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APPENDIX

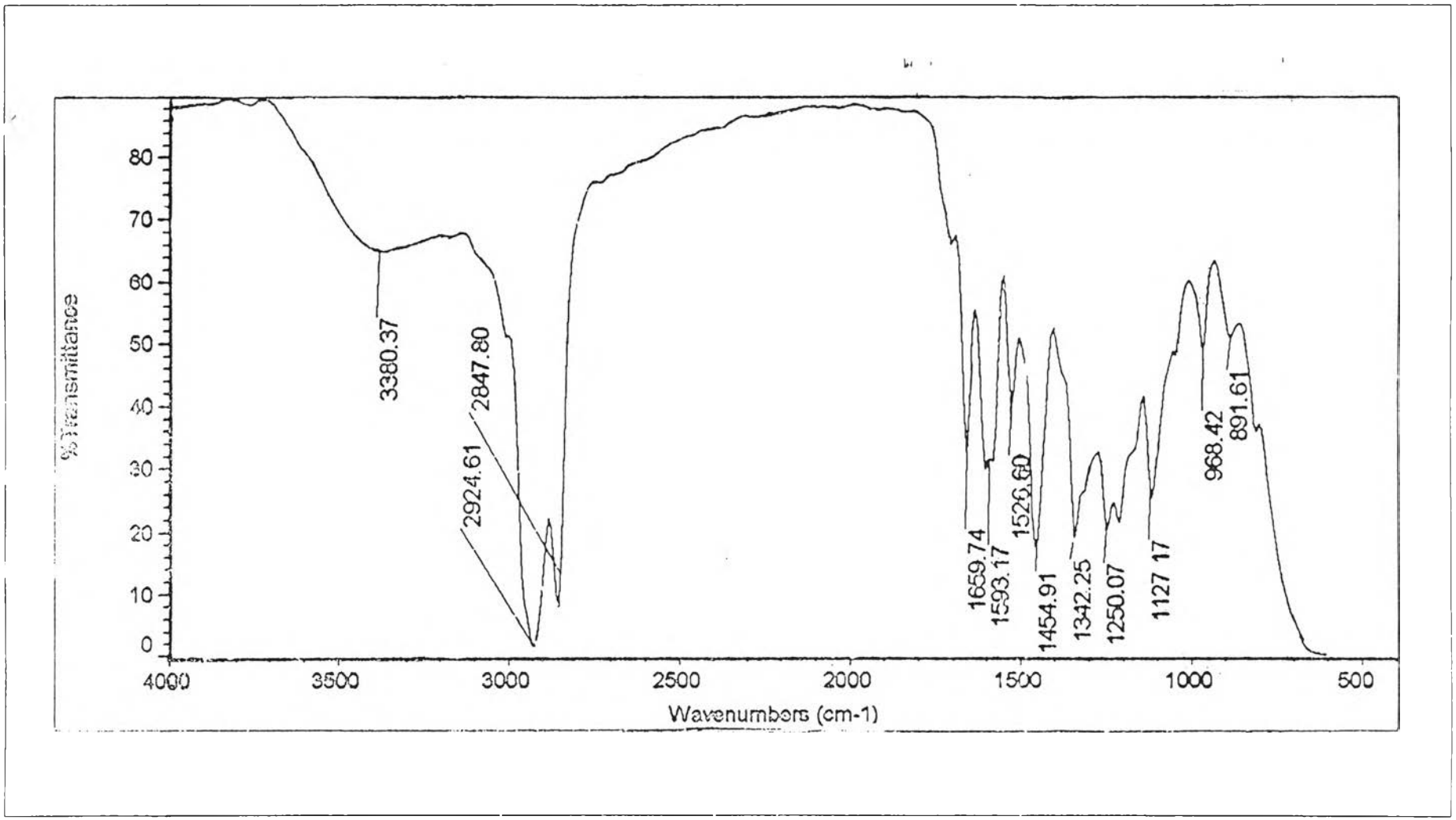

Figure A-1 FT-IR spectrum of marker dye A_1

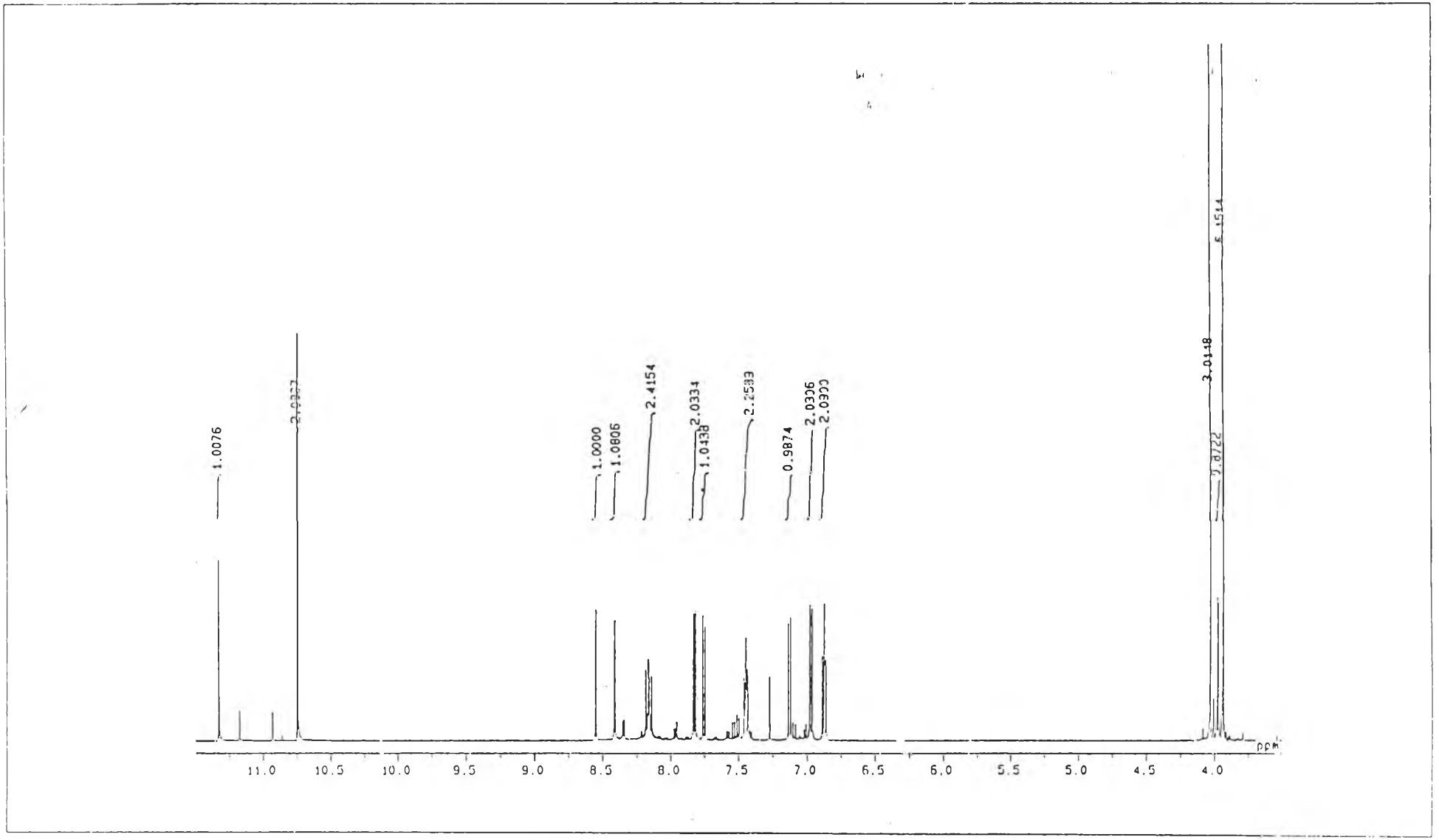

Figure A-2 : ^{1}H-NMR spectrum of marker dye A_1

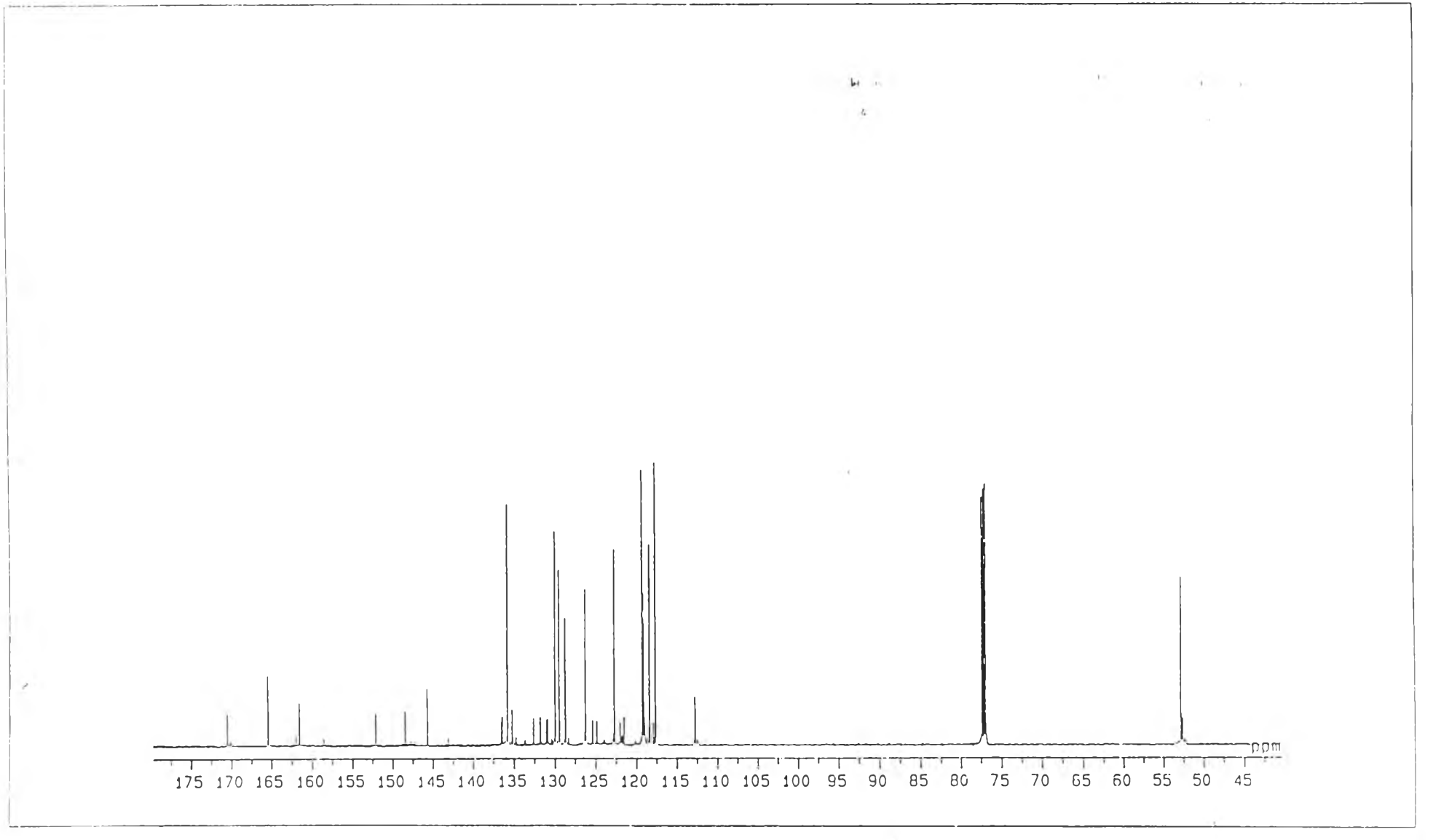

Figure A-3 : ^{13}C-NMR spectrum of marker dye A_1

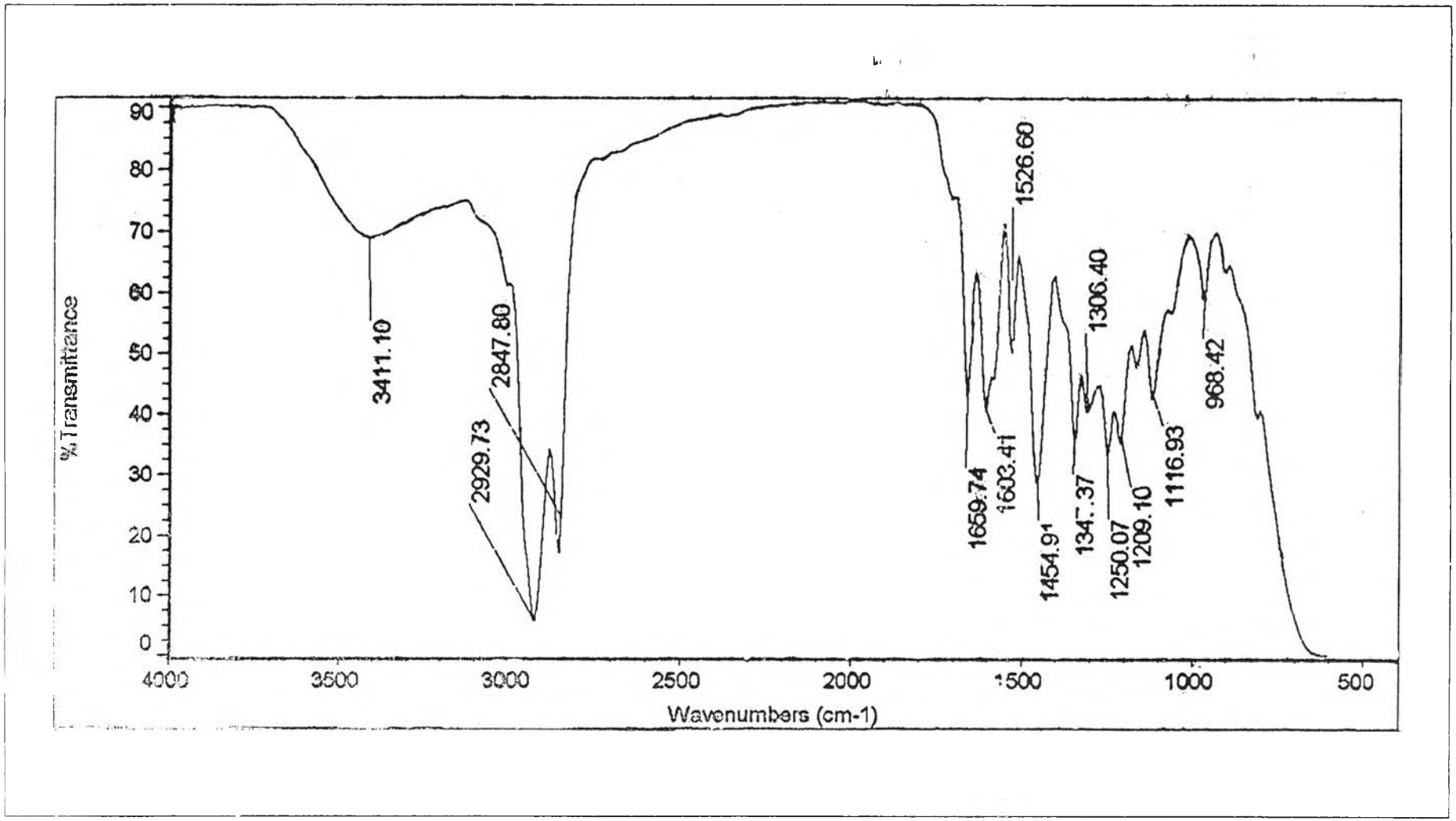

Figure A-4 : FT-IR spectrum of marker dye A_2

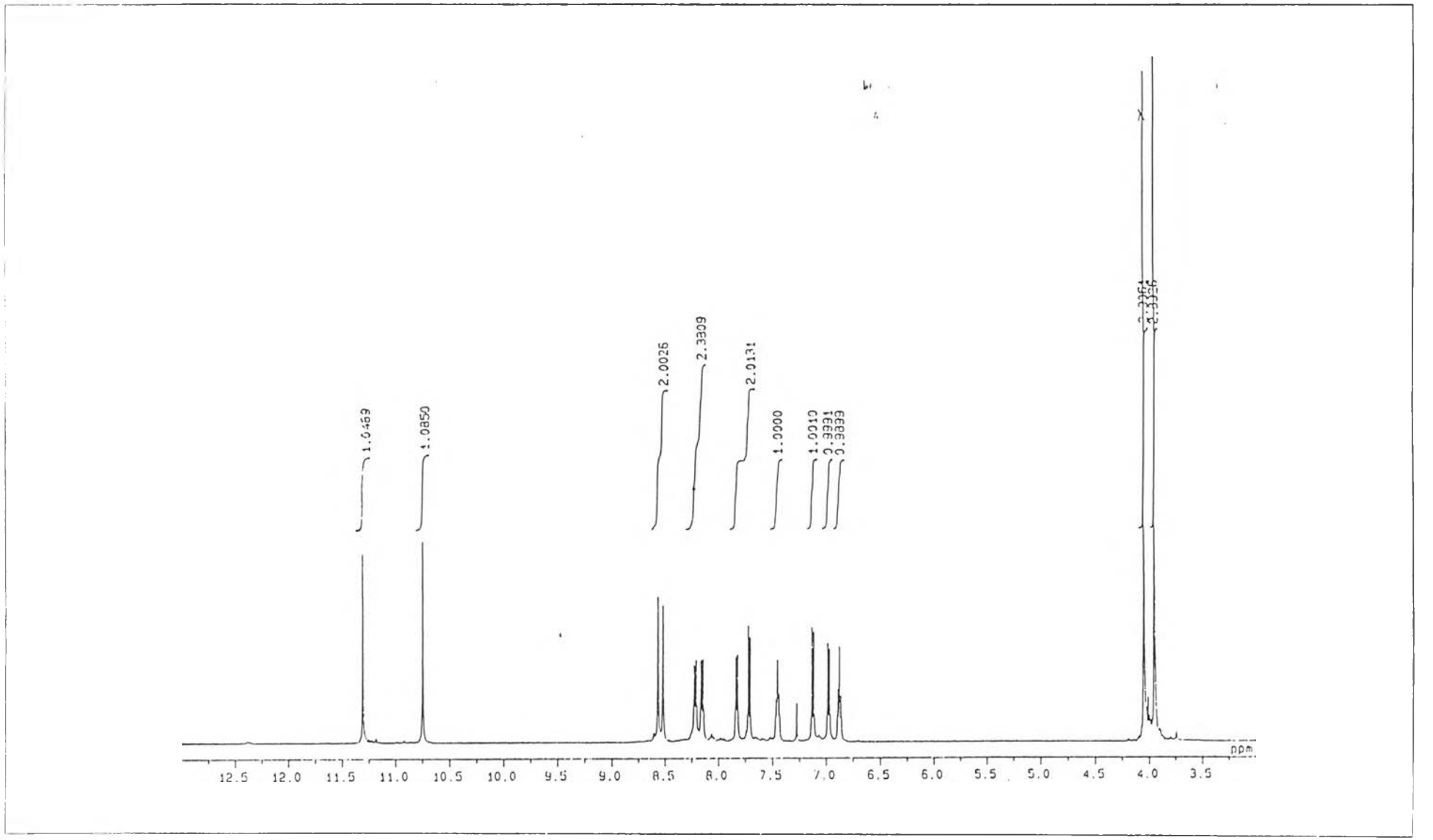

Figure A-5 : ^{1}H-NMR spectrum of marker dye A_2

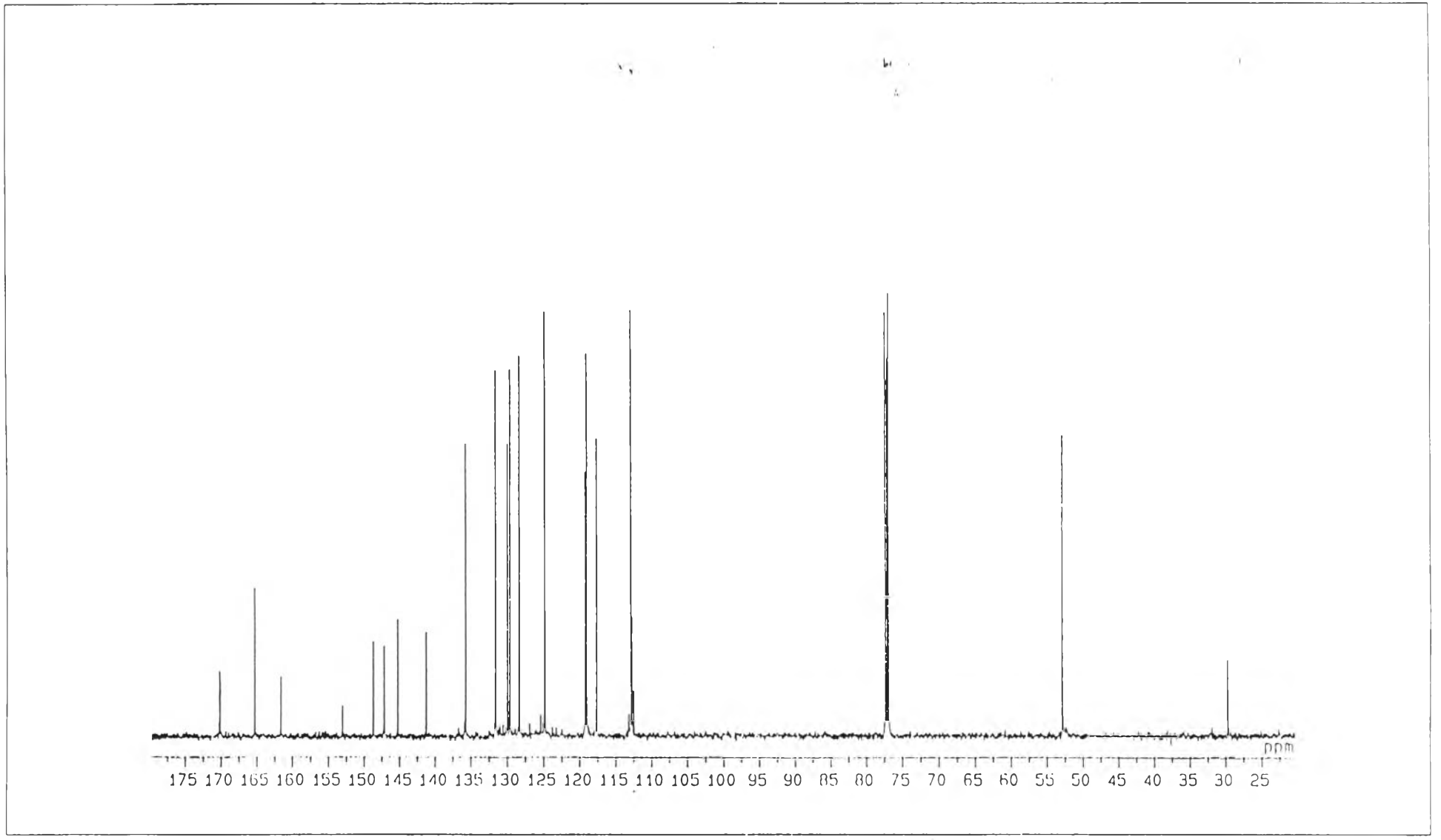

Figure A-6 : ^{13}C-NMR spectrum of marker dye A_2

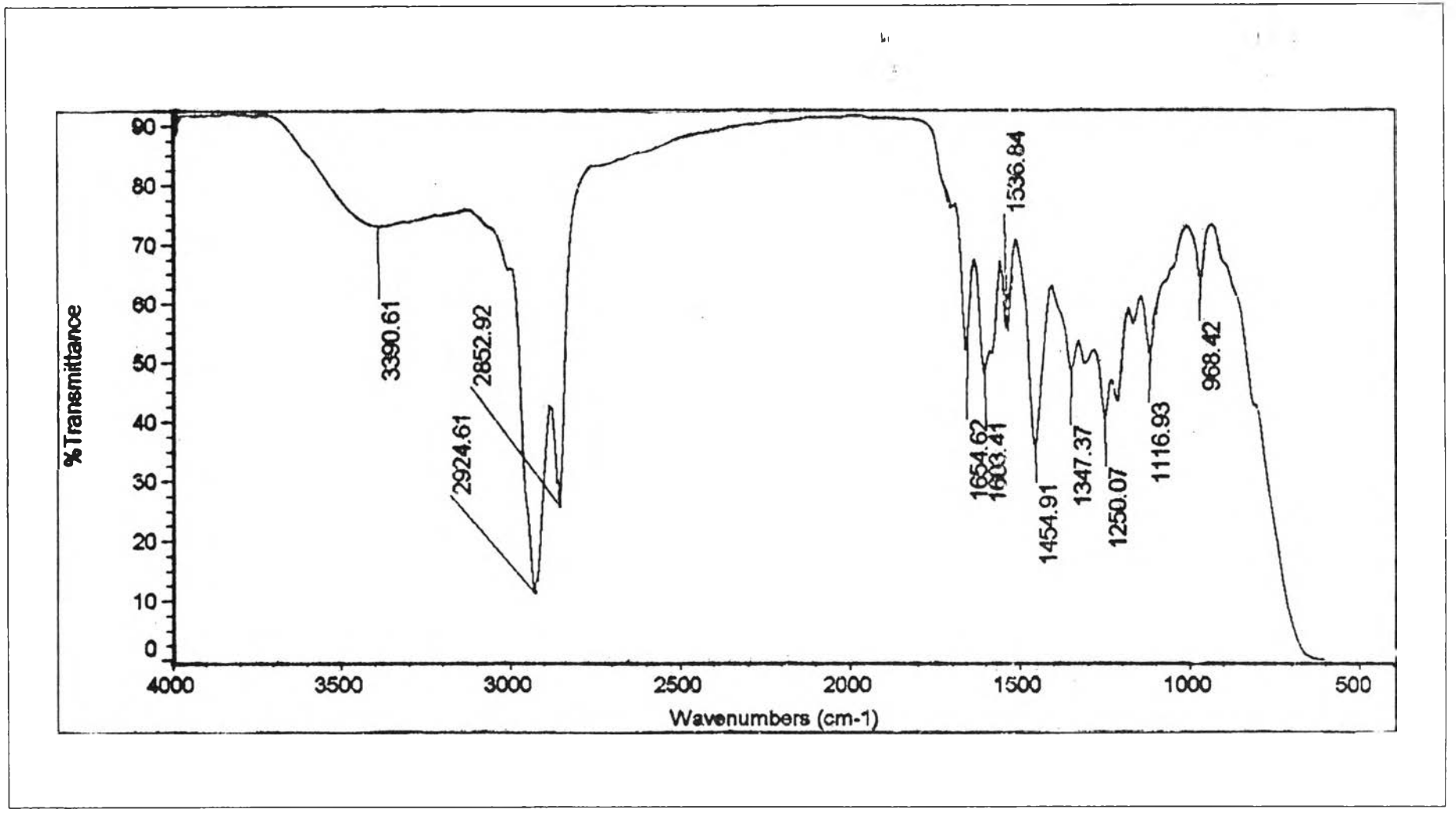

Figure A-7 : FT-IR spectrum of marker dye A_3

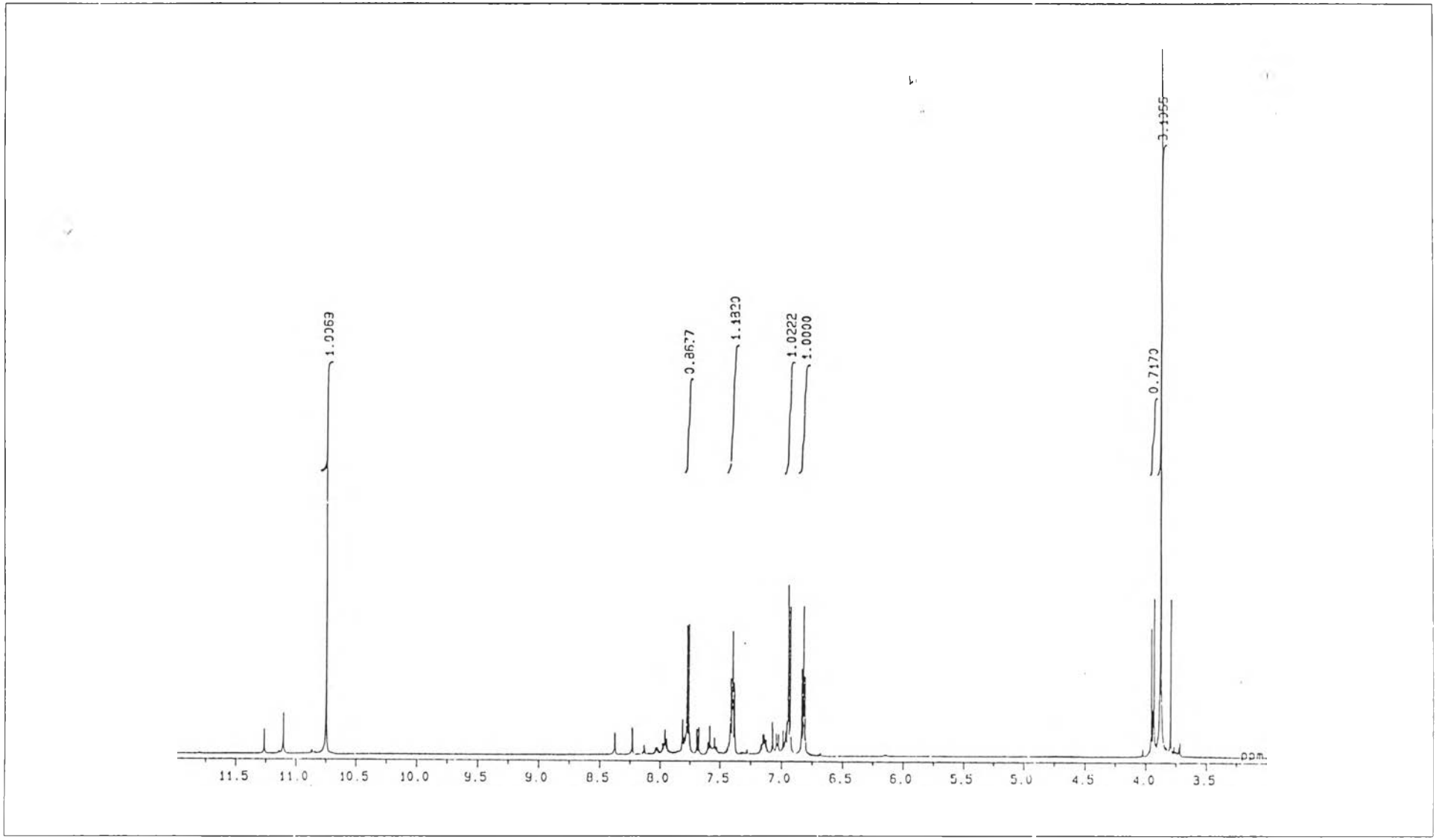

