Certificate Of Analysis

Analysis Date: 14-01-2025 **Re-test Date:** 15-01-2028

DESMETHYL TACROLIMUS

Identification

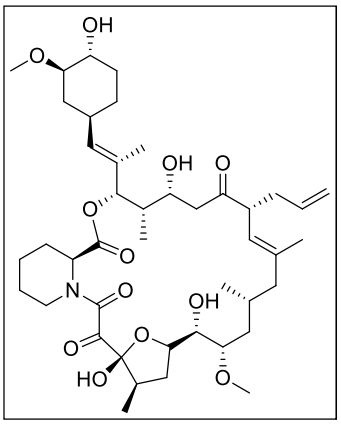
Chemical Name : (1R,9S,12S,13R,14S,17R,18E,21S,23S,24R,25S,27R)-1,14-dihydroxy-12-[(E)-1-[(1R,3R,4R)-4-hydroxy-3-methoxy cyclo hexyl]prop-1-en-2-yl]-23,25-dimethoxy-13,21,27-trimethyl -17-prop-2-enyl-11,28-dioxa-4-azatricyclo[22.3.1.04,9]octacos-18-ene-2,3,10,16-tetrone

CAT No : ALL-T03931

CAS No : 132172-14-6

Molecular Formula : C43H67NO12

Molecular Weight : 789.99



Analytical Information

Batch Code	: ALL-T03931	**HPLC Purity**	: 96.39 %
Solubility	: MeOH: ACN	**Potency**	: 95.70 %
Appearance of Product	: Off White Solid	**Mass**	: Confirm
Long Term Storage	: 2-8 0C	**IR Analysis**	: Confirm
Weight Loss By TGA	: 0.183 %	**1HNMR**	: Confirm
Residue Of Ignition	: 0.529 %	**13C NMR**	: Confirm

Additional Information

%Potency = [100 - (Inorganic Impurities % + Water %) × Chromatographic Purity%]/100 =

[100 – (0.183+0.529) × 96.39]/100 = 95.70 %

Recommendation : Released

	Department	Name	Signature
Prepared and Reviewed by	Analytical	Mr. Swapnil Kausatkar Jr. Executive	
Approved By	QA&QC	Dr. Ashish Keche Director QA&QC	

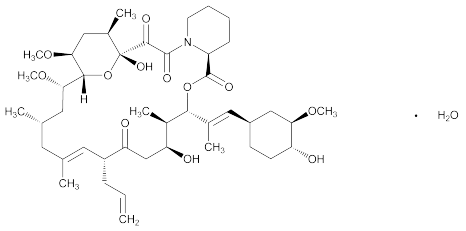
Attachment : HPLC, Mass, 1H NMR, IR, TGA, Q-NMR, 13C NMR, UV REPORT

Shipping Condition : All Product are stable to be shipped at room temperature, unless otherwise specified

Corporate Office

Allmpus Laboratories Pvt Ltd 38, Solitaire Industrial Estate, Plot No.TS-1, Near Nandi Palace Hotel, MIDC-Phase 1, Dombivli (E),Mumbai, Maharashtra 421203

Tacrolimus



$C_{44}H_{69}NO_{12} \cdot H_2O$ 822.03

15,19-Epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[2-(4-hydroxy-3-methoxycyclohexyl)-1-methylethenyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-8-(2-propenyl)-, monohydrate, [3*S*-[3*R**,*E*(1*S**,3*S**,4*S**)],4*S**,5*R**,8*S**,9*E*,12*R**,14*R**,15*S**,16*R**,18*S**,19*S**,26a*R**]]-;

(–)-(3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone monohydrate CAS RN®: 109581-93-3; UNII: WM0HAQ4WNM.

DEFINITION

Tacrolimus contains NLT 98.0% and NMT 102.0% of tacrolimus ($C_{44}H_{69}NO_{12}$), calculated on the anhydrous and solvent-free basis.

IDENTIFICATION

- **A. Spectroscopic Identification Tests** ⟨197⟩**,** *Infrared Spectroscopy***: 197M**
- **B.** The retention time of the major peak of the *Sample solution* corresponds to that of the *Standard solution* as obtained in the *Assay*.

ASSAY

- **Procedure**

Protect solutions containing tacrolimus from light.
Solution A: 6 mM phosphoric acid
Solution B: Acetonitrile and *tert*-butyl methyl ether (81:19)
Solution C: *Solution A* and *Solution B* (4:1)
Solution D: *Solution A* and *Solution B* (1:4)
Mobile phase: See *Table 1*.

Table 1

Time (min)	Solution C (%)	Solution D (%)
0	72	28
30	72	28
53	15	85
54	72	28
60	72	28

Diluent: Acetonitrile and water (7:3)
System suitability solution: 3 mg/mL of USP Tacrolimus System Suitability Mixture RS in *Diluent*. Allow the solution to stand for 3 h at ambient temperature before use.
Standard solution: 3 mg/mL of USP Tacrolimus RS in *Diluent*. Allow the solution to stand for 3 h at ambient temperature before use.
Sample solution: 3 mg/mL of Tacrolimus in *Diluent*. Allow the solution to stand for 3 h at ambient temperature before use.
Chromatographic system
(See *Chromatography* ⟨621⟩*, System Suitability*.)
Mode: LC
Detector: UV 220 nm
Column: 4.6-mm × 15-cm; 3-µm packing L1
Temperatures
Column: 60°
Autosampler: 4°
Flow rate: 1.5 mL/min
Injection volume: 20 µL
System suitability
Samples: *System suitability solution* and *Standard solution*
[Note—See *Table 3* for relative retention times.]
Suitability requirements
Resolution: NLT 3.0 between ascomycin and tacrolimus, *System suitability solution*
Relative standard deviation: NMT 1.0% for the sum of the responses of tacrolimus, tacrolimus open ring, and tacrolimus 19-epimer, *Standard solution*
Analysis
Samples: *Standard solution* and *Sample solution*
Calculate the percentage of tacrolimus ($C_{44}H_{69}NO_{12}$) in the portion of Tacrolimus taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = sum of the peak responses of tacrolimus open ring, tacrolimus 19-epimer, and tacrolimus from the *Sample solution*
r_S = sum of the peak responses of tacrolimus open ring, tacrolimus 19-epimer, and tacrolimus from the *Standard solution*
C_S = concentration of USP Tacrolimus RS in the *Standard solution* (mg/mL)
C_U = concentration of Tacrolimus in the *Sample solution* (mg/mL)

Acceptance criteria: 98.0%–102.0% on the anhydrous and solvent-free basis

IMPURITIES

- **Residue on Ignition** ⟨281⟩**:** NMT 0.1%
- **Organic Impurities, Procedure 1**

Use *Organic Impurities, Procedure 1* when the impurity profile includes tacrolimus methylacrylaldehyde and tacrolimus diene. It is suggested that new columns be conditioned with about 500 mL of alcohol before use to meet the resolution criterion.
Mobile phase: Hexane, *n*-butyl chloride, and acetonitrile (7:2:1). Add *n*-butyl chloride to hexane, and mix well before adding acetonitrile. After adding acetonitrile, mix the *Mobile phase* for 2 h to get a clear solution. Any deviations from the ratio of components in the *Mobile phase* and the order of mixing will result in a two-phase solution.
System suitability solution: 0.1 mg/mL each of USP Tacrolimus RS and USP Tacrolimus Related Compound A RS in *Mobile phase*
Sample solution: 2.0 mg/mL of Tacrolimus in *Mobile phase*
Chromatographic system
(See *Chromatography* ⟨621⟩*, System Suitability*.)
Mode: LC
Detector: UV 225 nm
Column: Two 4.6-mm × 25-cm columns; 5-µm packing L20

Column temperature: 28 ± 2°
Flow rate: 1.5 mL/min. Adjust the *Flow rate* so that the retention time of tacrolimus is approximately 15 min.
Injection volume: 20 µL

System suitability
Sample: *System suitability solution*
Suitability requirements
Resolution: NLT 1.1 between tacrolimus and tacrolimus related compound A
Tailing factor: NMT 1.5
Relative standard deviation: NMT 2.0%

Analysis
Sample: *Sample solution*
Calculate the percentage of each impurity in the portion of Tacrolimus taken:

$$\text{Result} = (r_U/F_i) \times \{1/[r_T + \Sigma(r_U/F_i)]\} \times 100$$

r_U = peak response of each impurity from the *Sample solution*
F_i = relative response factor for each corresponding impurity (see *Table 2*)
r_T = peak response of tacrolimus from the *Sample solution*

Acceptance criteria: See *Table 2*.

Table 2

Name	Relative Retention Time	Relative Response Factor	Acceptance Criteria, NMT (%)
Tacrolimus methylacryl aldehyde[a]	0.55	16.7	0.2
Tacrolimus diene[b]	0.79	2.2	0.2
Tacrolimus impurity 1[c]	0.96	1.0	0.2
Tacrolimus related compound A[d]	0.96	—	—
Tacrolimus	1.0	1.0	—
Tacrolimus 19-epimer[d, e]	1.1	—	—
Tacrolimus open ring[d, f]	1.3	—	—
Any individual unspecified impurity	—	1.0	0.2
Total impurities[g]	—	—	0.3

[a] (*E*)-3-[[(1*R*,3*R*,4*R*)-4-Hydroxy-3-methoxycyclohexyl]-2-methylacrylaldehyde.
[b] (14*E*,18*E*)-17-Allyl-1-hydroxy-12-[(*E*)-2-(4-hydroxy-3-methoxycyclohexyl)-1-methylvinyl]-23,25-dimethoxy-13,19,21,27-tetramethyl-11,28-dioxa-4-azatricyclo[22.3.1.0^{4,9}] octacosa-14,18-diene-2,3,10,16-tetrone.
[c] Specified unidentified impurity.
[d] For informational purposes only; not to be reported.
[e] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*S*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a,hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16,dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.
[f] (3*S*,4*R*,5*S*,8*R*,12*S*,14*S*,15*R*,16*S*,18*R*,26a*S*,*E*)-8-Allyl-5,6,11,12,13,14,15,16,17,18,24,25,26,26a-tetradecahydro-5,15,20,20-tetrahydroxy-3-{(*E*)-2-[1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-3*H*-pyrido[2,1-*c*][1,4] oxaazacyclotricosine-1,7,19,21(4*H*,8*H*,20*H*,23*H*)-tetrone.
[g] Total impurities limit does not include tacrolimus open ring and tacrolimus 19-epimer.

• Organic Impurities, Procedure 2

Use *Organic Impurities, Procedure 2* when the impurity profile includes ascomycin, desmethyl tacrolimus, tacrolimus 8-epimer, and tacrolimus 8-propyl analog. Protect solutions containing tacrolimus from light.

Solution A, Solution B, Solution C, Solution D, Mobile phase, Diluent, System suitability solution, Sample solution, and **Chromatographic system:** Proceed as directed in the *Assay*.
Standard solution: 30 µg/mL of USP Tacrolimus RS in *Diluent*. Allow the solution to stand for 3 h at ambient temperature before use.
Reporting threshold solution: 1.5 µg/mL of USP Tacrolimus RS in *Diluent*
Peak identification solution 1: 10 µg/mL of USP Tacrolimus 8-epimer RS in acetonitrile
Peak identification solution 2: 10 µg/mL of USP Tacrolimus 8-propyl Analog RS in acetonitrile

System suitability
[Note—Identify the related compounds by the relative retention times provided in *Table 3*.]
Samples: *System suitability solution* and *Standard solution*
Suitability requirements
Resolution: NLT 3.0 between tacrolimus and ascomycin, *System suitability solution*
Relative standard deviation: NMT 10.0% for the sum of the responses of tacrolimus and tacrolimus 19-epimer, *Standard solution*

Analysis
Samples: *Sample solution*, *Standard solution*, *Reporting threshold solution*, *Peak identification solution 1*, and *Peak identification solution 2*
Calculate the percentage of each impurity in the portion of Tacrolimus taken:

$$\text{Result} = (r_U/r_S) \times (C_S/C_U) \times 100$$

r_U = peak response of each impurity from the *Sample solution*
r_S = sum of the peak responses of tacrolimus 19-epimer and tacrolimus from the *Standard solution*
C_S = concentration of USP Tacrolimus RS in the *Standard solution* (mg/mL)
C_U = concentration of Tacrolimus in the *Sample solution* (mg/mL)

Acceptance criteria: See *Table 3*. Identify tacrolimus 8-epimer and tacrolimus 8-propyl analog using *Peak identification solution 1* and *Peak identification solution 2*. Report impurity peaks with responses NLT that of the peak in the *Reporting threshold solution* (0.05%). Disregard peaks with retention times less than 3 min.

Table 3

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Tacrolimus open ring[a, b]	0.52	—
Ascomycin 19-epimer (if present)[c, d]	0.54	0.1
Tacrolimus 19-epimer[b, e]	0.63	—
Ascomycin[f]	0.87	0.50
Desmethyl tacrolimus (if present)[d, g]	0.94	0.1
Tacrolimus	1.00	—
Tacrolimus 8-epimer[h]	1.28	0.15
Tacrolimus 8-propyl analog[i]	1.33	0.15
Any individual unspecified impurity	—	0.1

Table 3 *(continued)*

Name	Relative Retention Time	Acceptance Criteria, NMT (%)
Total impurities[j]	—	1.0

[a] (3*S*,4*R*,5*S*,8*R*,12*S*,14*S*,15*R*,16*S*,18*R*,26a*S*,*E*)-8-Allyl-5,6,11,12,13,14,15,16,17,18,24,25,26,26a-tetradecahydro-5,15,20,20-tetrahydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,19,21(4*H*,8*H*,20*H*,23*H*)-tetrone.

[b] Tacrolimus open ring and tacrolimus 19-epimer are isomers of tacrolimus, which are present in equilibrium with the active ingredient. They are not to be reported as degradation products.

[c] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*S*,26a*S*)-8-Ethyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21-(4*H*,23*H*)-tetrone.

[d] If possible from the manufacturing process.

[e] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*S*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.

[f] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Ethyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21-(4*H*,23*H*)-tetrone.

[g] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl]-14,16-dimethoxy-4,12,18-trimethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21-(4*H*,23*H*)-tetrone.

[h] (3*S*,4*R*,5*S*,8*S*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.

[i] (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-Hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-8-propyl-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.

[j] Total impurities limit does not include tacrolimus open ring and tacrolimus 19-epimer.

