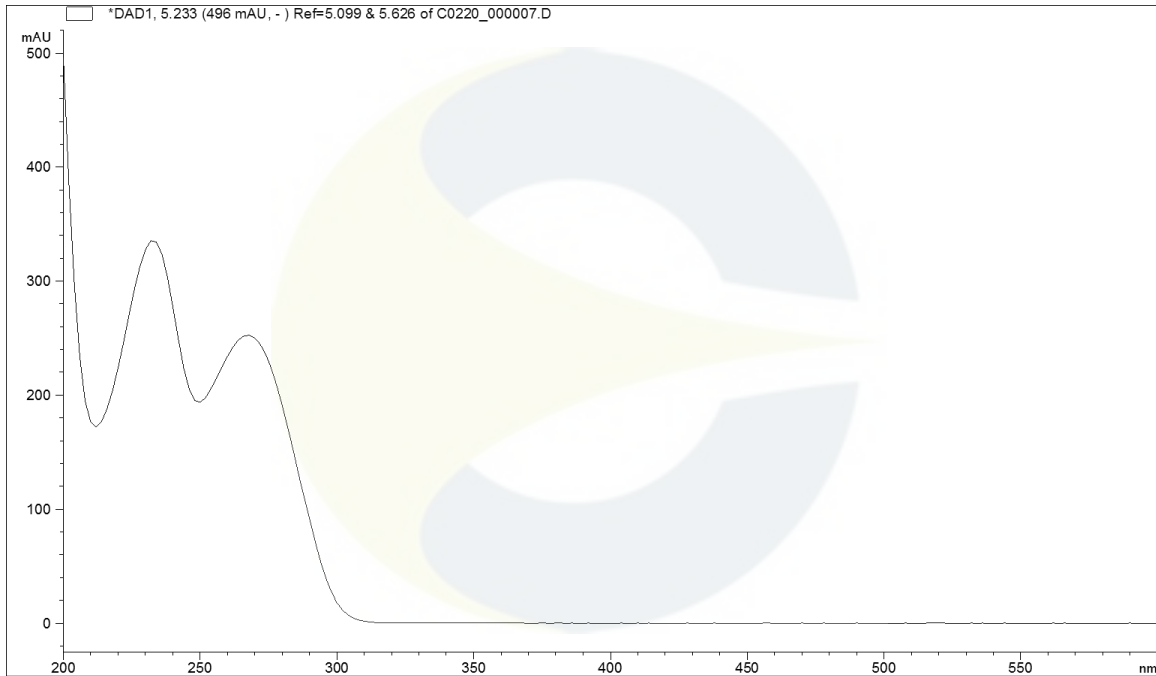
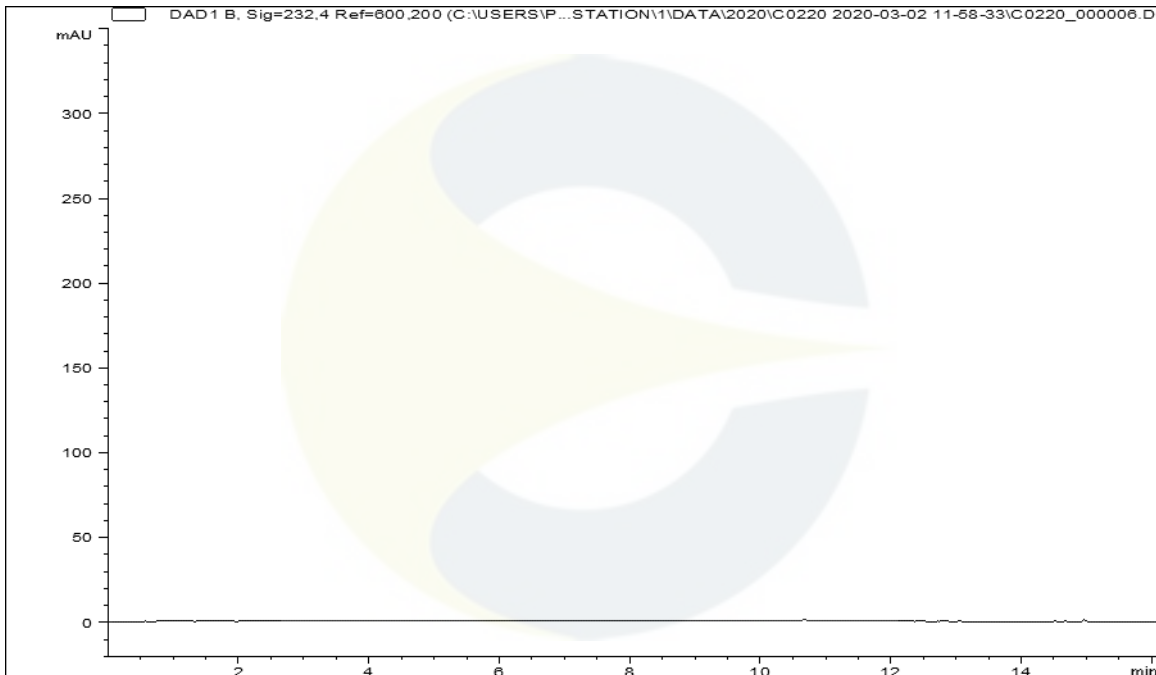
<b>INSTRUMENT</b>	AGILENT 1260 HPLC UV-VIS (DAD), AB-SCIEX 6600 TRIPLE TOF
<b>COLUMN</b>	Agilent InfinityLab Poroshell 120 EC-C18 150 x 3.00 mm, 2.7 µm particle size
<b>MOBILE PHASE</b>	A – 25 mM Potassium phosphate, dibasic (aq) pH 7.0, B - Acetonitrile; Isocratic 1% B for 5 minutes, then increasing to 30% B over 7 minutes, then increasing to 40% B over 4 minutes.
<b>COLUMN TEMP.</b>	35 °C
<b>FLOW RATE</b>	0.45 mL/minute
<b>INJECTION VOL.</b>	5.0 µL
<b>INJECTION CONC.</b>	1.0 mg/mL in water
<b>DETECTION</b>	232 ± 2 nm