Figure A-8 : ^{1}H-NMR spectrum of marker dye A_3

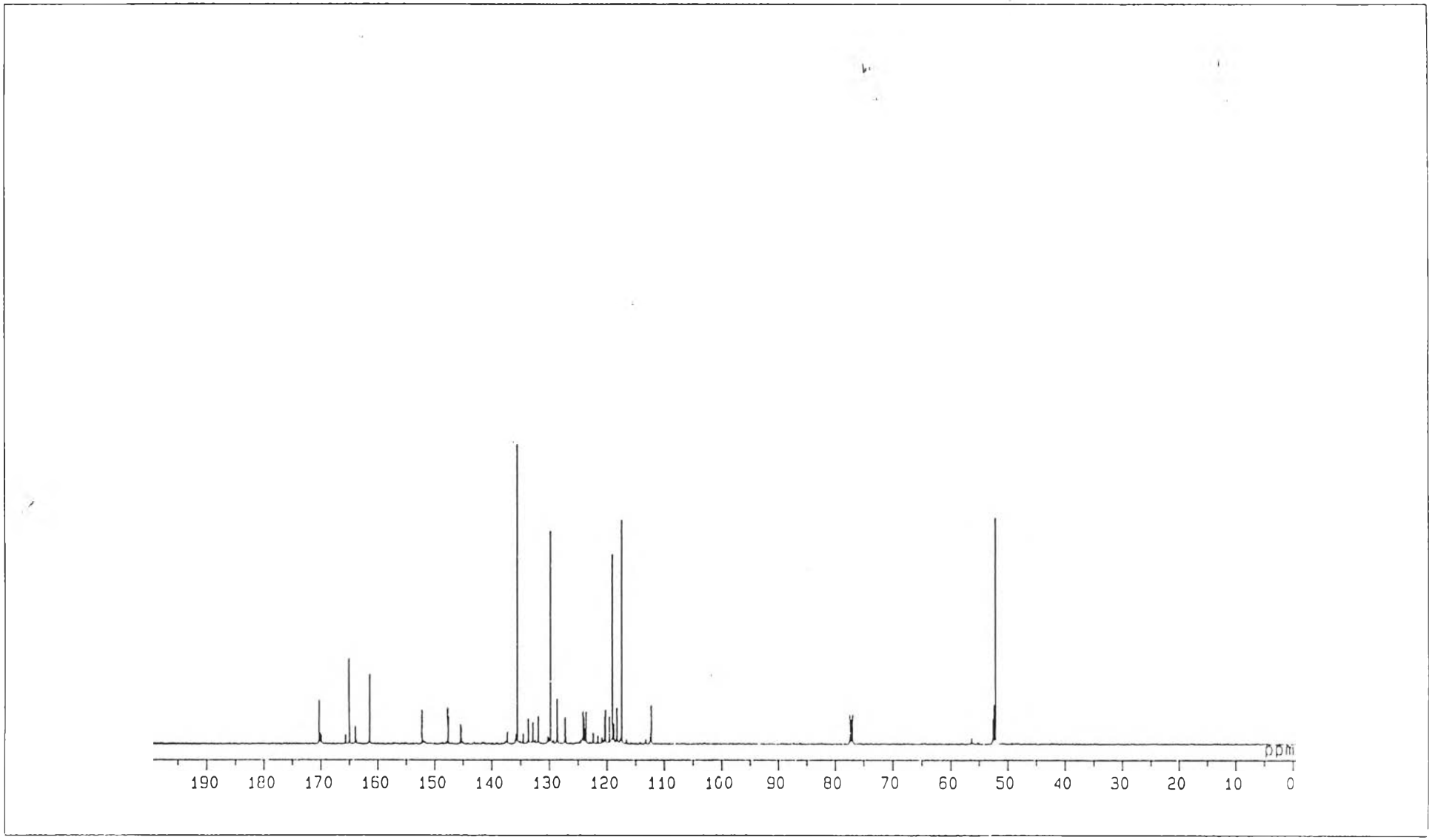

Figure A-9 : ^{13}C-NMR spectrum of marker dye A_3

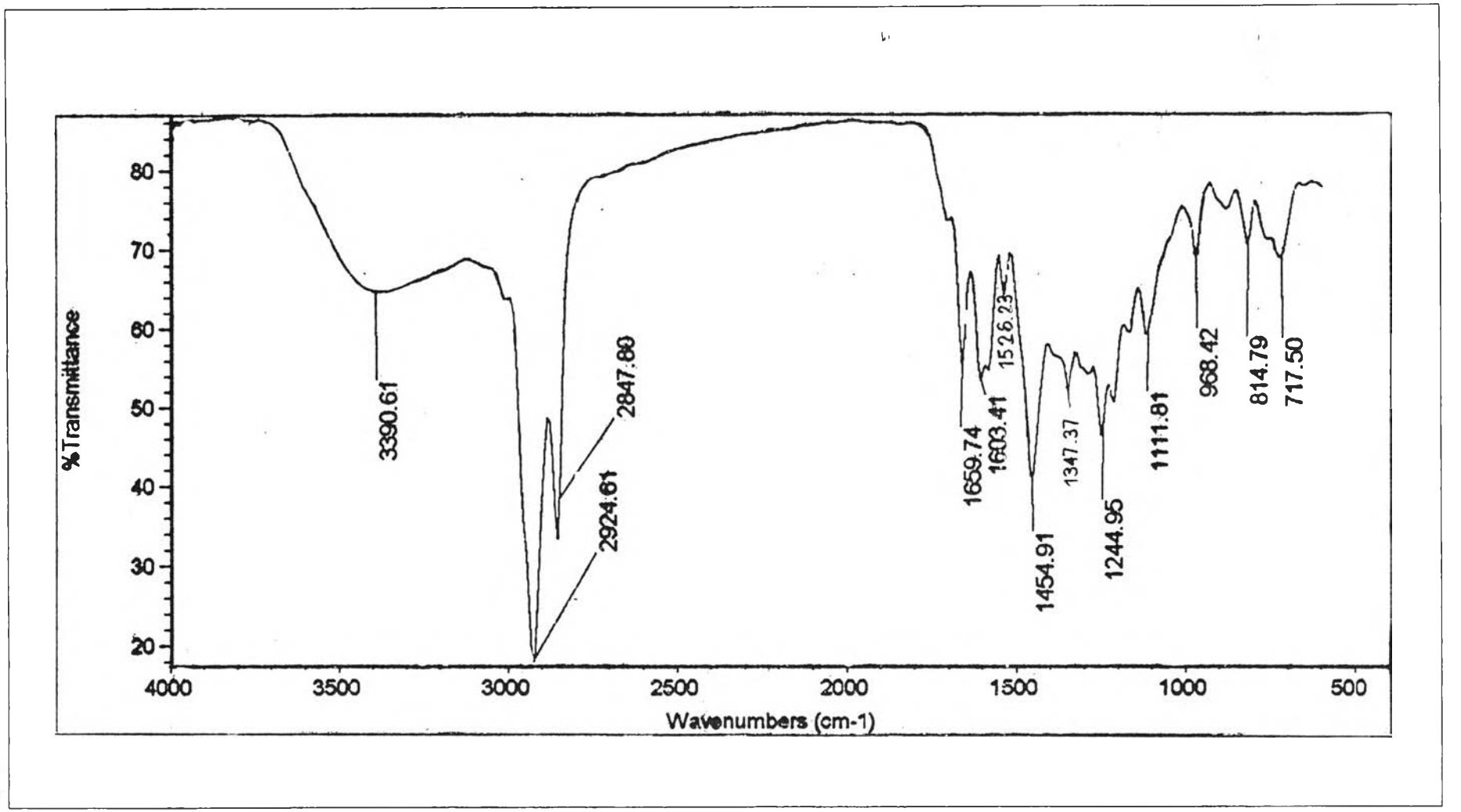

Figure A-10 : FT-IR spectrum of marker dye A_4

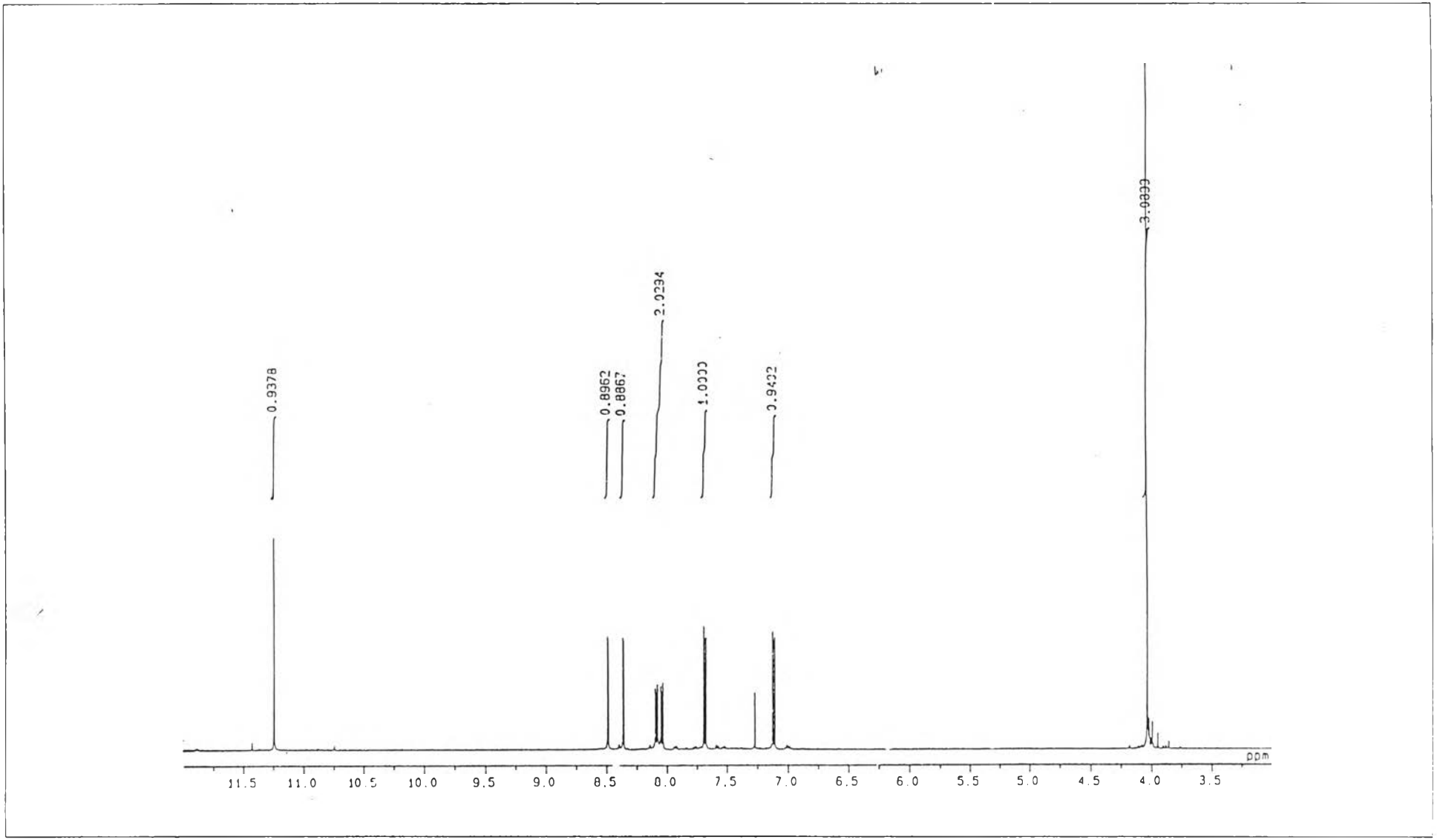

Figure A-11 : ^{1}H-NMR spectrum of marker dye A_4

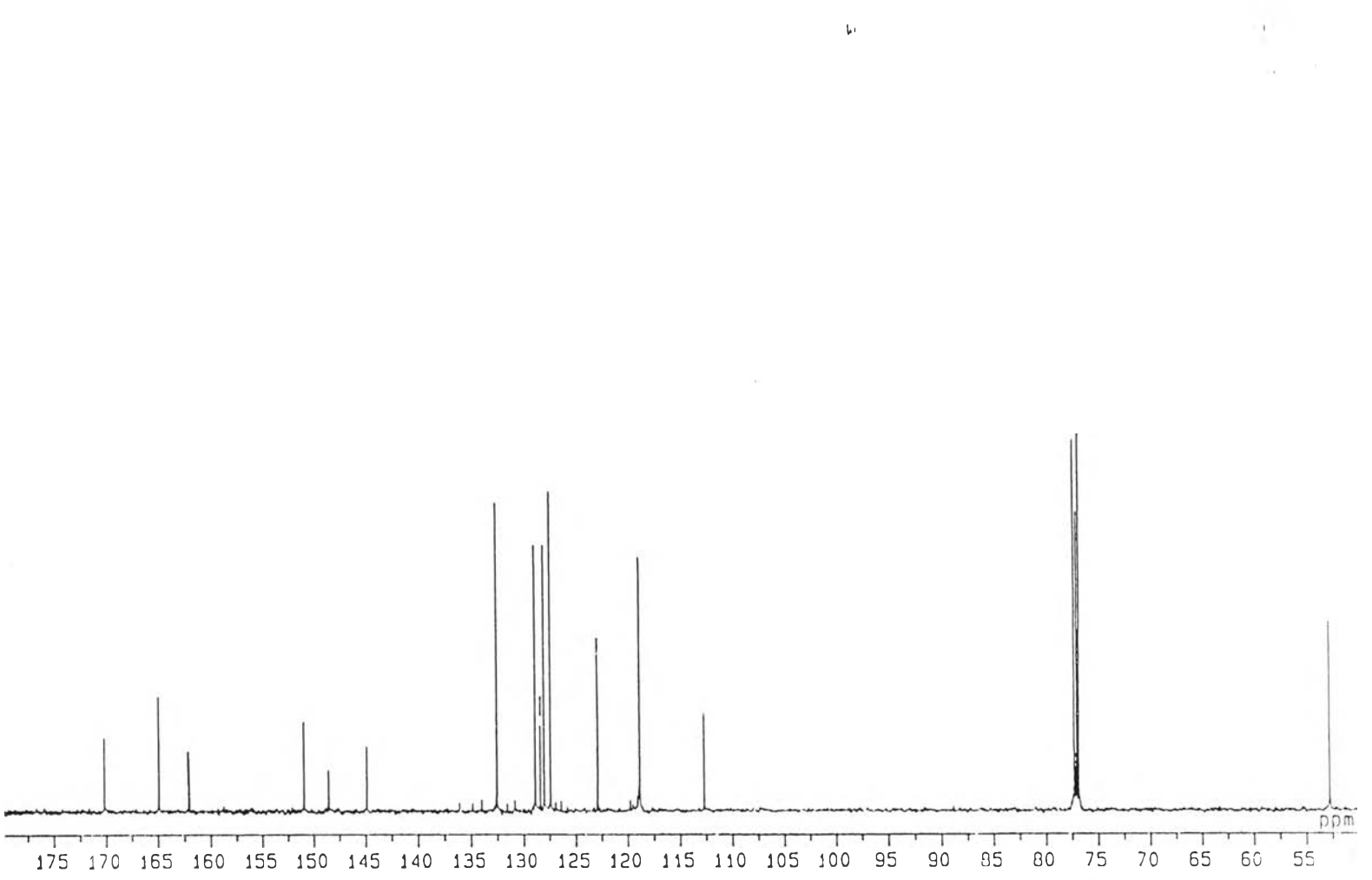

Figure A-12 : ^{13}C-NMR spectrum of marker dye A_4

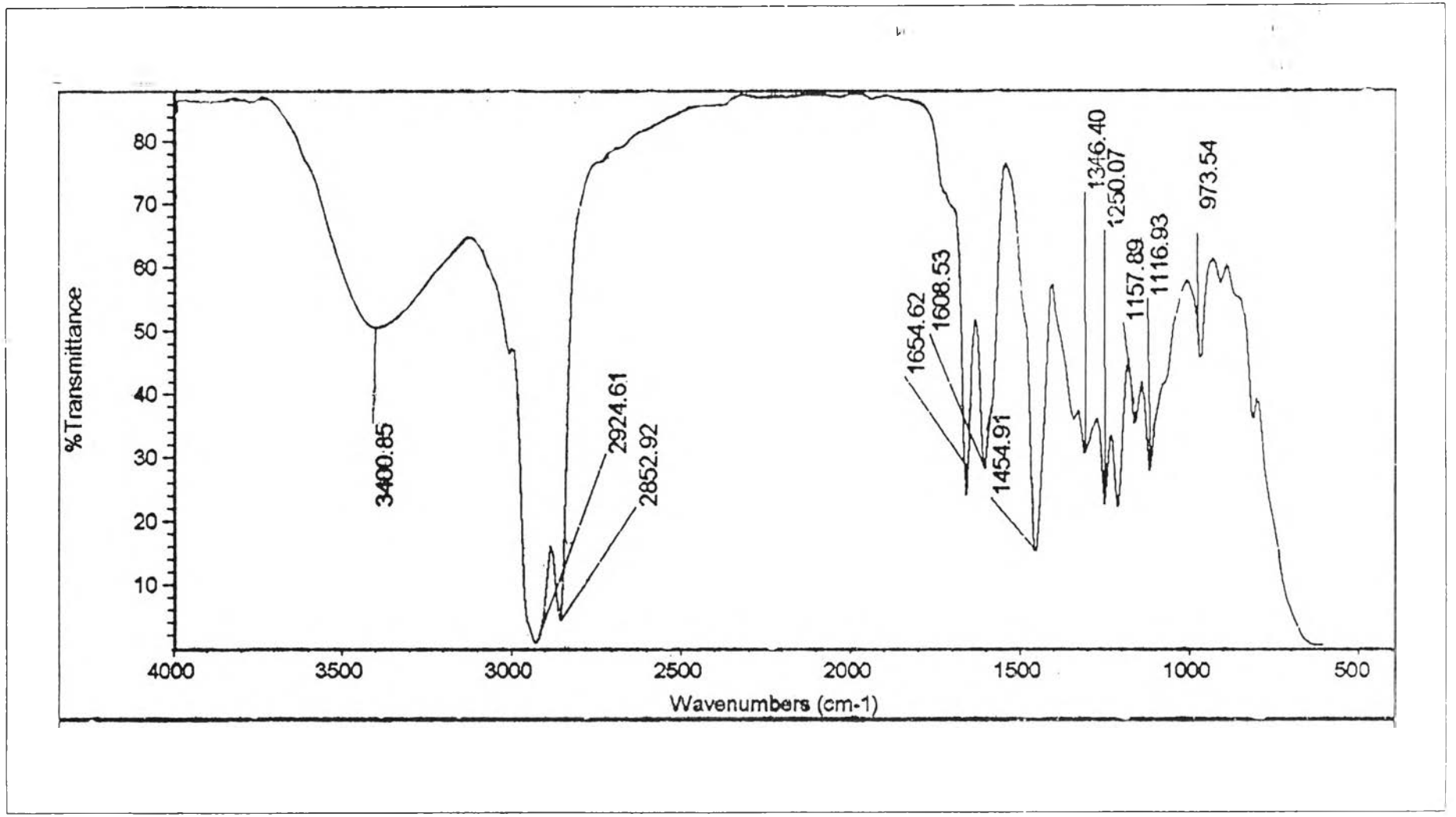

Figure B-1 : FT-IR spectrum of octylsalicylate (ester B)

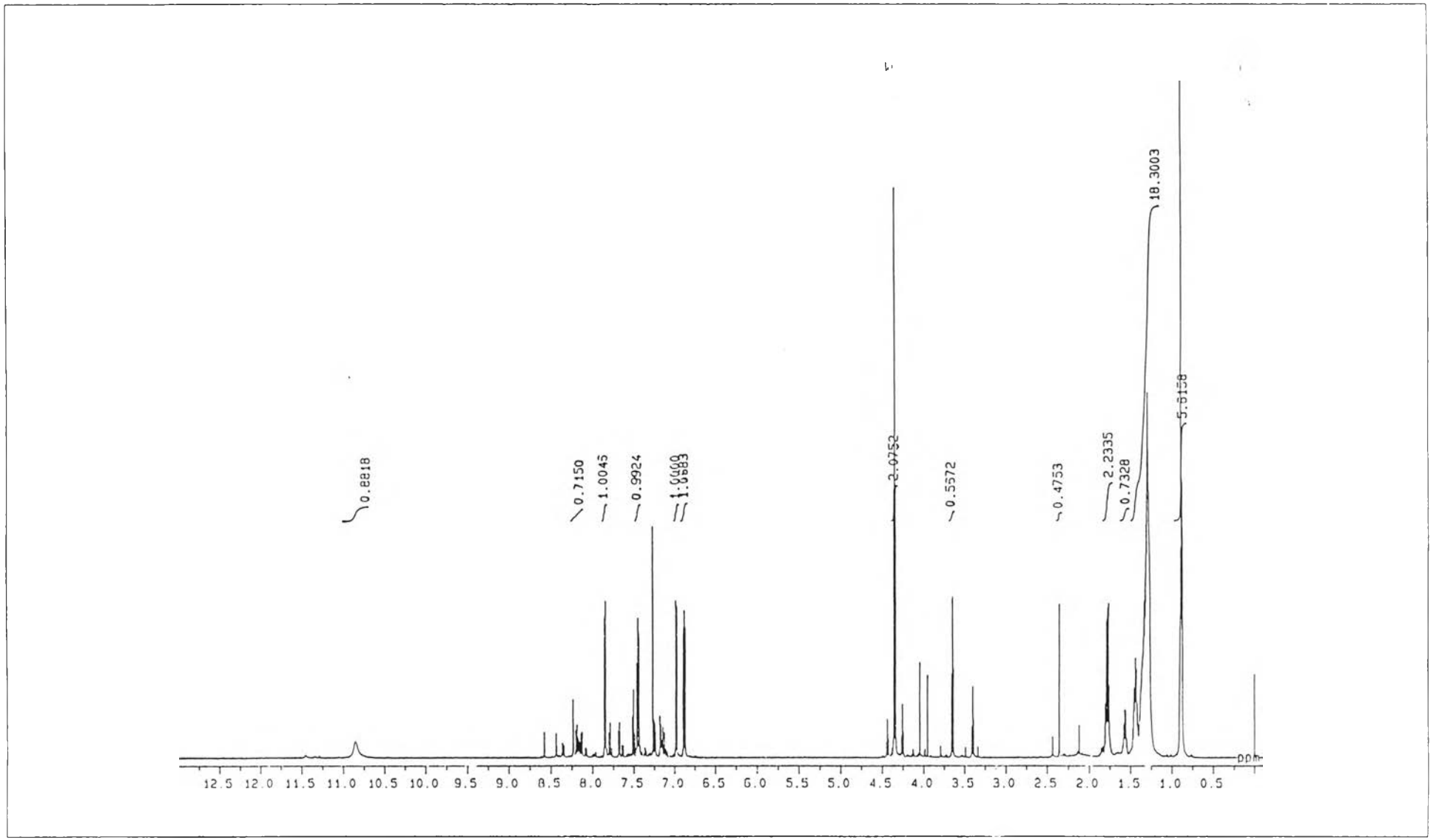

Figure B-2 : ^{1}H-NMR spectrum of octylsalicylate (ester B)

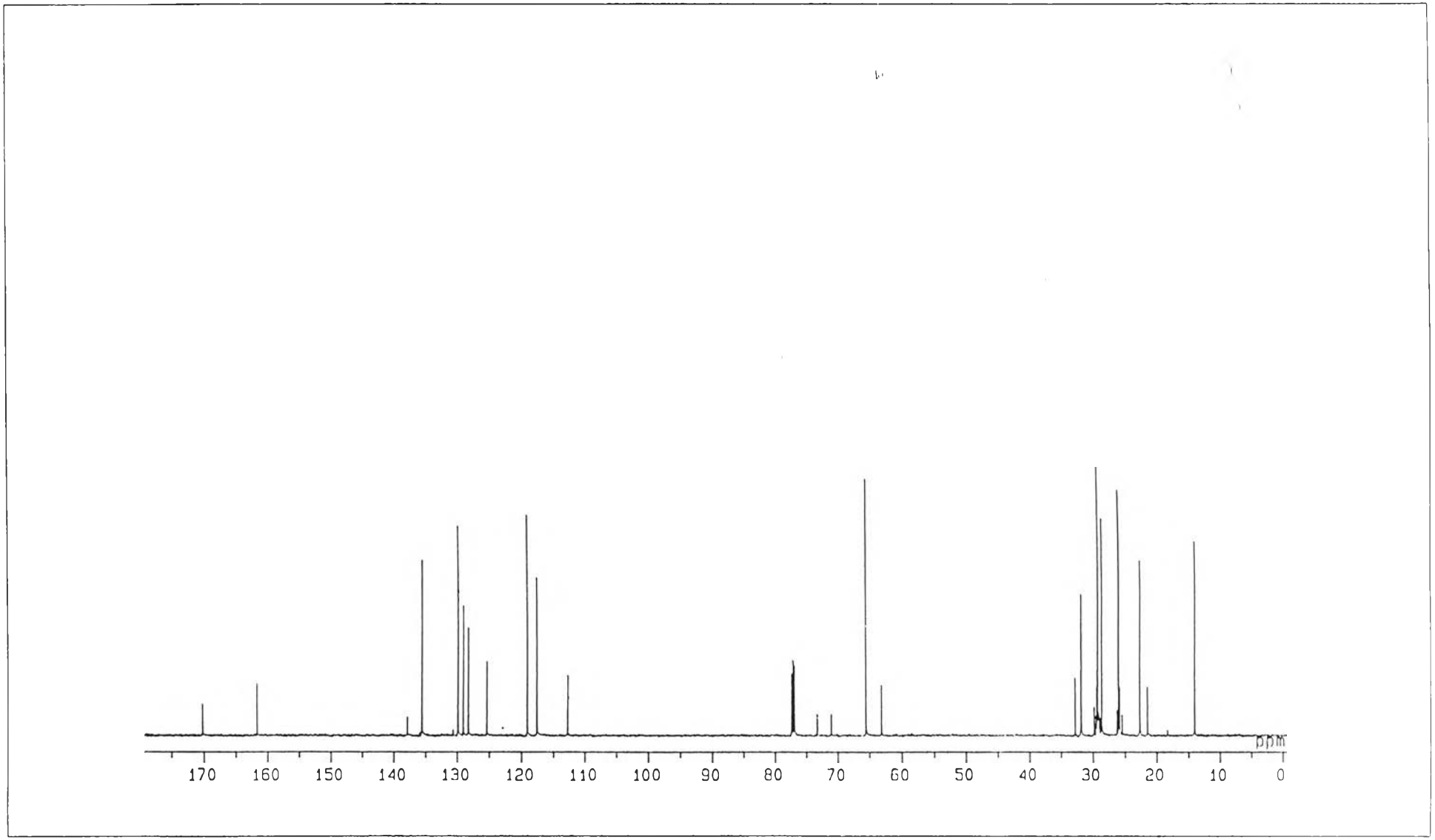

Figure B-3 ^{13}C-NMR spectrum of octylsalicylate (ester B)