SPECIFIC TESTS

- **Optical Rotation,** *Specific Rotation* ⟨781S⟩
  Sample solution: 10 mg/mL in *N,N*-dimethylformamide
  Acceptance criteria: –110° to –115° on the "as-is" basis
- **Water Determination,** *Method I* ⟨921⟩**:** NMT 4.0%

ADDITIONAL REQUIREMENTS

- **Packaging and Storage:** Preserve in tight containers. Store at controlled room temperature.
- **Labeling:** If a test for *Organic Impurities* other than *Procedure 1* is used, then the labeling states with which test for *Organic Impurities* the article complies.

Change to read:

- **USP Reference Standards** ⟨11⟩

USP Tacrolimus RS
15,19-Epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-[2-(4-hydroxy-3-methoxycyclohexyl)-1-methylethenyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-8-(2-propenyl)-, monohydrate, [3*S*-[3*R**,*E*(1*S**,3*S**,4*S**)],4*S**,5*R**,8*S**,9*E*,12*R**,14*R**,15*S**,16*R**, 18*S**,19*S**,26a*R**]]-.
$C_{44}H_{69}NO_{12} \cdot H_2O$ 822.03

USP Tacrolimus Related Compound A RS
(*E*)-8-Ethyl-5,6,8,11,12,13,14,15,16,17,18,19,24, 25,26,26a-Hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-(4-hydroxy-3-methoxycyclohexyl)-1-methylvinyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21-(4*H*, 23*H*)-tetrone.
$C_{43}H_{69}NO_{12}$ ▲792.02▲ (ERR 1-Sep-2021)

USP Tacrolimus 8-epimer RS
(3*S*,4*R*,5*S*,8*S*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Allyl-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*, 23*H*)-tetrone.
$C_{44}H_{69}NO_{12}$ ▲804.03▲ (ERR 1-Sep-2021)

USP Tacrolimus 8-propyl Analog RS
(3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-5,6,8,11,12,13,14,15,16,17,18,19,24,25,26,26a-Hexadecahydro-5,19-dihydroxy-3-{(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-8-propyl-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.
$C_{44}H_{71}NO_{12}$ 806.03

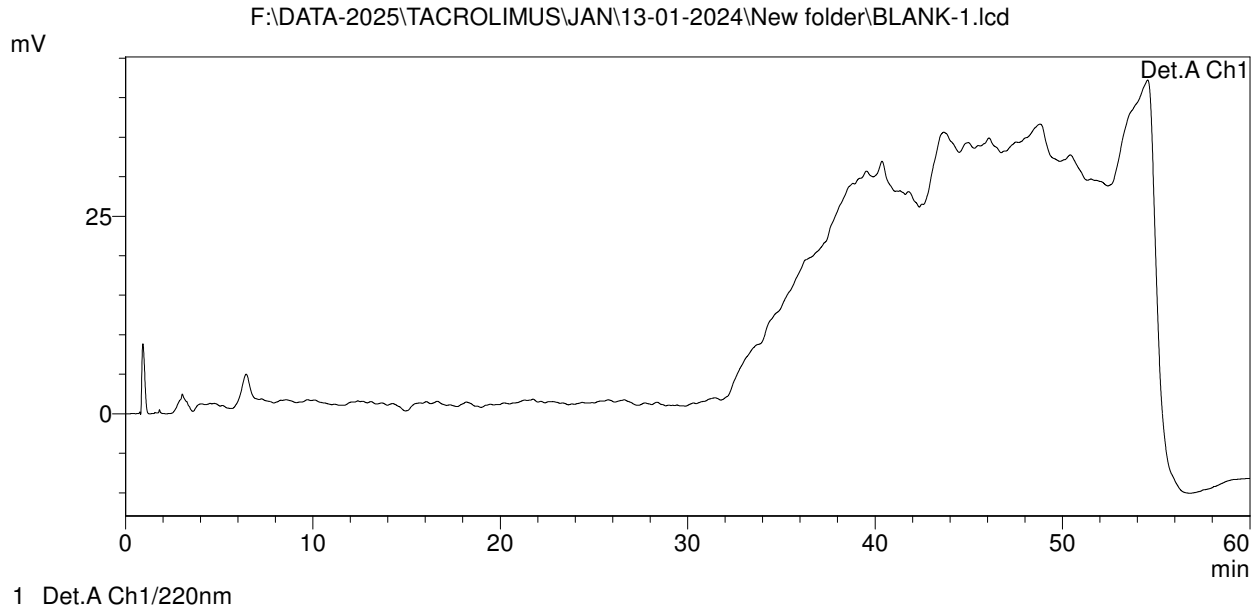
USP Tacrolimus System Suitability Mixture RS
This is a mixture of tacrolimus, ascomycin (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*,19*R*,26a*S*)-8-Ethyl-5,6,8,11,12,13,14,15,16,17,18,19,24, 25,26,26a-hexadecahydro-5,19-dihydroxy-3-[(*E*)-2-[(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl]-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21-(4*H*, 23*H*)-tetrone.
$C_{43}H_{69}NO_{12}$ 792.01
and tacrolimus 8-propyl analog (3*S*,4*R*,5*S*,8*R*,9*E*,12*S*,14*S*,15*R*,16*S*,18*R*, 19*R*,26a*S*)-5,6,8,11,12,13,14,15,16,17,18,19,24, 25,26,26a-Hexadecahydro-5,19-dihydroxy-3-{(*E*)-2- [(1*R*,3*R*,4*R*)-4-hydroxy-3-methoxycyclohexyl]-1-methylvinyl}-14,16-dimethoxy-4,10,12,18-tetramethyl-15,19-epoxy-8-propyl-3*H*-pyrido[2,1-*c*][1,4]oxaazacyclotricosine-1,7,20,21(4*H*,23*H*)-tetrone.
$C_{44}H_{71}NO_{12}$ 806.03

==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\BLANK-1.lcd

Acquired by	: Admin
Sample Name	: BLANK-1
Sample ID	: BLANK-1
Tray#	: 1
Vail #	: 1
Injection Volume	: 20 uL
Data File Name	: BLANK-1.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/13/2025 6:10:07 PM
Data Processed	: 1/13/2025 7:10:10 PM

<Chromatogram>



1 Det.A Ch1/220nm

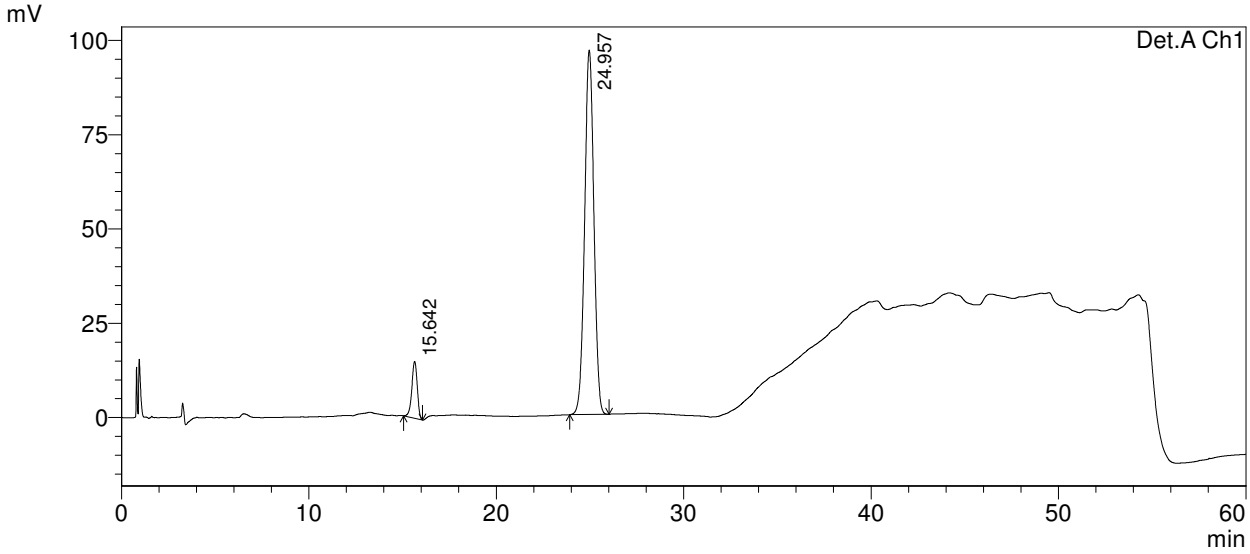
==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\TACROLIMUS--.lcd

Acquired by	: Admin
Sample Name	: TACROLIMUS
Sample ID	: TACROLIMUS
Tray#	: 1
Vail #	: 2
Injection Volume	: 20 uL
Data File Name	: TACROLIMUS--.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/14/2025 10:14:17 AM
Data Processed	: 1/14/2025 11:14:21 AM

<Chromatogram>

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\TACROLIMUS--.lcd



1 Det.A Ch1/220nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	15.642	303388	15074	8.377	13.494
2	24.957	3318189	96637	91.623	86.506
Total		3621576	111712	100.000	100.000

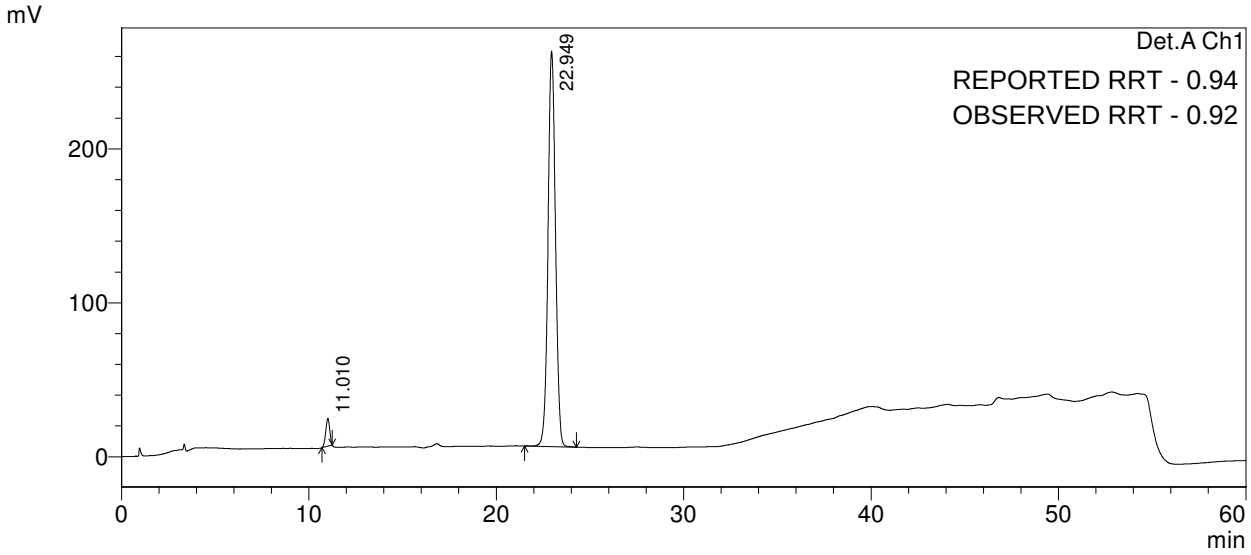
==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ALL-T03931-.lcd

Acquired by	: Admin
Sample Name	: ALL-T03931
Sample ID	: ALL-T03931
Tray#	: 1
Vail #	: 11
Injection Volume	: 20 uL
Data File Name	: ALL-T03931-.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/14/2025 3:00:27 PM
Data Processed	: 1/14/2025 4:00:30 PM

<Chromatogram>

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ALL-T03931-.lcd



1 Det.A Ch1/220nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	11.010	266430	18091	3.610	6.578
2	22.949	7113125	256947	96.390	93.422
Total		7379555	275038	100.000	100.000

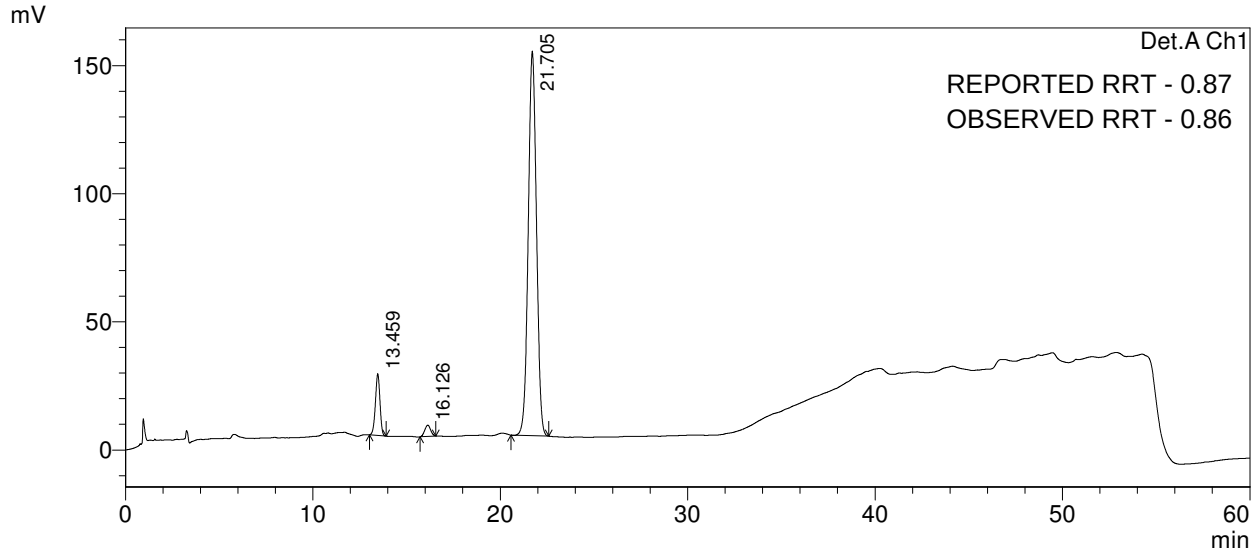
==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ASCOMYCIN-.lcd

Acquired by	: Admin
Sample Name	: ASCOMYCIN
Sample ID	: ASCOMYCIN
Tray#	: 1
Vail #	: 3
Injection Volume	: 20 uL
Data File Name	: ASCOMYCIN-.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/14/2025 11:24:17 AM
Data Processed	: 1/14/2025 12:24:19 PM

<Chromatogram>

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ASCOMYCIN-.lcd



1 Det.A Ch1/220nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	13.459	408199	24156	8.034	13.521
2	16.126	95983	4413	1.889	2.470
3	21.705	4576619	150082	90.077	84.008
Total		5080801	178652	100.000	100.000