**HPLC CHROMATOGRAM OF VITAMIN B1 HCL (CDXP-20-00025)**


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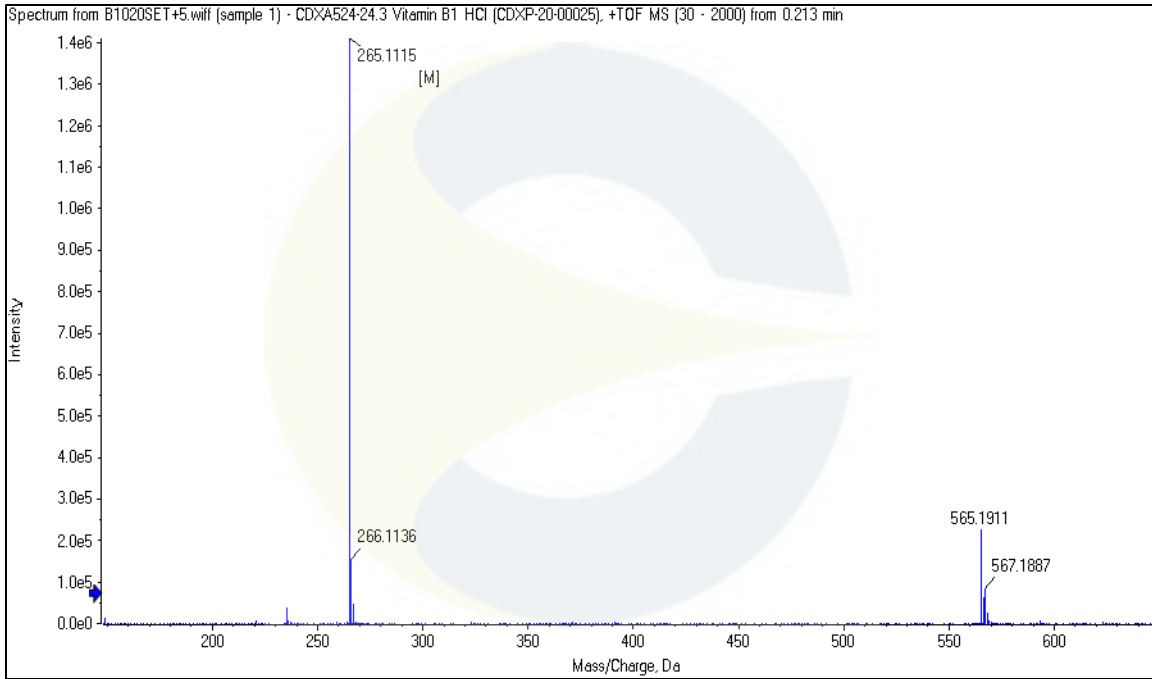
## Certificate of Analysis