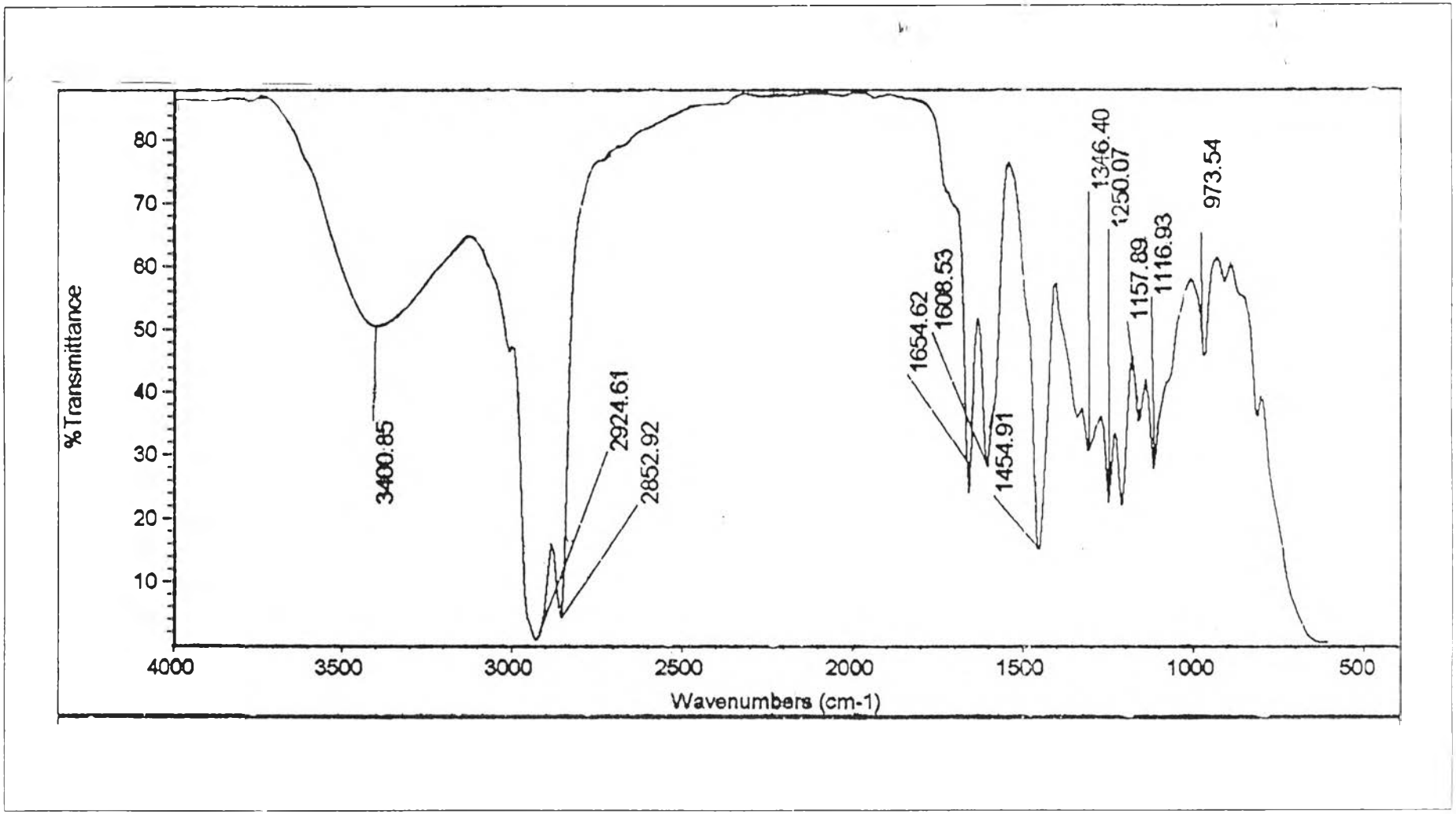

Figure B-4 : FT-IR spectrum of marker dye B_1

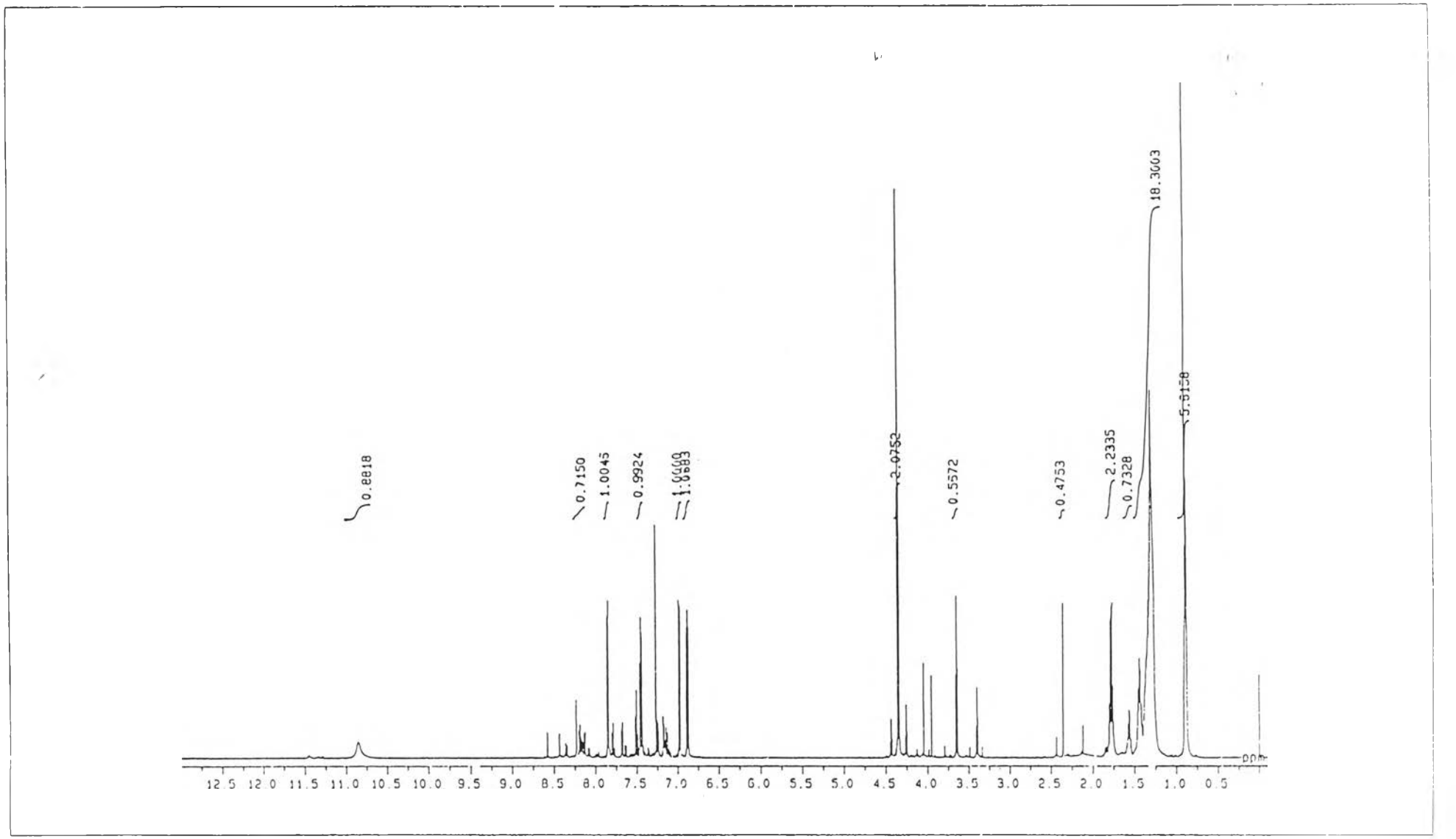

Figure B-5 : ^{1}H-NMR spectrum of marker dye B_1

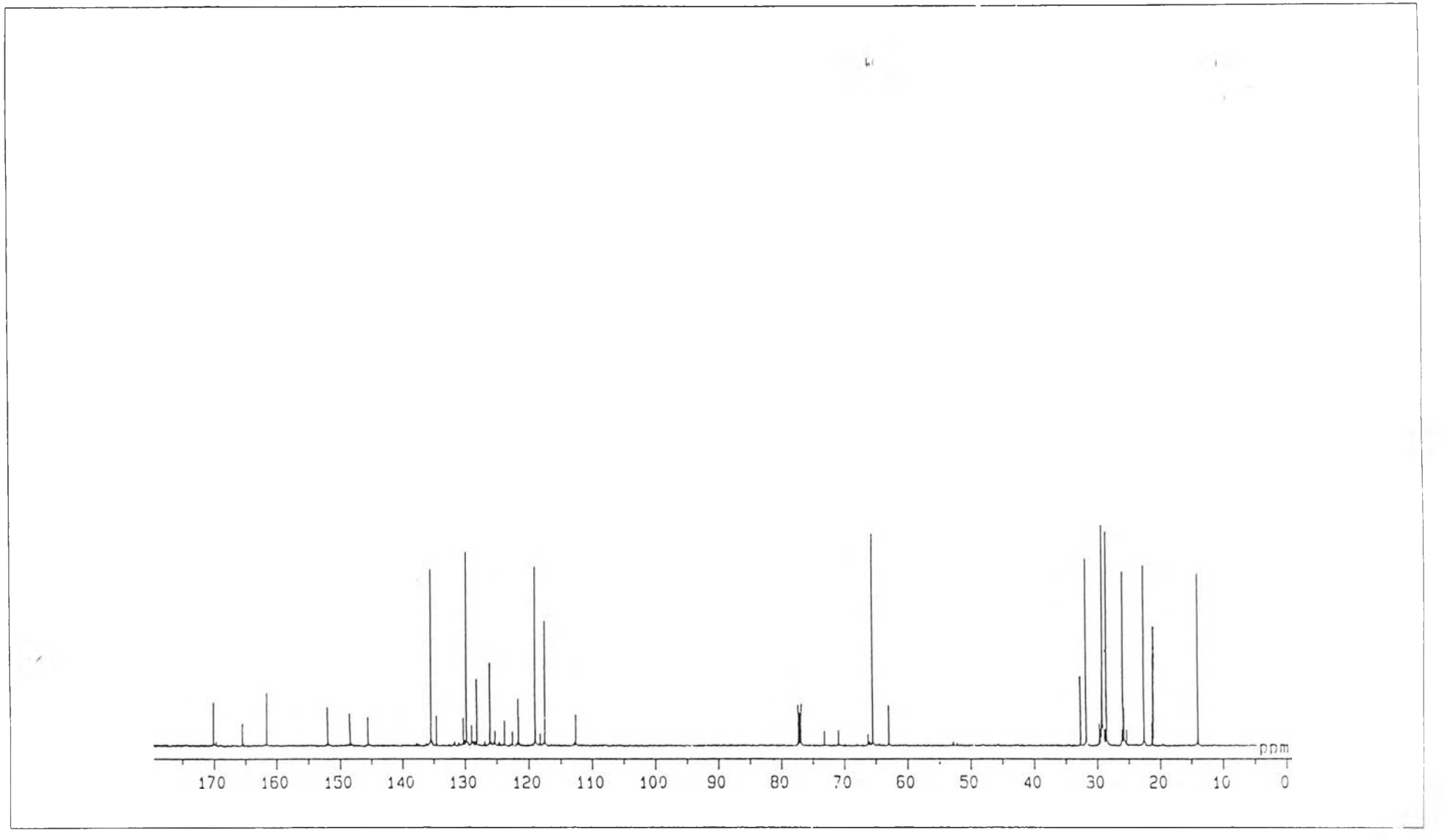

Figure B-6 : ^{13}C-NMR spectrum of marker dye B_1

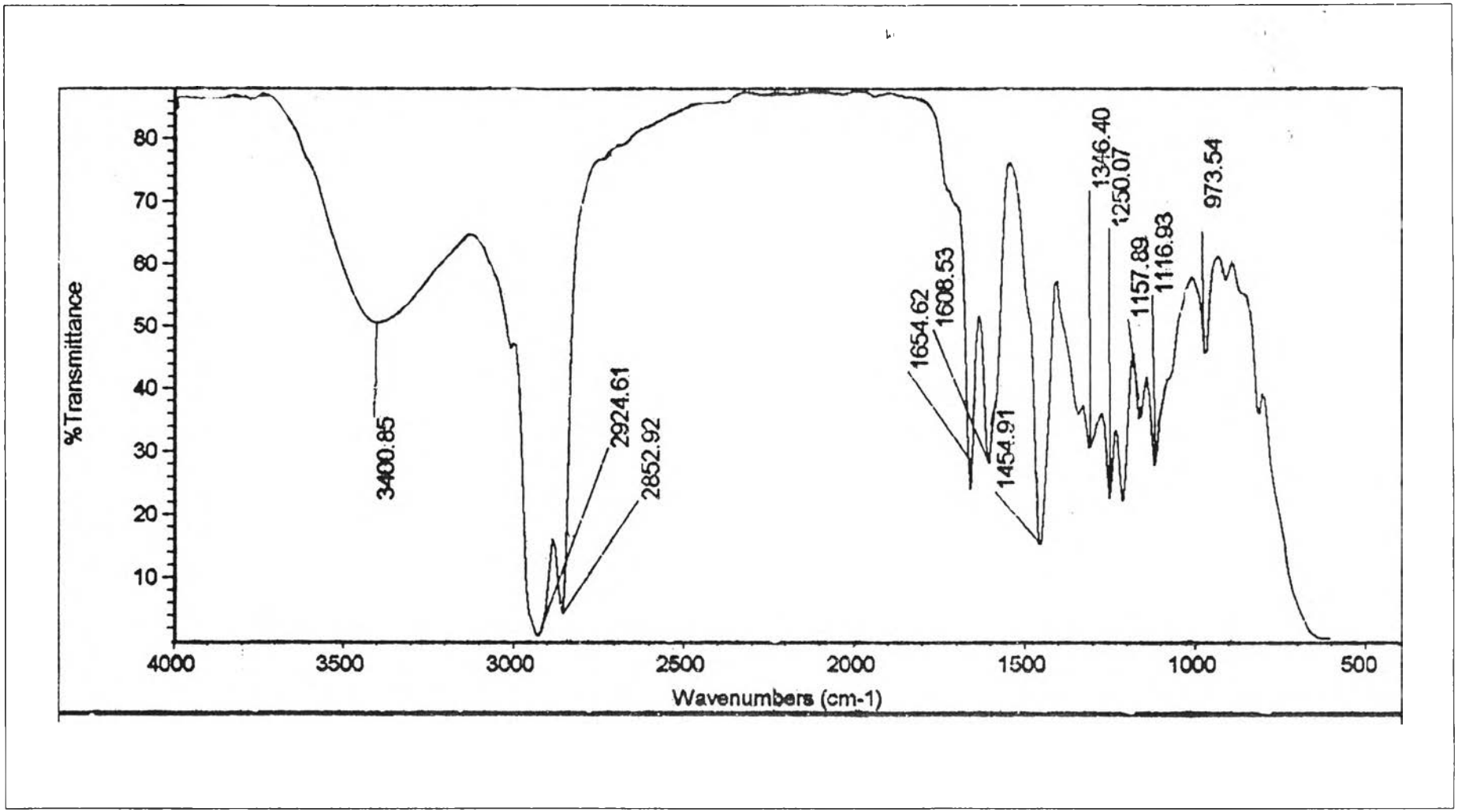

Figure B-7 : FT-IR spectrum of marker dye B_2

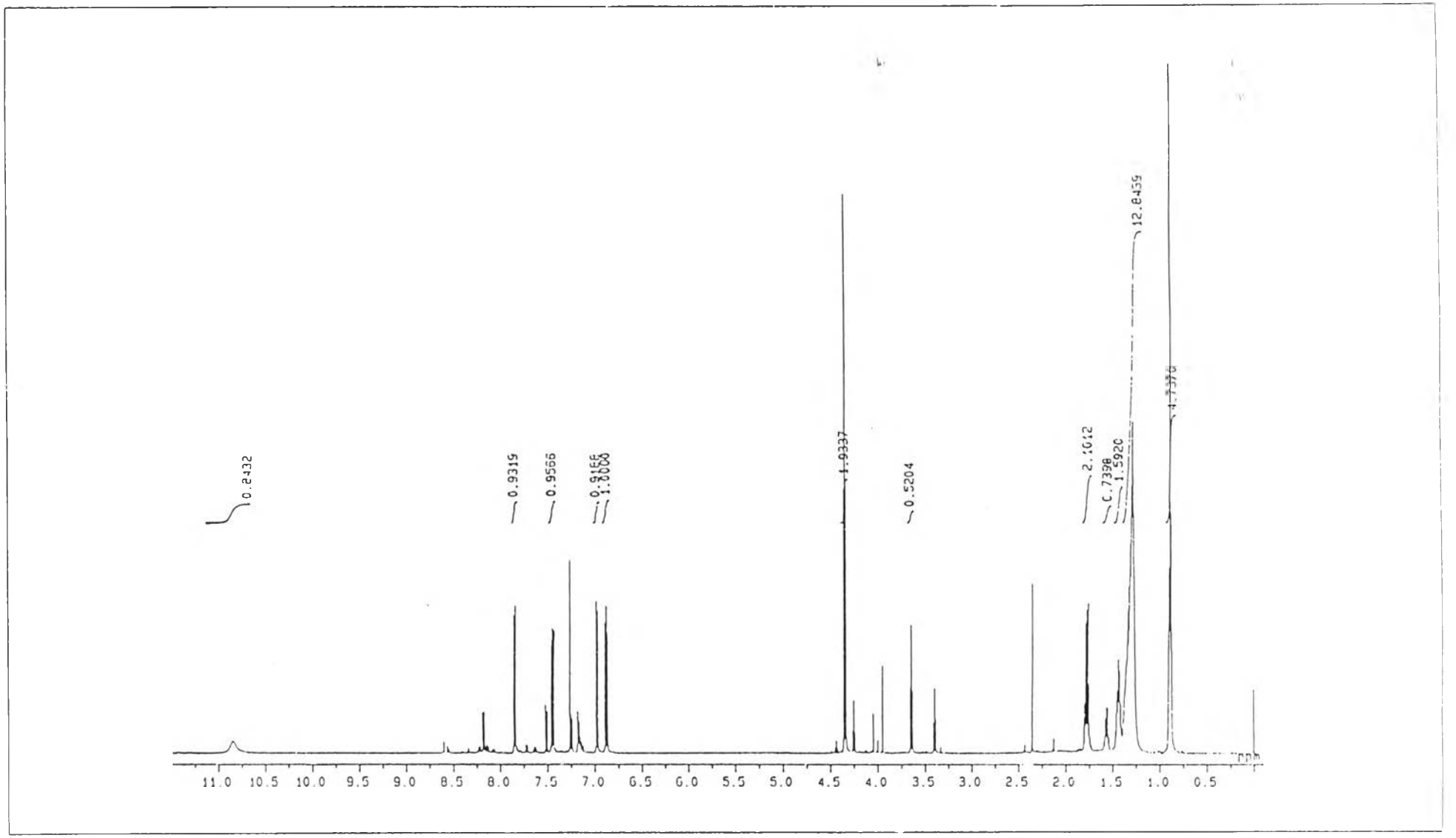

Figure B-8 : ^{1}H-NMR spectrum of marker dye B_2

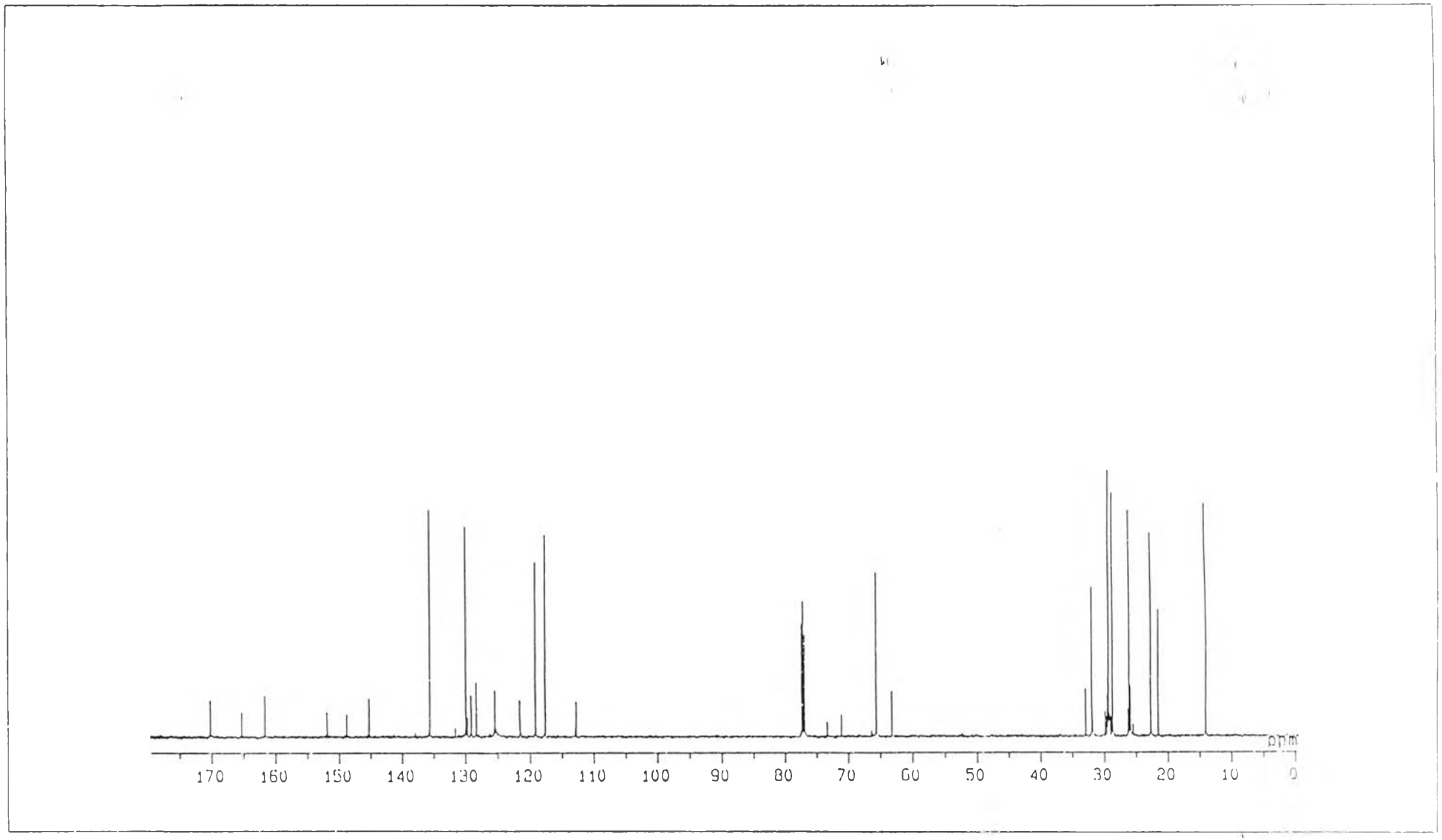

Figure B-9 : ^{13}C-NMR spectrum of marker dye B_2

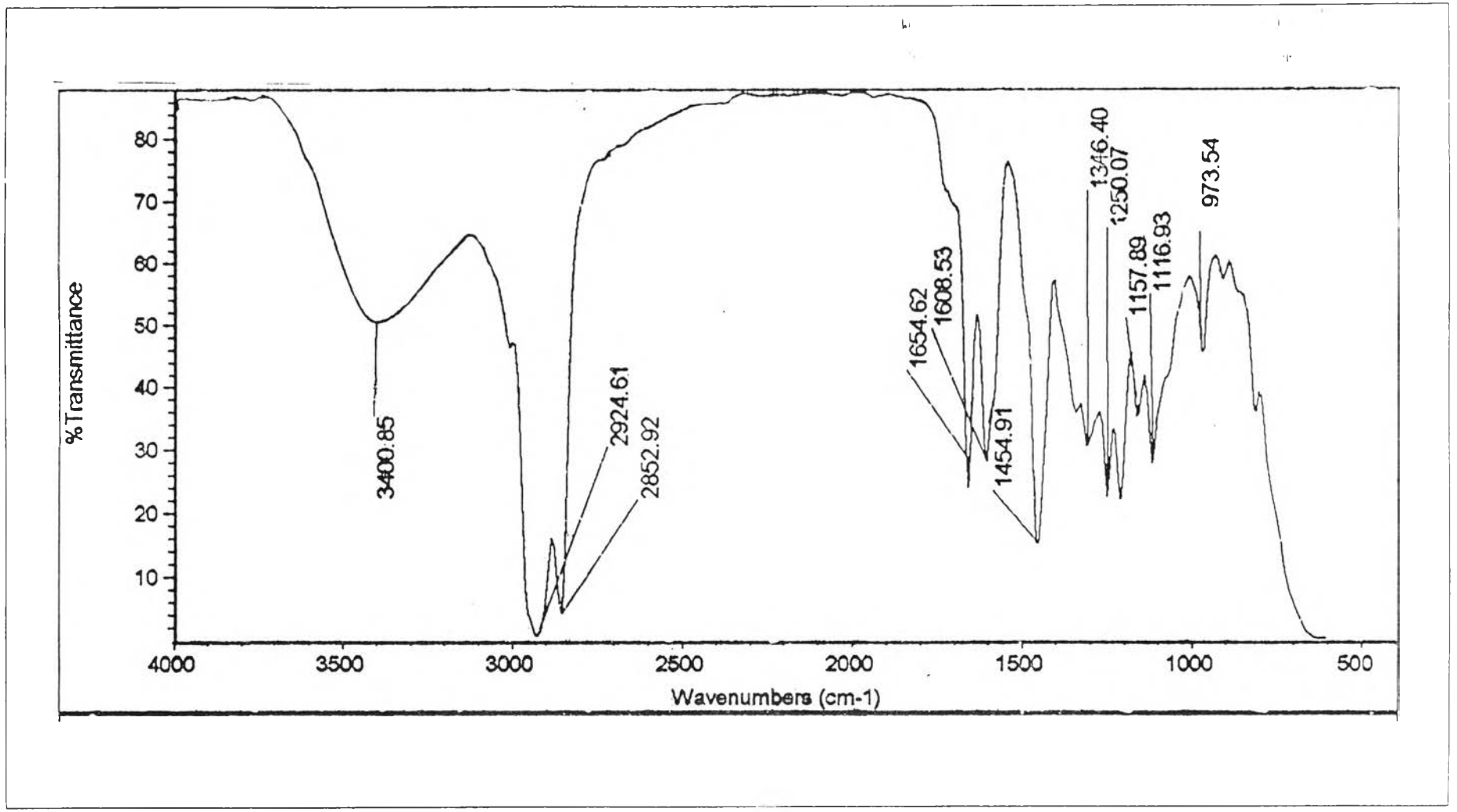

Figure B-10 : FT-IR spectrum of marker dye B_3

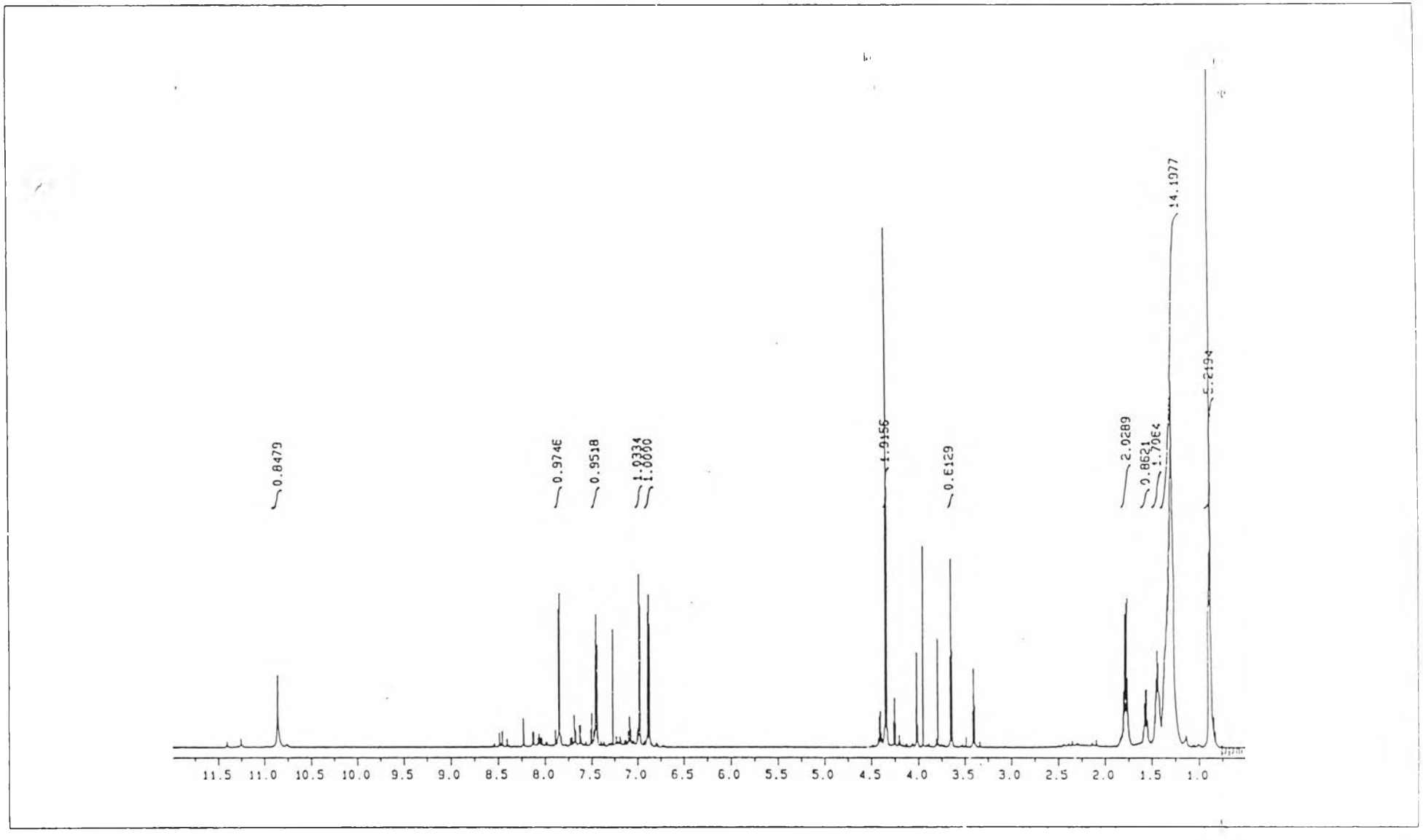

Figure B-11 : ^{1}H-NMR spectrum of marker dye B_3

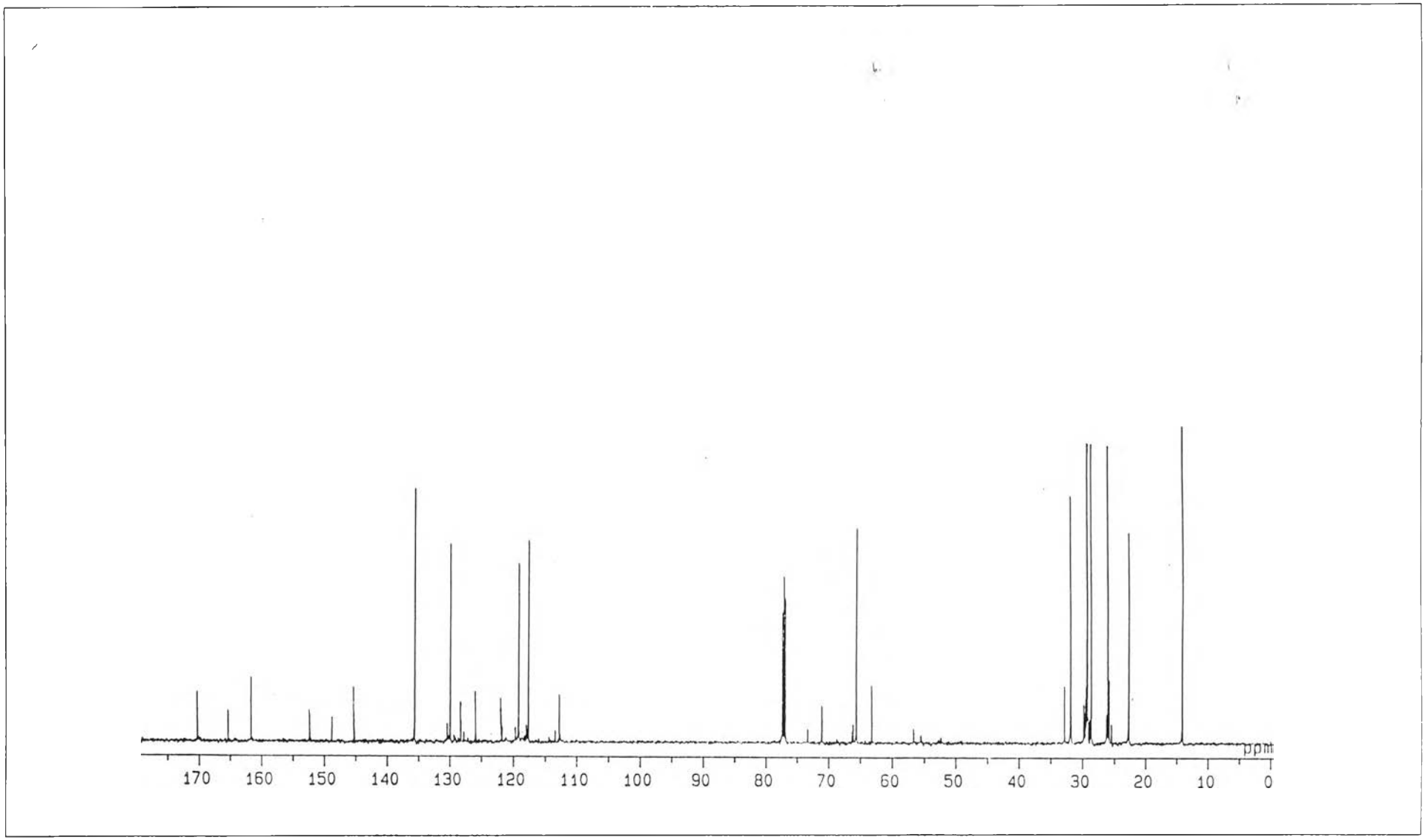