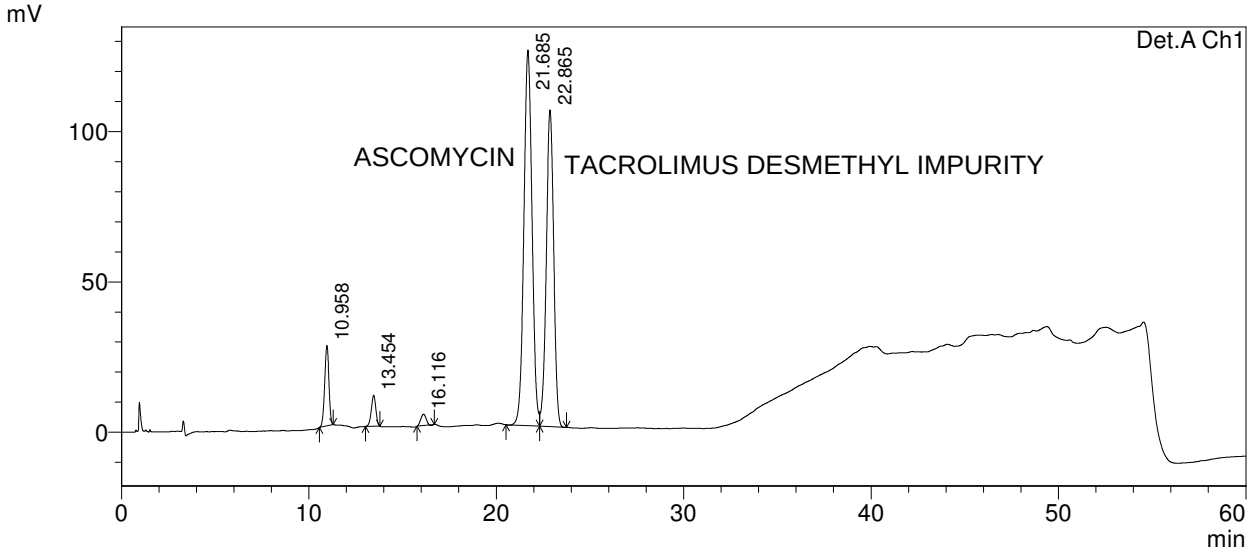
==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ALL-T03931+ASCOMYCIN-.lcd

Acquired by	: Admin
Sample Name	: ALL-T03931+ASCOMYCIN
Sample ID	: ALL-T03931+ASCOMYCIN
Tray#	: 1
Vail #	: 5
Injection Volume	: 20 uL
Data File Name	: ALL-T03931+ASCOMYCIN-.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/14/2025 12:49:59 PM
Data Processed	: 1/14/2025 1:50:02 PM

<Chromatogram>

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\ALL-T03931+ASCOMYCIN-.lcd



1 Det.A Ch1/220nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.958	418267	26754	5.697	9.863
2	13.454	174644	10391	2.379	3.831
3	16.116	72777	3756	0.991	1.385
4	21.685	3787407	124988	51.584	46.078
5	22.865	2889106	105366	39.349	38.844
Total		7342200	271255	100.000	100.000

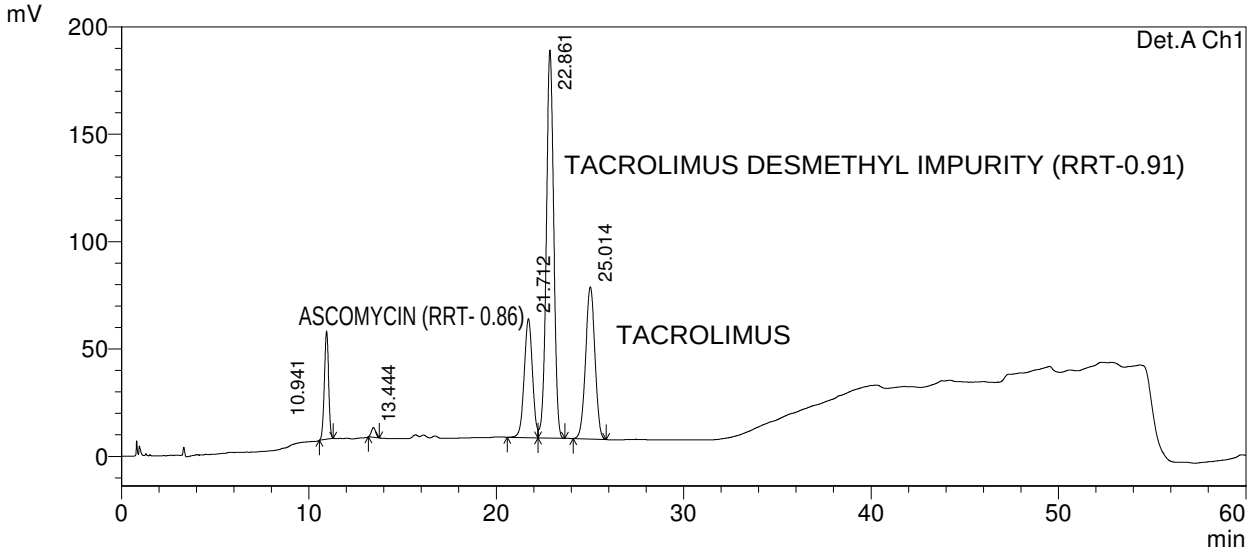
==== Shimadzu LCsolution Analysis Report ====

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\TACROLIMUS+ALL-T03931+ASCOMYCIN-.lcd

Acquired by	: Admin
Sample Name	: TACROLIMUS+ALL-T03931+ASCOMYCIN
Sample ID	: TACROLIMUS+ALL-T03931+ASCOMYCIN
Tray#	: 1
Vail #	: 6
Injection Volume	: 20 uL
Data File Name	: TACROLIMUS+ALL-T03931+ASCOMYCIN-.lcd
Method File Name	: TACROLIMUS 60 MIN.lcm
Batch File Name	: SEQ.lcb
Report File Name	: Default.lcr
Data Acquired	: 1/14/2025 1:51:40 PM
Data Processed	: 1/14/2025 2:51:44 PM

<Chromatogram>

F:\DATA-2025\TACROLIMUS\JAN\13-01-2024\New folder\TACROLIMUS+ALL-T03931+ASCOMYCIN-.lcd



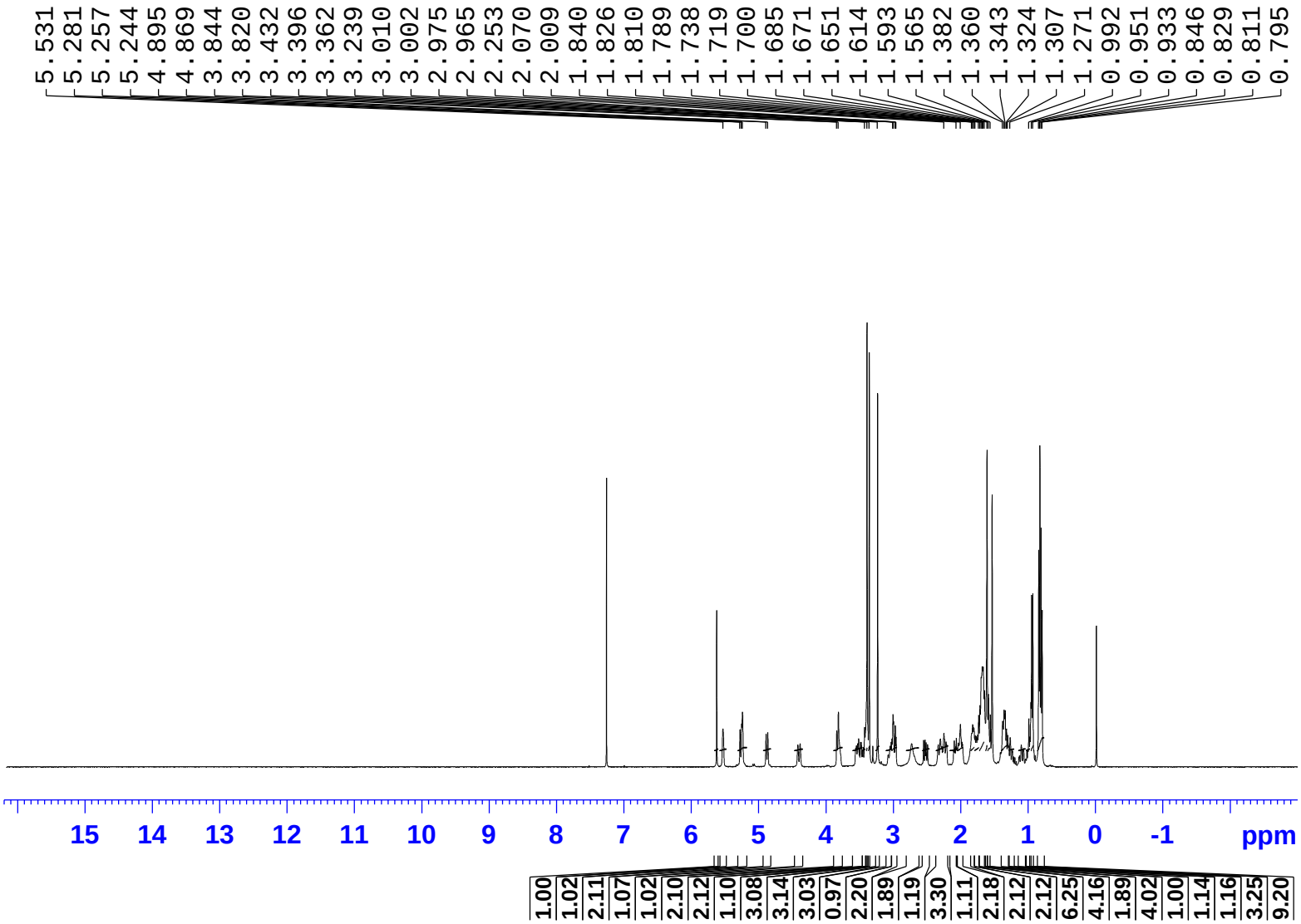
1 Det.A Ch1/220nm

PeakTable

Detector A Ch1 220nm

Peak#	Ret. Time	Area	Height	Area %	Height %
1	10.941	785111	50313	7.892	13.902
2	13.444	72394	4565	0.728	1.261
3	21.712	1684068	55472	16.928	15.328
4	22.861	4950760	180666	49.766	49.920
5	25.014	2455840	70893	24.686	19.589
Total		9948173	361910	100.000	100.000

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3
31-AUG-2023



Current Data Parameters

NAME	QC11230831003
EXPNO	1
PROCNO	1

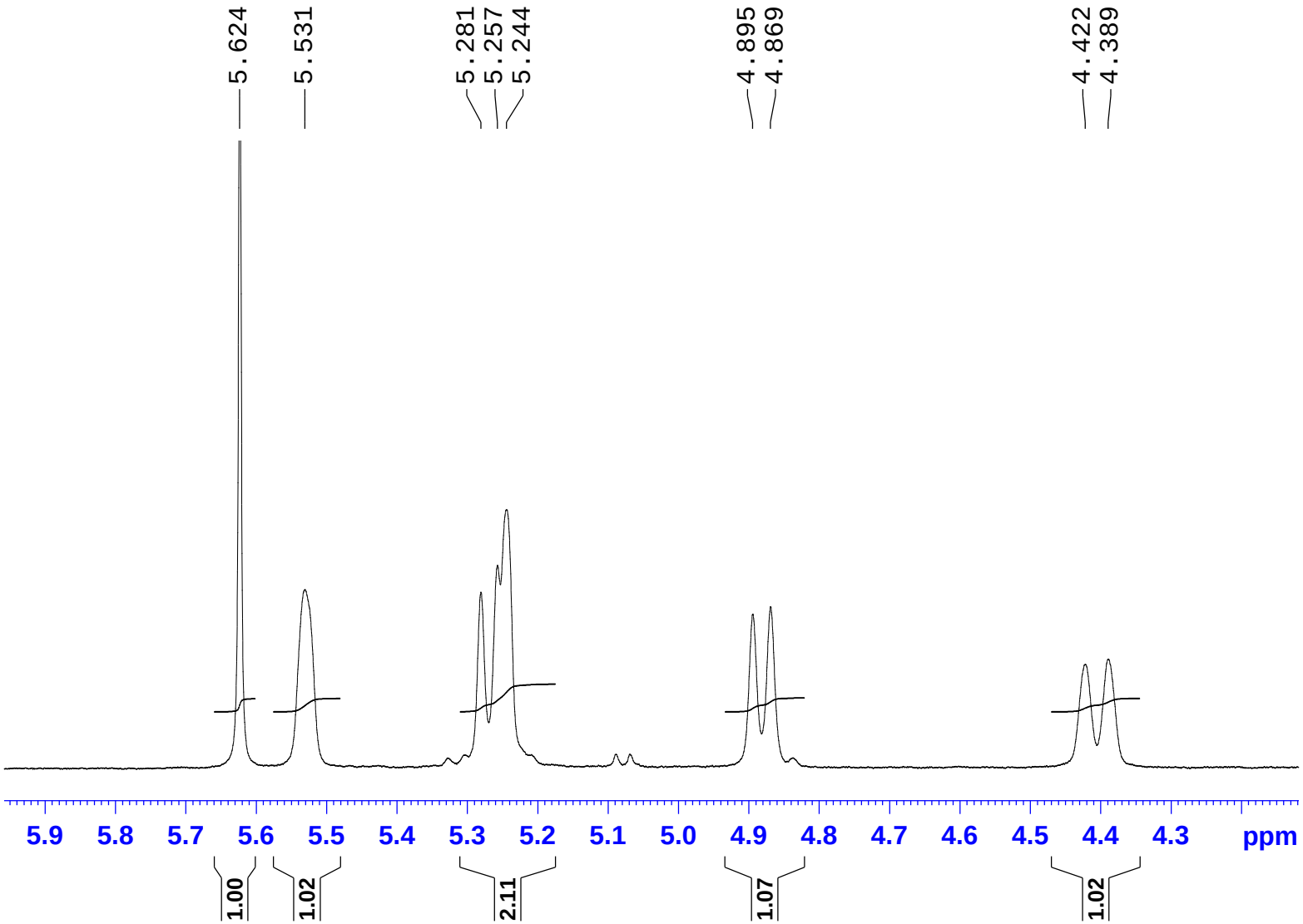
F2 - Acquisition Parameters

Date_	20230831
Time	14.07 h
INSTRUM	spect
PROBHD	Z108618_0828 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	4.0894465 sec
RG	174.45
DW	62.400 usec
DE	16.75 usec
TE	0 K
D1	1.00000000 sec
TD0	1
SFO1	400.0904705 MHz
NUC1	1H
P0	5.33 usec
P1	16.00 usec
PLW1	12.89900017 W

F2 - Processing parameters

SI	65536
SF	400.0880107 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3
31-AUG-2023



