

TBI-FORENSIC SERVICES DIVISION PERFORMANCE VERIFICATION FORM

Instrument/Method to Verify:

Nicolet iS20 FTIR with Smart iTX (ATR) accessory (S/N BEP2310108) "GROGU"

Check the appropriate box: New Validation ☐ Modification ☐ Performance Check ☒

Laboratory: NCL ☐ KCL ☐ JCL ☒ Unit: Forensic Chemistry

Based on training and competency, the following analyst(s) are authorized by the Technical Leader to participate in this study:

Name Emily Isaacs Title SA/FS I Initials EI

Completed: *Emily Isaacs*

Name _____ Title _____ Initials _____

Completed:

Name _____ Title _____ Initials _____

Completed:

Verification of final review:

Unit Supervisor: *Rachel Strandquist*

Section Manager: *Mark Dunlap*
Mark Dunlap (Apr 3, 2024 15:24 CDT)

Unit Supervisor:

Section Manager:

Unit Supervisor:

Section Manager:

Regional Administrator: *Donna Nelson*
Donna Nelson (Apr 10, 2024 20:30 CDT)

Regional Administrator:

Regional Administrator:

Quality Assurance Manager: *Chad Johnson*

By signing below, I have verified this study meets all requirements and I deem this procedure/instrument fit for the intended use:

Technical Leader: *Brett Trotter*

All information must be submitted to the Quality Assurance Manager prior to the implementation of the procedure/instrument. If applicable, include training plan and competency testing schedule.

Forensic Chemistry Performance Verification
Nicolet iS20 FTIR with Smart iTX (ATR) accessory
(S/N BEP2310108) TBI FCU ID - GROGU

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Forensic Chemistry Performance Verification

Nicolet iS20 FTIR with Smart iTX (ATR) accessory
(S/N BEP2310108) TBI FCU ID - GROGU

1. Purpose:

A new interferometer was installed on this instrument and the instrument software was updated, correcting issues with the laser verification and the library database. This performance verification will assess the following:

- The spectrometer's ability to generate accurate spectra of certified reference standards compared to previously run laboratory standard spectra using the Smart iTX accessory

Forensic Chemistry Performance Verification

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2. Components and Experiment Setup:

<i>Instrument Components</i>	
iS20 FTIR	Smart iTX accessory
Source: Single point	Crystal plate type Monolithic Diamond
Beam splitter: KBr/Ge coated	Verification Standard Polystyrene “lollipop”
Laser Type: Solid-state Diode	
Detector: DTGS KBr	
Internal Verification: Polystyrene/NG Glass Standard Wheel	
Experiment parameters	
Scans	16
Resolution	4
Spectral Range	4000 – 600 (iTX)
Gain	Auto
Optical Velocity	0.4747
Aperture	Medium resolution

3. Procedure:

Ten certified reference standards were tested on this instrument using the Smart iTX attachment. Several of these standards were selected because they are frequently encountered in case work. Both salt forms of cocaine were tested to determine if salt forms could be determined. Non-controlled substances were also tested to determine if the spectrometer could detect possible adulterants.

Prior to running these standards, the routine monthly maintenance as outlined in TBI SOP was performed to ensure the instrument was operating according to acceptable standards. Additionally, laser alignment is recommended every two months by the manufacturer since a slight drift in output is possible. In this performance check, the laser verification was performed before the standards were acquired.

All standards were run in their pure form — no extractions, washes, or other alterations were performed. Prior to each standard run, the instrument's sampling area was cleaned, and a background spectrum was collected to ensure no cross-contamination occurred.

Forensic Chemistry Performance Verification

Nicolet iS20 FTIR with Smart iTX (ATR) accessory
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4. Standards Used:

Standard	Source	Lot Number
Aspirin	Alltech	531
Carisoprodol	Grace	392
Clonazepam	Alltech	150
Cocaine base	Sigma	90K1947
Cocaine HCl	USP	R067U0
Diazepam	Alltech	0102
Methamphetamine	Sigma	057K0666
3,4 MDE HCl	Alltech	3506
Oxycodone	Alltech	520
Pseudoephedrine HCl	Fluka	1342219/12307008

5. Results and Conclusions:

Results from GROGU using the iTX accessory were consistent with both sets of spectra and matched satisfactorily for identification.

The ValPro Qualification reports outlined in the Procedure section as well as the current maintenance log are in Appendix A.

All data generated for the iS20 using the iTX attachment can be found in Appendix B.

The laser monitoring requirement will be incorporated into the monthly maintenance to ensure the laser is verified regularly.

In summary, this instrument has demonstrated satisfactory results for use within the TBI FCU. The operation is the same as the unit's other ATRs with a few minor software differences for instrument performance checks. Therefore, no additional training requirements will be needed for currently trained scientists. Please refer to additional documents for the instructions for these differences.

ATR Maintenance Log

Instrument ID GROGU

[illegible]

Other Maintenance

Date	Description
6/28/23	Laser not recognized, Background timing out - Possible humidity reaction (A/C went out)
08/10/23	I didn't realize there was another ValPro report that needed to be acquired. Acquired USP report on 08/10/23. RRS
11/03/23	Could not verify laser - Out of service EI
12/04/23	Couldn't complete monthly maintenance due to issue with laser - placed out of service EI
01/02/24	Couldn't complete monthly maintenance due to issue with laser - placed out of service EI
03/20/24	New interferometer installed by ThermoFisher EI
03/27/24	Performance Verification performed EI

ValPro Qualification Report**Qualification test: Nicolet iS20 system KBr - PV****Operator: OMNICAdmin****Date: Wednesday, March 27, 2024 9:32:39 AM (GMT-05:00)****Instrument: Nicolet iS20 Serial number: BEP2310108****Filename: Nicolet iS20 system KBr - PV_20240327_093239.spg**

Test description	High limit	Low limit	Measured	Result
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Energy ratio

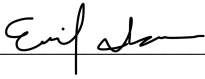
Energy ratio 4000 / 2000	1.00	0.20	0.40	Pass
Energy ratio 2000 / 1000	4.00	0.80	1.53	Pass

Noise level

P-P noise 4050 - 3950 (%T)	0.25	0.00	0.01	Pass
P-P noise 2050 - 1950 (%T)	0.221	0.00	0.008	Pass
P-P noise 1050 - 950 (%T)	0.10	0.00	0.01	Pass
P-P noise 550 - 450 (%T)	1.50	0.00	0.13	Pass
RMS noise 4050 - 3950	0.05	0.00	0.00	Pass
RMS noise 2050 - 1950	0.039	0.00	0.001	Pass
RMS noise 1050 - 950	0.014	0.00	0.003	Pass
RMS noise 550 - 450	0.30	0.00	0.02	Pass

Detector linearity

Slope	1.10	0.90	1.04	Pass
Intercept (%T)	1.00	-1.00	0.03	Pass

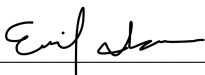
Performed by: 	Title: SA/FS	Date: 03/27/24
Approved by: _____	Title: _____	Date: _____
Comments: _____		

Digital comment(s):

No digital comments found.