Figure B-12 : ^{13}C-NMR spectrum of marker dye B_3

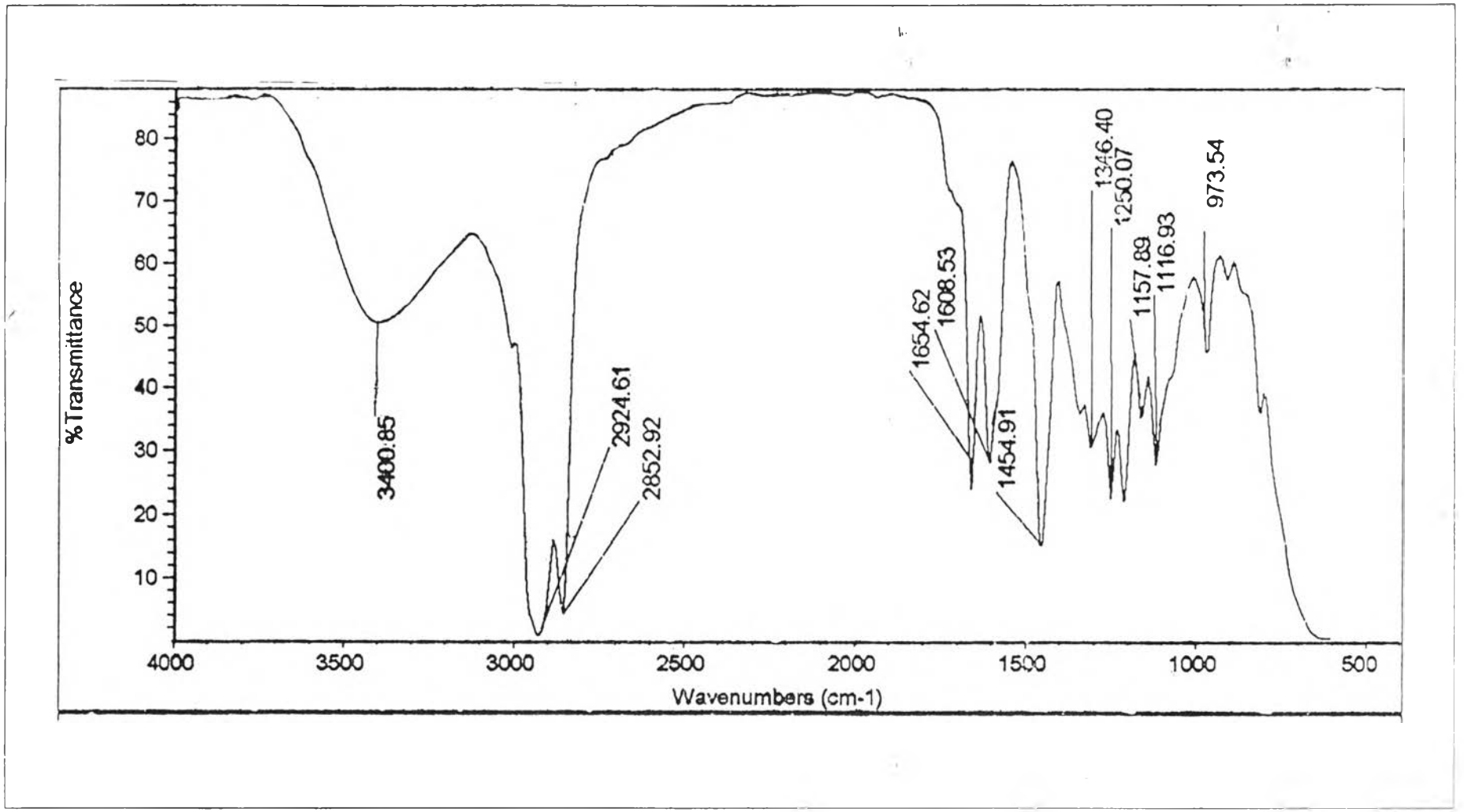

Figure B-13 : FT-IR spectrum of marker dye B_4

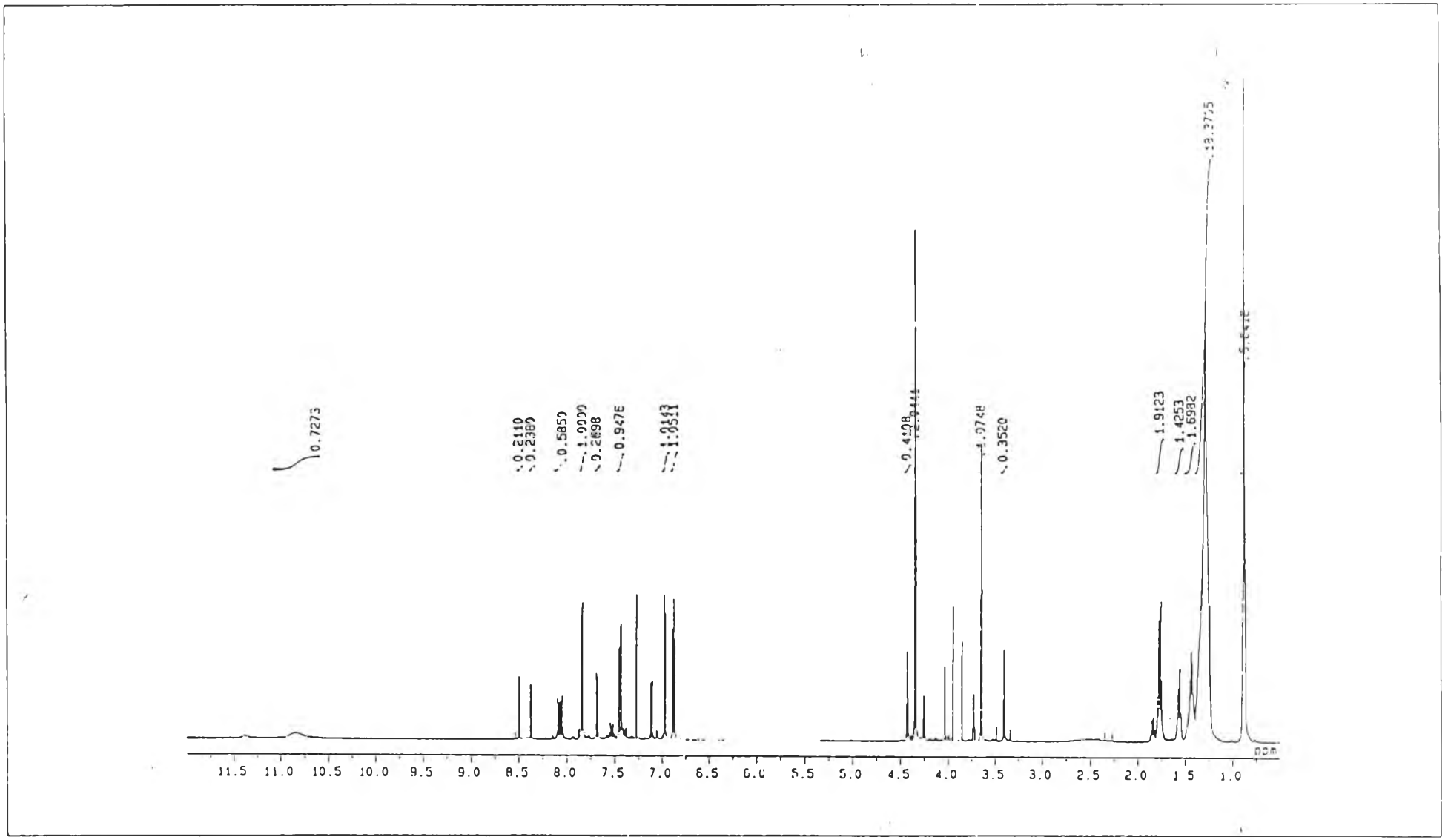

Figure B-14 : ^{1}H-NMR spectrum of marker dye B_4

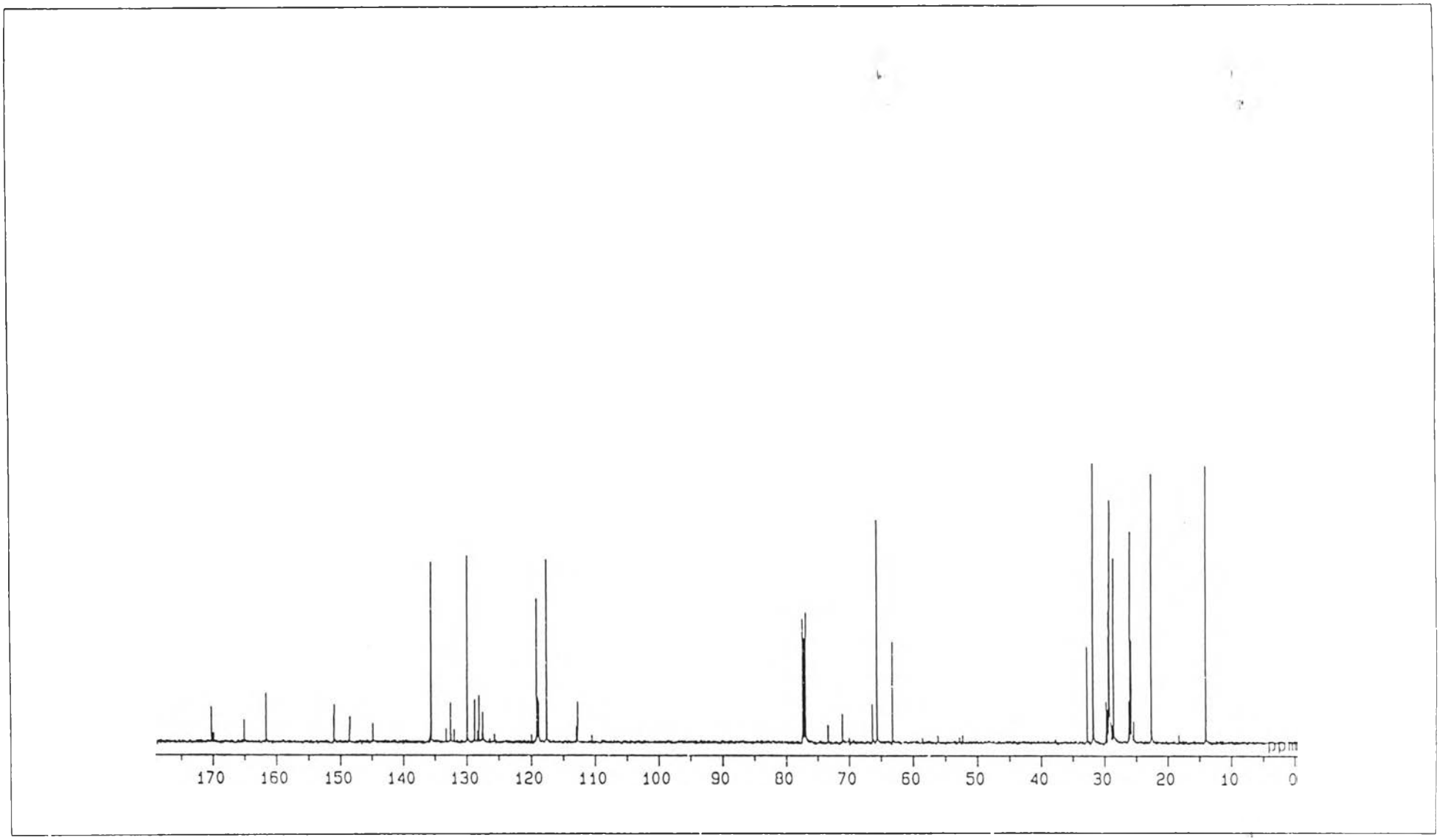

Figure B-15 : ^{13}C-NMR spectrum of marker dye B_4

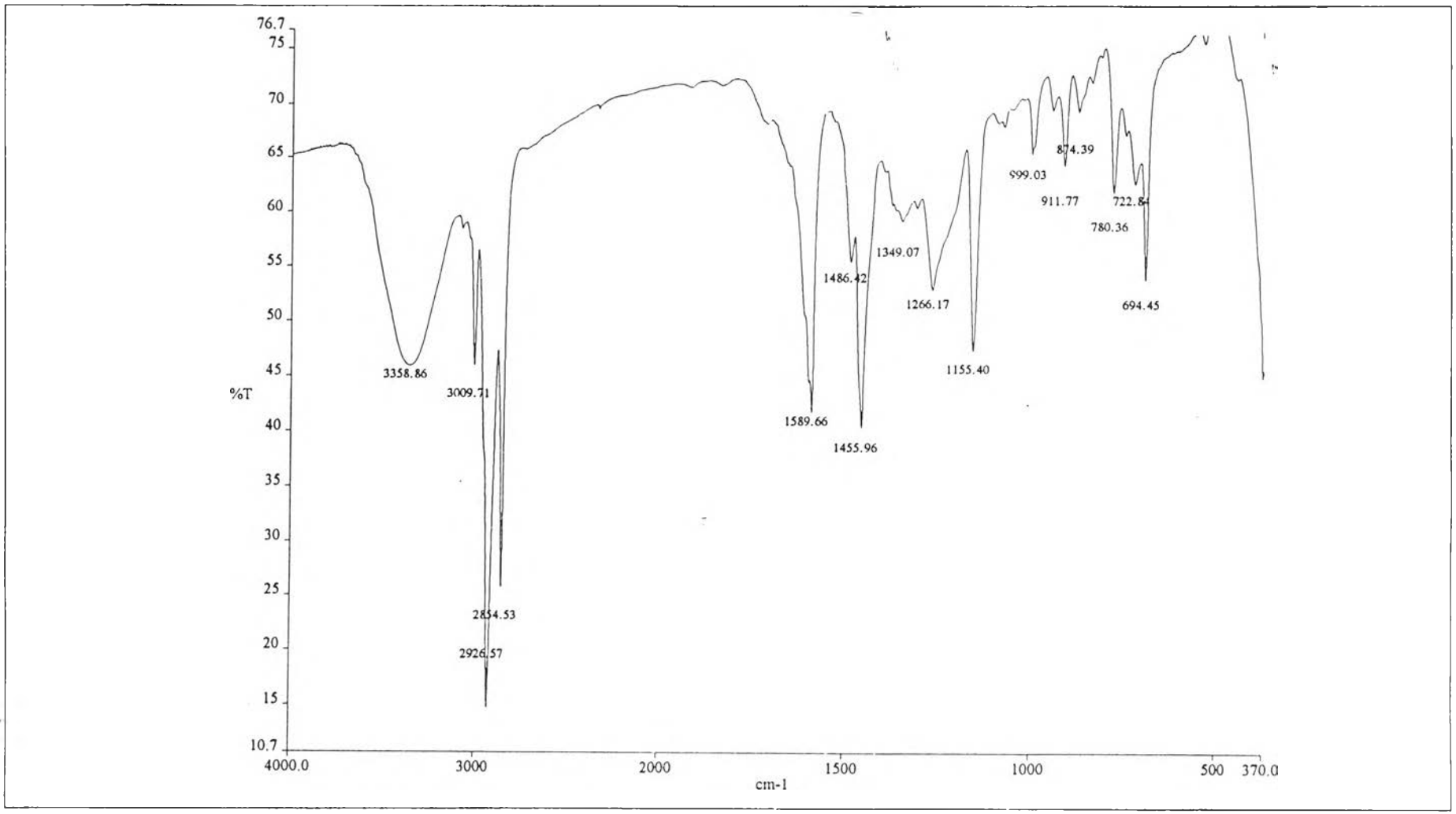

Figure C-1 : FT-IR spectrum of Cashew Nut Shell Liquid (CNSL)

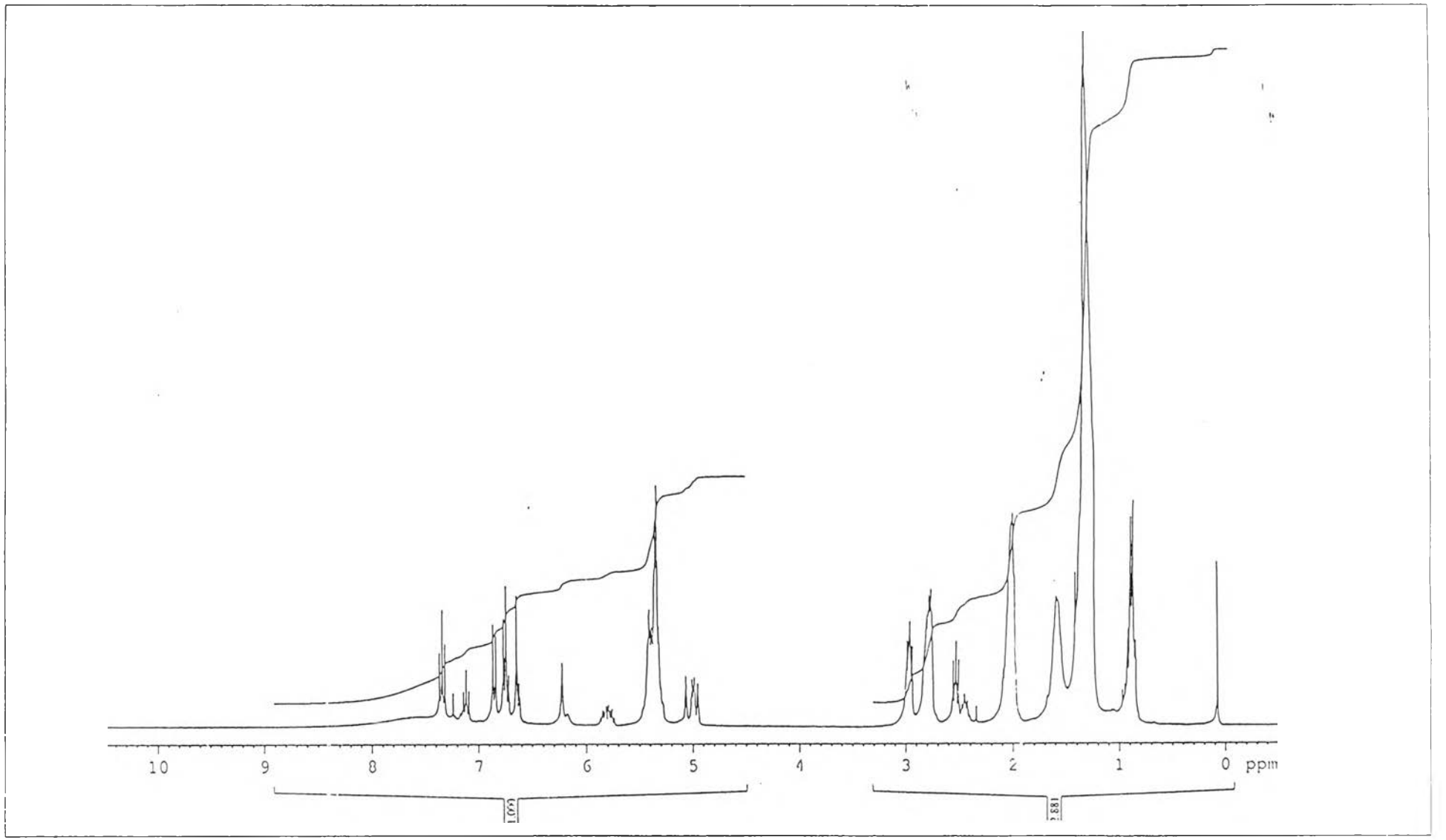

Figure C-2 : ^{1}H-NMR spectrum of Cashew Nut Shell Liquid (CNSL)

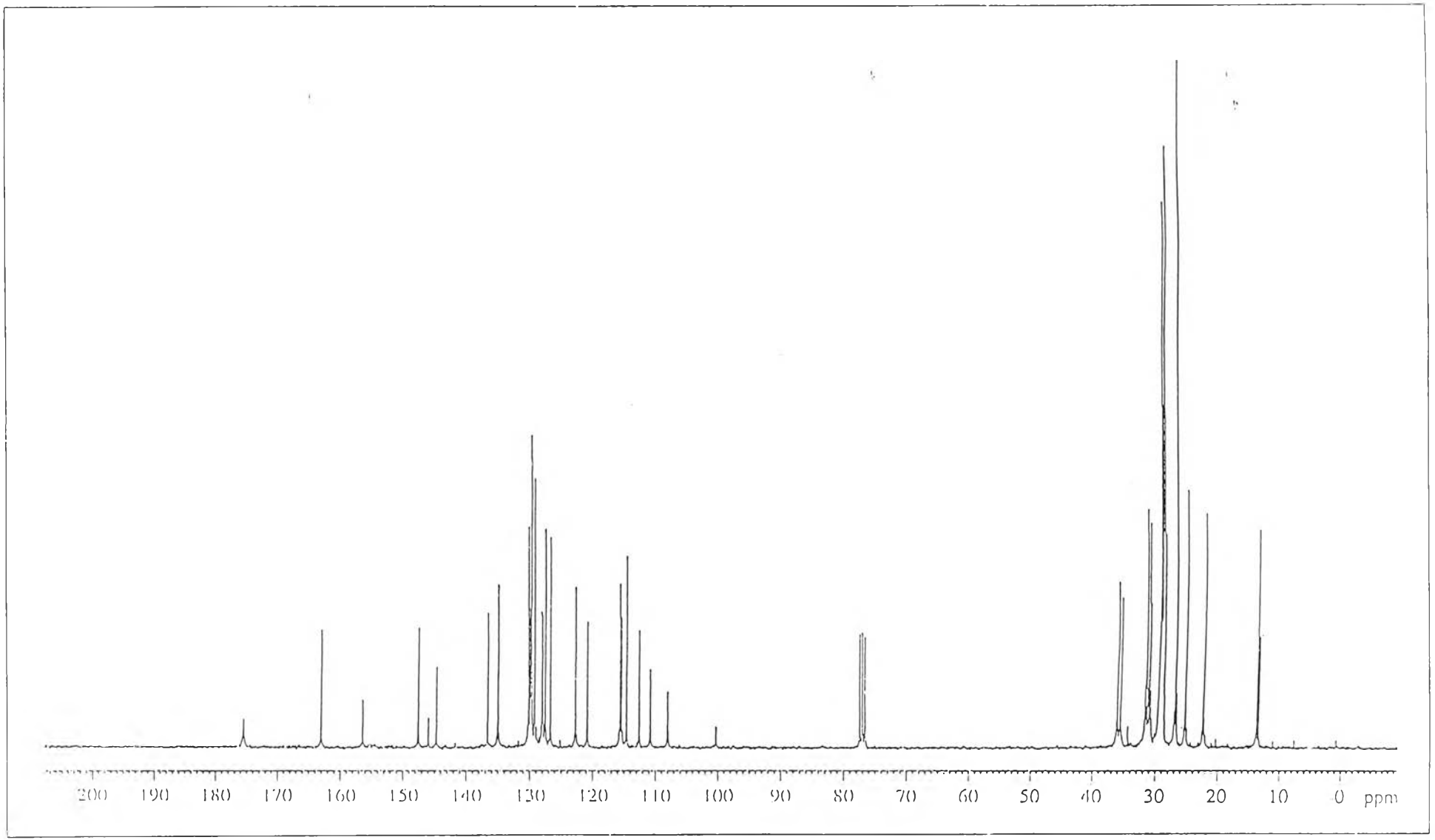

Figure C-3 : ^{13}C-NMR spectrum of Cashew Nut Shell Liquid (CNSL)

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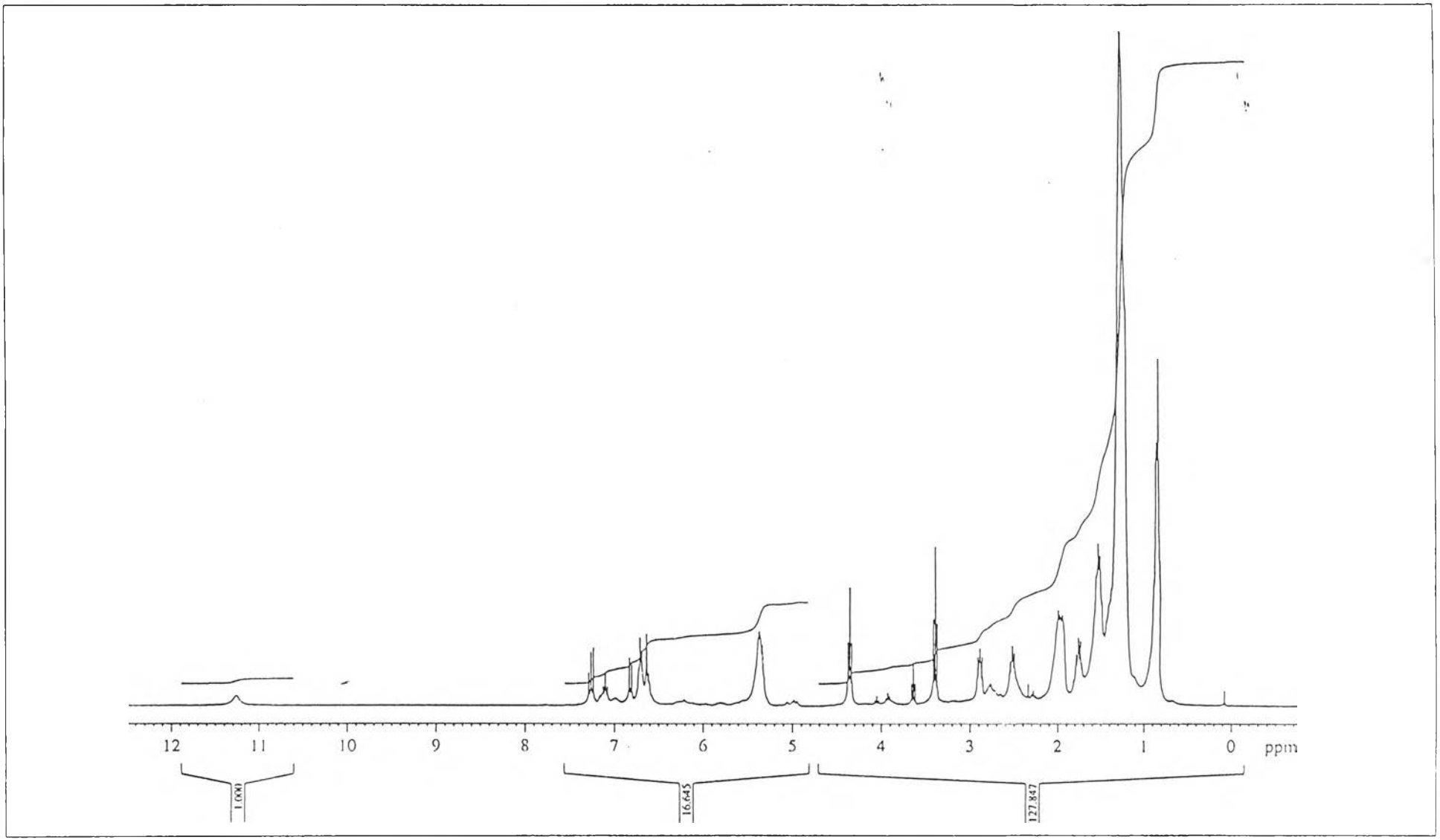