Current Data Parameters

NAME	QC11230831003
EXPNO	1
PROCNO	1

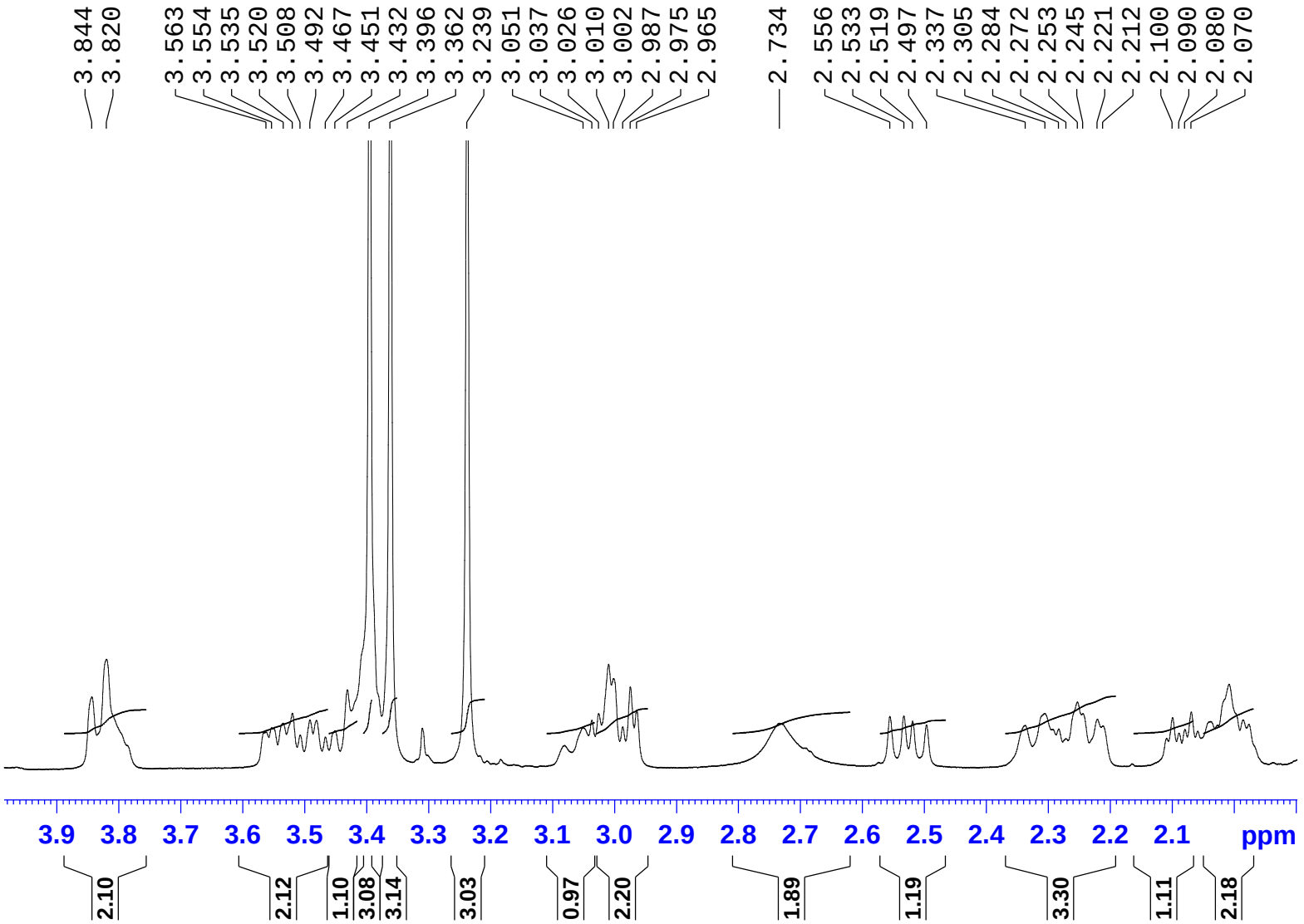
F2 - Acquisition Parameters

Date_	20230831
Time	14.07 h
INSTRUM	spect
PROBHD	Z108618_0828 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	4.0894465 sec
RG	174.45
DW	62.400 usec
DE	16.75 usec
TE	0 K
D1	1.00000000 sec
TD0	1
SFO1	400.0904705 MHz
NUC1	1H
P0	5.33 usec
P1	16.00 usec
PLW1	12.89900017 W

F2 - Processing parameters

SI	65536
SF	400.0880107 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3
31-AUG-2023

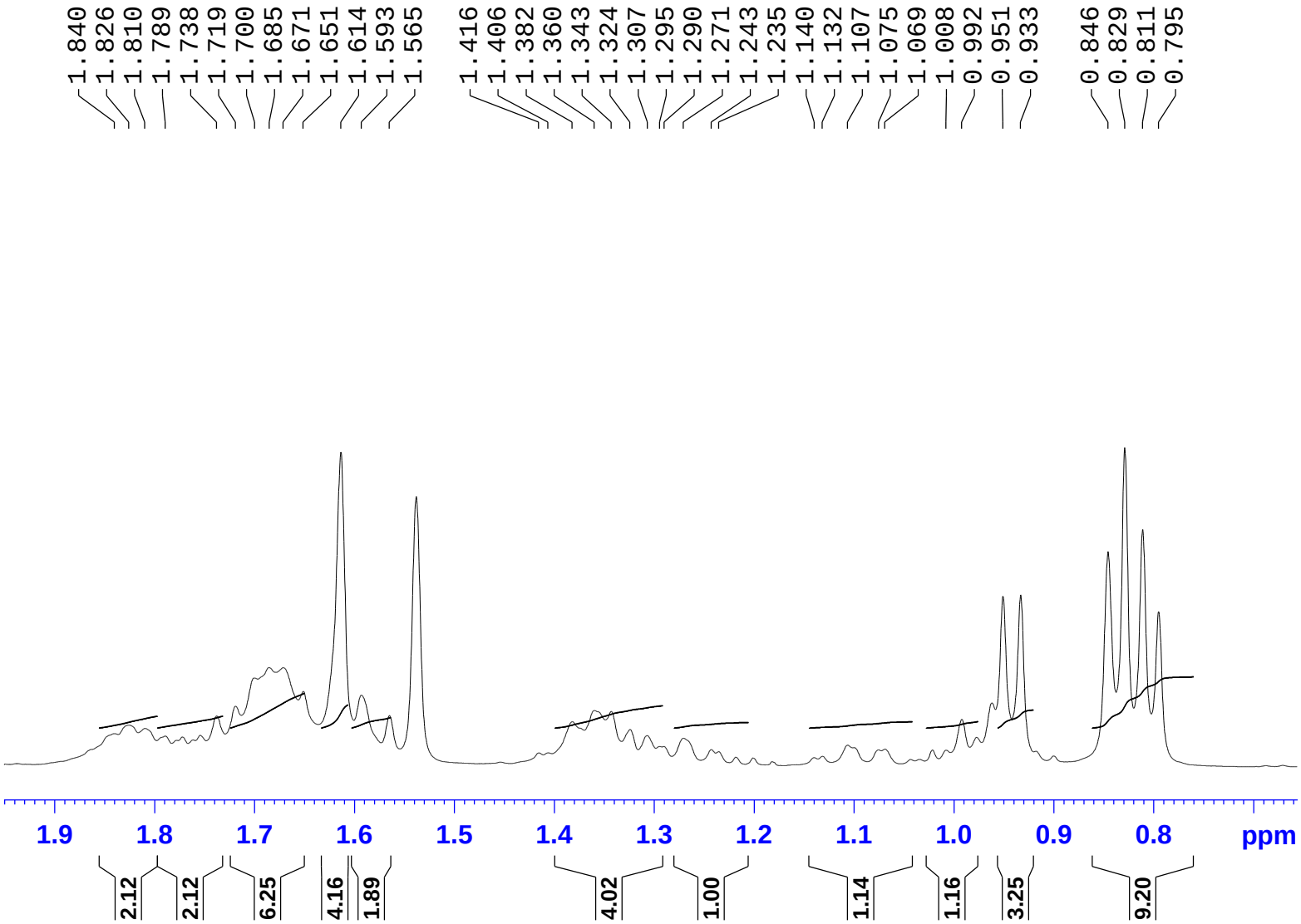



```
Current Data Parameters
NAME      QC11230831003
EXPNO                 1
PROCNO                1

F2 - Acquisition Parameters
Date_          20230831
Time              14.07 h
INSTRUM            spect
PROBHD   Z108618_0828 (
PULPROG             zg30
TD                 65536
SOLVENT            CDCl3
NS                    16
DS                     2
SWH             8012.820 Hz
FIDRES          0.244532 Hz
AQ              4.0894465 sec
RG                174.45
DW                62.400 usec
DE                16.75 usec
TE                    0 K
D1           1.00000000 sec
TD0                    1
SFO1         400.0904705 MHz
NUC1                  1H
P0                 5.33 usec
P1                16.00 usec
PLW1        12.89900017 W

F2 - Processing parameters
SI                 65536
SF          400.0880107 MHz
WDW                   EM
SSB                    0
LB                0.30 Hz
GB                     0
PC                 1.00
```

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3
31-AUG-2023



Current Data Parameters

NAME	QC11230831003
EXPNO	1
PROCNO	1

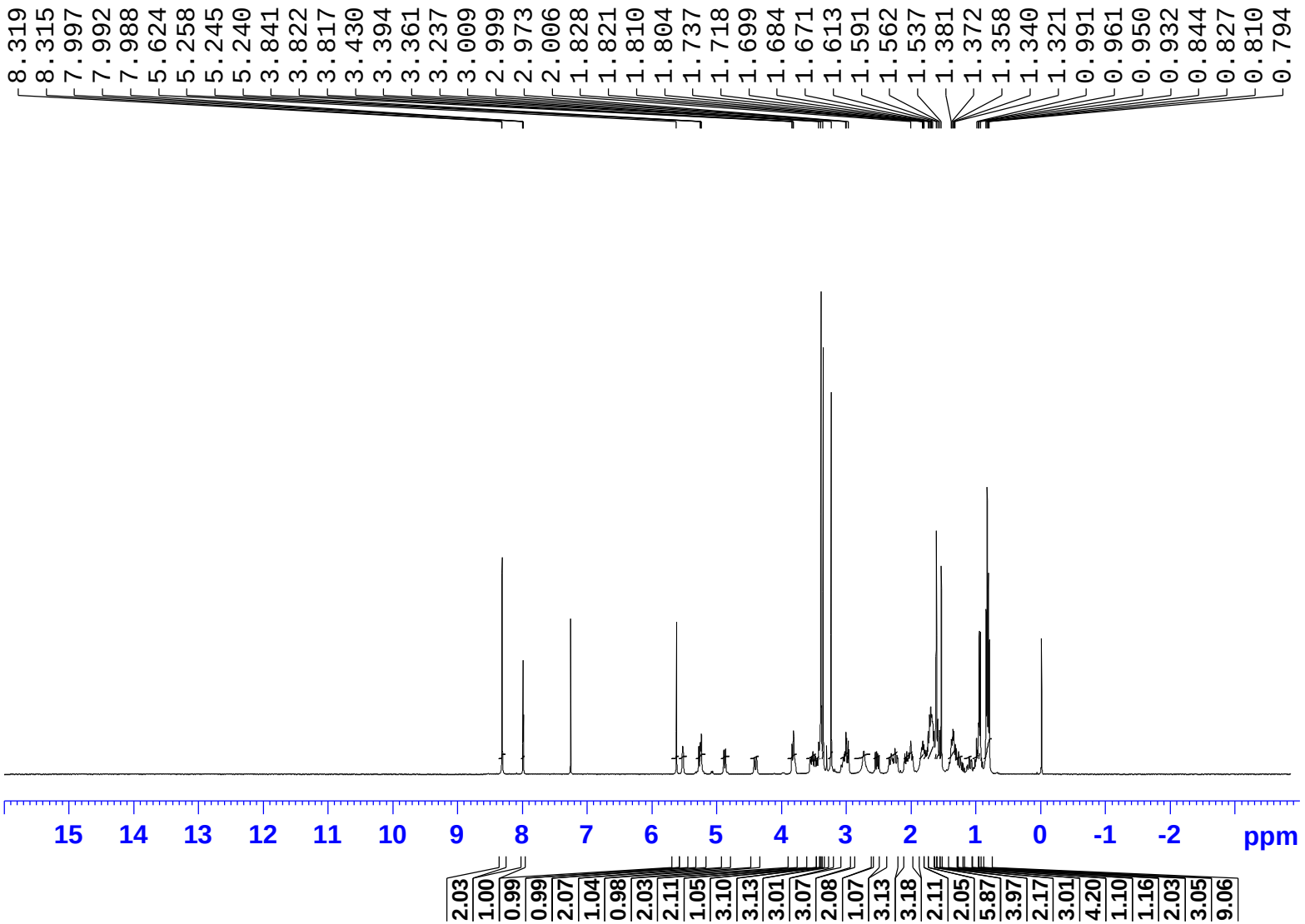
F2 - Acquisition Parameters

Date_	20230831
Time	14.07 h
INSTRUM	spect
PROBHD	Z108618_0828 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	4.0894465 sec
RG	174.45
DW	62.400 usec
DE	16.75 usec
TE	0 K
D1	1.00000000 sec
TD0	1
SFO1	400.0904705 MHz
NUC1	1H
P0	5.33 usec
P1	16.00 usec
PLW1	12.89900017 W

F2 - Processing parameters

SI	65536
SF	400.0880107 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3+3,5-DIBROMO NITROBENZENE
02-SEP-2023