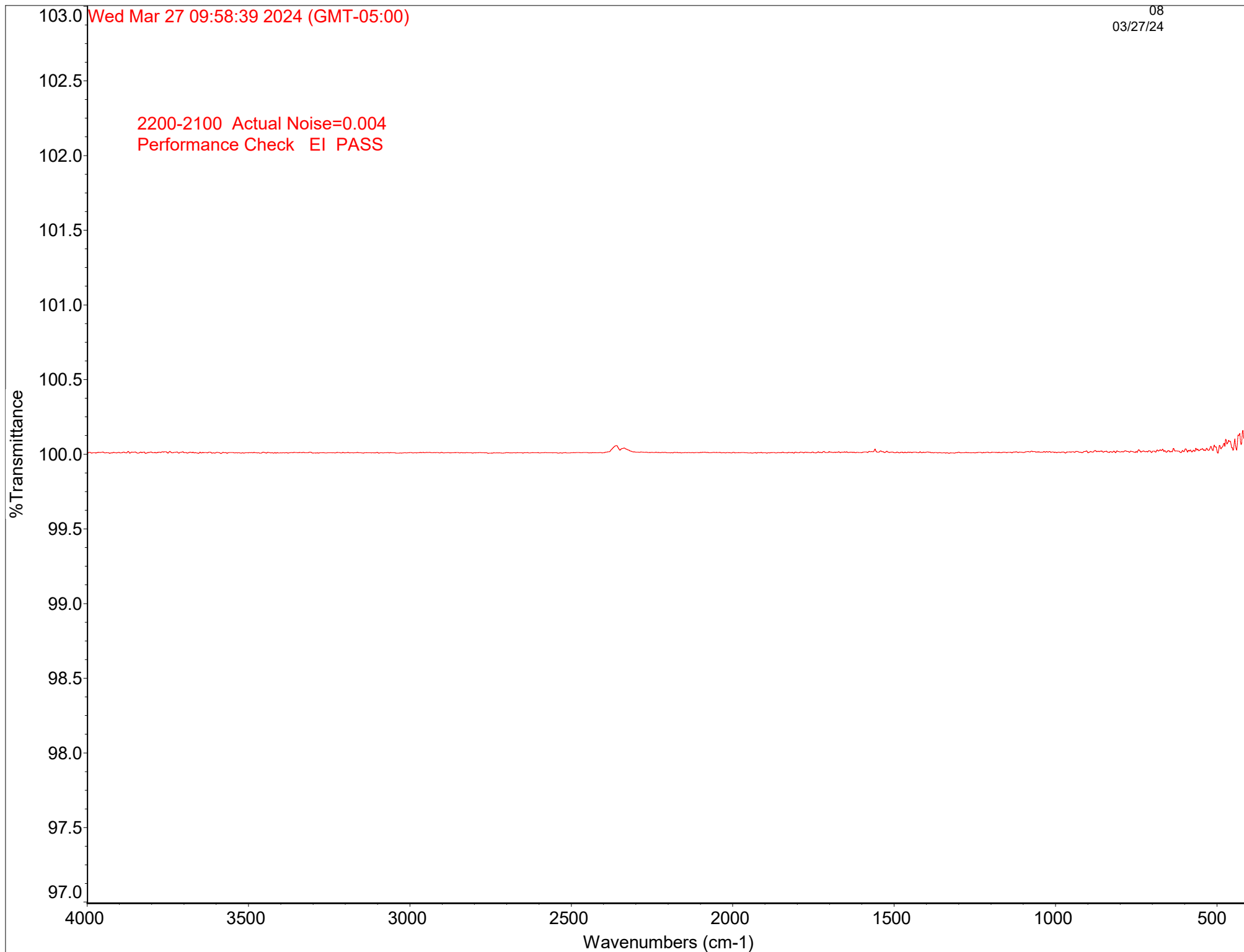
ValPro Qualification Report**Qualification test: Nicolet iS20 system KBr - USP****Operator: OMNICAdmin****Date: Wednesday, March 27, 2024 9:41:53 AM (GMT-05:00)****Instrument: Nicolet iS20 Serial number: BEP2310108****Filename: Nicolet iS20 system KBr - USP_20240327_094153.spg**

Test description	High limit	Low limit	Measured	Result
Wavenumber accuracy				
Peak at 3060.0 (cm-1)	3061.0	3059.0	3059.5	Pass
Peak at 2849.5 (cm-1)	2850.5	2848.5	2849.3	Pass
Peak at 1942.9 (cm-1)	1943.9	1941.9	1942.4	Pass
Peak at 1601.2 (cm-1)	1602.2	1600.2	1601.0	Pass
Peak at 1583.0 (cm-1)	1584.0	1582.0	1582.9	Pass
Peak at 1154.5 (cm-1)	1155.5	1153.5	1154.5	Pass
Peak at 1028.3 (cm-1)	1029.3	1027.3	1028.4	Pass

Performed by: 	Title: SA/FS	Date: 03/27/24
Approved by: _____	Title: _____	Date: _____
Comments: _____		

Digital comment(s):

No digital comments found.



Power Supply	Status	Current	Acceptable Range
+ 5 Volt	Pass	4.97V	4.50V to 5.50V
+ 12 Volt	Pass	11.89V	10.80V to 13.20V
- 12 Volt	Pass	-11.92V	-13.20V to -10.80V
+3.3 Volt	Pass	3.35V	3.00V to 3.60V

ValPro Qualification Report**Qualification test: Smart iTX accessory - PHEUR****Operator: OMNICAdmin****Date: Wednesday, March 27, 2024 10:06:19 AM (GMT-05:00)****Instrument: Nicolet iS20 Serial number: BEP2310108****Accessory serial number: Z100823****Filename: Smart iTX accessory - PHEUR_20240327_100619.spg**

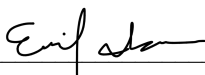
Test description	High limit	Low limit	Measured	Result
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Wavenumber accuracy

Peak at 3059.7 (cm-1)	3060.7	3058.7	3059.2	Pass
Peak at 1601.0 (cm-1)	1602.0	1600.0	1600.7	Pass
Peak at 1027.7 (cm-1)	1028.7	1026.7	1027.6	Pass
Peak at 906.1(cm-1)	907.1	905.1	906.1	Pass

Optical Resolution

FWHH at 1154 (cm-1)	10.00	5.00	8.51	Pass
FWHH at 907 (cm-1)	14.00	5.00	13.19	Pass

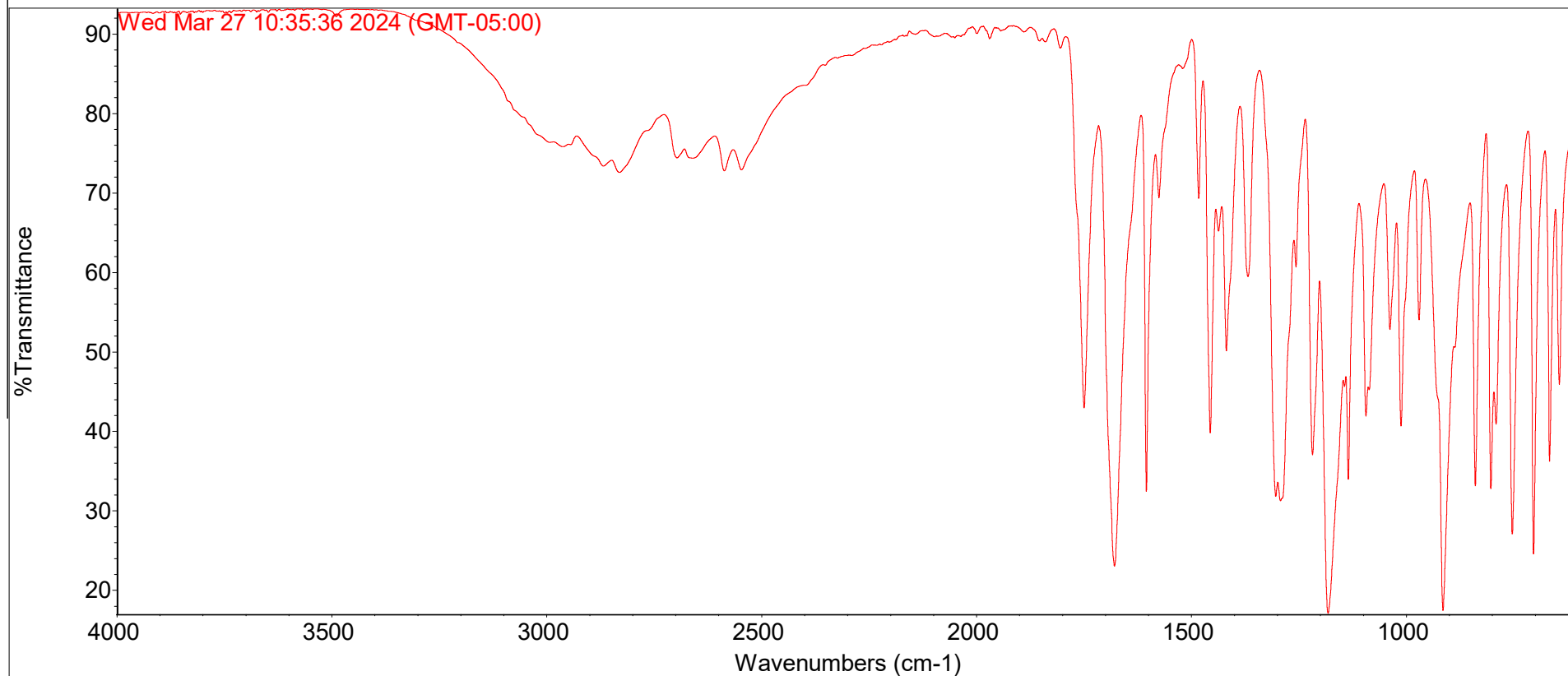
Performed by: 	Title: SA/FS	Date: 03/27/24
Approved by: _____	Title: _____	Date: _____
Comments: _____		

Digital comment(s):

No digital comments found.