Figure C-5 : ^{1}H-NMR spectrum of the esterified CNSL

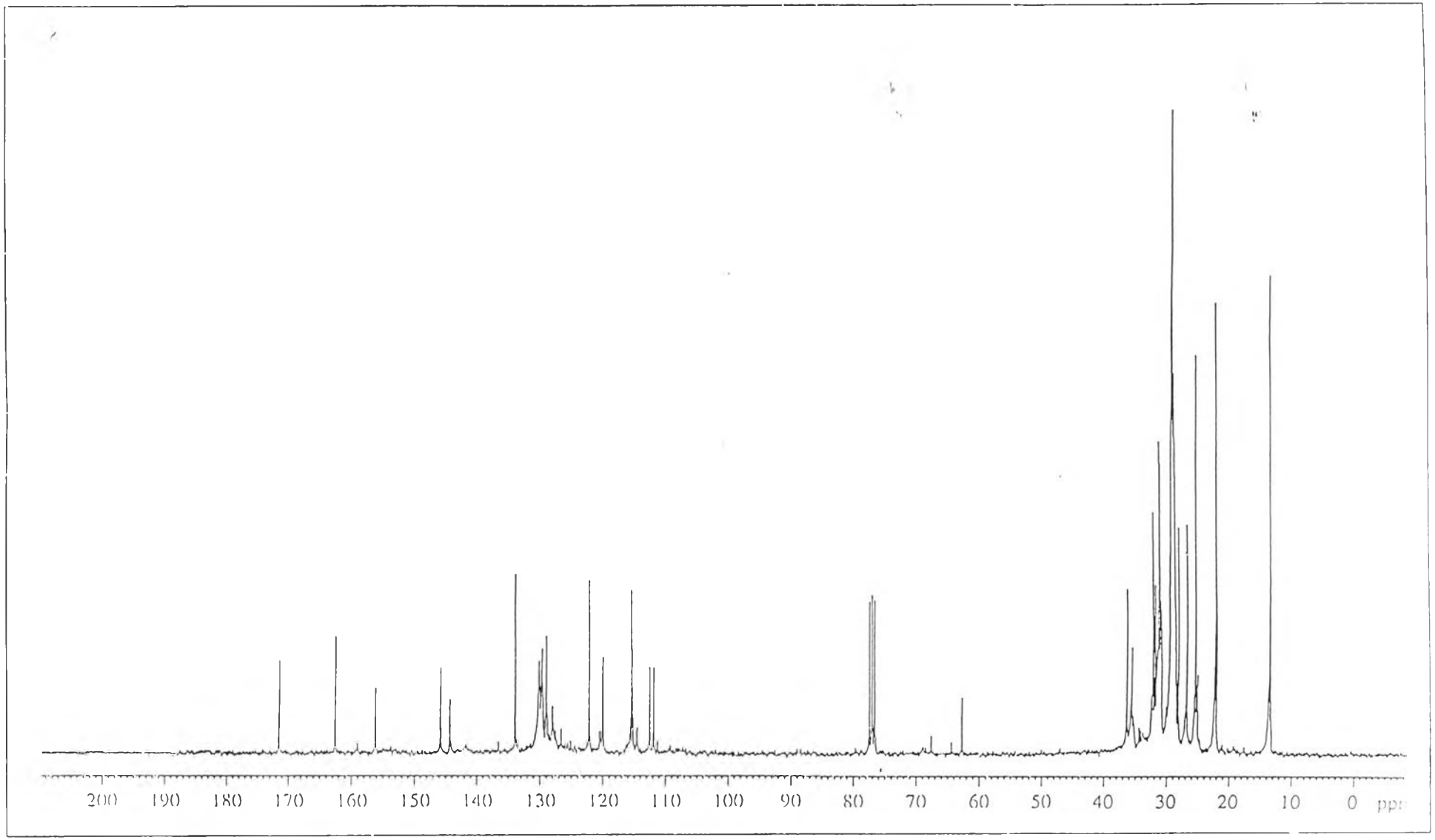

Figure C-6 : ^{13}C-NMR spectrum of the esterified CNSL

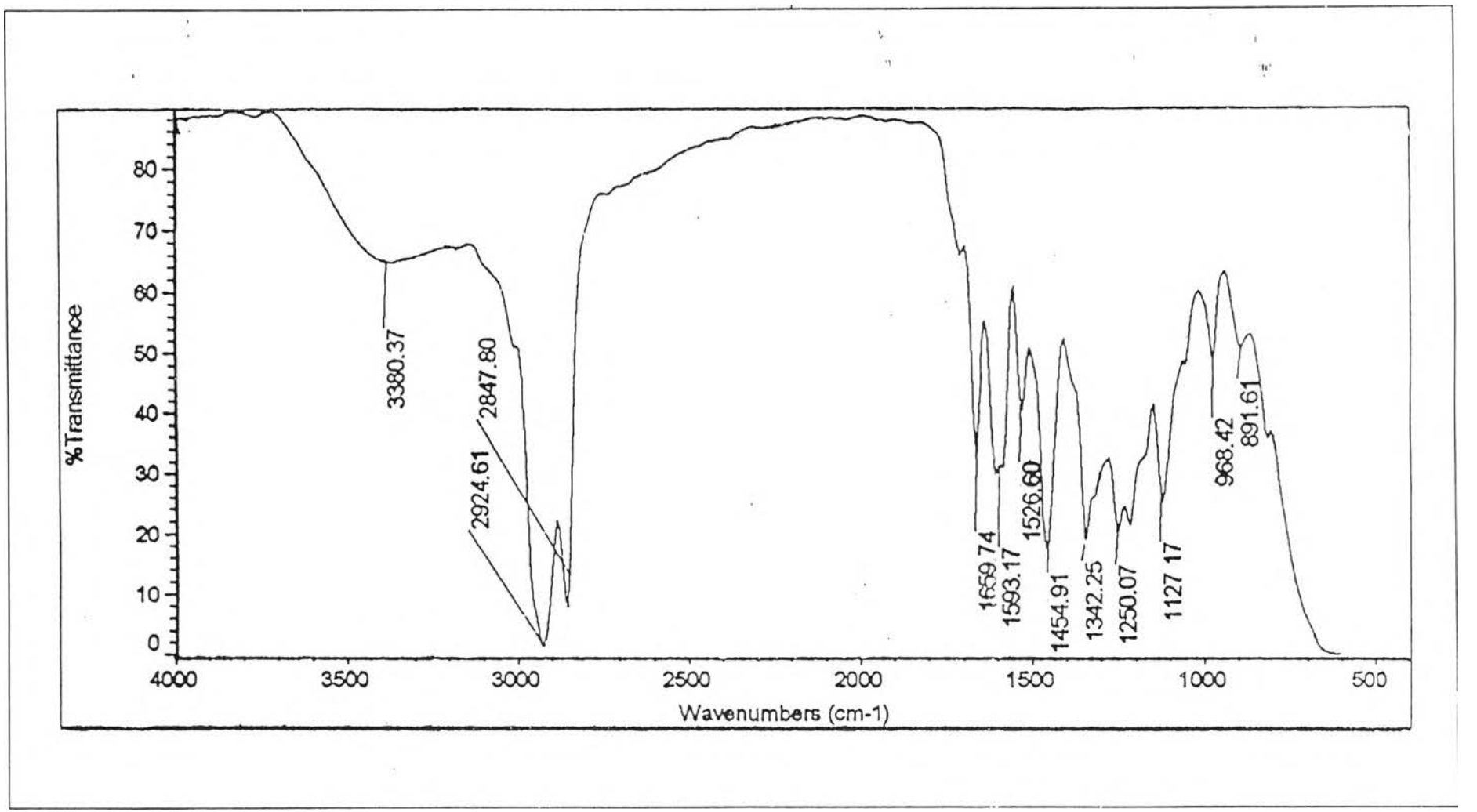

Figure C-7 : FT-IR spectrum of marker dye C_1

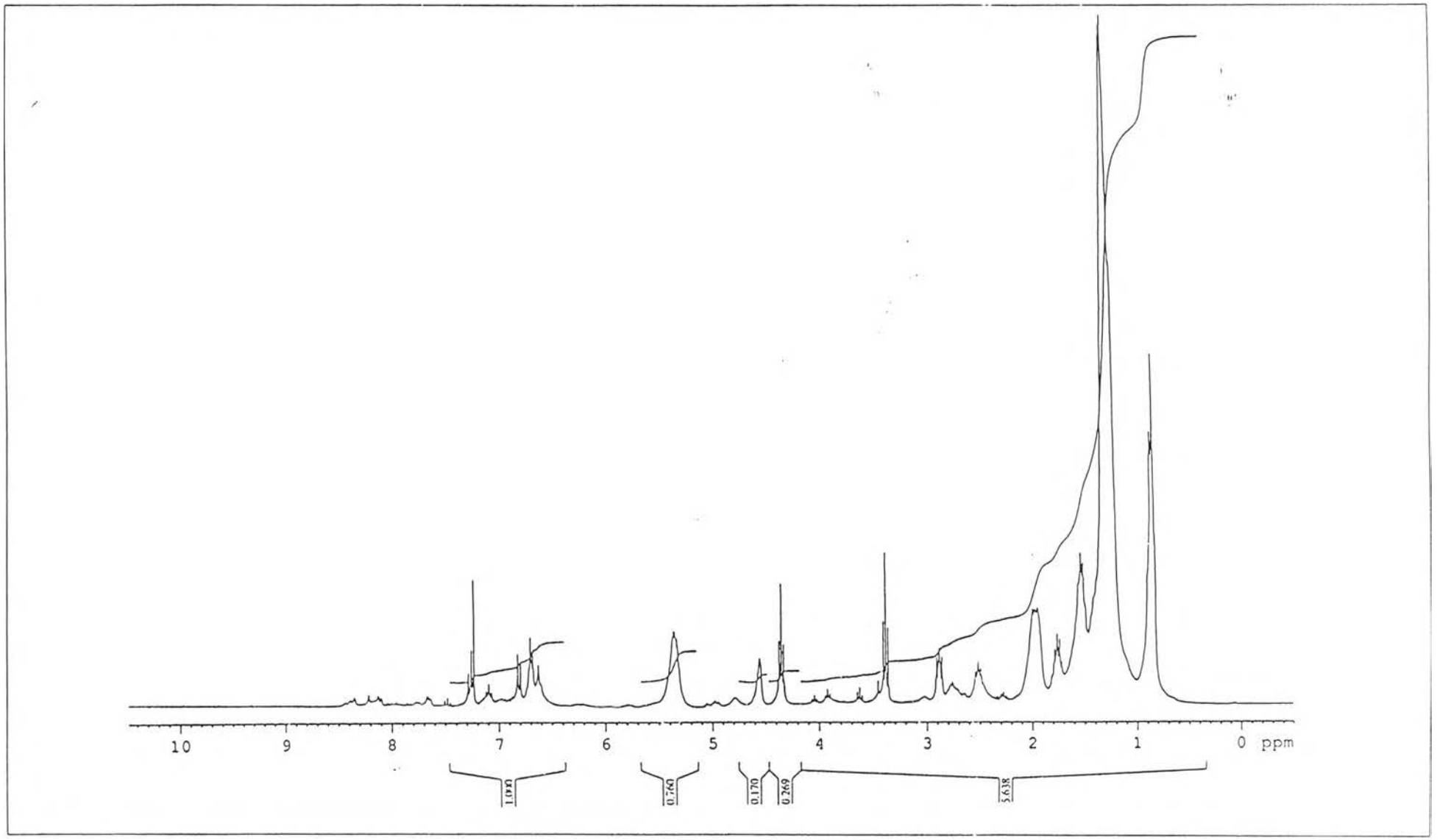

Figure C-8 : ^{1}H-NMR spectrum of marker dye C_1

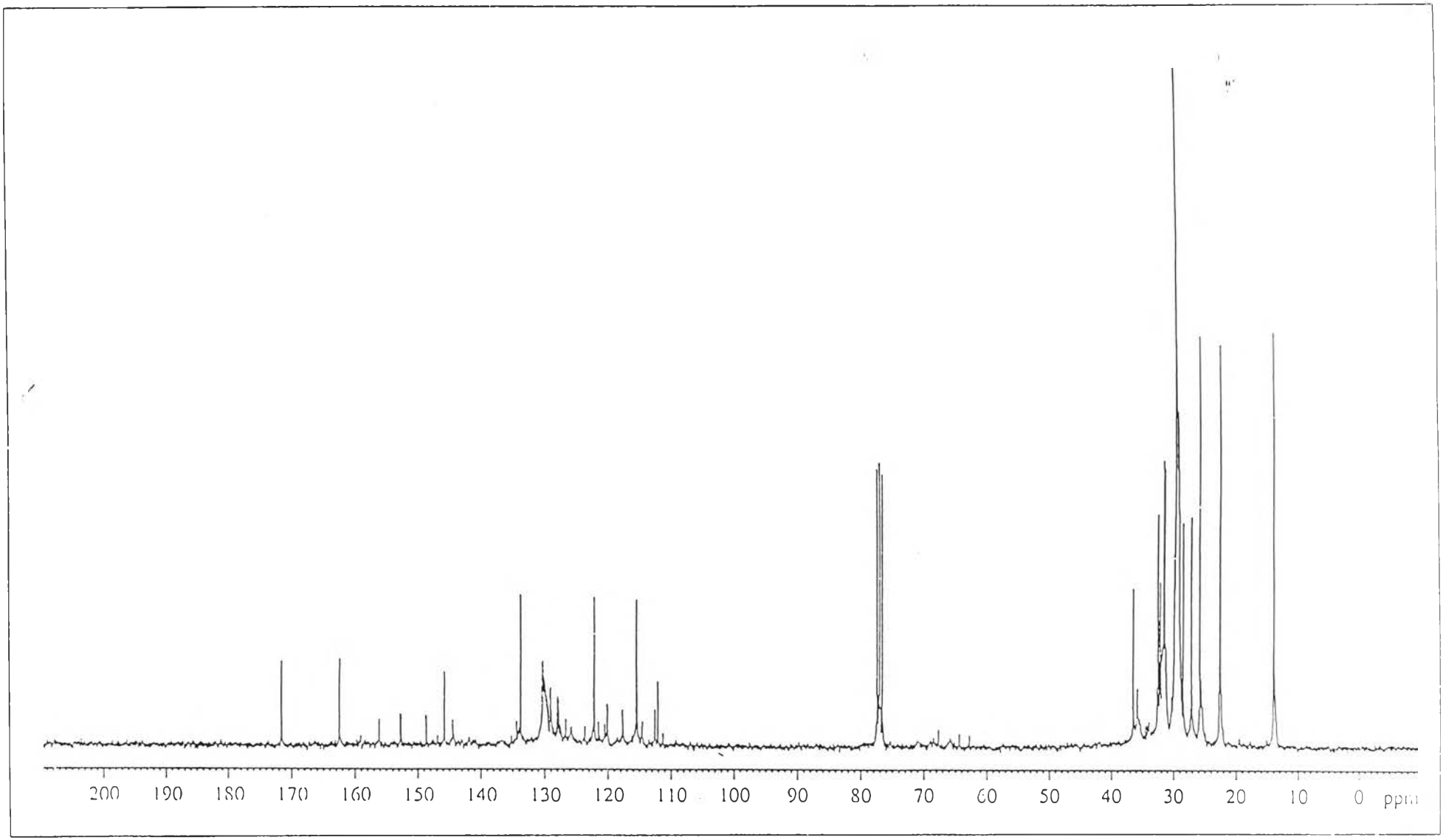

Figure C-9 : ^{13}C-NMR spectrum of marker dye C_1

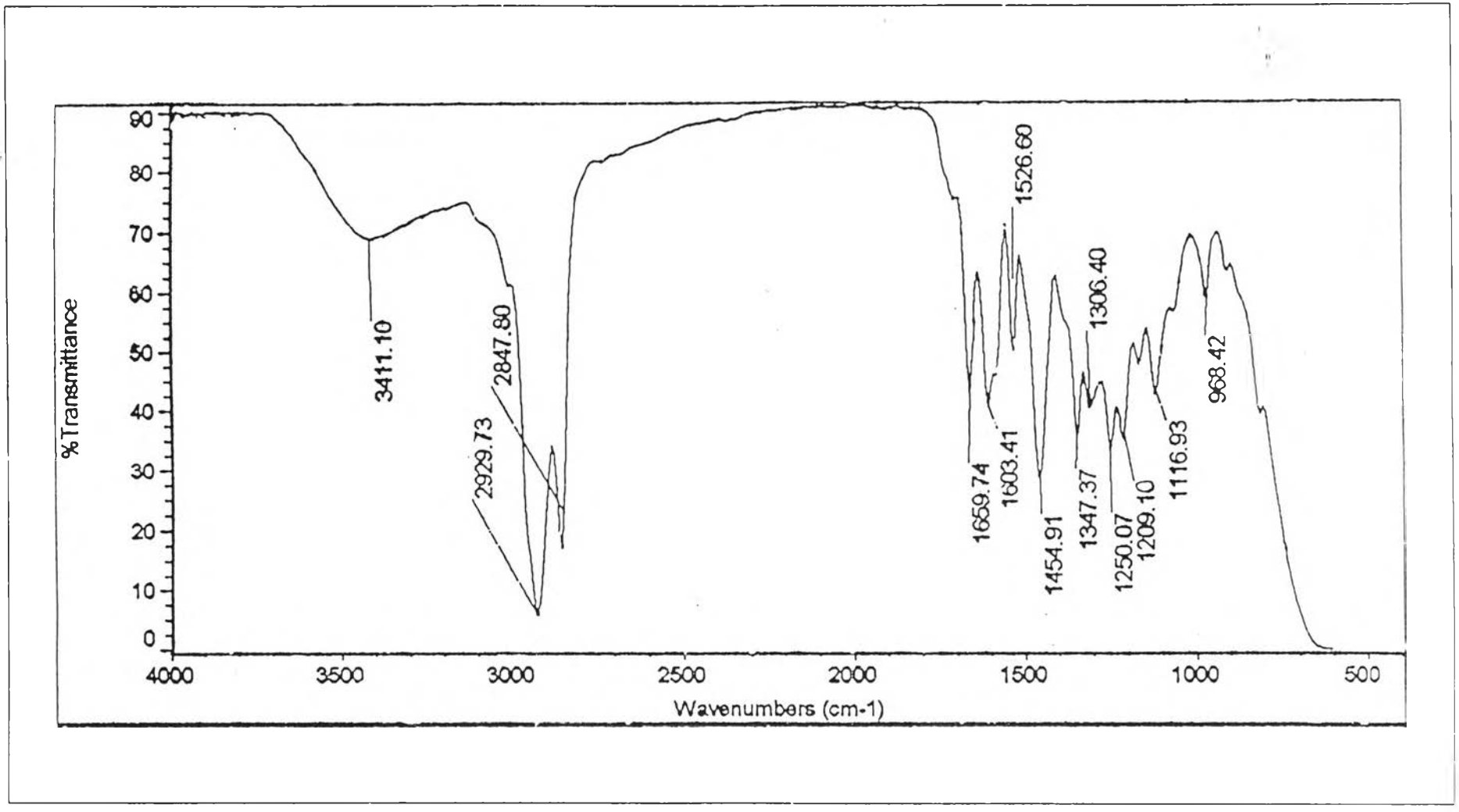

Figure C-10 : FT-IR spectrum of marker dye C_2

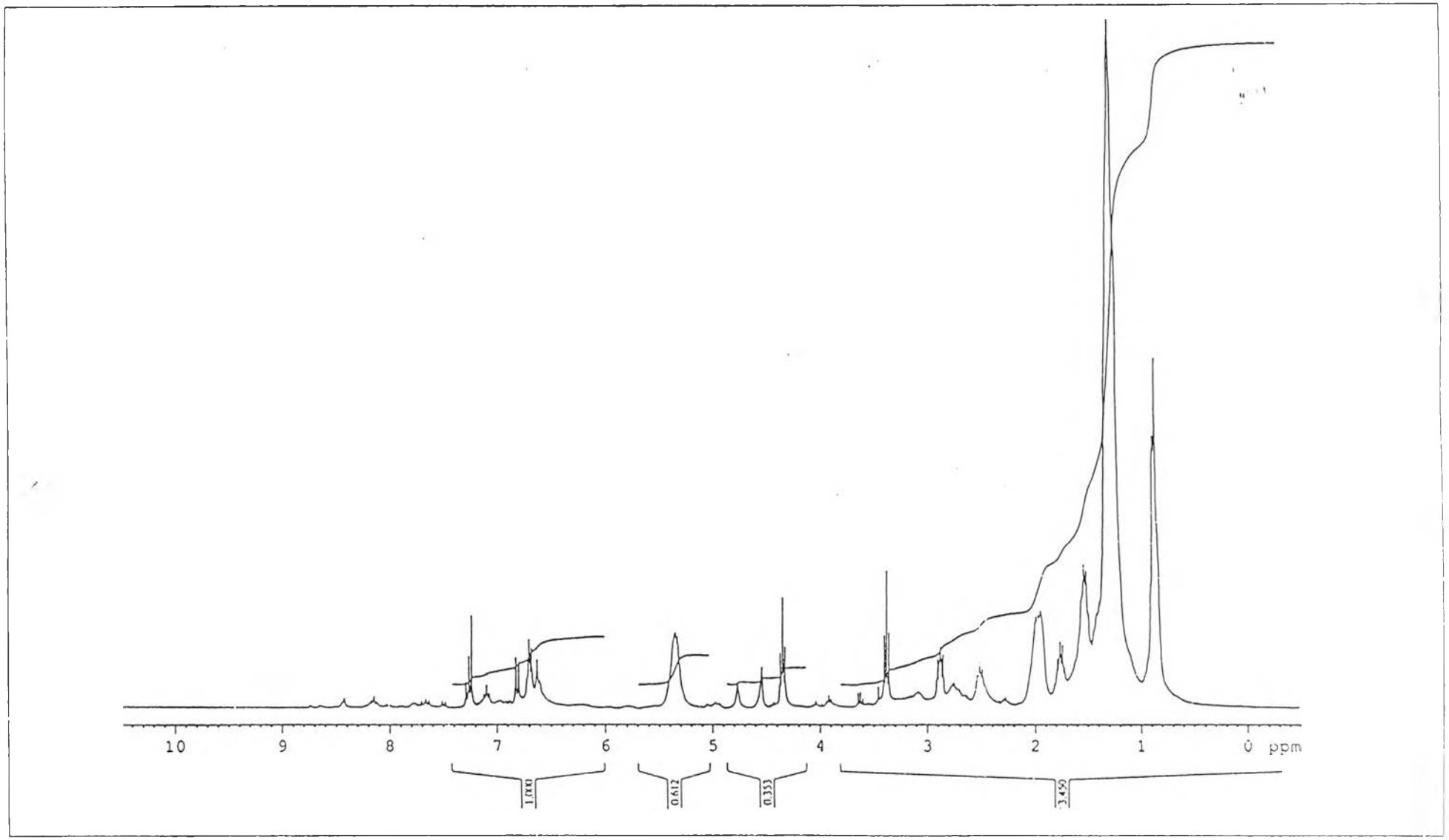

Figure C-11 : ^{1}H-NMR spectrum of marker dye C_2

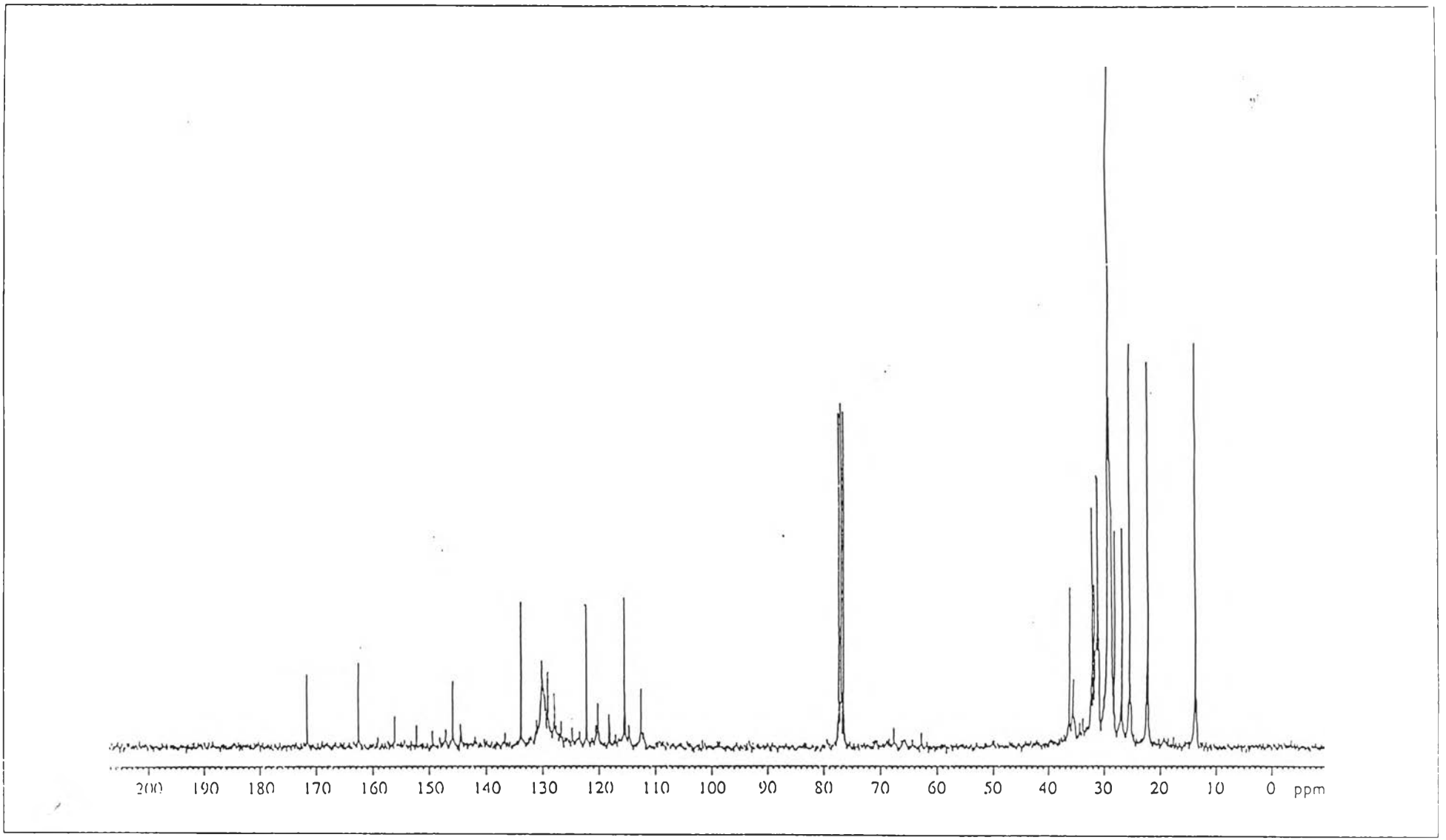

Figure C-12 : ^{13}C-NMR spectrum of marker dye C_2

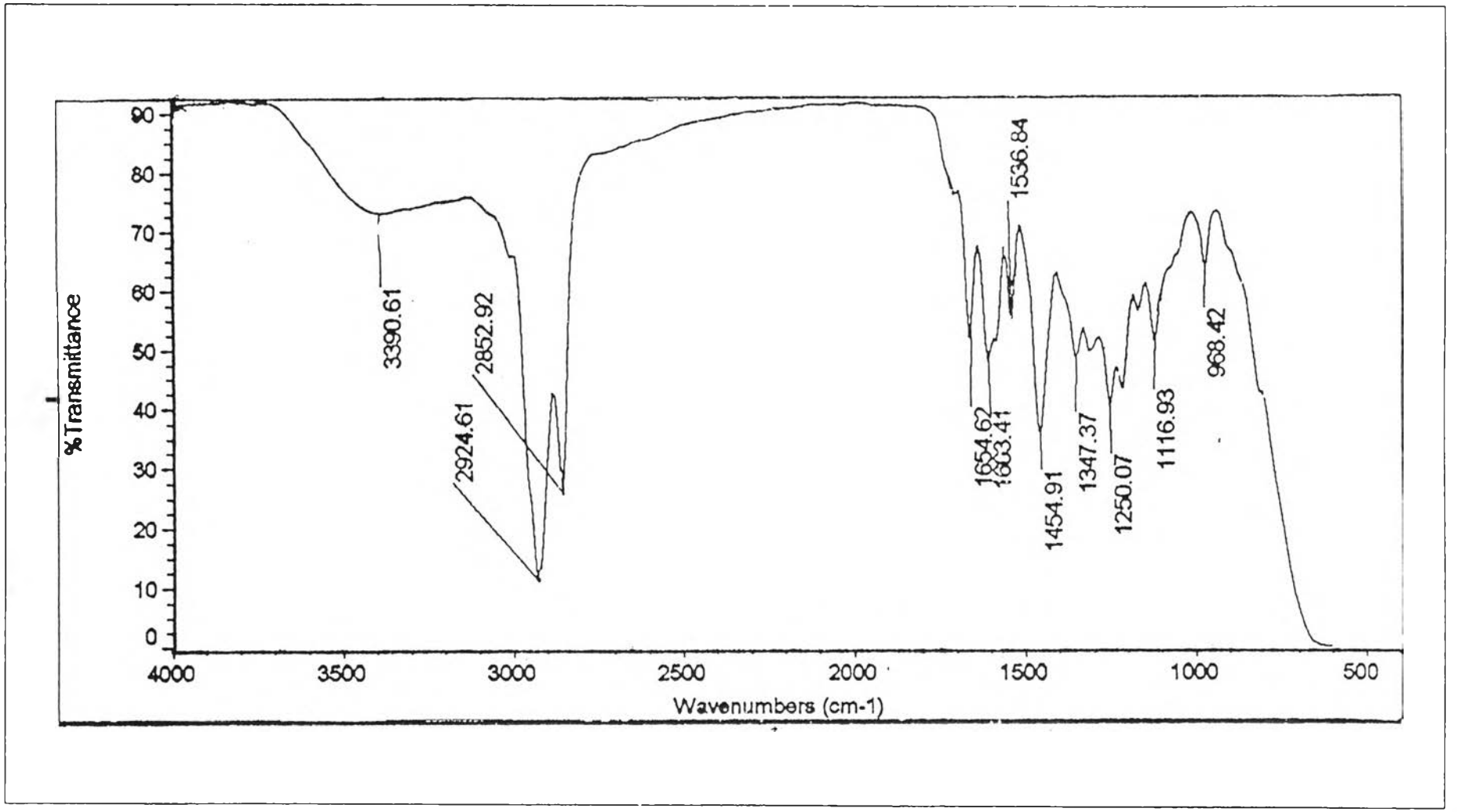

Figure C-13 : FT-IR spectrum of marker dye C_3

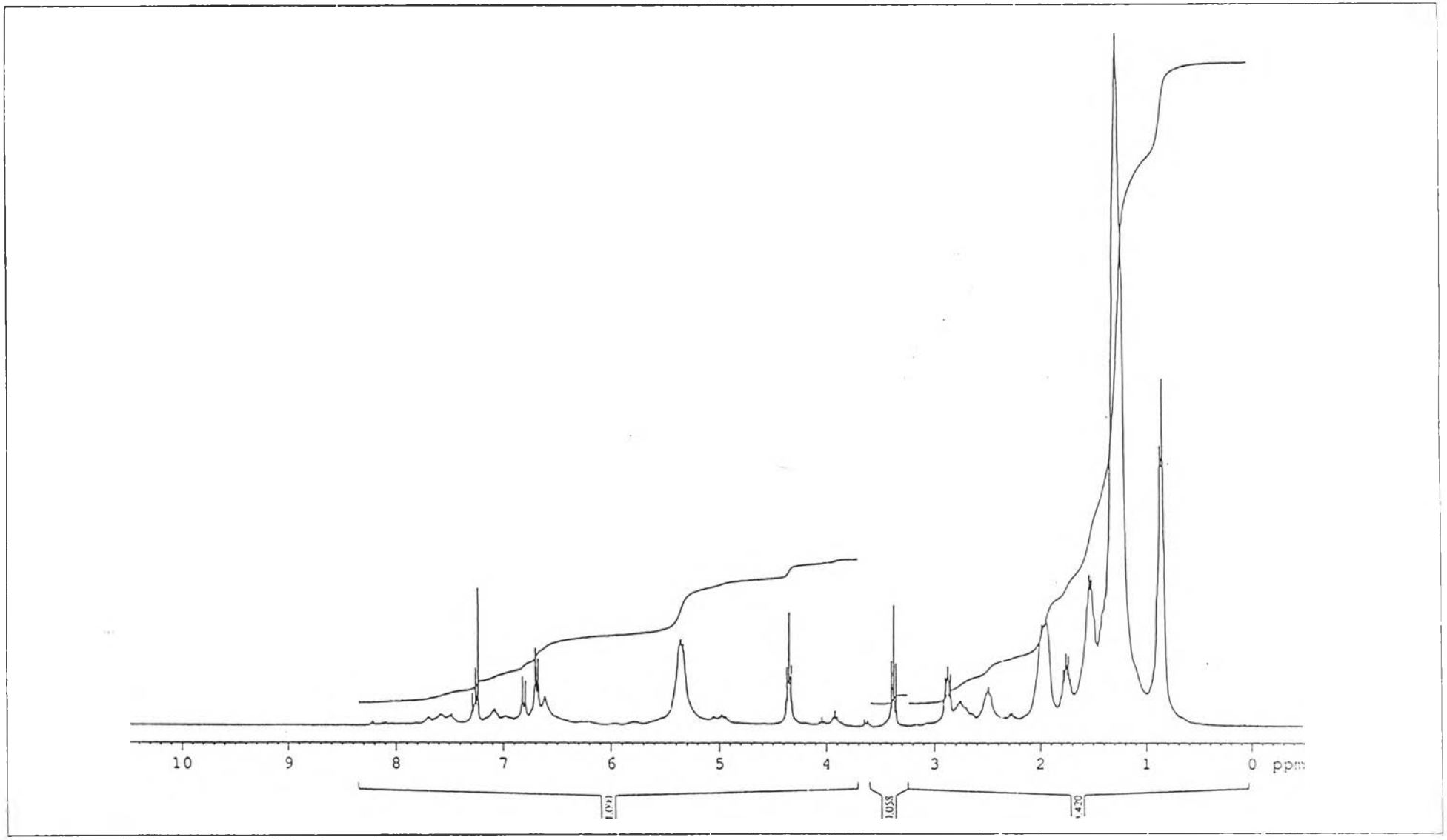

Figure C-14 : ^{1}H-NMR spectrum of marker dye C_3

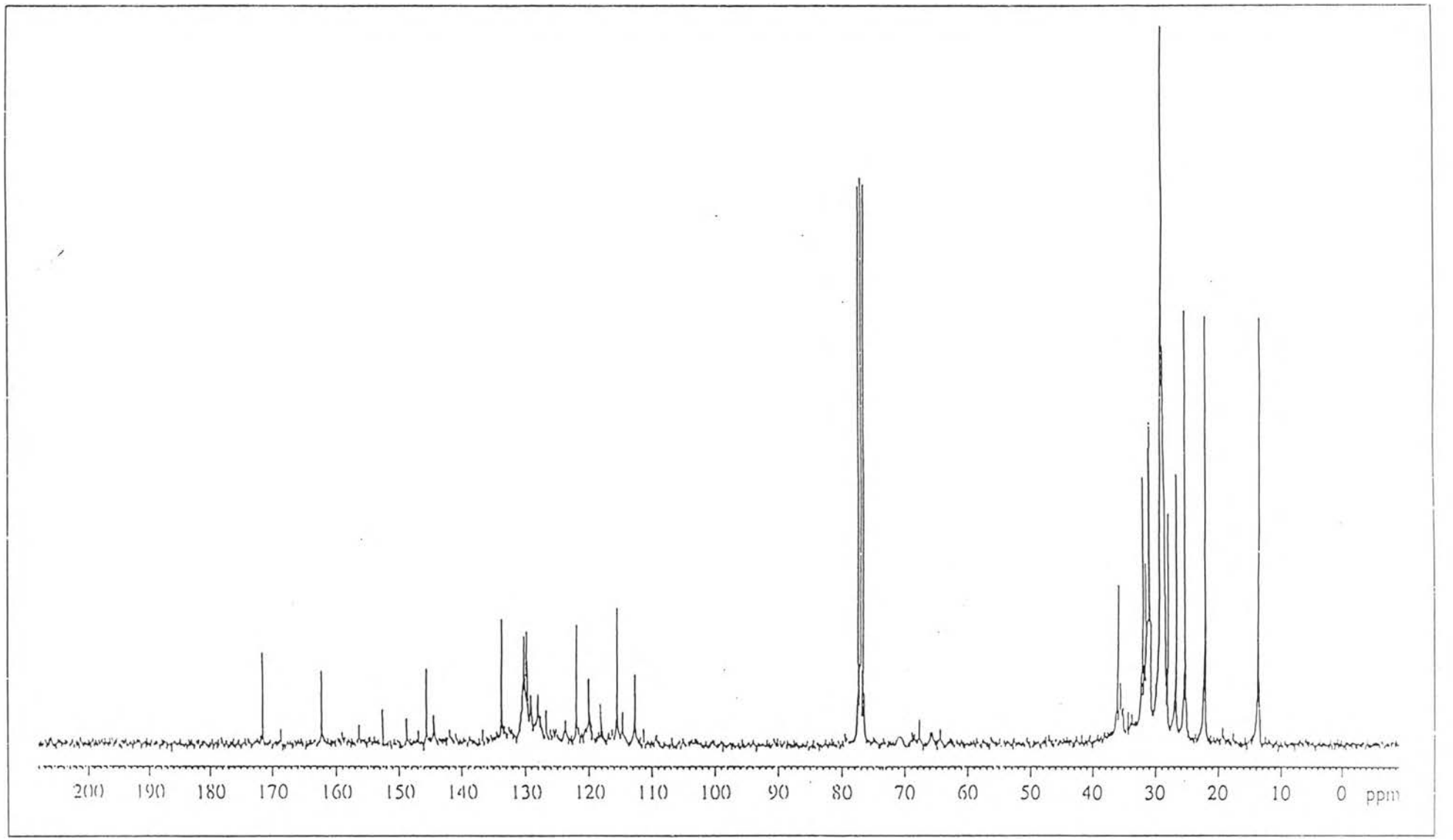

Figure C-15 : ^{13}C-NMR spectrum of marker dye C_3