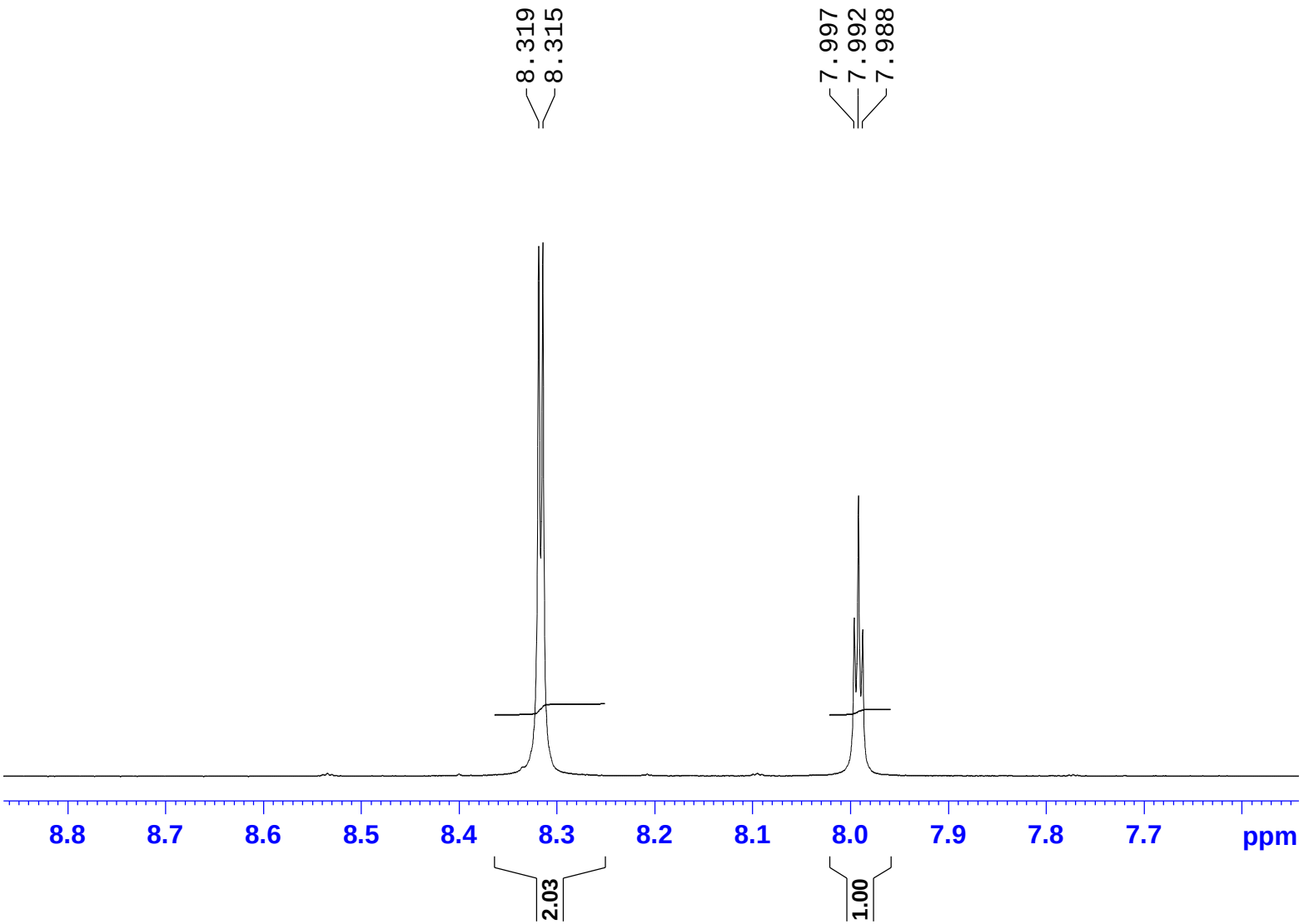


Current Data Parameters
NAME QC11230902027
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230902
Time 12.56 h
INSTRUM spect
PROBHD Z108618_0828 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894465 sec
RG 140.13
DW 62.400 usec
DE 16.75 usec
TE 0 K
D1 1.00000000 sec
TD0 1
SFO1 400.0904705 MHz
NUC1 1H
P0 5.33 usec
P1 16.00 usec
PLW1 12.89900017 W

F2 - Processing parameters
SI 65536
SF 400.0880107 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3+3,5-DIBROMO NITROBENZENE
02-SEP-2023

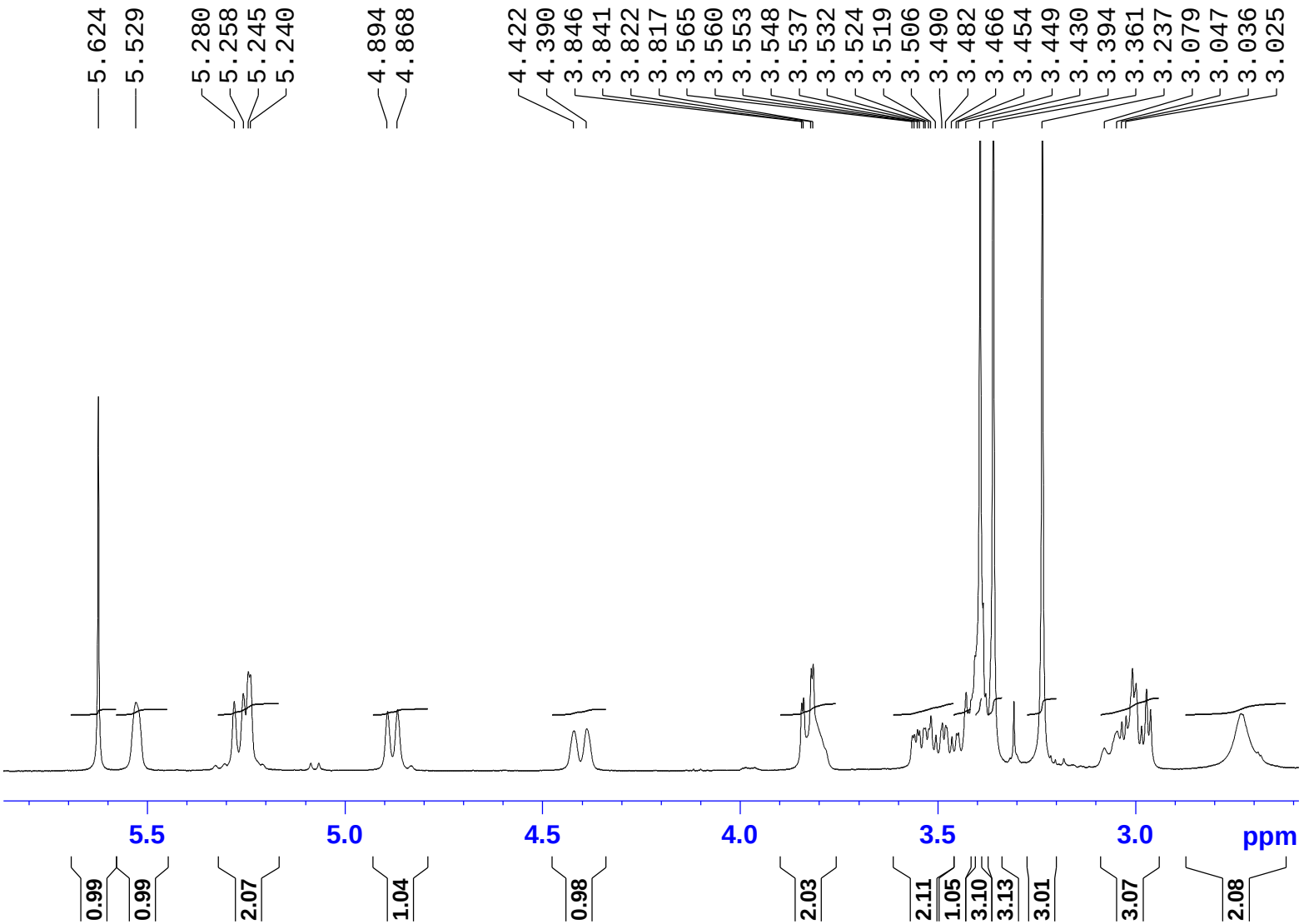


Current Data Parameters
NAME QC11230902027
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230902
Time 12.56 h
INSTRUM spect
PROBHD Z108618_0828 (
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.244532 Hz
AQ 4.0894465 sec
RG 140.13
DW 62.400 usec
DE 16.75 usec
TE 0 K
D1 1.00000000 sec
TD0 1
SFO1 400.0904705 MHz
NUC1 1H
P0 5.33 usec
P1 16.00 usec
PLW1 12.89900017 W

F2 - Processing parameters
SI 65536
SF 400.0880107 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3+3,5-DIBROMO NITROBENZENE
02-SEP-2023



Current Data Parameters

NAME	QC11230902027
EXPNO	1
PROCNO	1

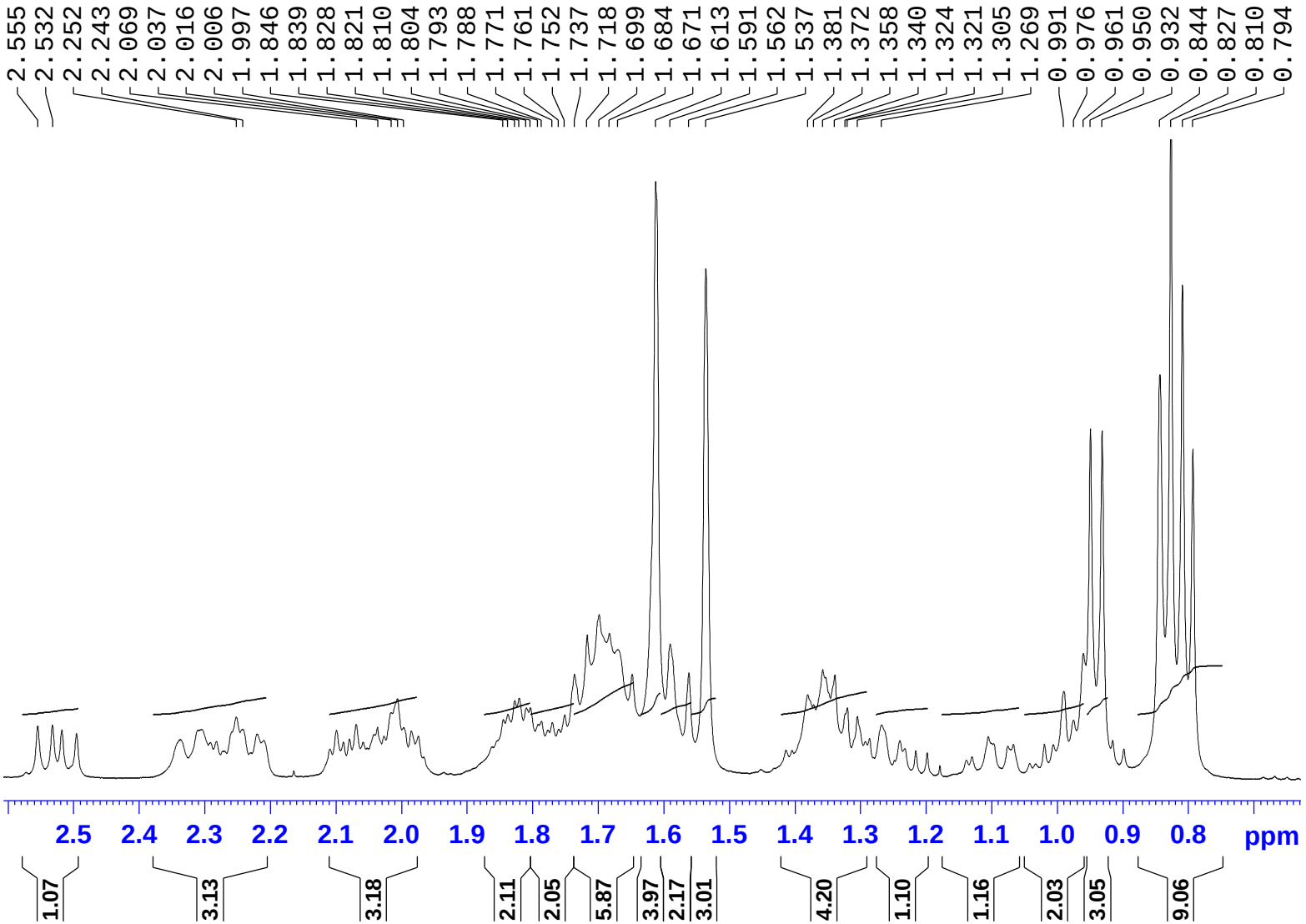
F2 - Acquisition Parameters

Date_	20230902
Time	12.56 h
INSTRUM	spect
PROBHD	Z108618_0828 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	4.0894465 sec
RG	140.13
DW	62.400 usec
DE	16.75 usec
TE	0 K
D1	1.00000000 sec
TD0	1
SFO1	400.0904705 MHz
NUC1	1H
P0	5.33 usec
P1	16.00 usec
PLW1	12.89900017 W

F2 - Processing parameters

SI	65536
SF	400.0880107 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
1H-NMR/CDCl3+3,5-DIBROMO NITROBENZENE
02-SEP-2023



Current Data Parameters

NAME	QC11230902027
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20230902
Time	12.56 h
INSTRUM	spect
PROBHD	Z108618_0828 (
PULPROG	zg30
TD	65536
SOLVENT	CDCl3
NS	16
DS	2
SWH	8012.820 Hz
FIDRES	0.244532 Hz
AQ	4.0894465 sec
RG	140.13
DW	62.400 usec
DE	16.75 usec
TE	0 K
D1	1.00000000 sec
TD0	1
SFO1	400.0904705 MHz
NUC1	1H
P0	5.33 usec
P1	16.00 usec
PLW1	12.89900017 W