Collection time: Wed Mar 27 10:36:14 2024 (GMT-05:00)

Aspirin Alltech Lot# 531



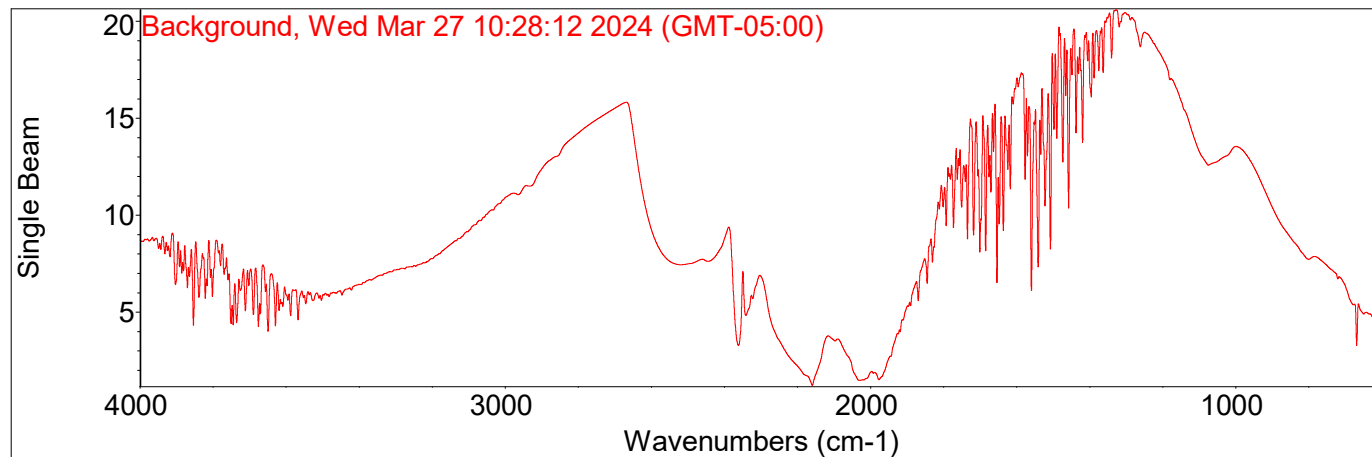
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Background

Number of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

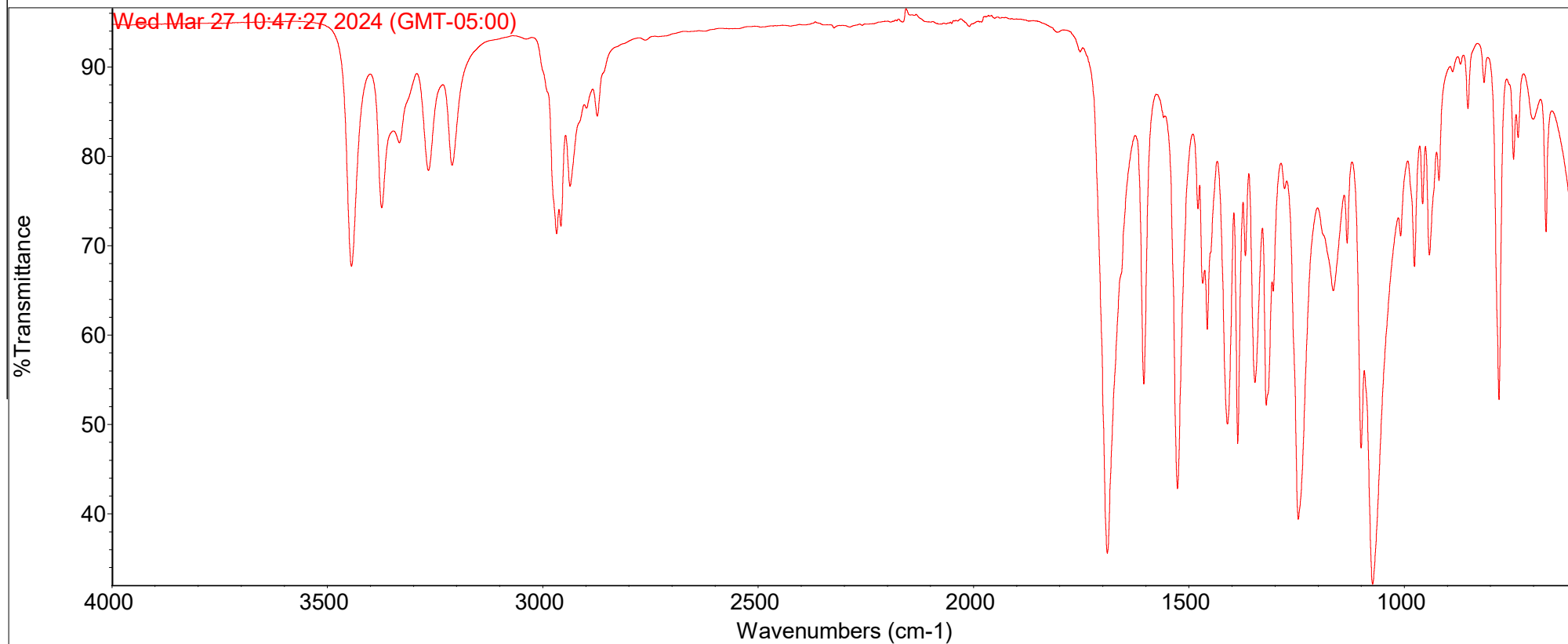
Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU



Collection time: Wed Mar 27 10:47:59 2024 (GMT-05:00)

Carisoprodol Grace Lot# 392



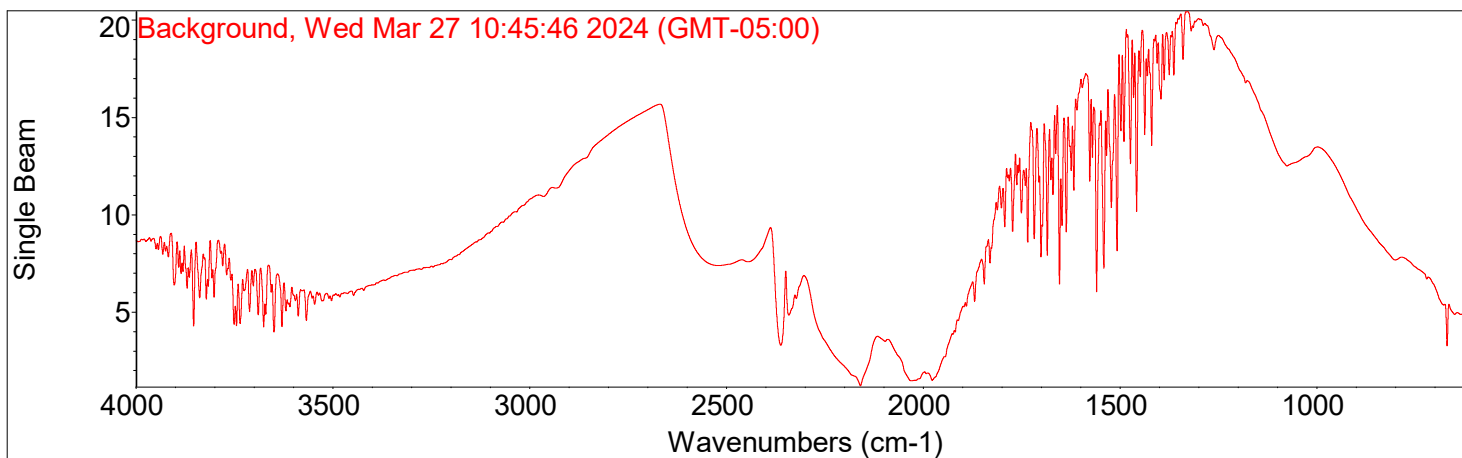
Number of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