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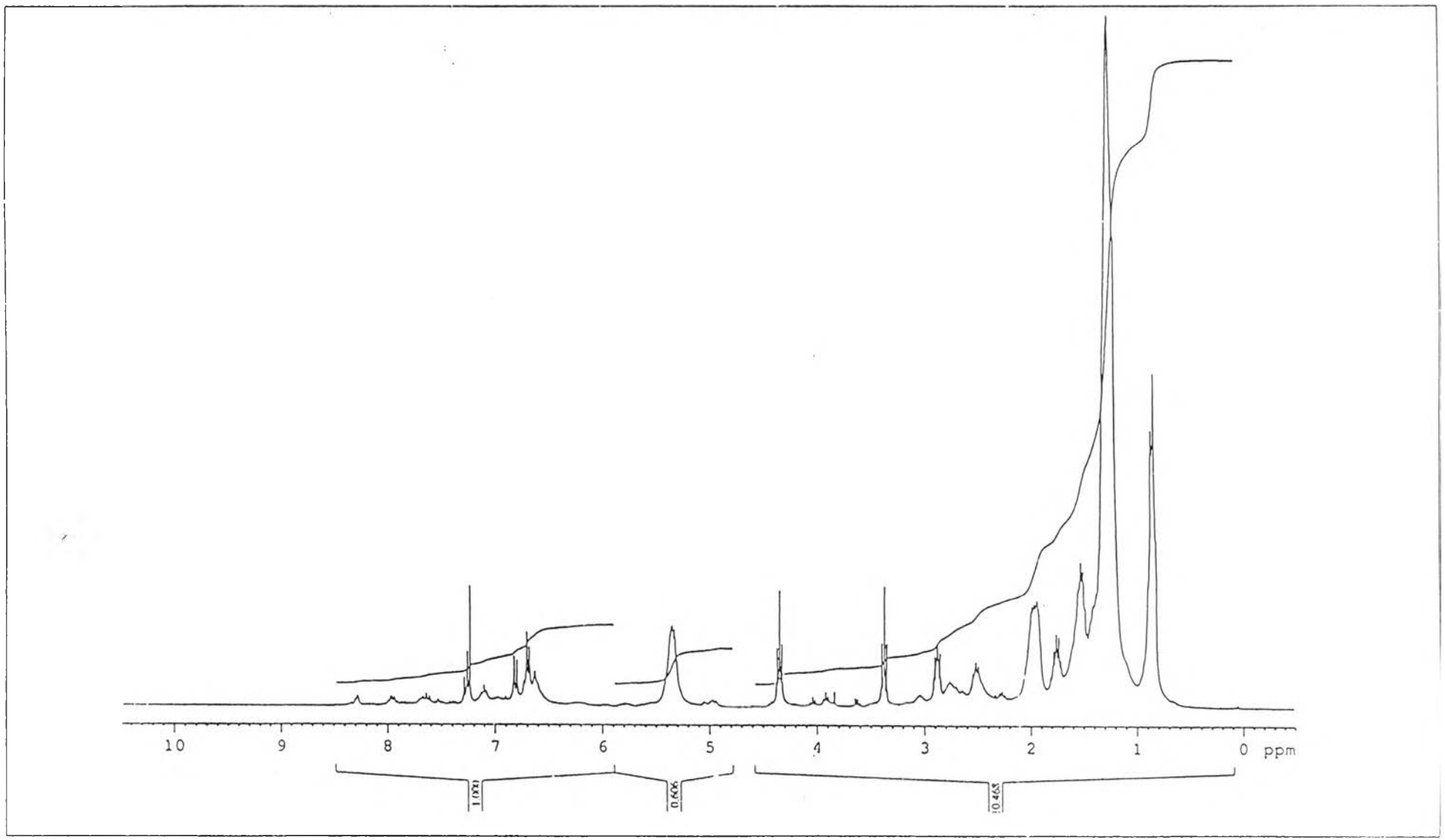

Figure C-17 : ^{1}H-NMR spectrum of marker dye C_4

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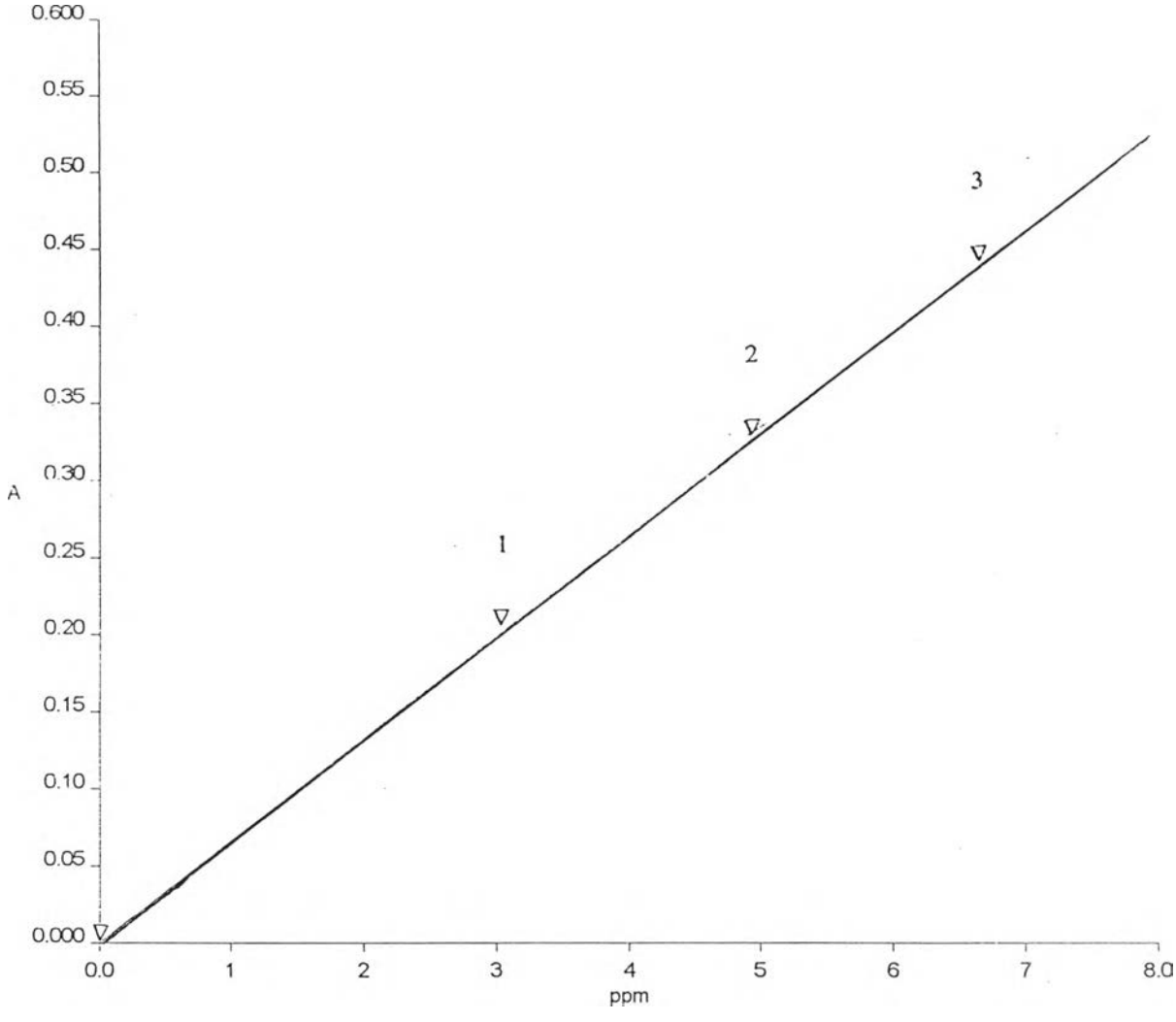
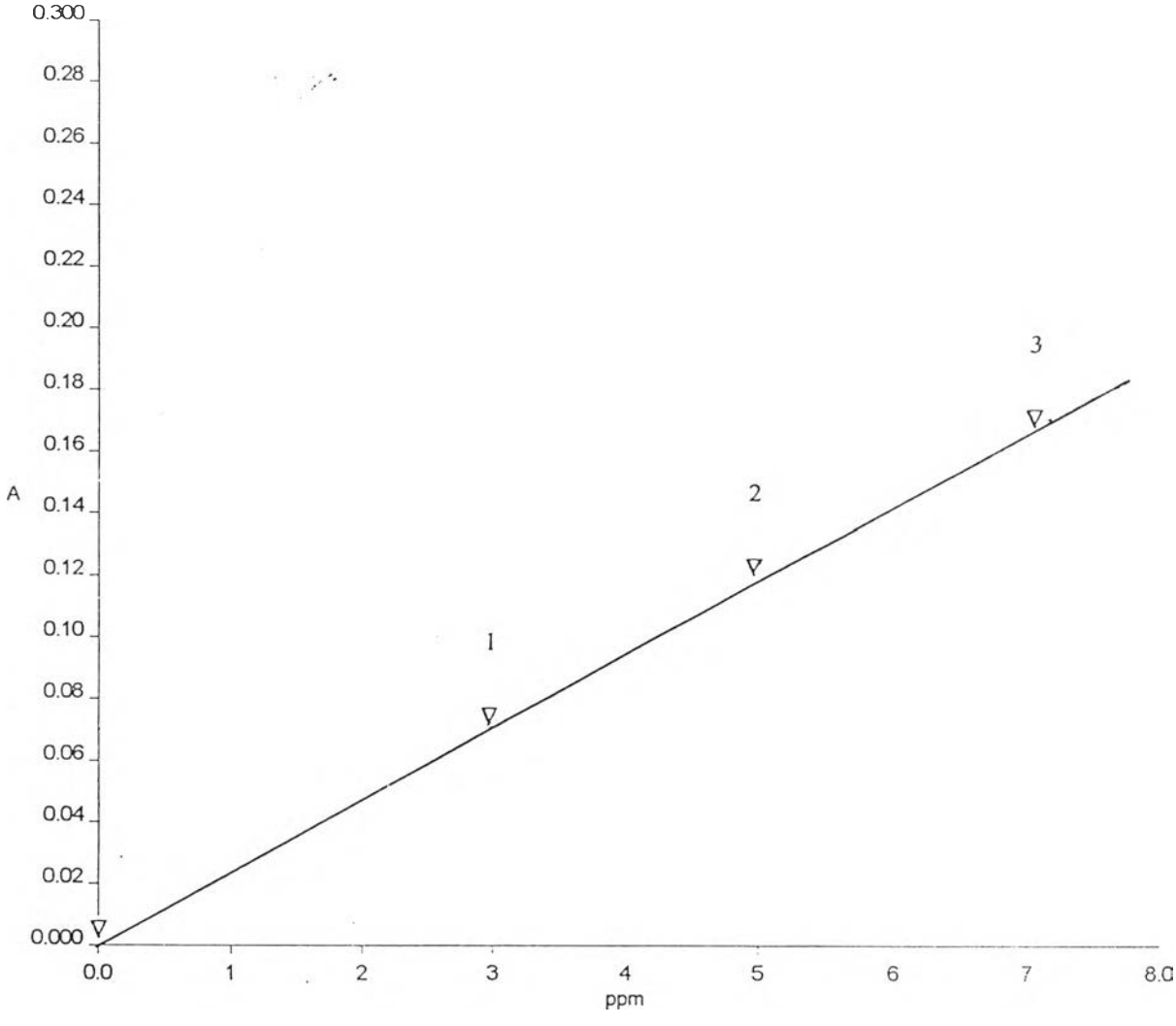


Wavelength (s)	Sample	Concentration	absorbance
526.0	s1b1	3.0000ppm	0.2059
526.0	s1b1	5.0000ppm	0.3265
526.0	s1b1	7.0000ppm	0.4467

Equation : y= 2.337250e-04 + 6.019750e-02*x

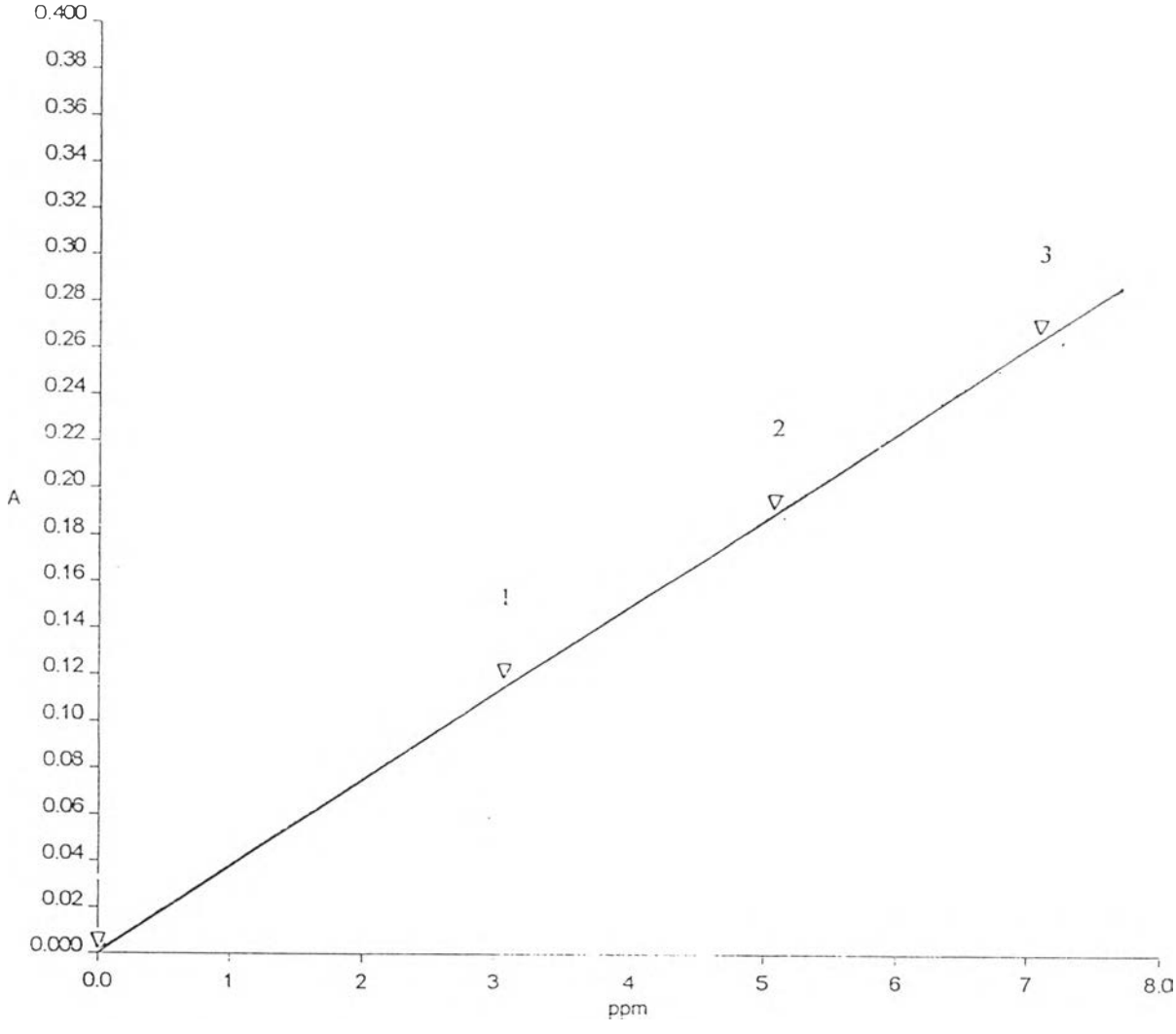
Figure D-1 : The calibration curve of marker dye B_1 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
570.0	s1c1	3.0000ppm	0.0705
570.0	s1c1	5.0000ppm	0.1209
570.0	s1c1	7.0000ppm	0.1713

Equation : y= 2.261500e-04 + 2.520000e-02*x

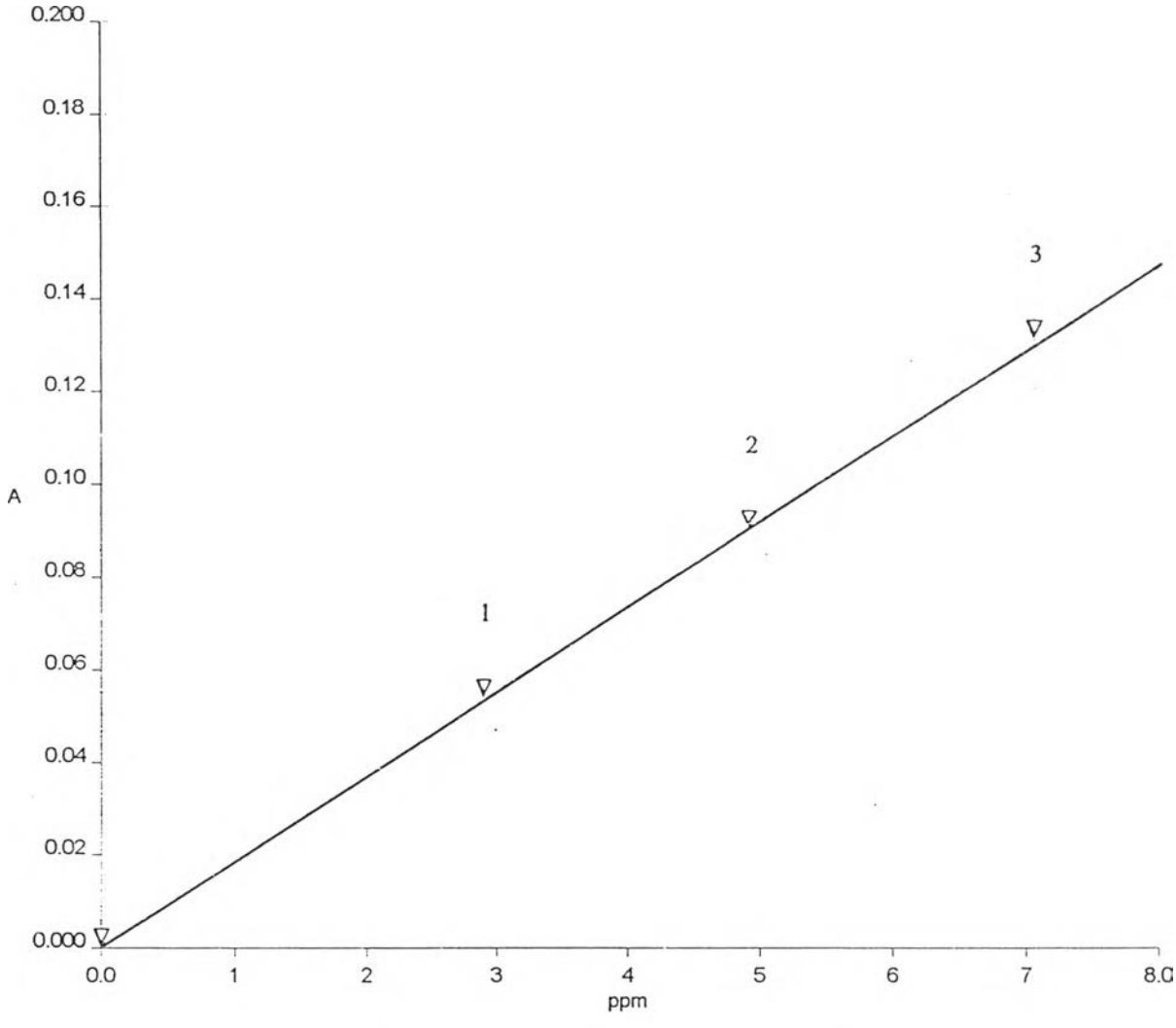
Figure D-2 : The calibration curve of marker dye C_1 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
470.2	s1b2	3.0000ppm	0.1194
470.2	s1b2	5.0000ppm	0.1948
470.2	s1b2	7.0000ppm	0.2702