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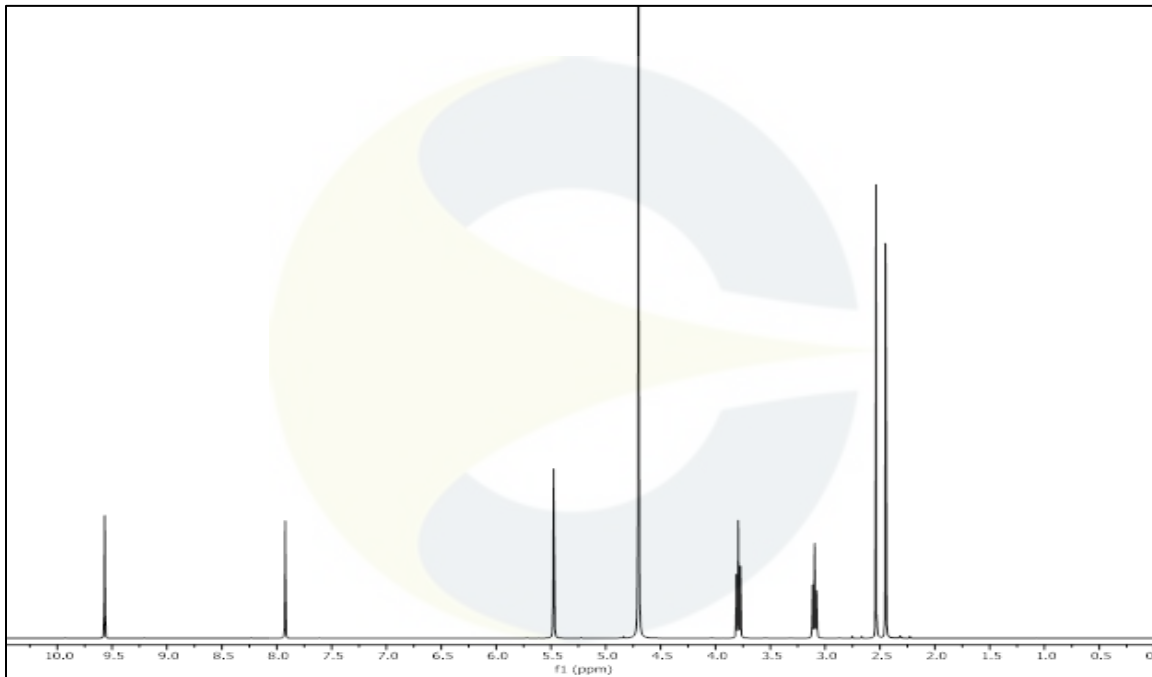
**UV SPECTRUM AT RT = 5.2 MINUTES****HPLC CHROMATOGRAM OF DILUENT BLANK**

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### MASS SPECTRUM OF VITAMIN B1 HCL (CDXP-20-00025)