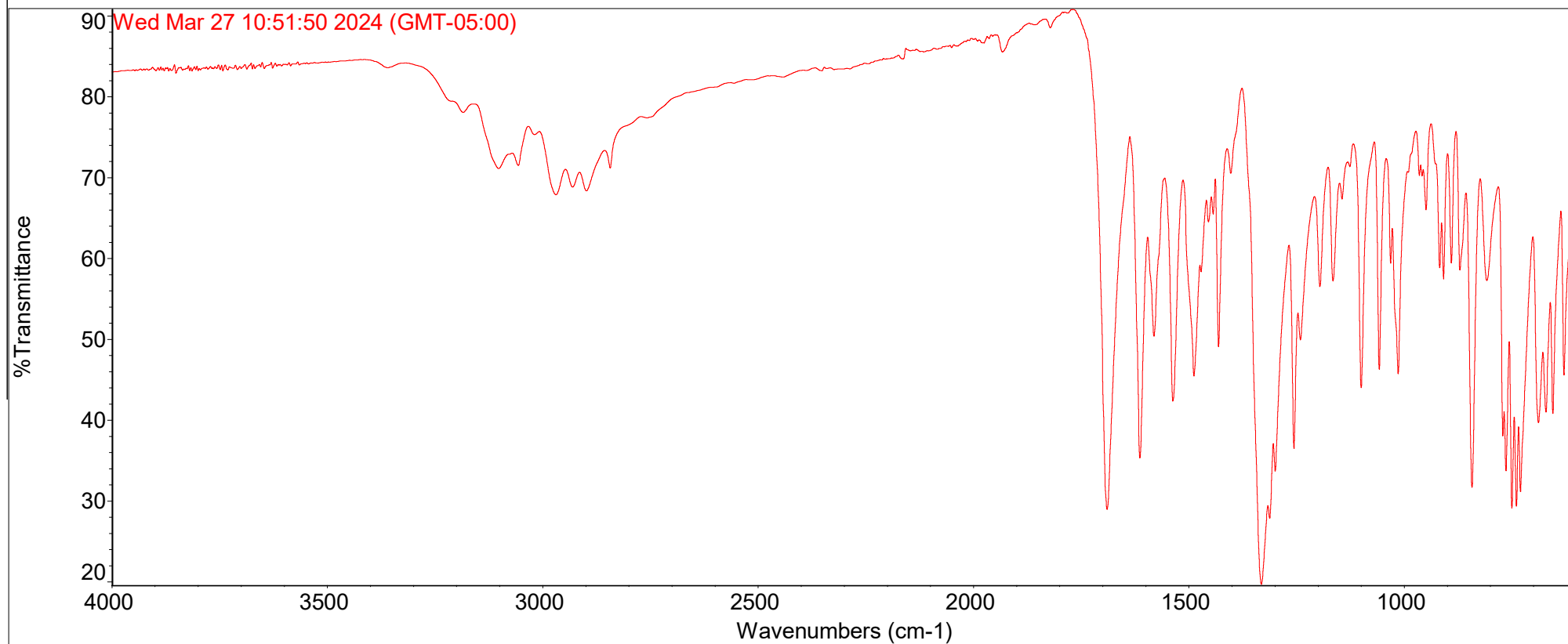
Collection time: Wed Mar 27 10:46:28 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 10:52:21 2024 (GMT-05:00)

Clonazepam Alltech Lot# 150



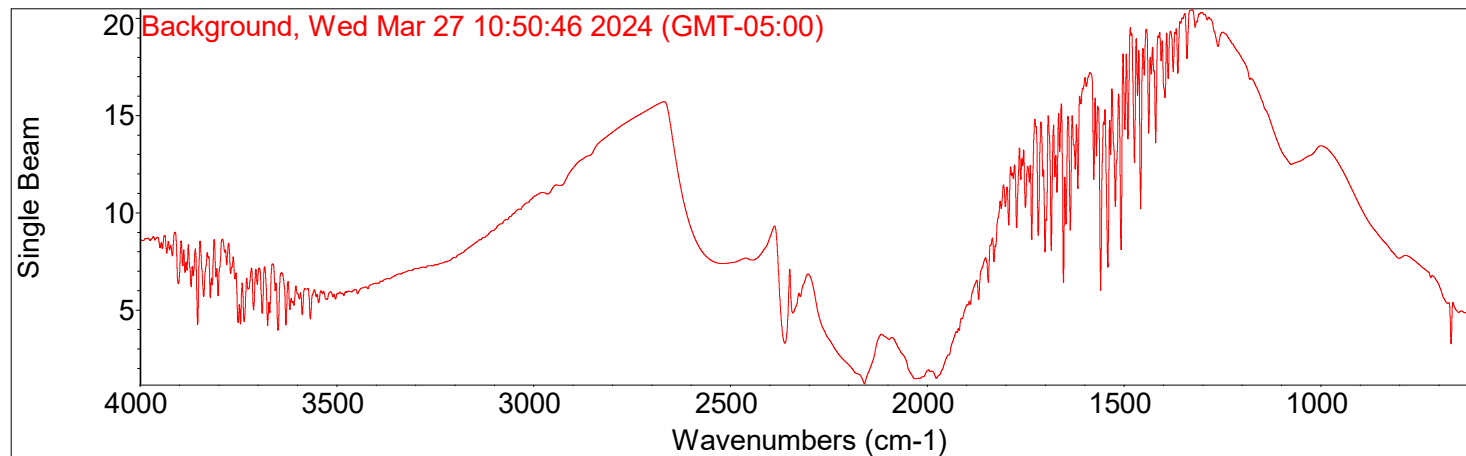
Collection time: Wed Mar 27 10:51:14 2024 (GMT-05:00)

Background

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Aperture: 80.00

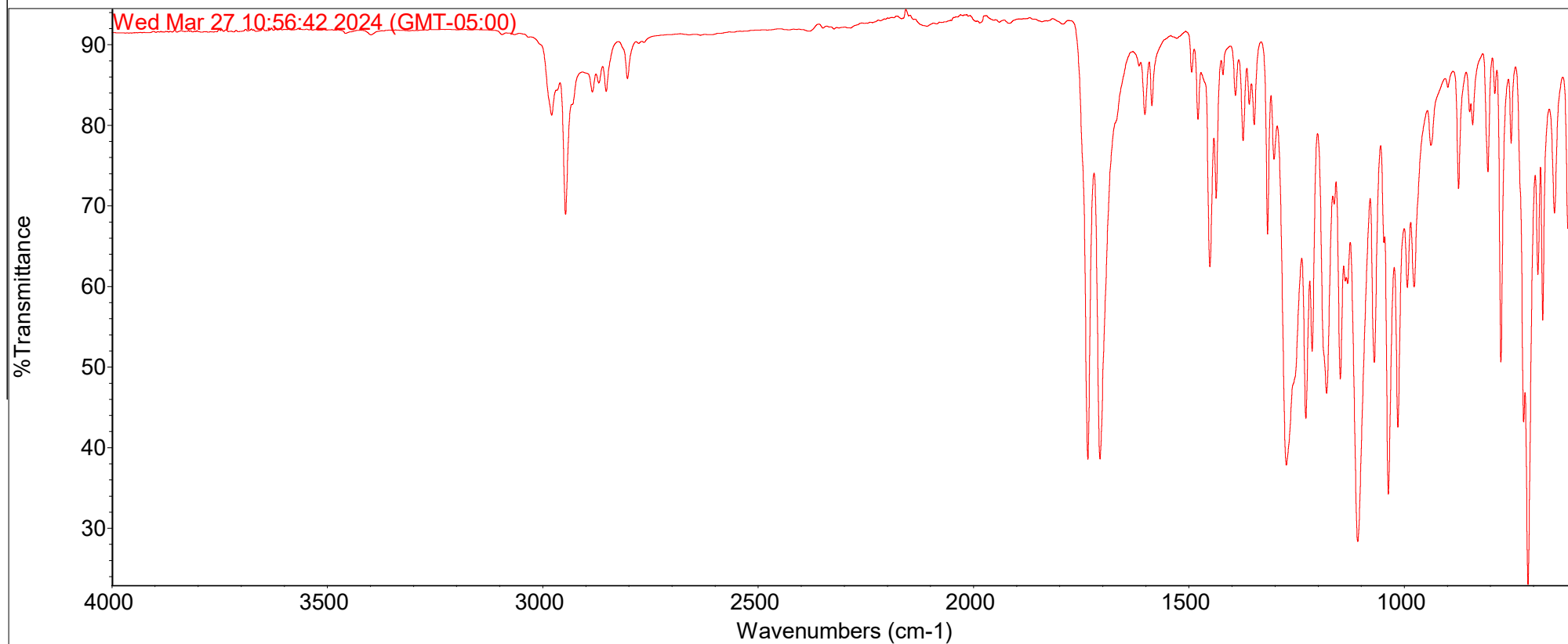
Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU



Collection time: Wed Mar 27 10:57:11 2024 (GMT-05:00)