F2 - Processing parameters

SI	65536
SF	400.0880107 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

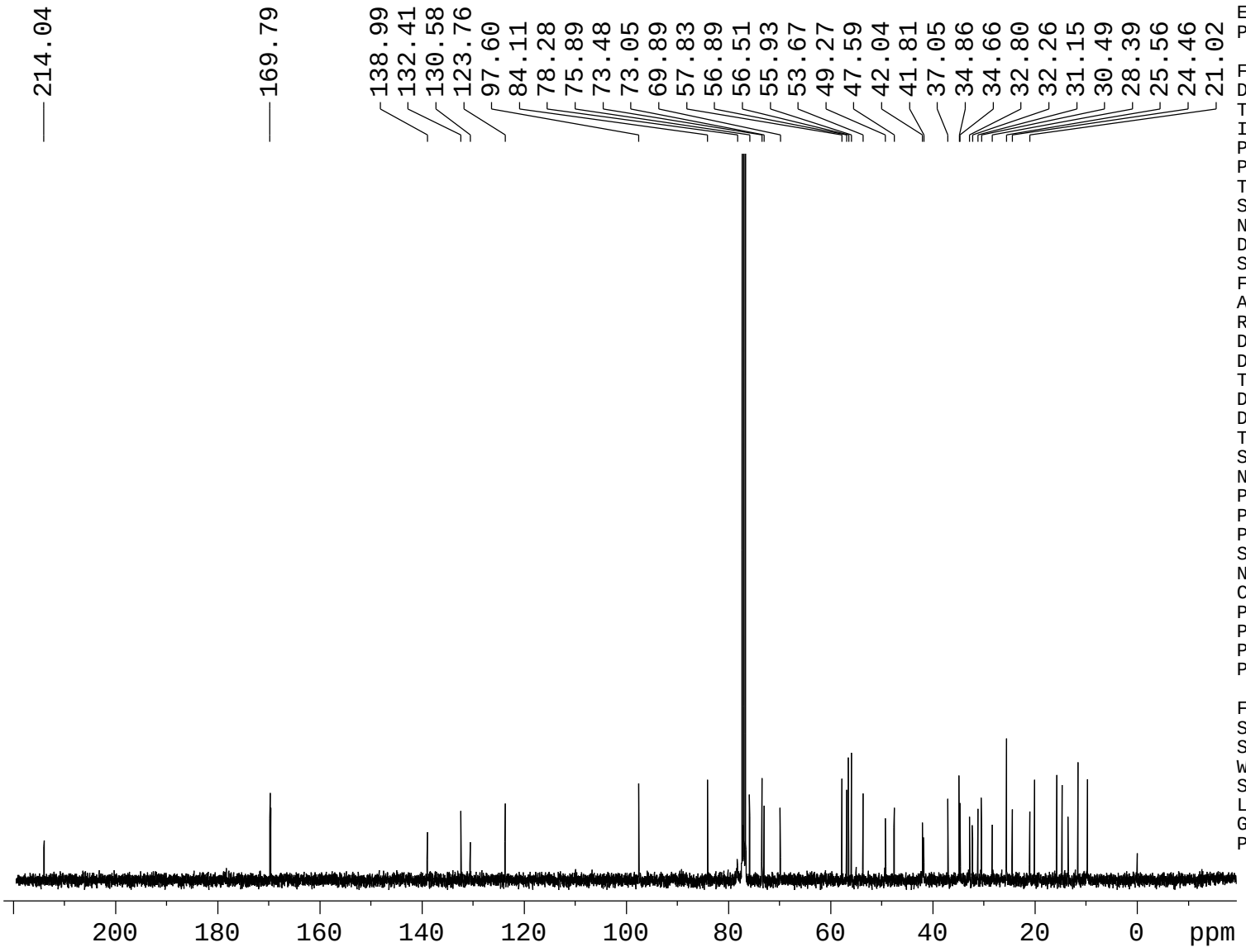
ALLMPUS LABORATORIES

Assay by NMR

B.No: ALL-T03931 **Internal Standard:** 3,5-DIBROMO NITROBENZENE	
Integral of sample resonanace at 5.6 ppm (Is)	0.99
Number of protons internal standard (Nr)	1
Molecular weight of sample (Ms)	789
Weight of intenal standard (Wr)	4.76
Purity of internal Std (Pr)	98
Integral of internal standard resonance at 7.9 ppm (Ir)	1
Number of sample protons (Ns)	1
Molecular weight of internal standard (Mr)	280.9
Weight of the sample (mg) (Ws)	13.09

Assay by NMR = $\frac{(Is \times Wr \times Ms \times Nr \times Pr)}{(Ir \times Ws \times Mr \times Ns)}$	
Assay by NMR =	**99.10**

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
13C-NMR/CDCl3
31-AUG-2023

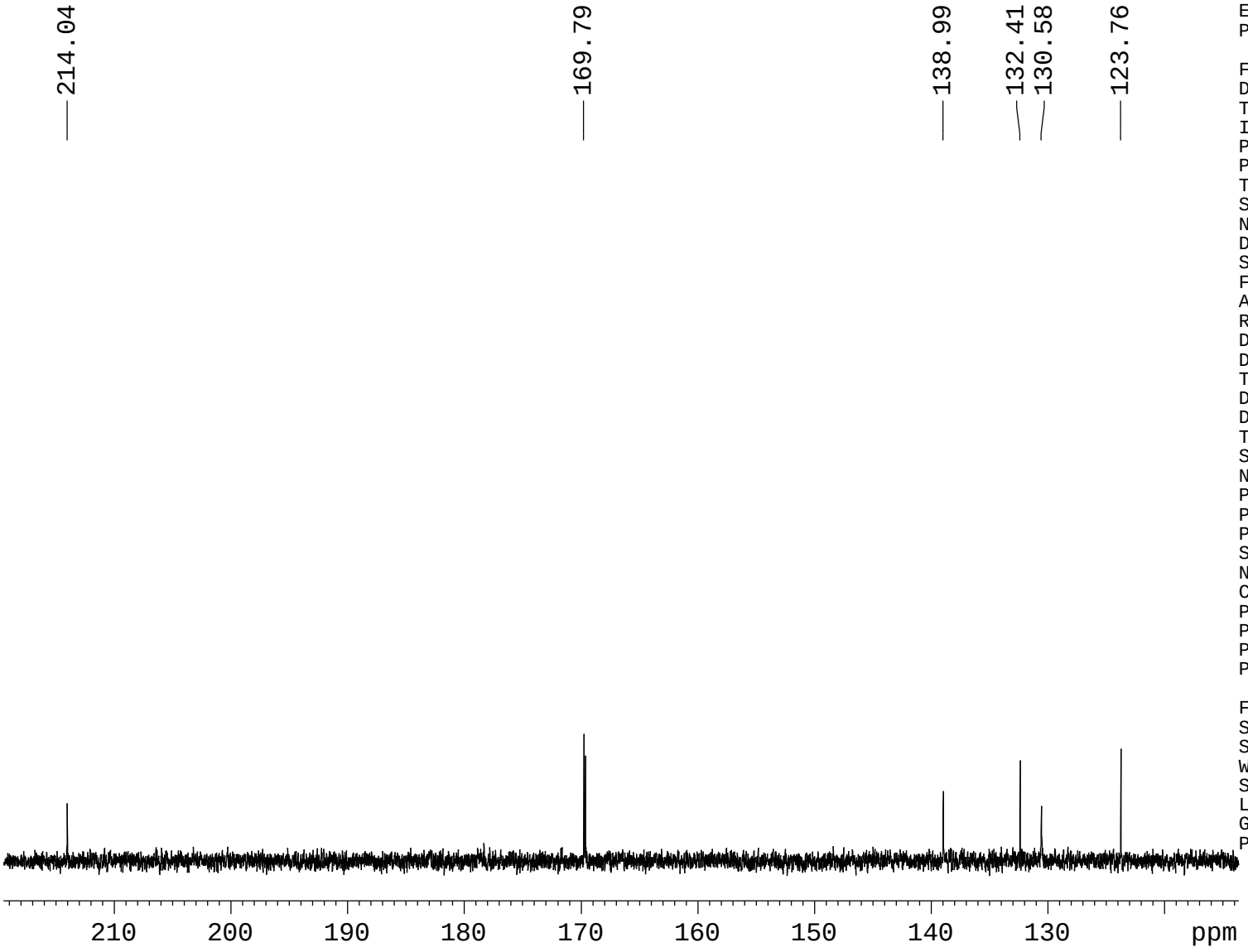


Current Data Parameters
NAME QC11230831003
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230901
Time 1.39 h
INSTRUM spect
PROBHD Z108618_0828 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631488 sec
RG 195.98
DW 20.800 usec
DE 6.50 usec
TE 0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6122678 MHz
NUC1 13C
P0 3.67 usec
P1 11.00 usec
PLW1 40.78400040 W
SFO2 400.0896004 MHz
NUC2 1H
CPDPRG[2 waltz65
PCPD2 90.00 usec
PLW2 12.89900017 W
PLW12 0.40766999 W
PLW13 0.20506001 W

F2 - Processing parameters
SI 32768
SF 100.6022115 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
13C-NMR/CDCl3
31-AUG-2023

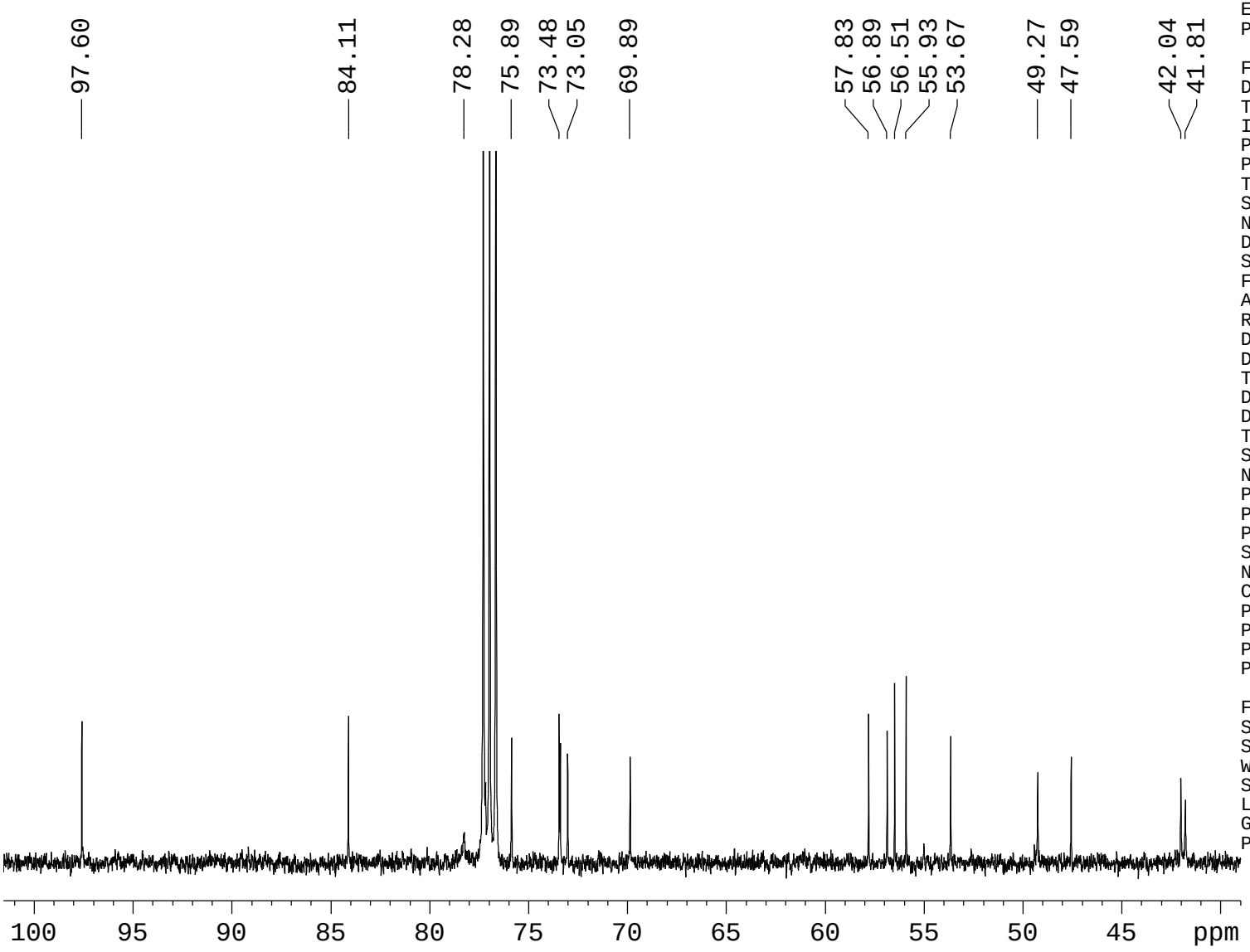



```
Current Data Parameters
NAME      QC11230831003
EXPNO                 2
PROCNO                1

F2 - Acquisition Parameters
Date_          20230901
Time               1.39 h
INSTRUM           spect
PROBHD   Z108618_0828 (
PULPROG          zgpg30
TD                65536
SOLVENT           CDCl3
NS                 1024
DS                    4
SWH           24038.461 Hz
FIDRES         0.733596 Hz
AQ            1.3631488 sec
RG               195.98
DW               20.800 usec
DE                6.50 usec
TE                   0 K
D1           2.00000000 sec
D11          0.03000000 sec
TD0                  1
SFO1        100.6122678 MHz
NUC1                13C
P0                3.67 usec
P1               11.00 usec
PLW1        40.78400040 W
SFO2        400.0896004 MHz
NUC2                1H
CPDPRG[2        waltz65
PCPD2            90.00 usec
PLW2        12.89900017 W
PLW12        0.40766999 W
PLW13        0.20506001 W

F2 - Processing parameters
SI                32768
SF          100.6022115 MHz
WDW                  EM
SSB                   0
LB                 1.00 Hz
GB                    0
PC                 1.40
```

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
13C-NMR/CDCl3
31-AUG-2023

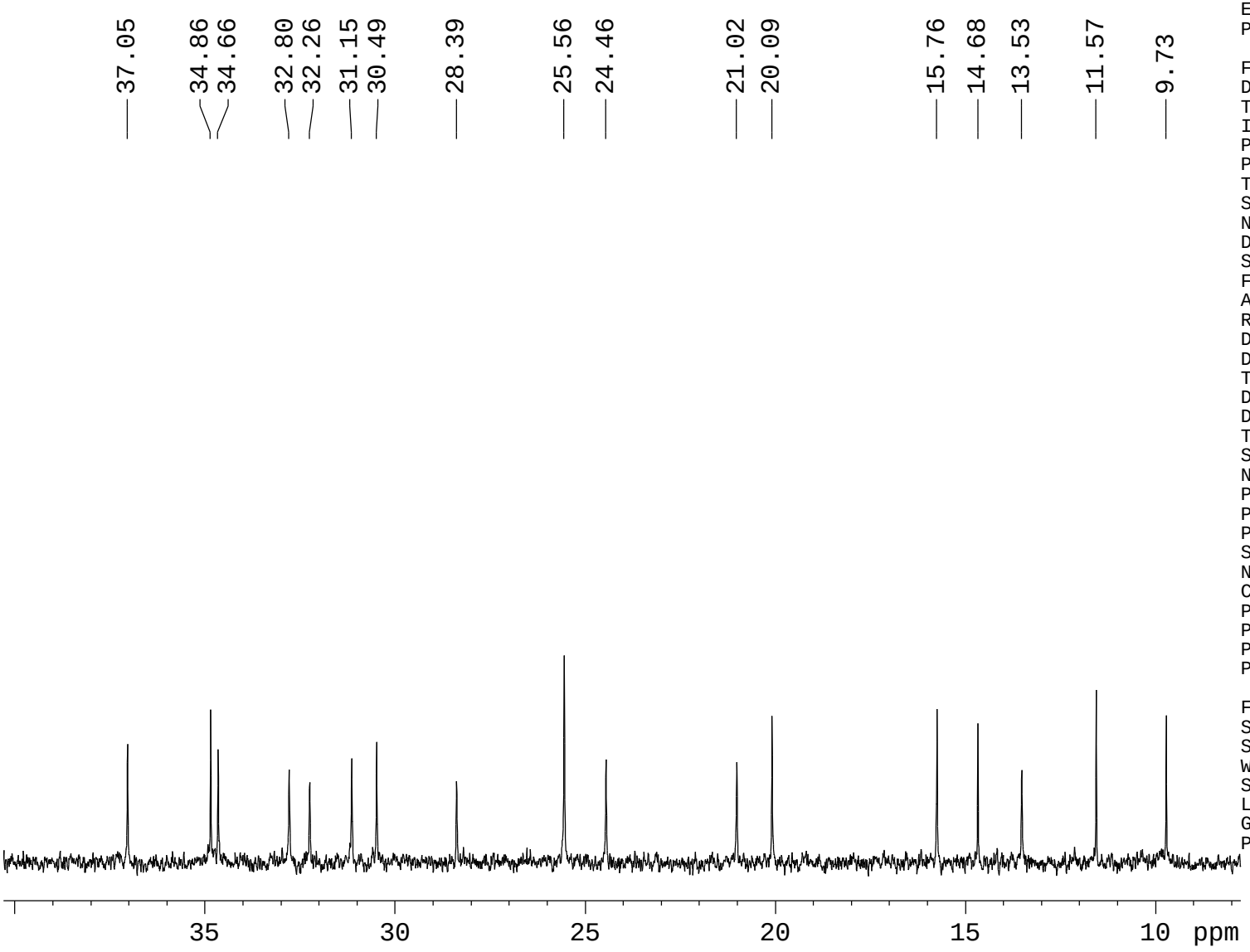


Current Data Parameters
NAME QC11230831003
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230901
Time 1.39 h
INSTRUM spect
PROBHD Z108618_0828 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631488 sec
RG 195.98
DW 20.800 usec
DE 6.50 usec
TE 0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6122678 MHz
NUC1 13C
P0 3.67 usec
P1 11.00 usec
PLW1 40.78400040 W
SFO2 400.0896004 MHz
NUC2 1H
CPDPRG[2 waltz65
PCPD2 90.00 usec
PLW2 12.89900017 W
PLW12 0.40766999 W
PLW13 0.20506001 W