Equation : y= 2.173823e-04 + 3.770000e-02*x

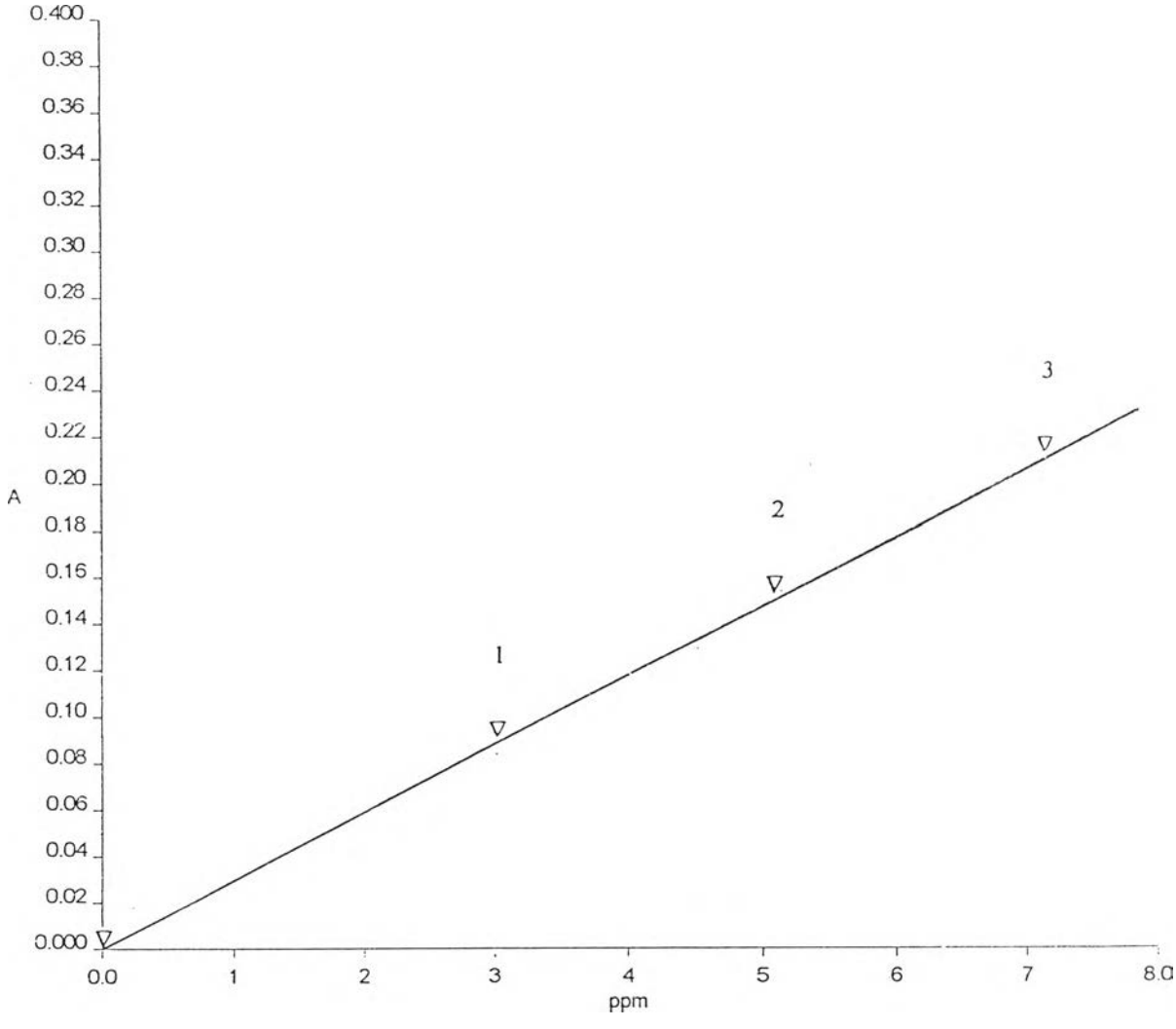
Figure D-3 : The calibration curve of marker dye B_2 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
496.2	s1c2	3.0000ppm	0.0557
496.2	s1c2	5.0000ppm	0.0948
496.2	s1c2	7.0000ppm	0.1318

Equation : y= 1.982000e-04 + 1.902500e-02*x

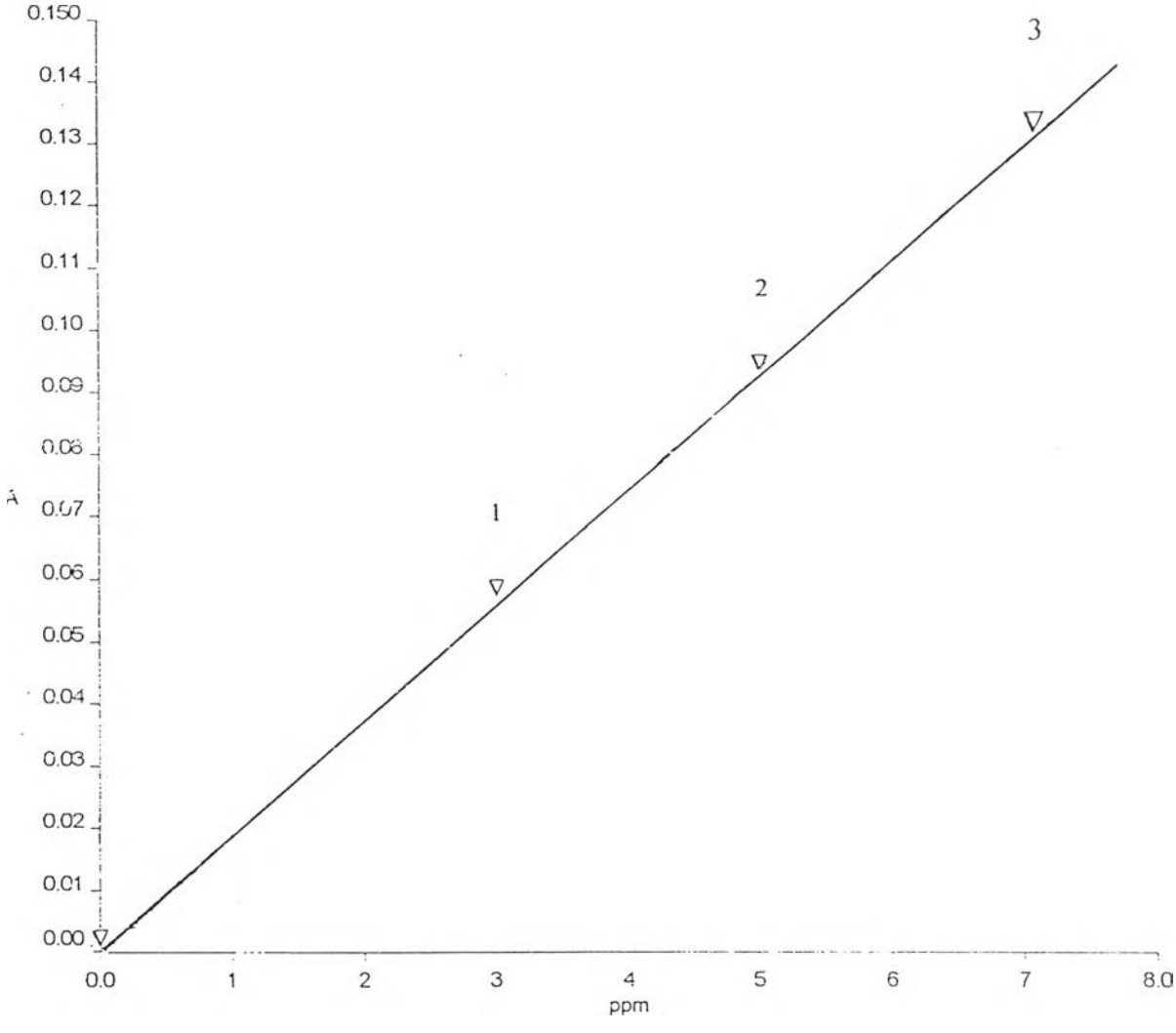
Figure D-4 : The calibration curve of marker dye C_2 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
464.8	s1b3	3.0000ppm	0.0931
464.8	s1b3	5.0000ppm	0.156
464.8	s1b3	7.0000ppm	0.2188

Equation : y= 2.132103e-04 + 3.142500e-02*x

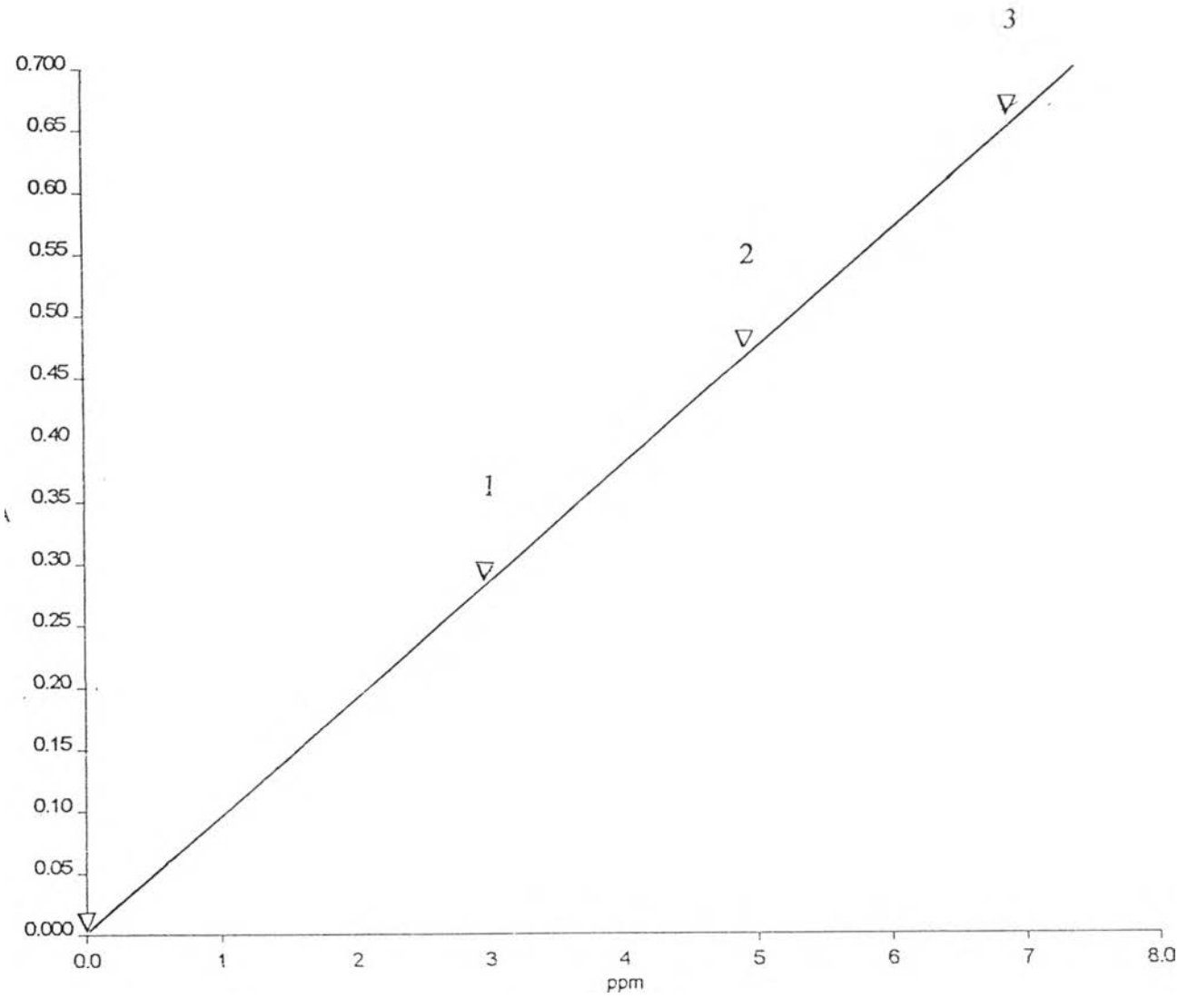
Figure D-5 : The calibration curve of marker dye B_3 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
498.2	s1c3	3.0000ppm	0.0572
498.2	s1c3	5.0000ppm	0.0937
498.2	s1c3	7.0000ppm	0.1301

Equation : y= 2.134000e-04 + 1.822500e-02*x

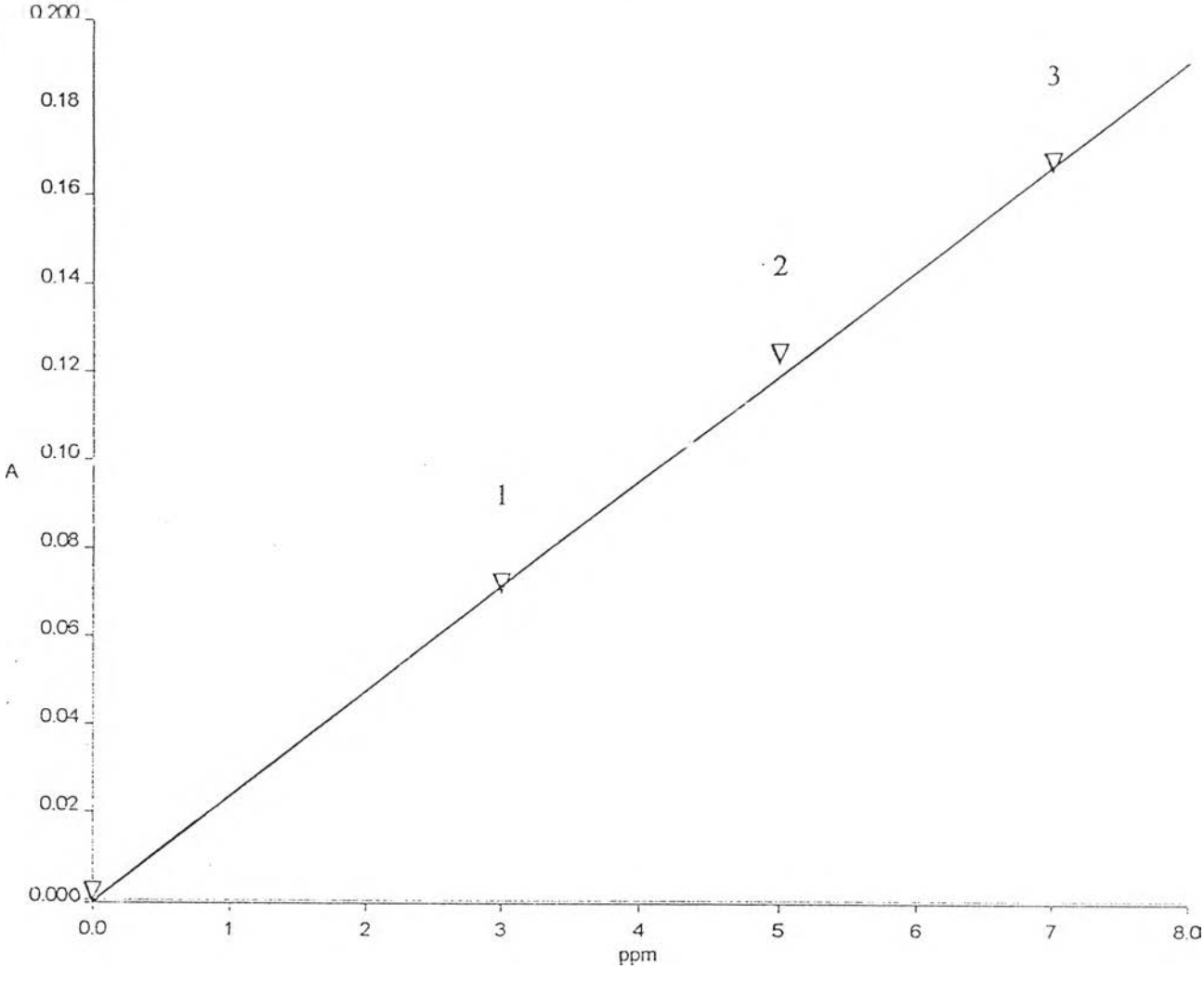
Figure D-6 : The calibration curve of marker dye C_1 extracted with solvent I



Wavelength (s)	Sample	Concentration	absorbance
449.9	s1b4	3.0000ppm	0.2895
449.9	s1b4	5.0000ppm	0.4696
449.9	s1b4	7.0000ppm	0.6494

Equation : y= 1.188266e-04 + 9.110000e-02*x

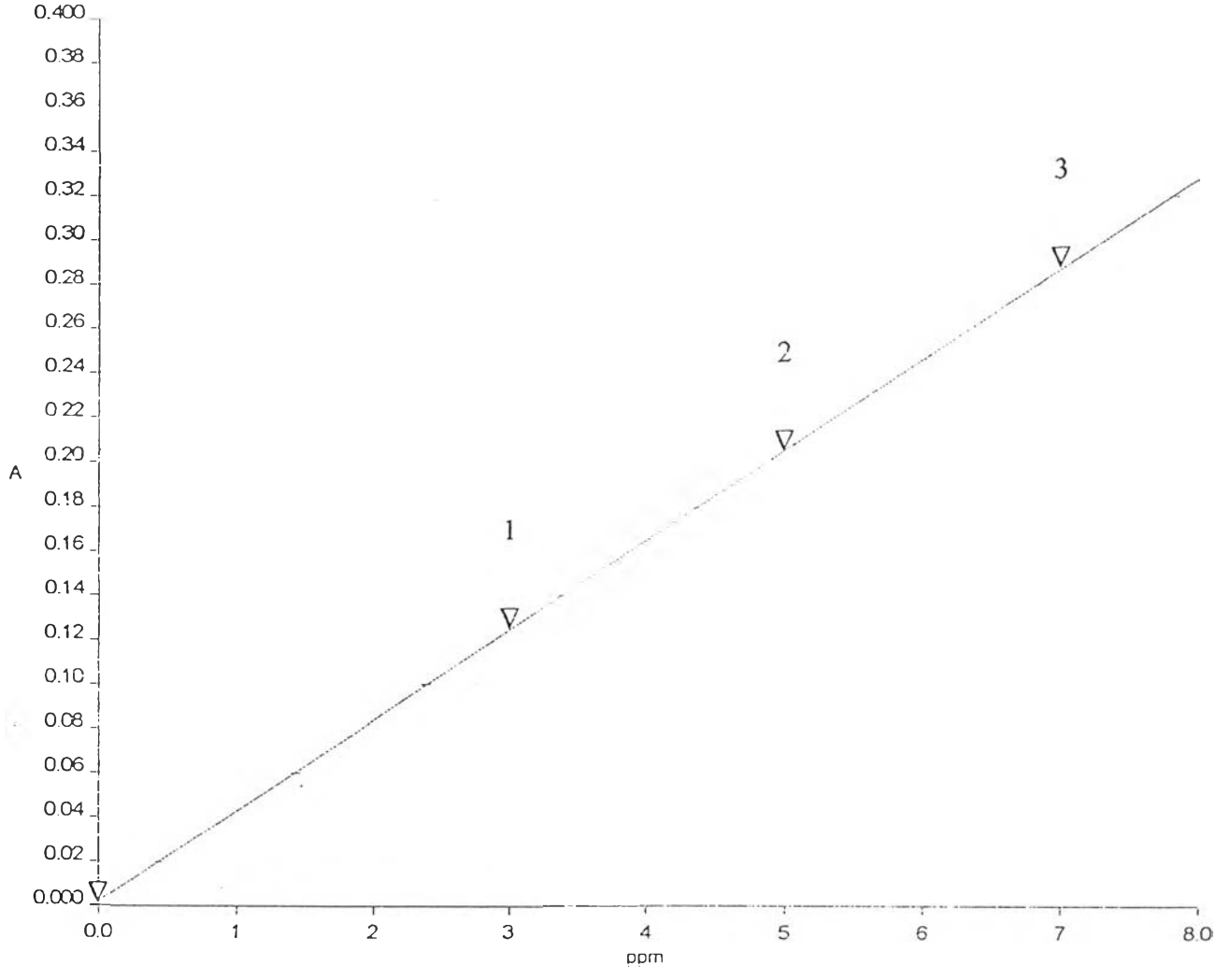
Figure D-7 : The calibration curve of marker dye B_4 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
486.8	s1c4	3.0000ppm	0.0718
486.8	s1c4	5.0000ppm	0.1200
486.8	s1c4	7.0000ppm	0.1608

Equation : y= 2.232418e-04 + 2.225000e-02*x

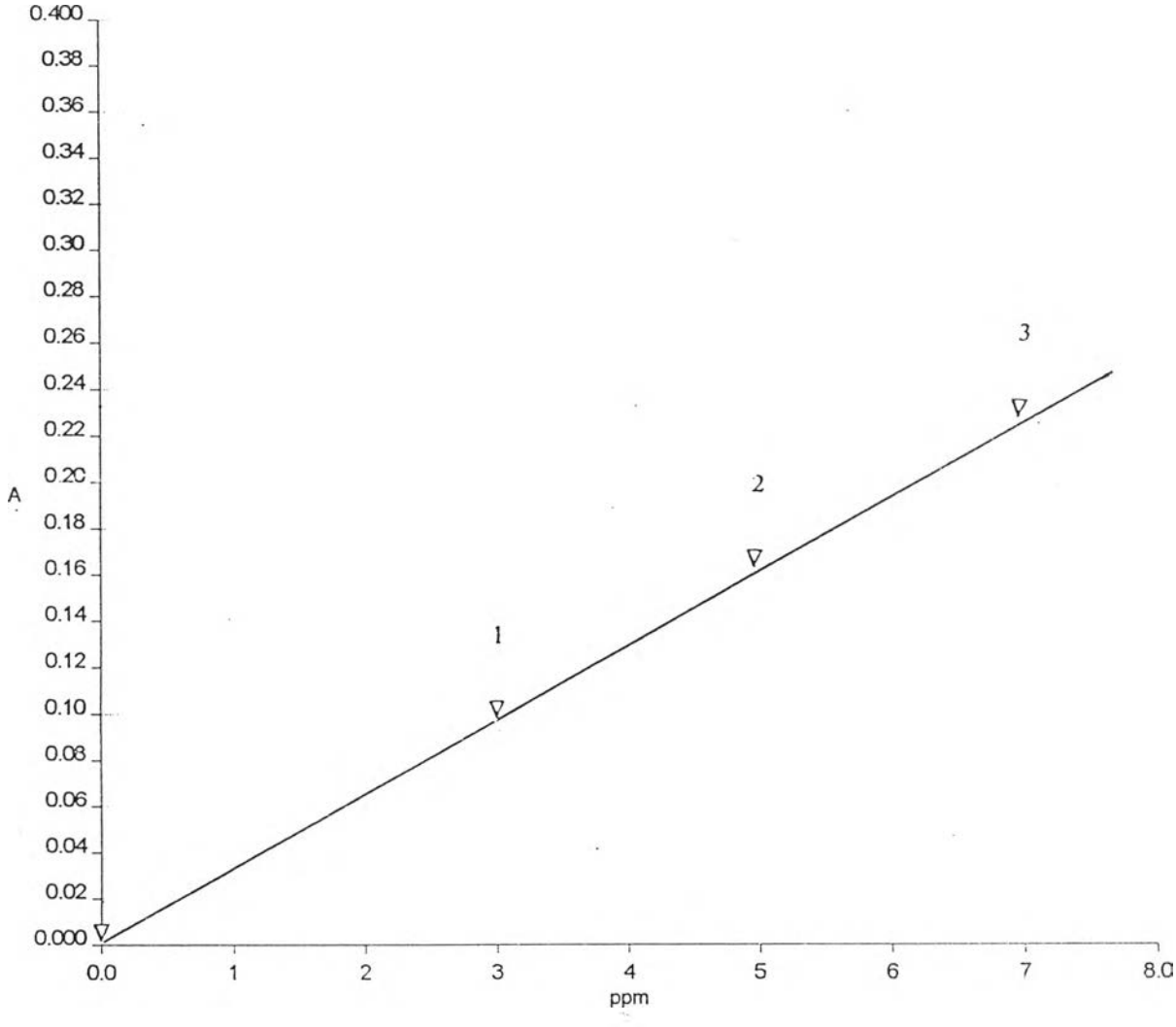
Figure D-8 : The calibration curve of marker dye C_4 extracted with solvent 1



Wavelength (s)	Sample	Concentration	absorbance
530.8	s2b1	3.0000ppm	0.1262
530.8	s2b1	5.0000ppm	0.2077
530.8	s2b1	7.0000ppm	0.2893

Equation : y= 1.110112e-04 + 4.077500e-02*x

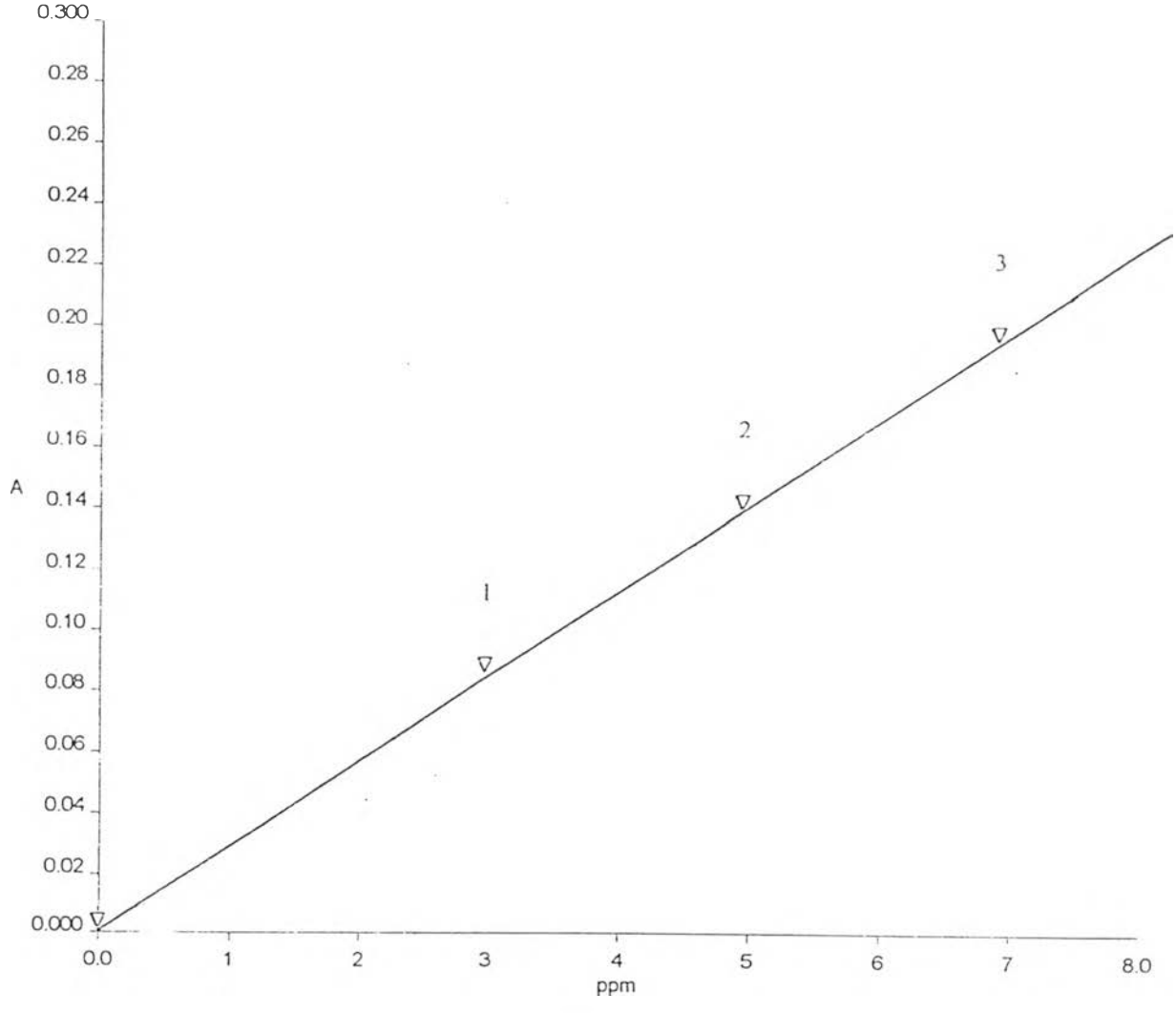
Figure D-9 : The calibration curve of marker dye B_1 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
570.0	s2c1	3.0000ppm	0.1010
570.0	s2c1	5.0000ppm	0.1662
570.0	s2c1	7.0000ppm	0.2324

Equation : y= 1.231821e-04 + 3.285102e-02*x

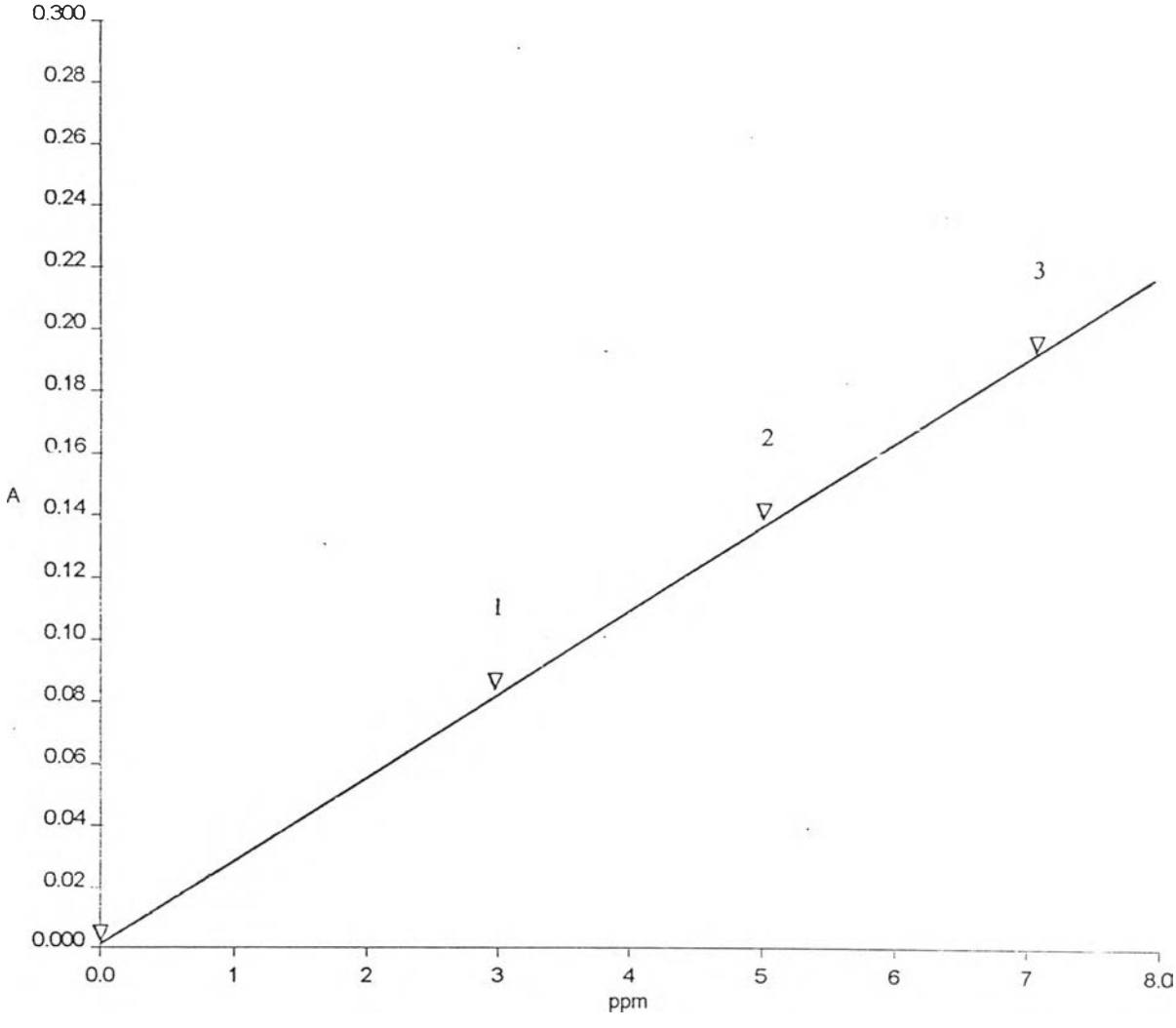
Figure D-10 : The calibration curve of marker dye C_1 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
471.2	s2b2	3.0000ppm	0.0876
471.2	s2b2	5.0000ppm	0.1415
471.2	s2b2	7.0000ppm	0.1953