Cocaine Base Sigma Lot# 90K1947



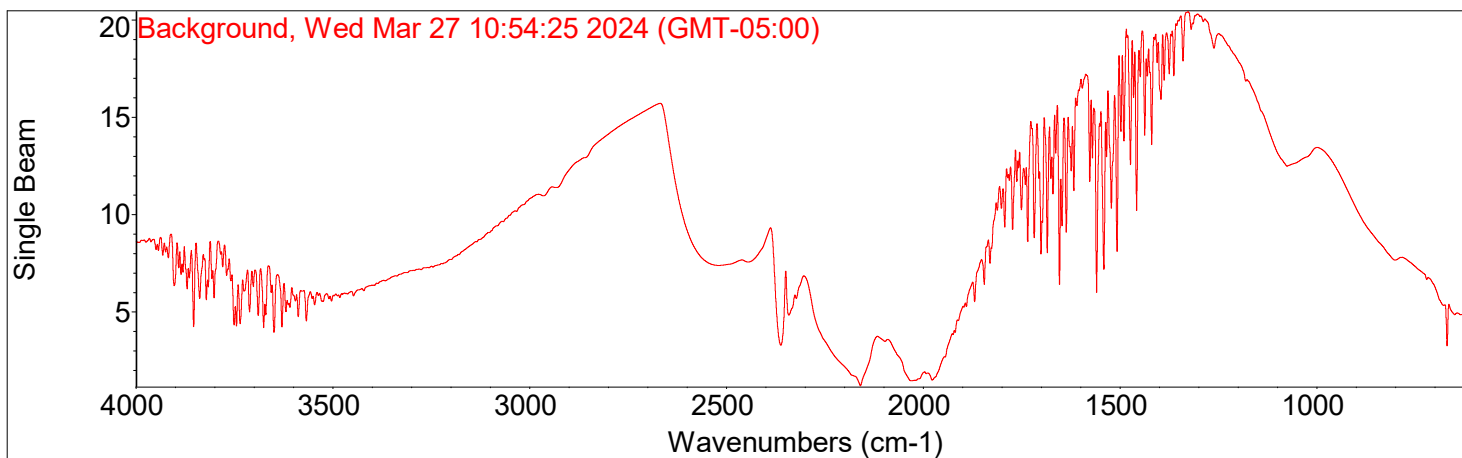
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Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

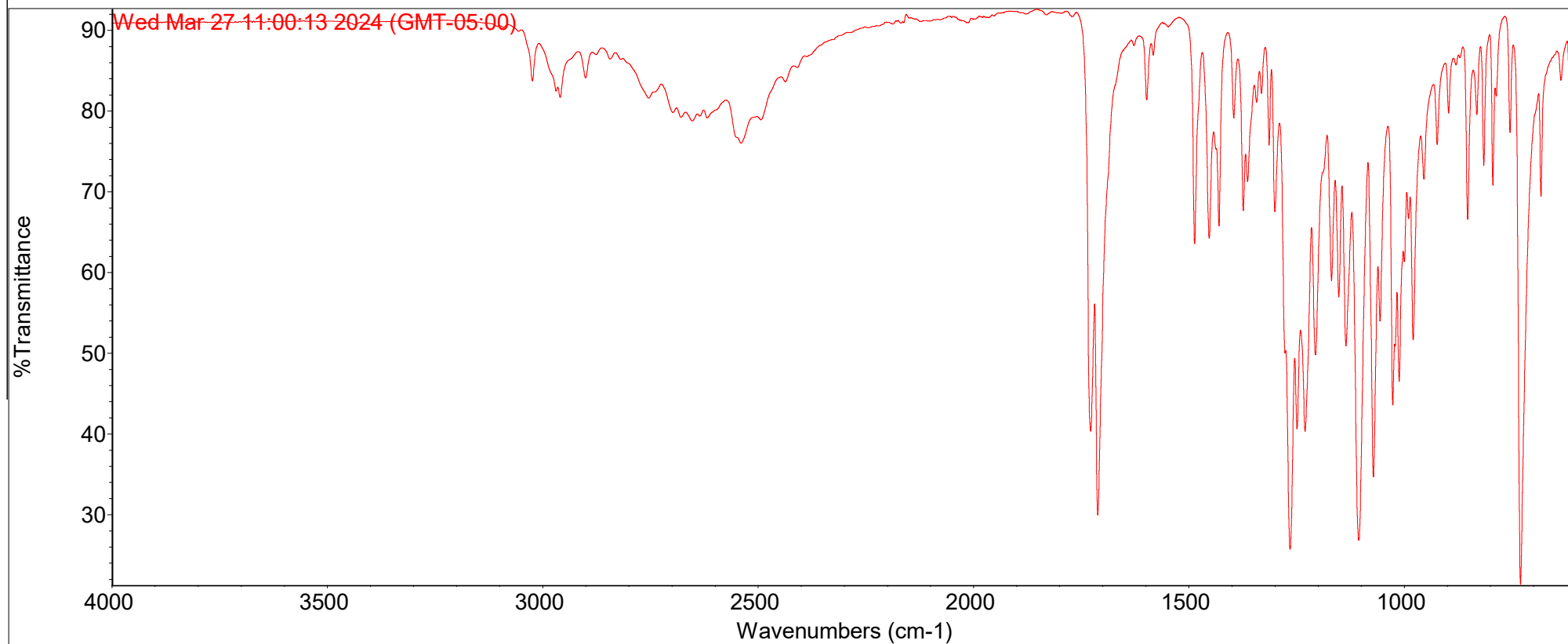
Collection time: Wed Mar 27 10:54:53 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 11:00:43 2024 (GMT-05:00)

Cocaine HCl USP Lot# R067U0



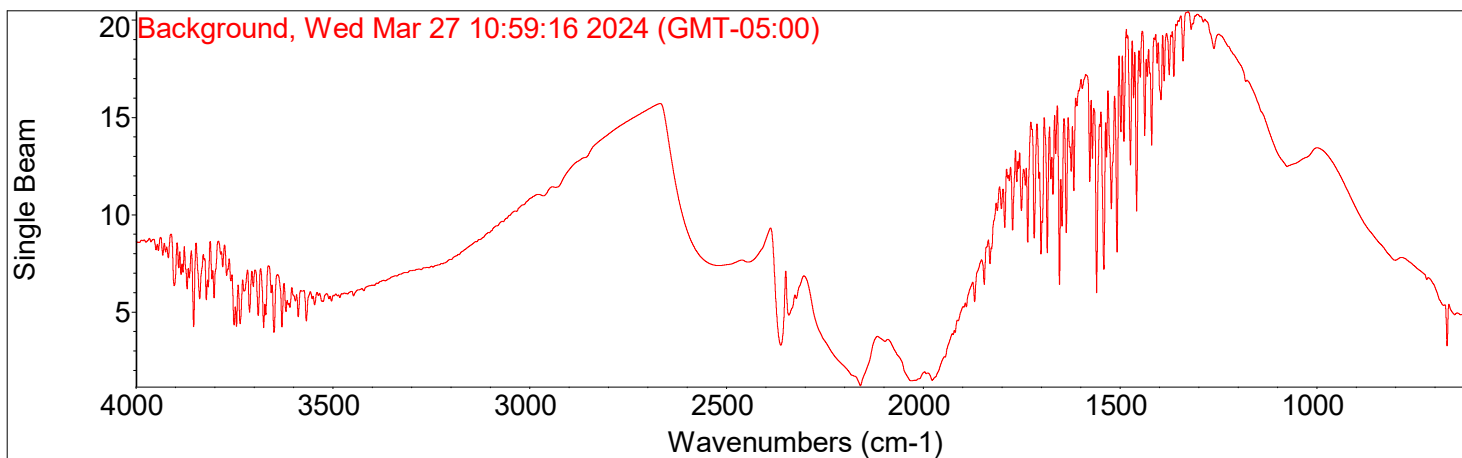
Number of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