F2 - Processing parameters
SI 32768
SF 100.6022115 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

ALLMPUS LABORATORIES PVT LTD
ALL-T03931
13C-NMR/CDCl3
31-AUG-2023



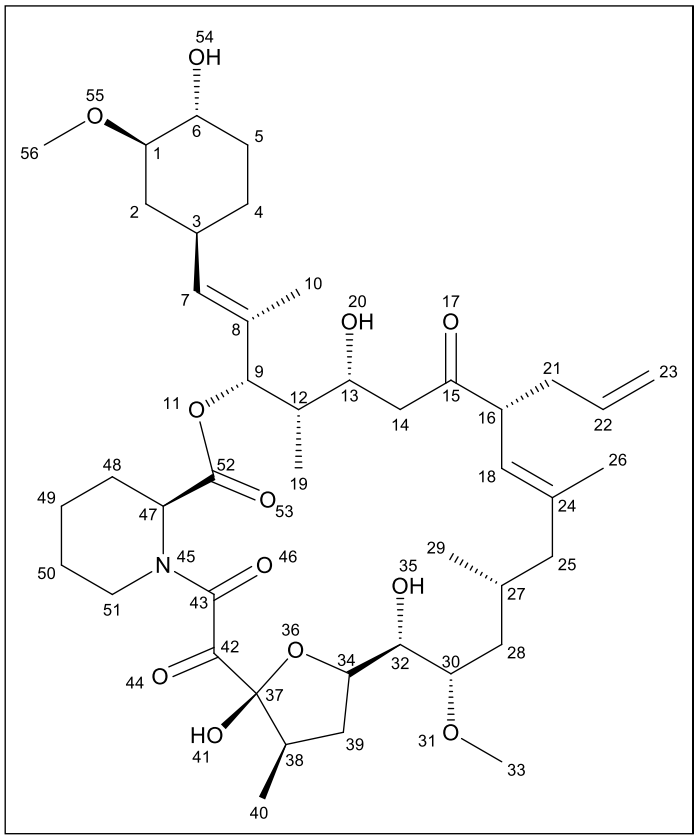
Current Data Parameters
NAME QC11230831003
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20230901
Time 1.39 h
INSTRUM spect
PROBHD Z108618_0828 (
PULPROG zgpg30
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 24038.461 Hz
FIDRES 0.733596 Hz
AQ 1.3631488 sec
RG 195.98
DW 20.800 usec
DE 6.50 usec
TE 0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1
SFO1 100.6122678 MHz
NUC1 13C
P0 3.67 usec
P1 11.00 usec
PLW1 40.78400040 W
SFO2 400.0896004 MHz
NUC2 1H
CPDPRG[2 waltz65
PCPD2 90.00 usec
PLW2 12.89900017 W
PLW12 0.40766999 W
PLW13 0.20506001 W

F2 - Processing parameters
SI 32768
SF 100.6022115 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

SER- DESMETHYL TACROLIMUS / TACROLIMUS 13 DMT

Structure



Chemical Name- (1R,9S,12S,13R,14S,17R,18E,21S,23S,24R,25S,27R)-1,14-dihydroxy-12-[(E)-1-[(1R,3R,4R)-4-hydroxy-3-methoxy cyclo hexyl]prop-1-en-2-yl]-23,25-dimethoxy-13,21,27-trimethyl -17-prop-2-enyl-11,28-dioxa-4-azatricyclo[22.3.1.04,9]octacos-18-ene-2,3,10,16-tetrone

BATCH No- ALL-T03931

NMR Study

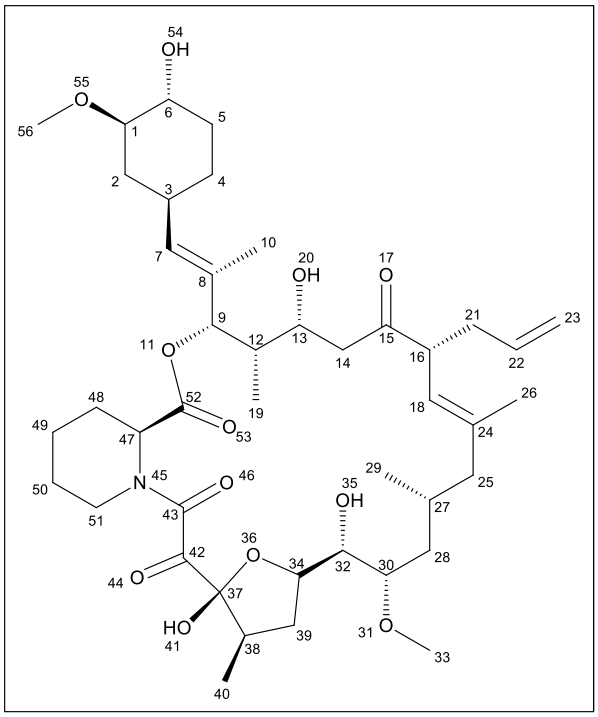
1. **1H NMR interpretation**

The NMR experiment was recorder in CDCl3 using 400 MHz Bruker instrument. Chemical shifts were reported on the δ scale in ppm, relative to (TMS as reference =0.000 ppm).^{1}H NMR assignment of **DESMETHYL TACROLIMUS OR TACROLIMUS 13 DMT** as below.

Sr.No.	1H Label/ Assignment's	^{1}H (δ=0.000 ppm)	No. of Protons	Multiplicity m, J (Hz)
1	19,29,40	0.795-0.846	9H	m
2	49,50,2,4,28	0.933-1.416	10H	m
3	10,3,12,26,38,48,39,5,27	1.565-1.840	16H	m
4	20,54,21,25	2.070-2.337	6H	m
5	14	2.497-2.556	1H	m
6	35,41	2.734	2H	m
7	1,14,6	2.965-3.051	3H	m
8	56	3.239	3H	s
9	33	3.362	3H	s
10	51,32,30,16,13	3.396-3.563	6H	m
11	34,47	3.820-3.844	2H	m
12	23	4.389-4.422	1H	d
13	23	4.869-4.895	1H	d
14	18,9	5.244-5.281	2H	m
15	22,7	5.531-5.624	2H	m

2. C13-NMR

The NMR experiment was recorder in CDCl3 using 400 MHz Bruker instrument. 13CNMR assignment as below.



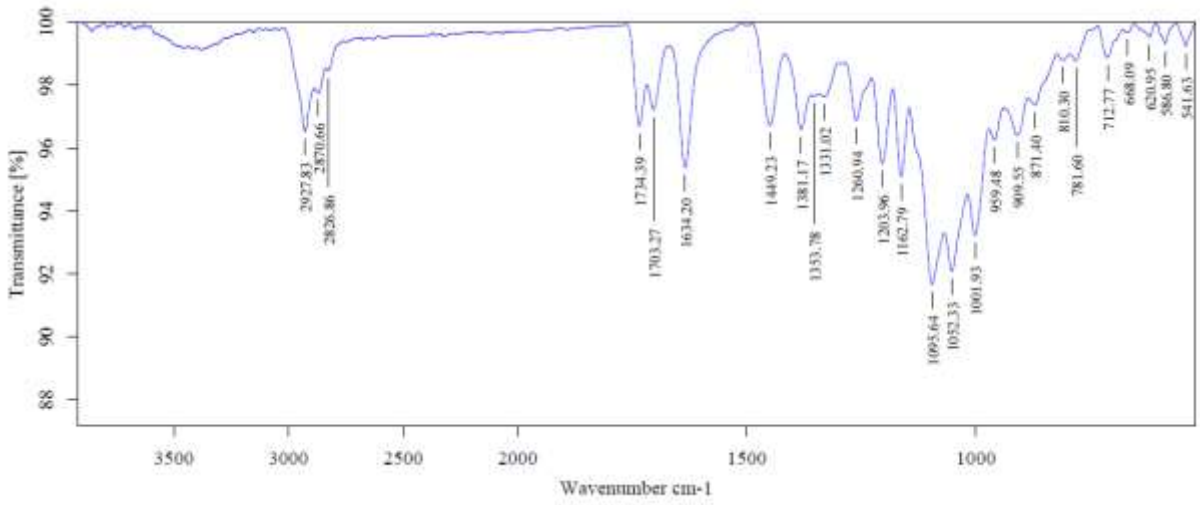
Sr.No.	Assignment of C	C^{13} (δ=0.000 ppm)
1	C-40,10,26,19	9.73-15.76
2	C-28,2,38,5,39,4,39,48,50,21,4, 27,29,49,5,4	20.09-37.05
3	C-33,56,25,14,51	41.81-57.83
4	C-6,34,13,47,30,32	69.89-78.25
5	C-1	84.11
6	C-9	97.60
7	C-24,22,18,7,8,23	123.76-138.99
8	C-43,42	169.79

11	C-15,52	214.04

3. IR Spectrum

Method: Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) Spectroscopy.

Instrument: BRUKER Model ALPHA



IR Stretching	Observed Frequency	Reported Frequency
Aliphatic		
C-H	2870.66	3000-2840
C-O	1052.33	1124-1087
Alcohol		
-OH	----------	3700-3584
Ketone		
C=O	1703.27	1725-1705
Amine		
C-N	2927.83	3300-3000

4. Mass Spectral Data

The impurity was analyzed using Waters 3100 mass instrument.

Chemical Formula: C43H67NO12

Molecular Weight: 789.99

The Molecular Weight of product was detected as 808.5 corresponding to (M+1+18) in positive mode and 786.6 (M-1) in negative mode spectrum.

5. HPLC Purity

The purity of compound was determined using area normalization method. The purity of product was found to be 96.39 % at 22.949 RT value.

6. Conclusion

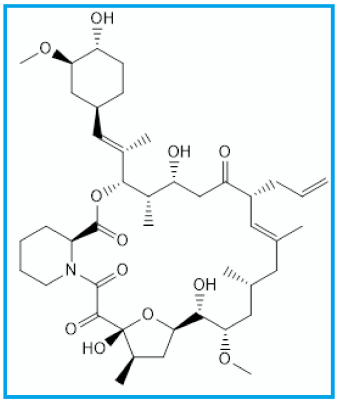
The results from the analytical techniques mass, HPLC and NMR confirmed the molecular structure of the DESMETHYL TACROLIMUS / TACROLIMUS 13 DMT.

AIImpus Laboratories Pvt. Ltd. **21:09:1019-Apr-2023**

ALL-T03931 589 (20.048)

1: Scan ES+

7.98e4



Molecular Weight: 789.99

[M+18] 808.5

802.3

[M+1]790.5

809.3

863.8

424.6

946.0

933.8

430.2

536.3

860.5

370.4

424.4

520.5

675.3

933.1

542.4

730.7

877.8

956.3

1037.2

1128.8

1196.4

565.3629.9

1006.5

1096.8

100

%

0

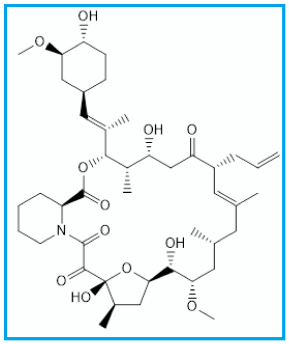
300 400 500 600 700 800 900 1000 1100

m/z

AIImpus Laboratories Pvt. Ltd. **21:09:1019-Apr-2023**

ALL-T03931 605 (20.610)