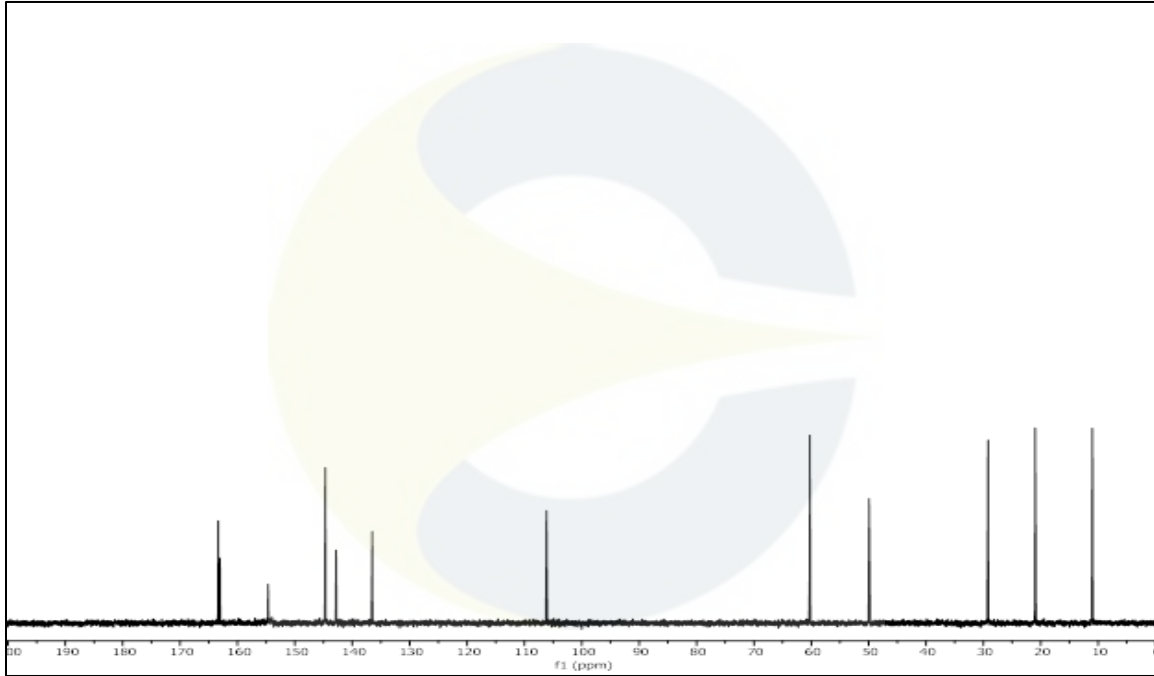


### <sup>1</sup>H-NMR SPECTRUM OF VITAMIN B1 HCL (CDXP-20-00025) IN D<sub>2</sub>O



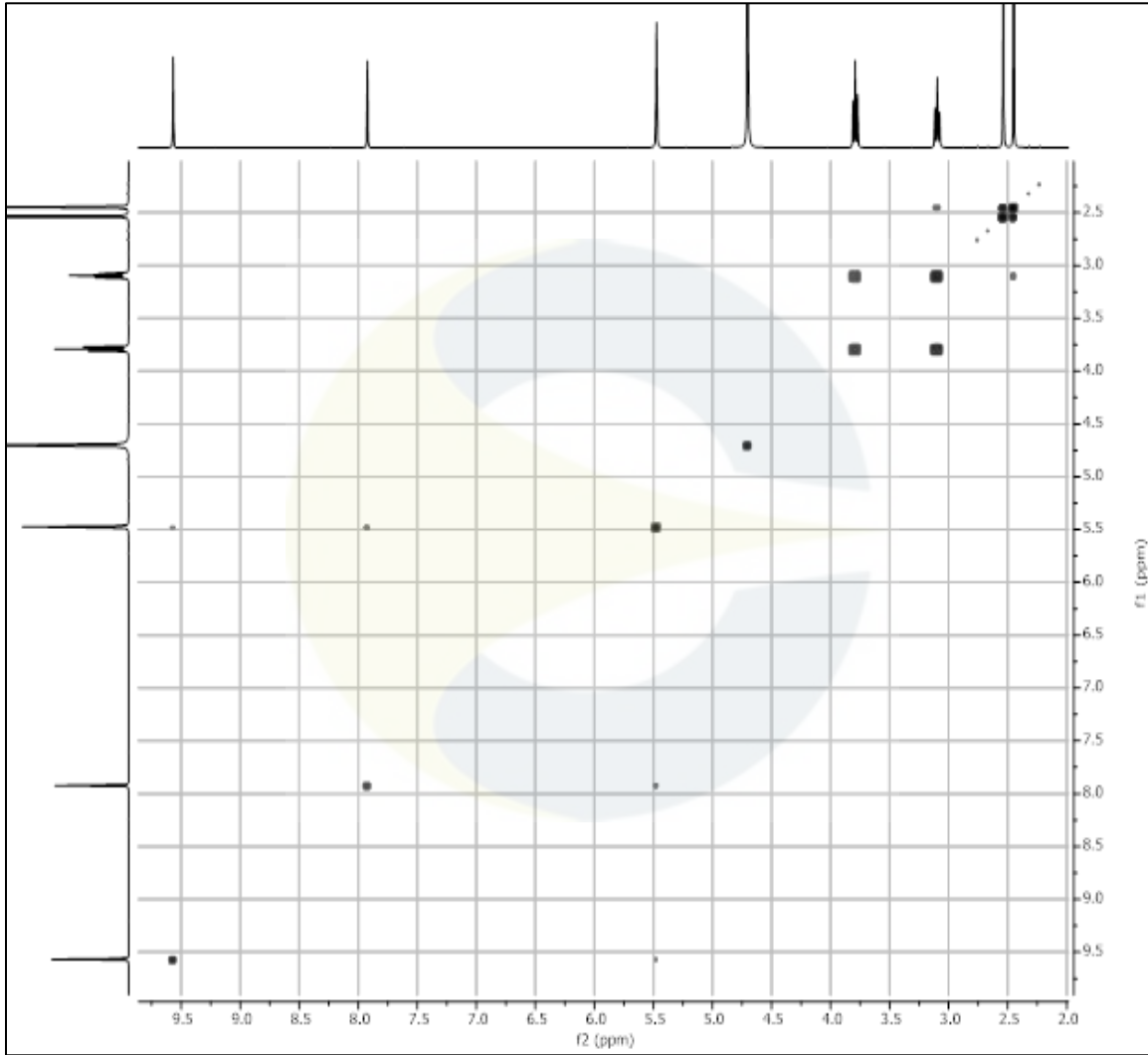
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<sup>13</sup>C-NMR SPECTRUM VITAMIN B1 HCL (CDXP-20-00025) IN D<sub>2</sub>O



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### COSY-NMR SPECTRUM OF VITAMIN B1 HCL (CDXP-20-00025) IN D<sub>2</sub>O



### REVISION HISTORY

<u>Revision History</u>	<u>Date of Revision</u>	<u>Document/Changes</u>
00	03/26/2020	New report

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