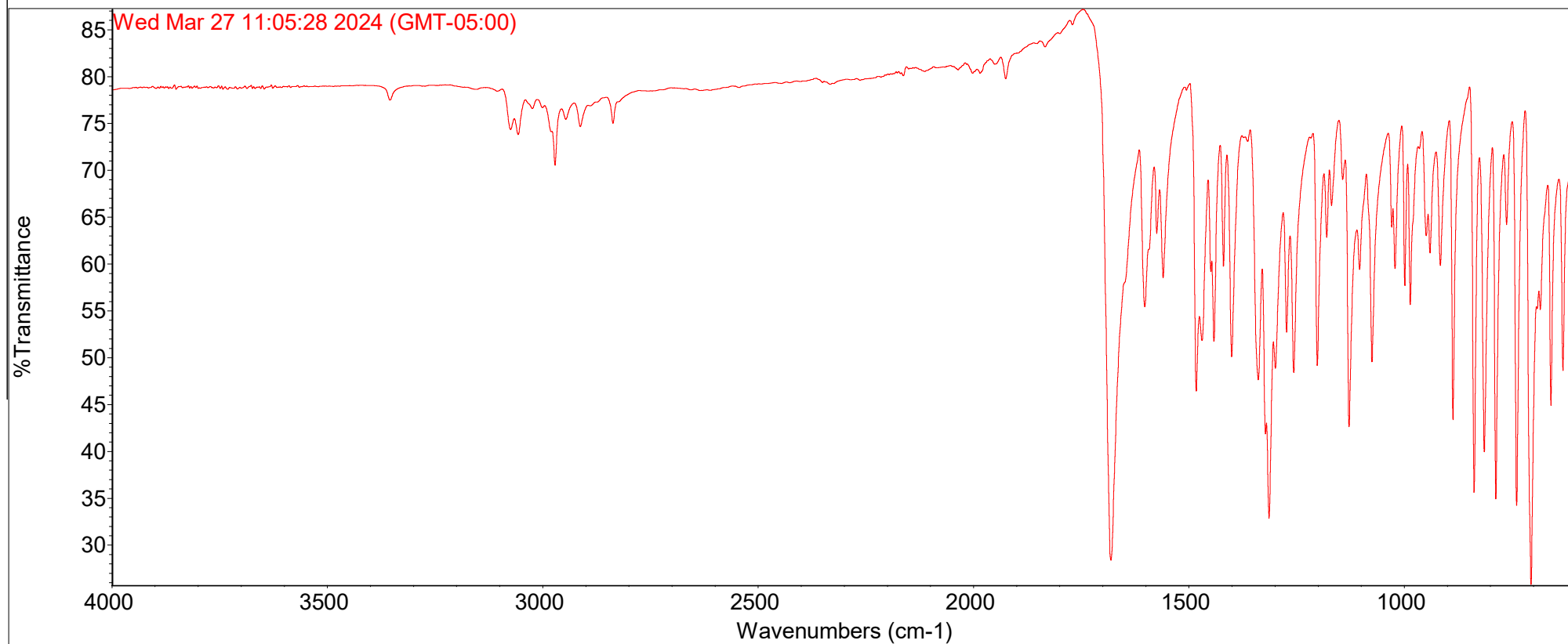
Collection time: Wed Mar 27 10:59:45 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 11:05:57 2024 (GMT-05:00)

Diazepam Alltech Lot# 0102



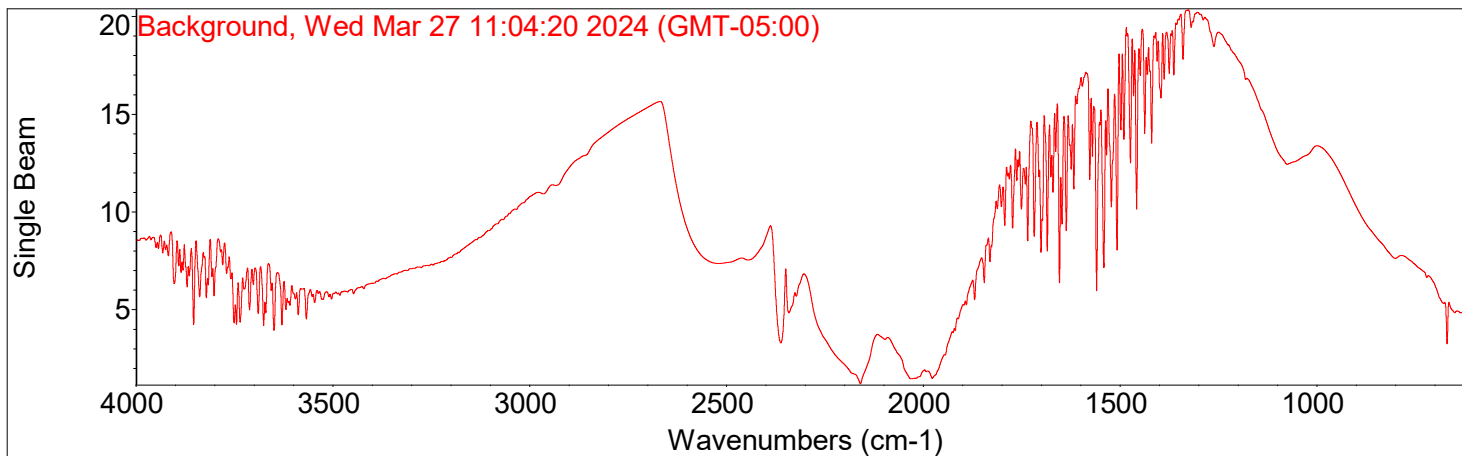
Number of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

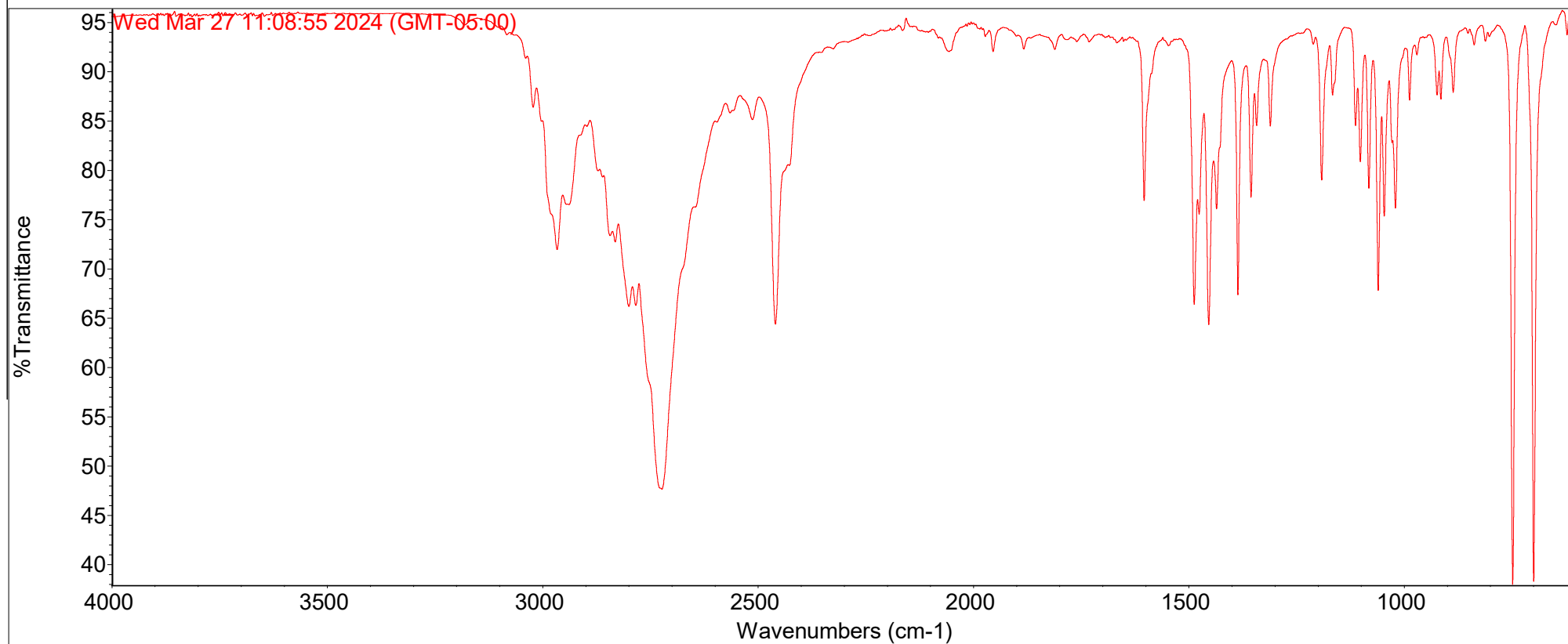
Collection time: Wed Mar 27 11:04:49 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 11:09:26 2024 (GMT-05:00)