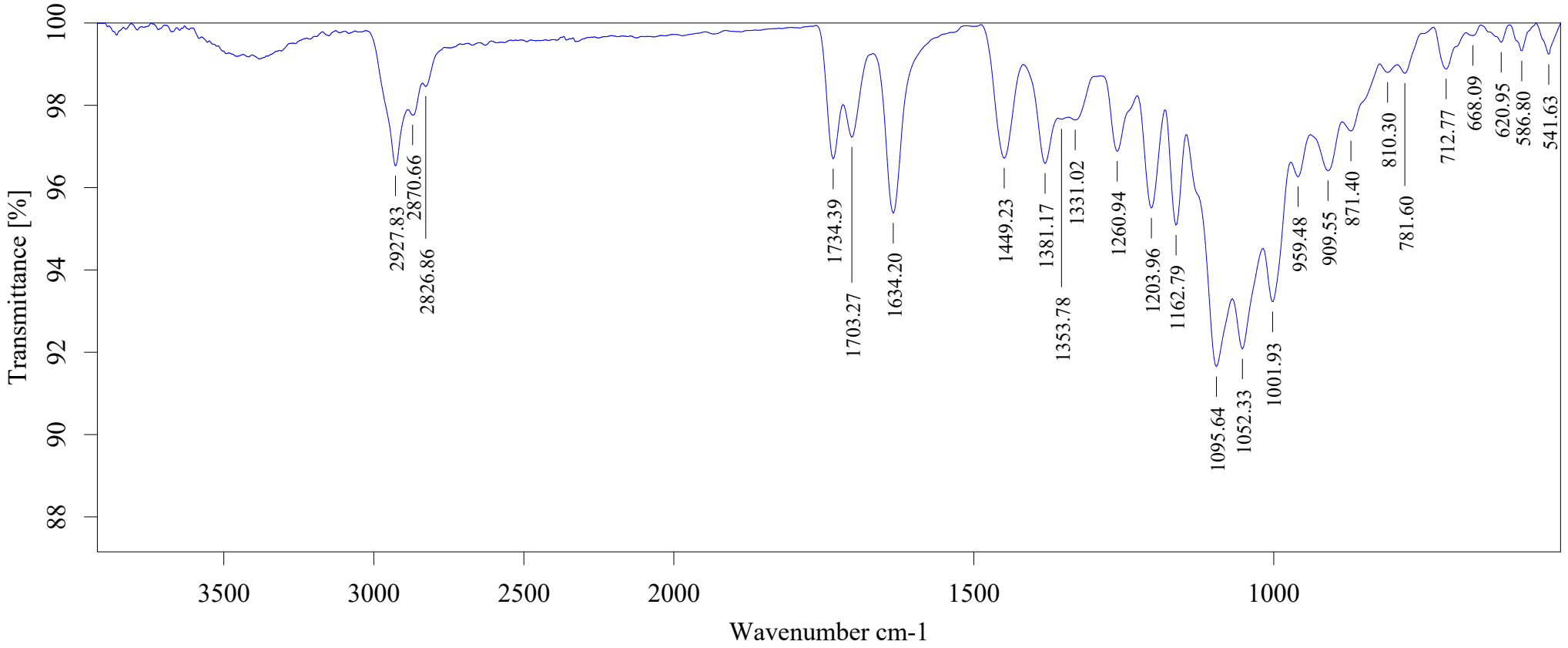
2: Scan ES-
1.45e4



Molecular Weight: 789.99

INFRARED SPECTRUM

Instrument ID No: AA-ID-002



Sample Name:ALL-T03931

Lot No./Batch No:

Date & Time:18-04-2023,10:07:15

Operator Name:Accu Chemist

Experiment:ACCU ANALYTICAL-131.xpm

Resolution:4

Sample Scans:16

Frequency Range:4000 to 500

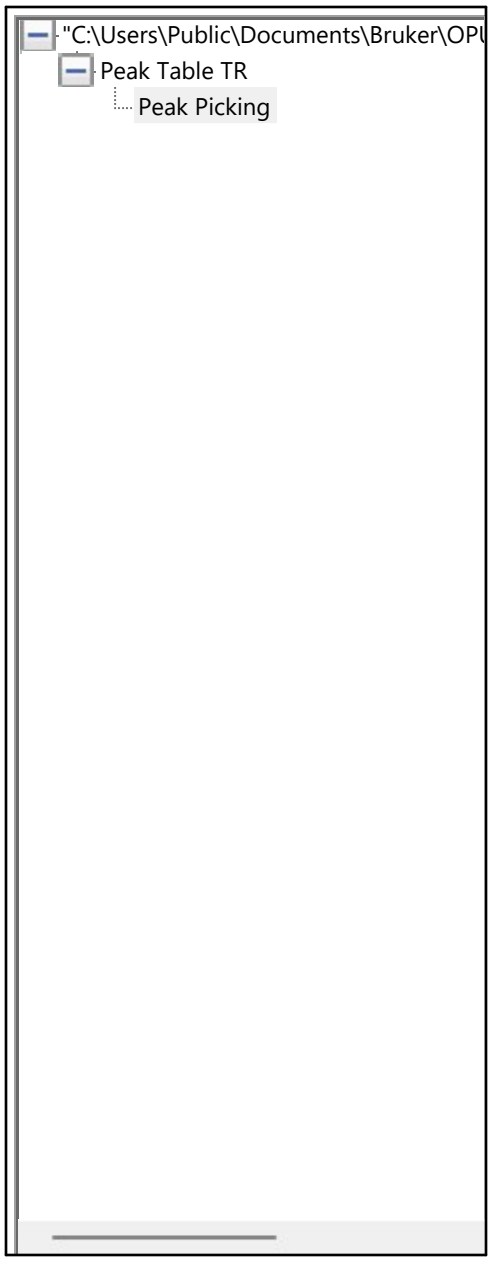
Analysed by:

Date:

18-04-2023 10:09:39

Checked by:

Date:



Peak Picking	Values
Method:	Standard
Searched for minima:	Yes
Number of peaks:	26
Sensitivity > [%]:	1.000000
From:	4000.000000
to:	400.000000
Absolute peak height >	0.000000
Relative peak height < [%]	0.000000
Absolute peak height <	0.000000

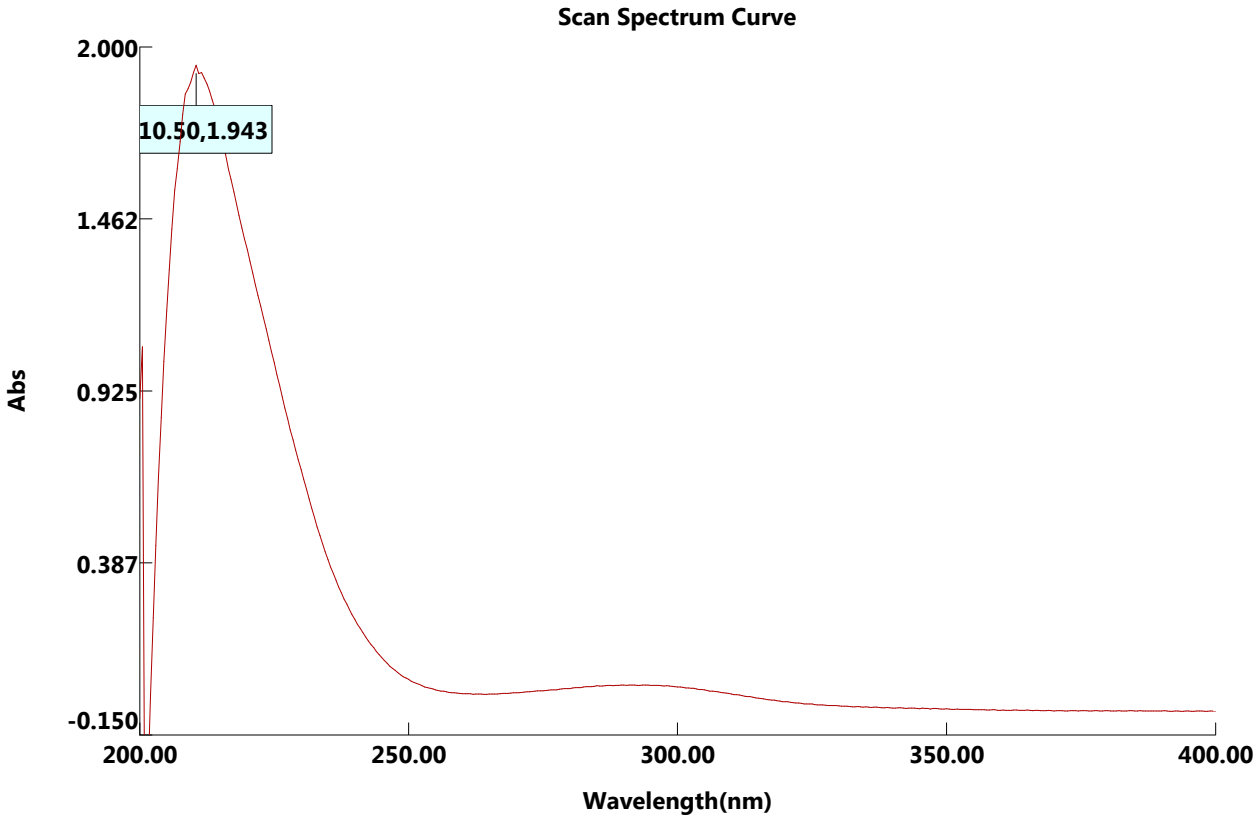
Wavenumber	Abs. intensity	Rel. intensity	Width	Found if threshold <	Shoulder
2927.8299	0.965	0.034	117.1621	40.873253	0
2870.6564	0.978	0.002	18.5118	1.597216	0
1734.3859	0.967	0.030	57.9138	30.711824	0
1703.2717	0.972	0.012	52.7256	9.551462	0
1634.1996	0.954	0.046	30.6051	54.907810	0
1449.2319	0.967	0.027	32.7267	27.284069	0
1381.1701	0.966	0.027	84.4563	25.502136	0
1260.9364	0.969	0.016	26.3162	16.213760	0
1203.9633	0.955	0.026	23.2396	28.726118	0
1162.7942	0.951	0.022	16.6629	26.508444	0
1095.6382	0.916	0.084	145.5716	100.005142	0
1052.3261	0.921	0.014	18.6311	14.657585	0
1001.9276	0.932	0.015	18.3115	15.658182	0
959.4763	0.963	0.005	14.6606	4.275040	0
909.5520	0.964	0.011	27.4744	10.500599	0
871.3963	0.974	0.003	361.2304	2.718293	0
810.3005	0.988	0.002	15.3346	2.233447	0
781.5973	0.988	0.004	325.8653	2.742132	0
712.7705	0.989	0.010	25.1894	12.194527	0
620.9495	0.995	0.004	20.7129	5.068223	0
586.8013	0.993	0.007	18.3476	7.679455	0

C:\Users\Public\Documents\Bruker\OPUS_8.7.31\MEAS\ALL-T03931.0 ALL-T03931

Peak Picking Values

Wavenumber	Abs. intensity	Rel. intensity	Width	Found if threshold <	Shoulder
541.6257	0.992	0.007	16.4810	7.375900	0
2826.8620	0.985	0.001	11.9659	4.232205	0
1331.0175	0.976	0.003	133.7701	3.061247	0
668.0895	0.997	0.002	62.7688	6.544214	0
1353.7799	0.977	0.000	8.0176	1.013995	0

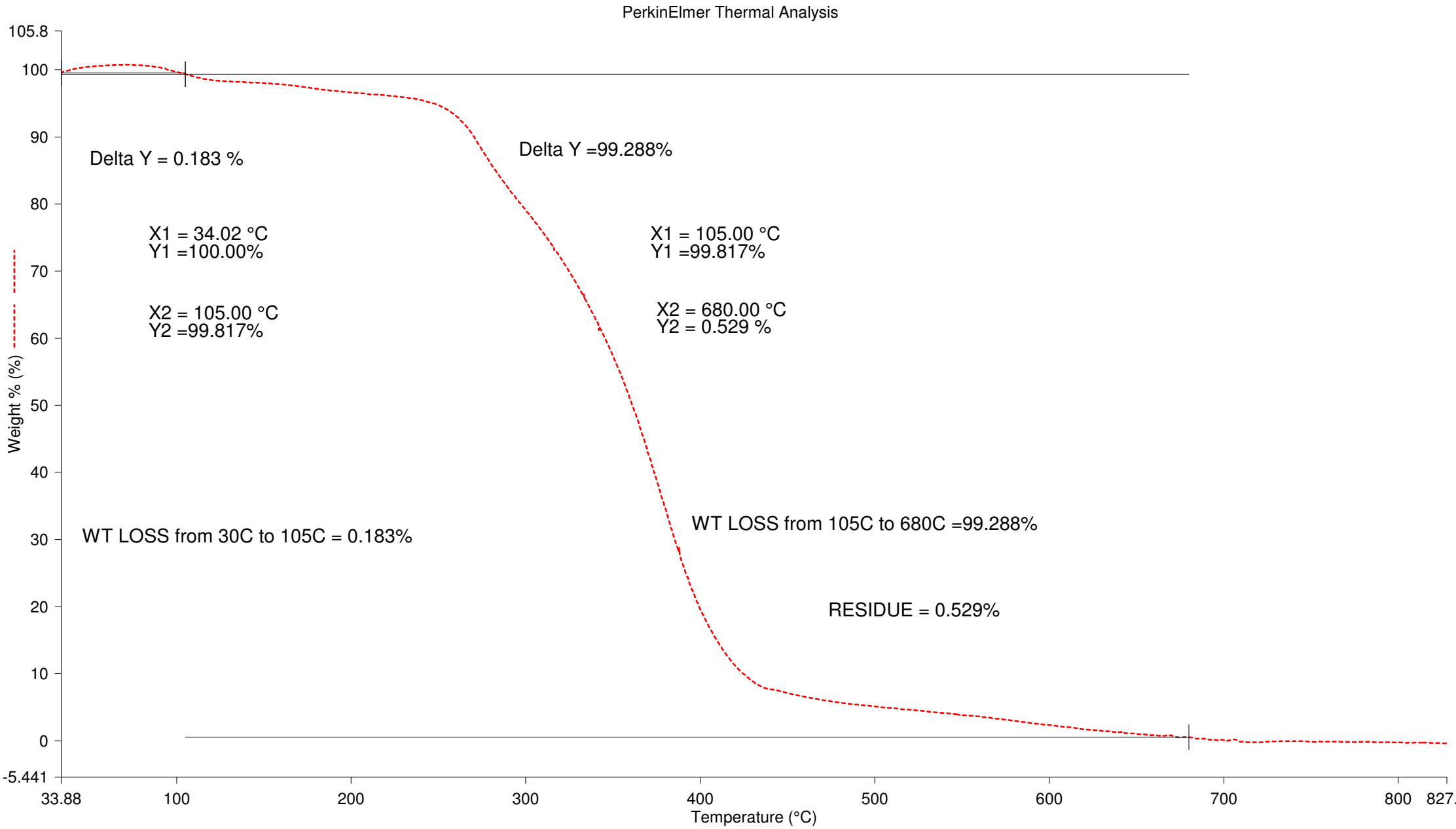
C:\Users\Public\Documents\Bruker\OPUS_8.7.31\MEAS\ALL-T03931.0 ALL-T03931



- **Instrument Performance**
  Model : UV-VIS Spectrophotometer
  Number : 23-1950-01-0032
  Spectral Bandwidth : 2.00 nm
- **Scan Spectrum Performance**
  Scan Range : 200.00 to 400.00 nm
  Measure Mode : Abs
  Interval : 0.50 nm
  Speed : Medium
  Data File : QC08-2404-021.spd
  Create Date/Time : Monday, April 22, 2024 2:51:13 PM
  Data Type : Original
  Method File:
- **Analyse Note**
  Analyser : Swapna
  Sample Name : ALL-T03931
  Comment : ALL-T03931

No.	P/V	Wavelength(nm)	Abs	Comment
1	Peak	210.50	1.943	

Filename:	D:\TGA Data\ALL-T03931.t6d
Operator ID:	BHARAT
Sample ID:	ALL-T03931
Sample Weight:	1.810 mg
Comment:	



4/18/2023 10:35:54 AM

1) Heat from 35.00°C to 850.00°C at 20.00°C/min