Methamphetamine Sigma Lot# 057K0666



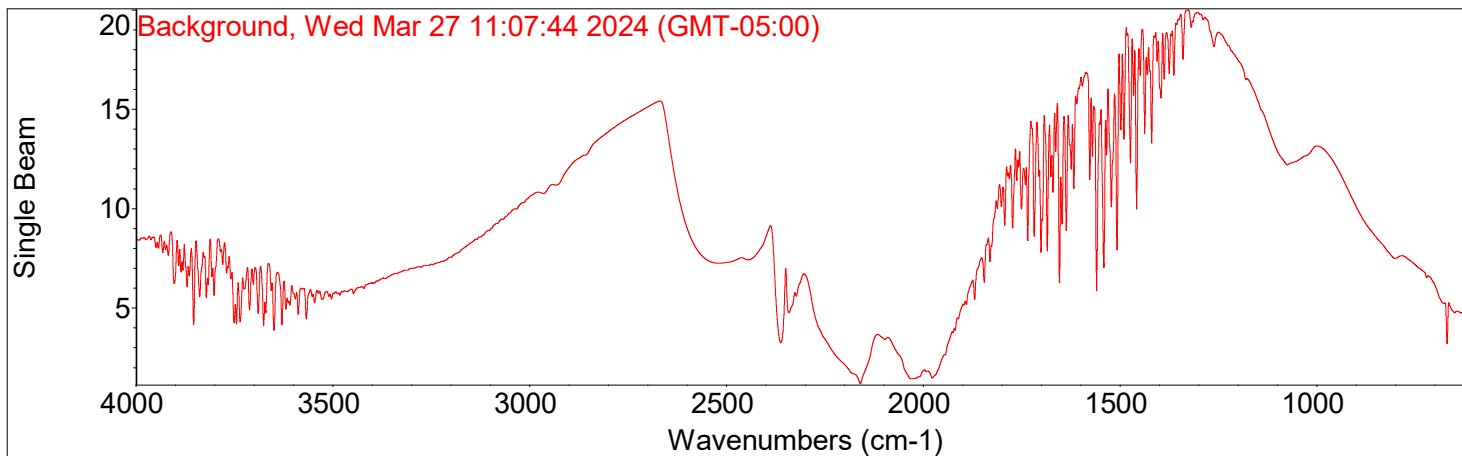
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Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

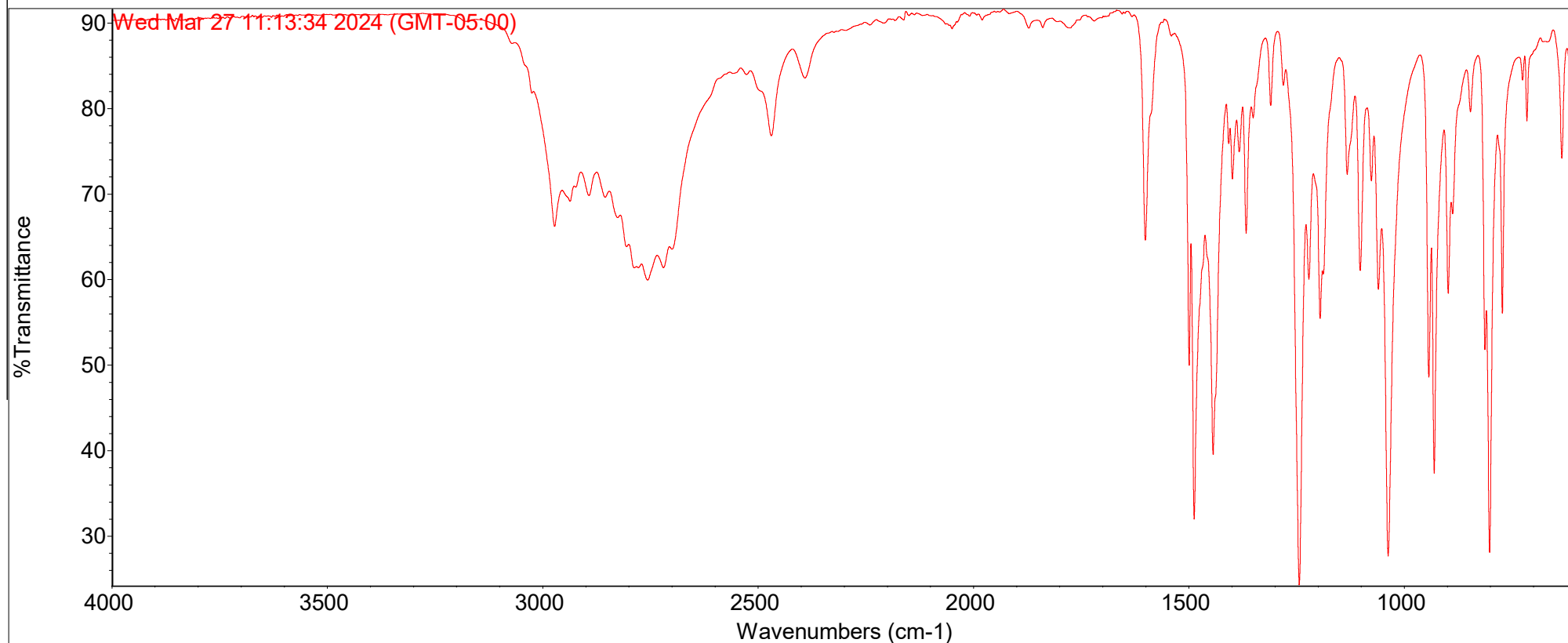
Collection time: Wed Mar 27 11:08:13 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 11:14:04 2024 (GMT-05:00)

3,4 Methylenedioxy-N-ethylamphetamine (MDE) HCl Alltech Lot# 3506



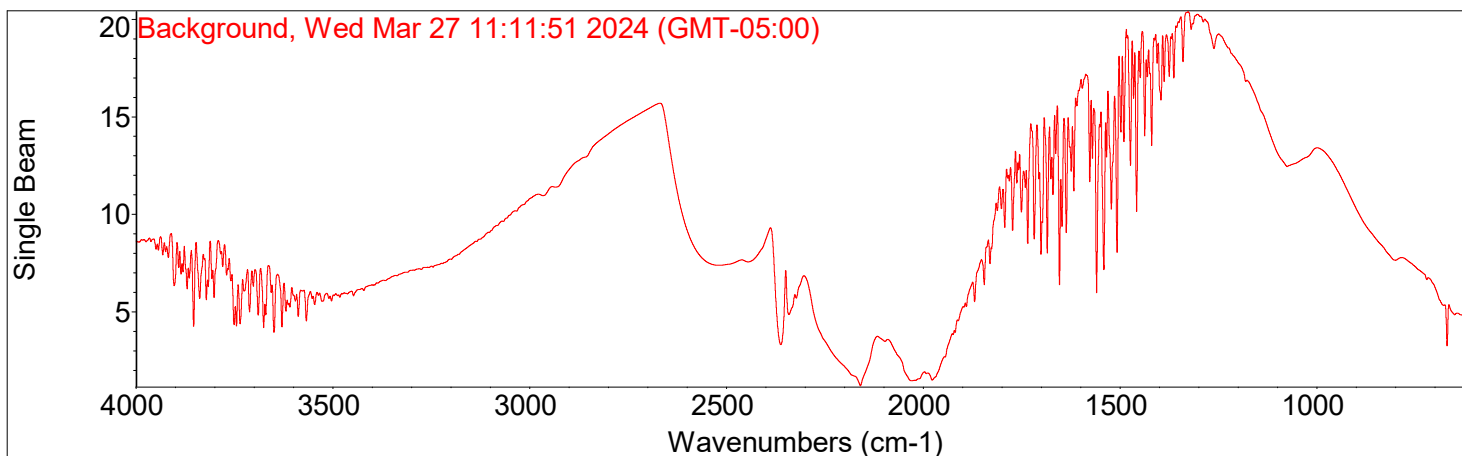
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Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

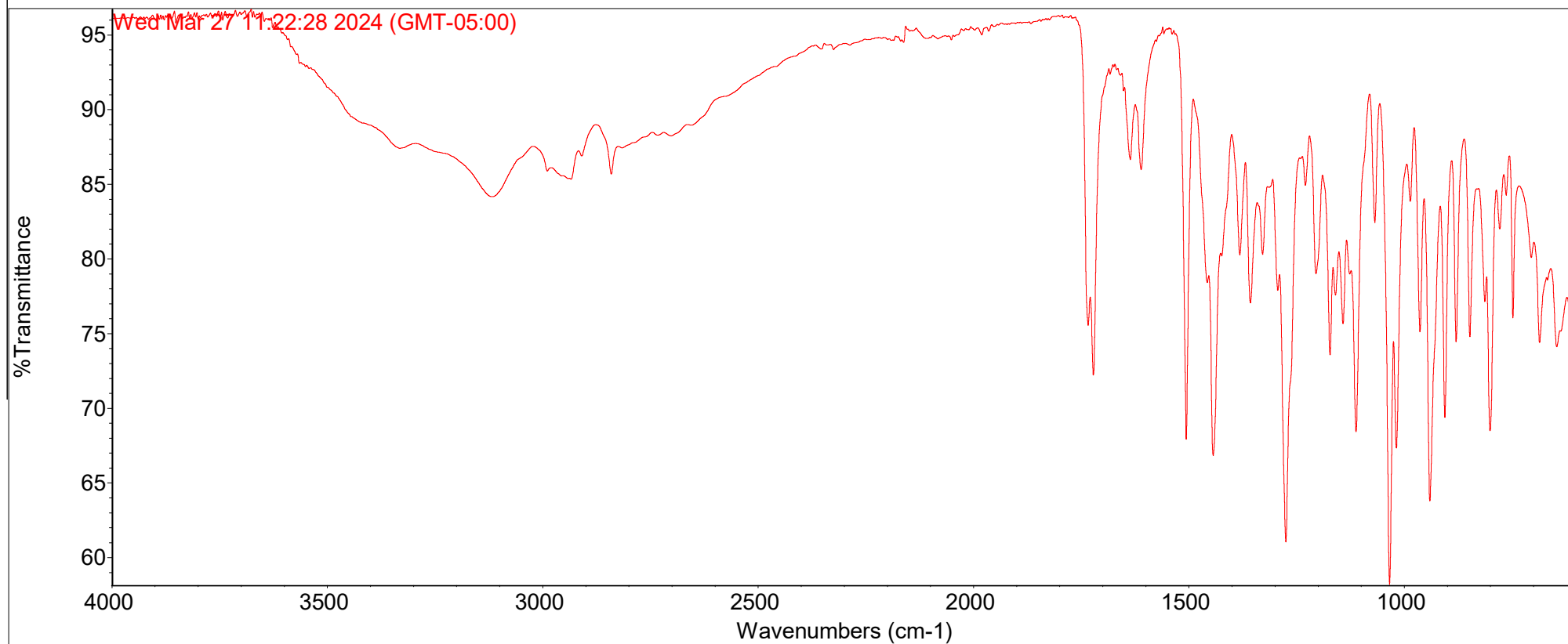
Collection time: Wed Mar 27 11:12:19 2024 (GMT-05:00)

Background



Collection time: Wed Mar 27 11:22:58 2024 (GMT-05:00)

Oxycodone HCl Alltech Lot# 520



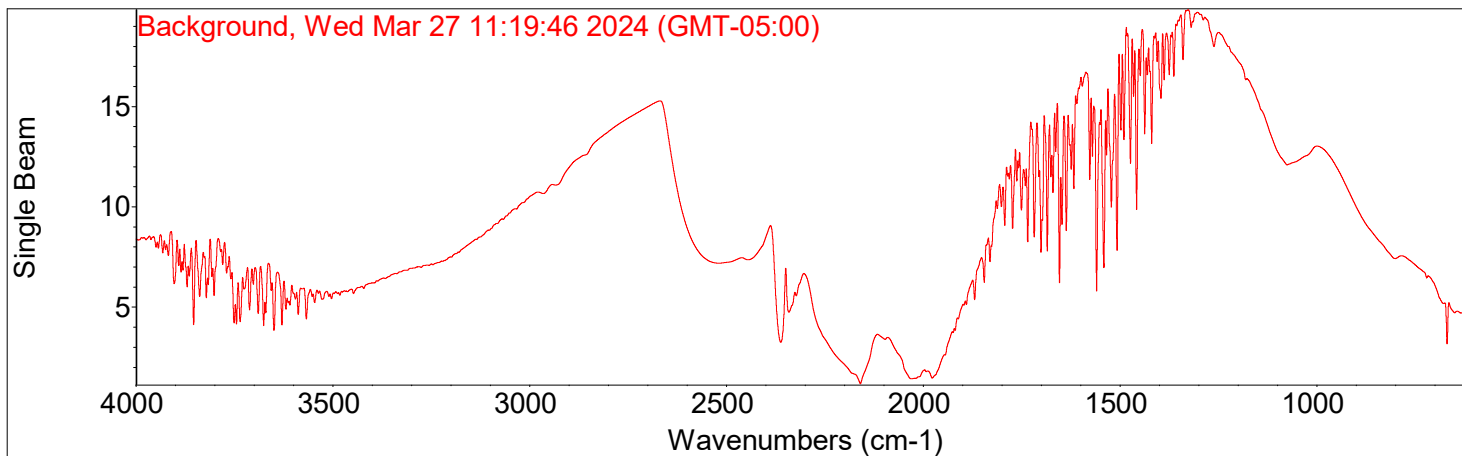
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Background

Number of sample scans: 16
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Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

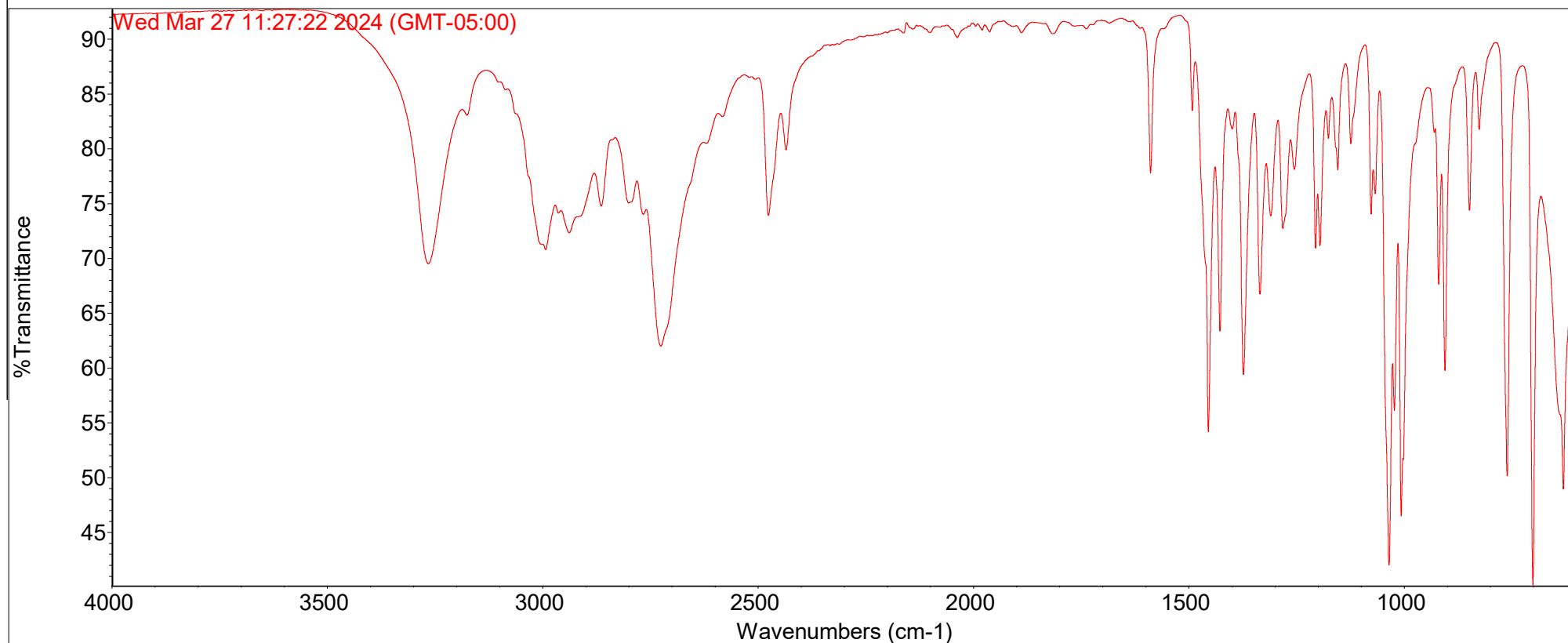
Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU



Collection time: Wed Mar 27 11:27:51 2024 (GMT-05:00)

Pseudoephedrine HCl Fluka Lot# 1342219/12307008



Collection time: Wed Mar 27 11:26:23 2024 (GMT-05:00)

Background

Number of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 4.0
Optical velocity: 0.4747
Aperture: 80.00

Detector: DTGS KBr
Beamsplitter: KBr
Source: IR

Instrument Name: GROGU