Equation : y= 1.18263e-04 + 2.692500e-02*x

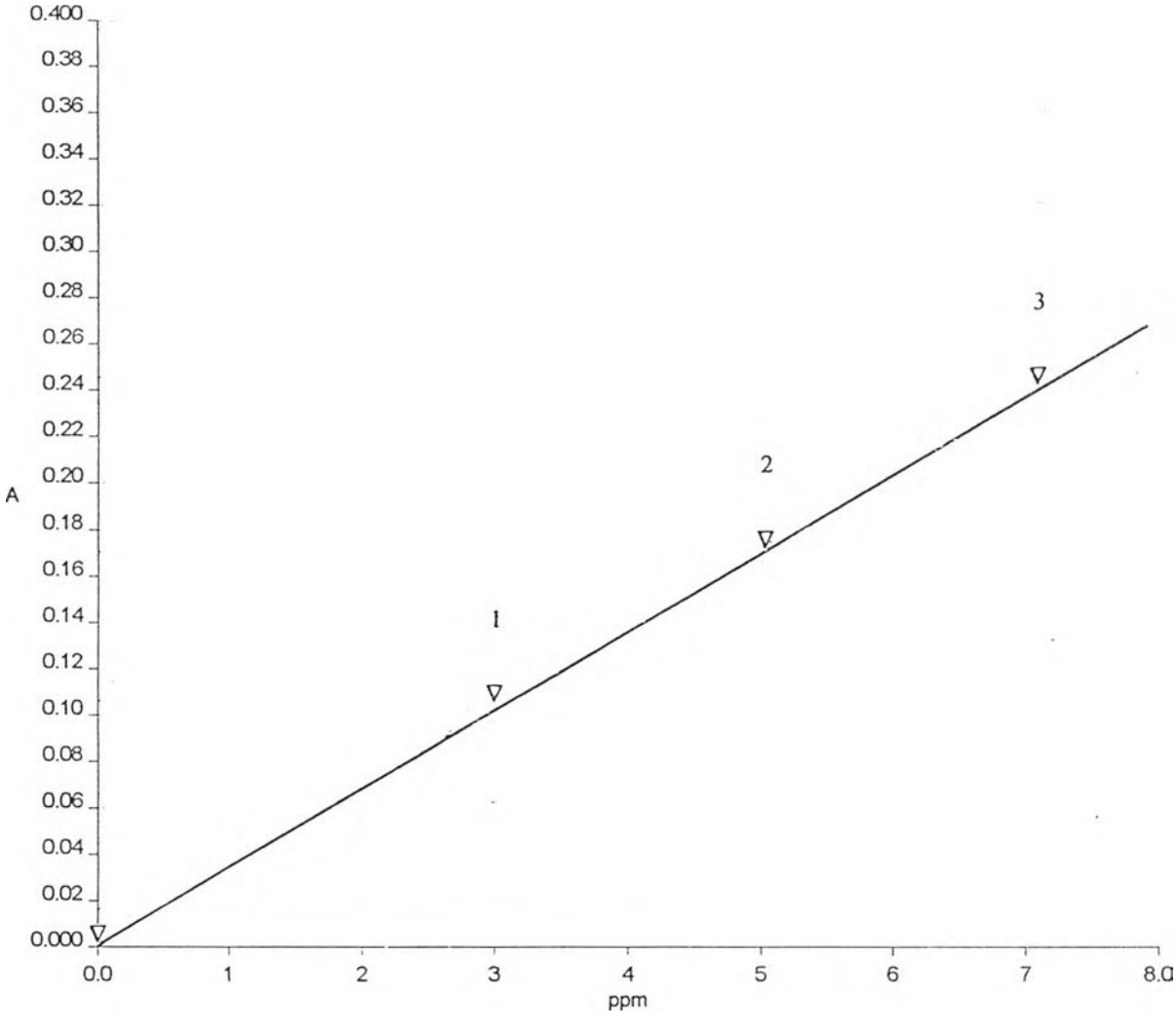
Figure D-11 : The calibration curve of marker dye B_2 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
498.2	s2c2	3.0000ppm	0.0839
498.2	s2c2	5.0000ppm	0.1383
498.2	s2c2	7.0000ppm	0.1907

Equation : y= 2.373231e-04 + 2.670000e-02*x

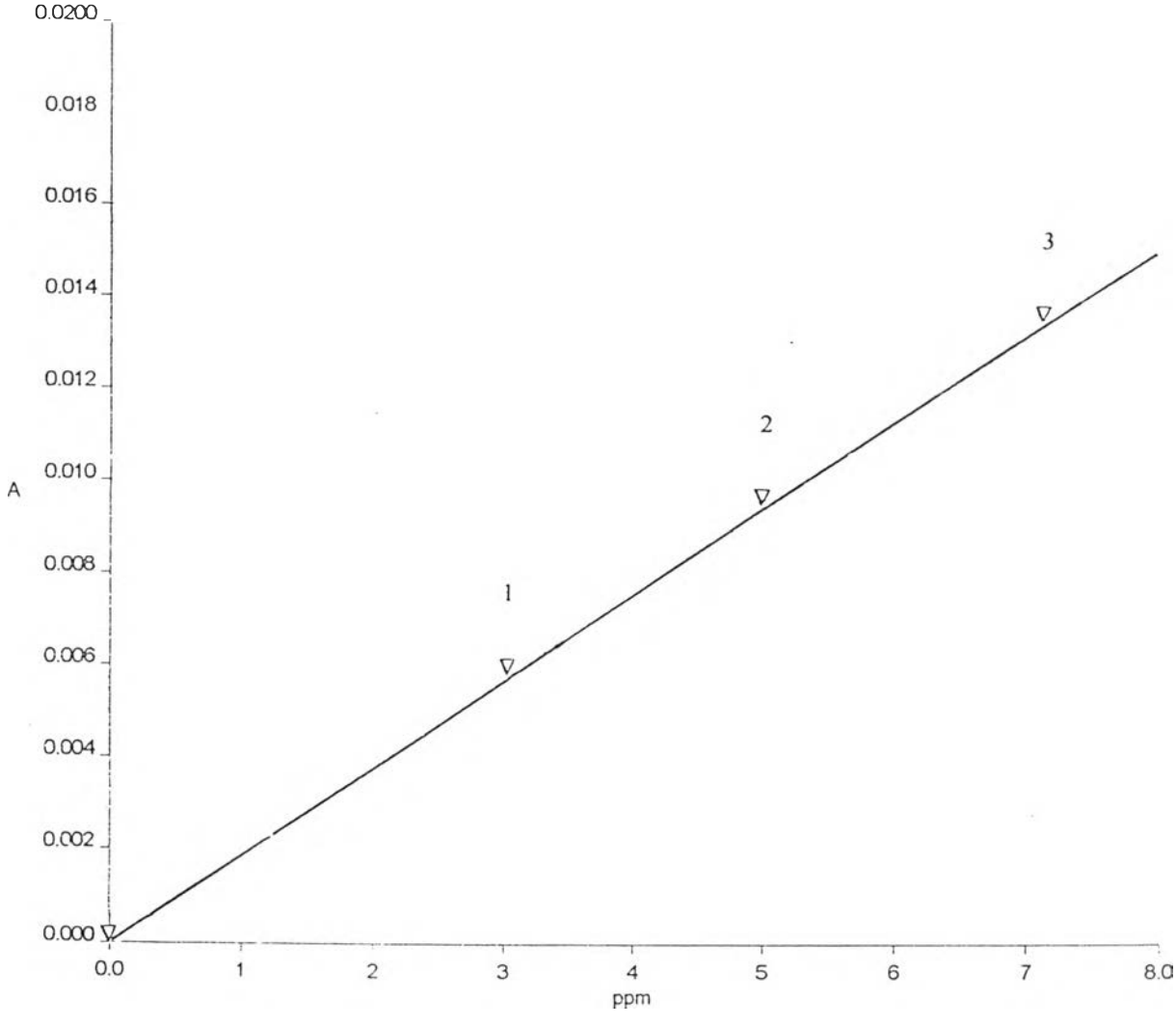
Figure D-12 : The calibration curve of marker dye C_2 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
467.9	s2b3	3.0000ppm	0.1073
467.9	s2b3	5.0000ppm	0.1747
467.9	s2b3	7.0000ppm	0.2421

Equation : y= 1.134721e-04 + 3.371300e-02*x

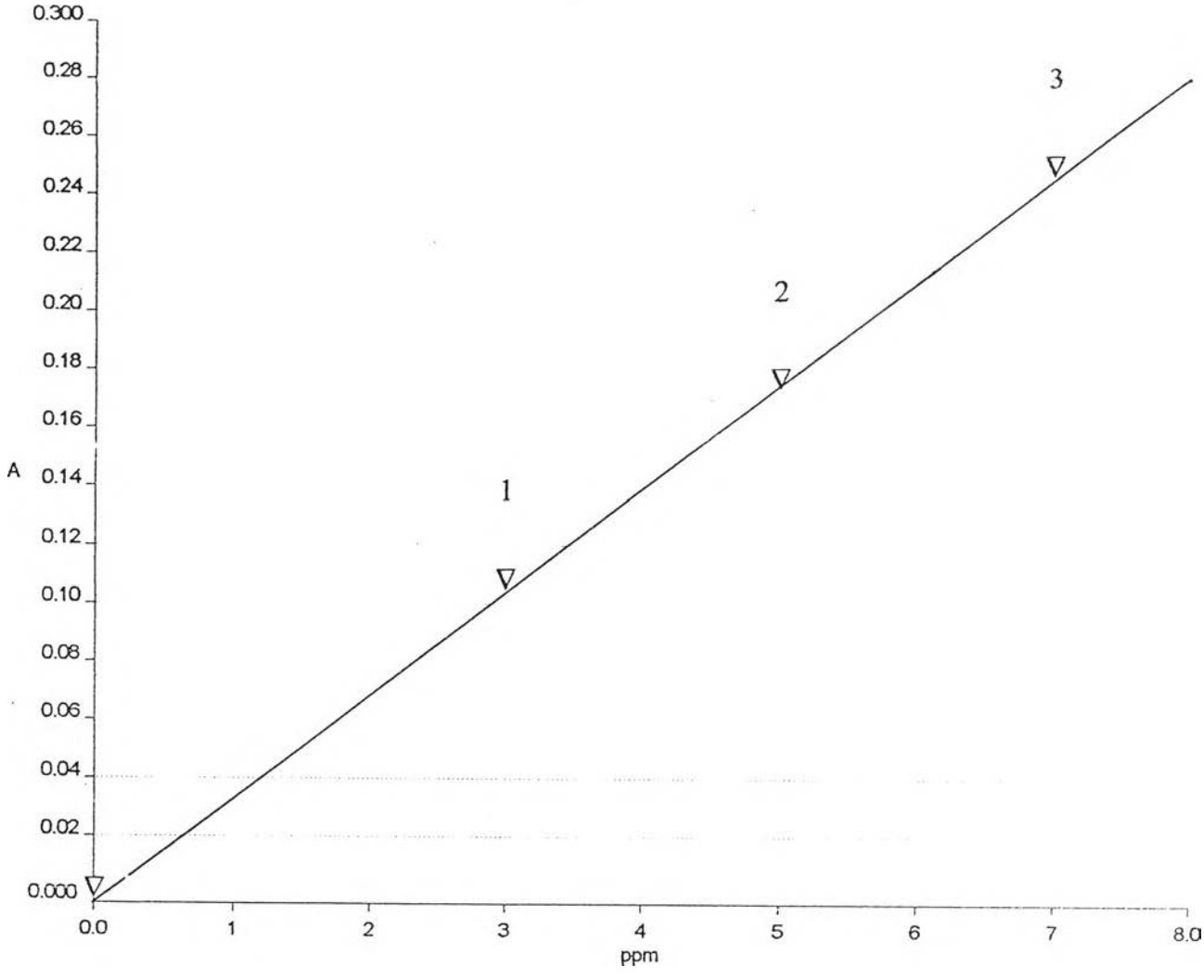
Figure D-13 : The calibration curve of marker dye B_3 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
498.9	s2c3	3.0000ppm	0.0573
498.9	s2c3	5.0000ppm	0.0915
498.9	s2c3	7.0000ppm	0.135

Equation : y= 0.091217e-05 + 1.942510e-02*x

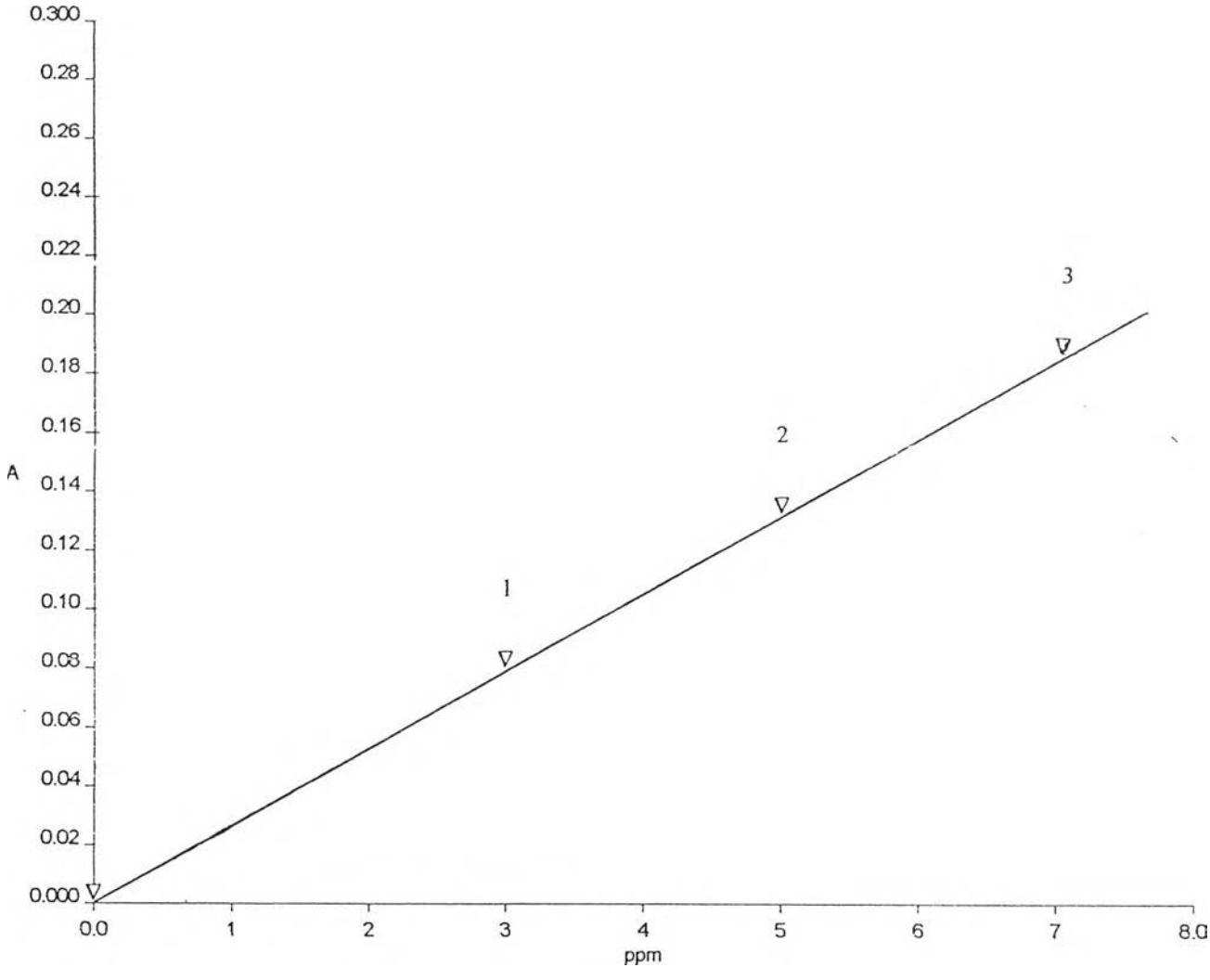
Figure D-14 : The calibration curve of marker dye C_3 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
467.2	s2b4	3.0000ppm	0.104
467.2	s2b4	5.0000ppm	0.1731
467.2	s2b4	7.0000ppm	0.2422

Equation : y= 0.810936e-05 + 3.455013e-02*x

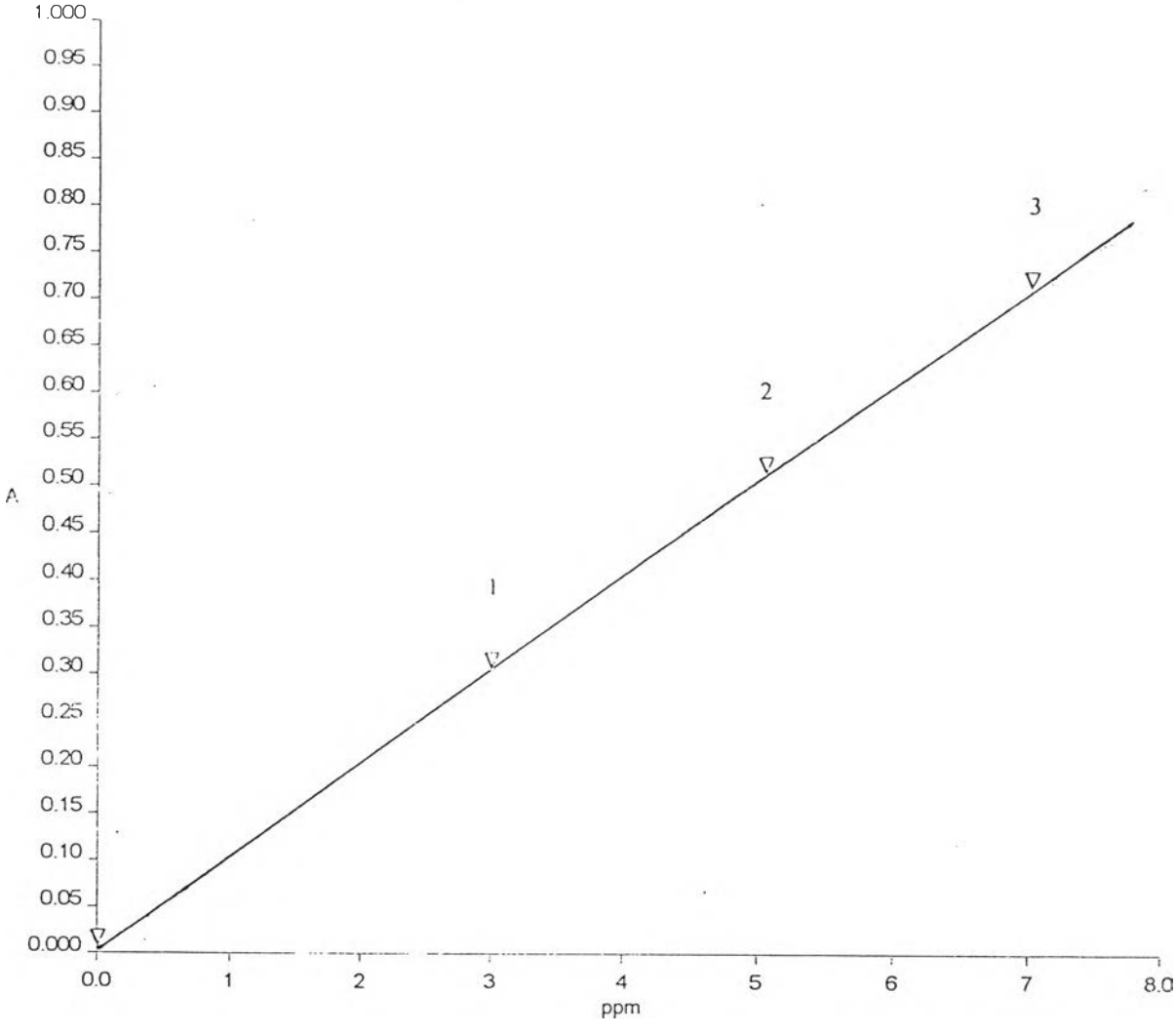
Figure D-15 : The calibration curve of marker dye B_4 extracted with solvent 2



Wavelength (s)	Sample	Concentration	absorbance
490.1	s2c4	3.0000ppm	0.0805
490.1	s2c4	5.0000ppm	0.1372
490.1	s2c4	7.0000ppm	0.1895

Equation : y= 1.089617e-04 + 2.725162e-02*x

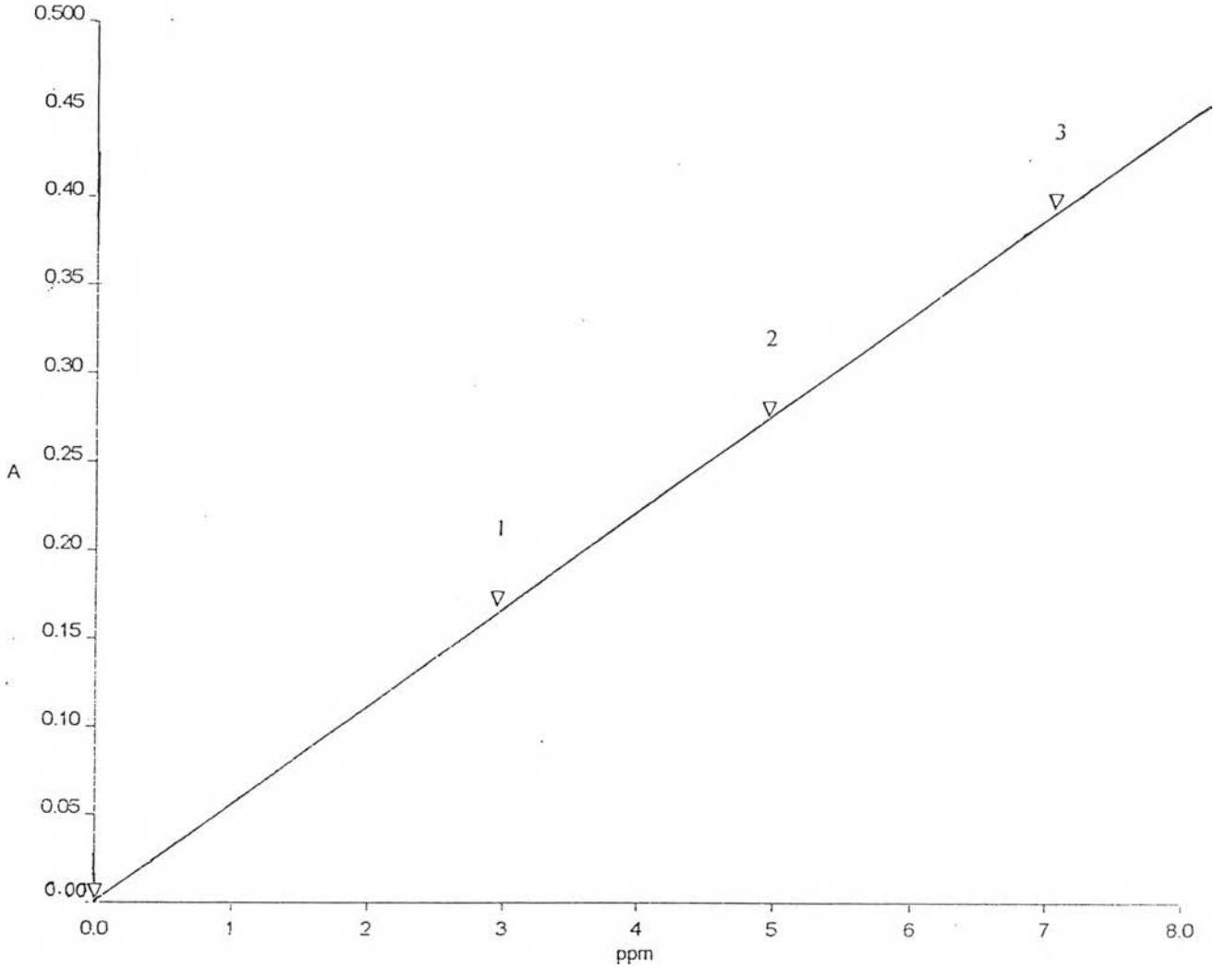
Figure D-16 : The calibration curve of marker dye C_4 extracted with solvent 2



Wavelength (s)	Sample	Concentration	Absorbance
528.3	s3b1	3.0000ppm	0.3000
528.3	s3b1	5.0000ppm	0.5016
528.3	s3b1	7.0000ppm	0.701

Equation y= 1.382161e-04 + 1.002500e-02 * x

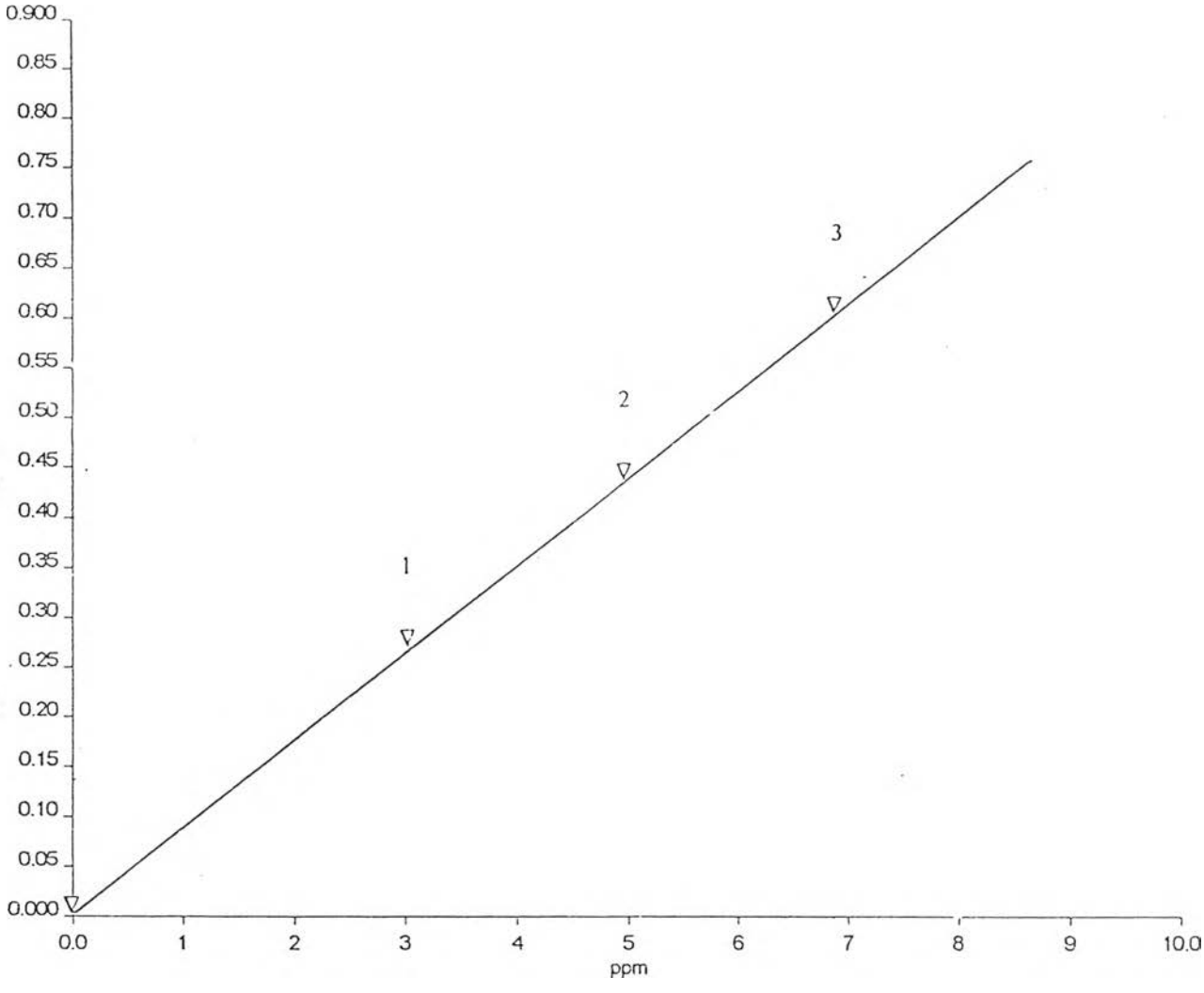
Figure D-17 : The calibration curve of marker dye B_1 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
581.7	s3c1	3.0000ppm	0.1713
581.7	s3c1	5.0000ppm	0.2821
581.7	s3c1	7.0000ppm	0.3928

Equation y= 1.070950e-04 + 5.5375060e-02 * x

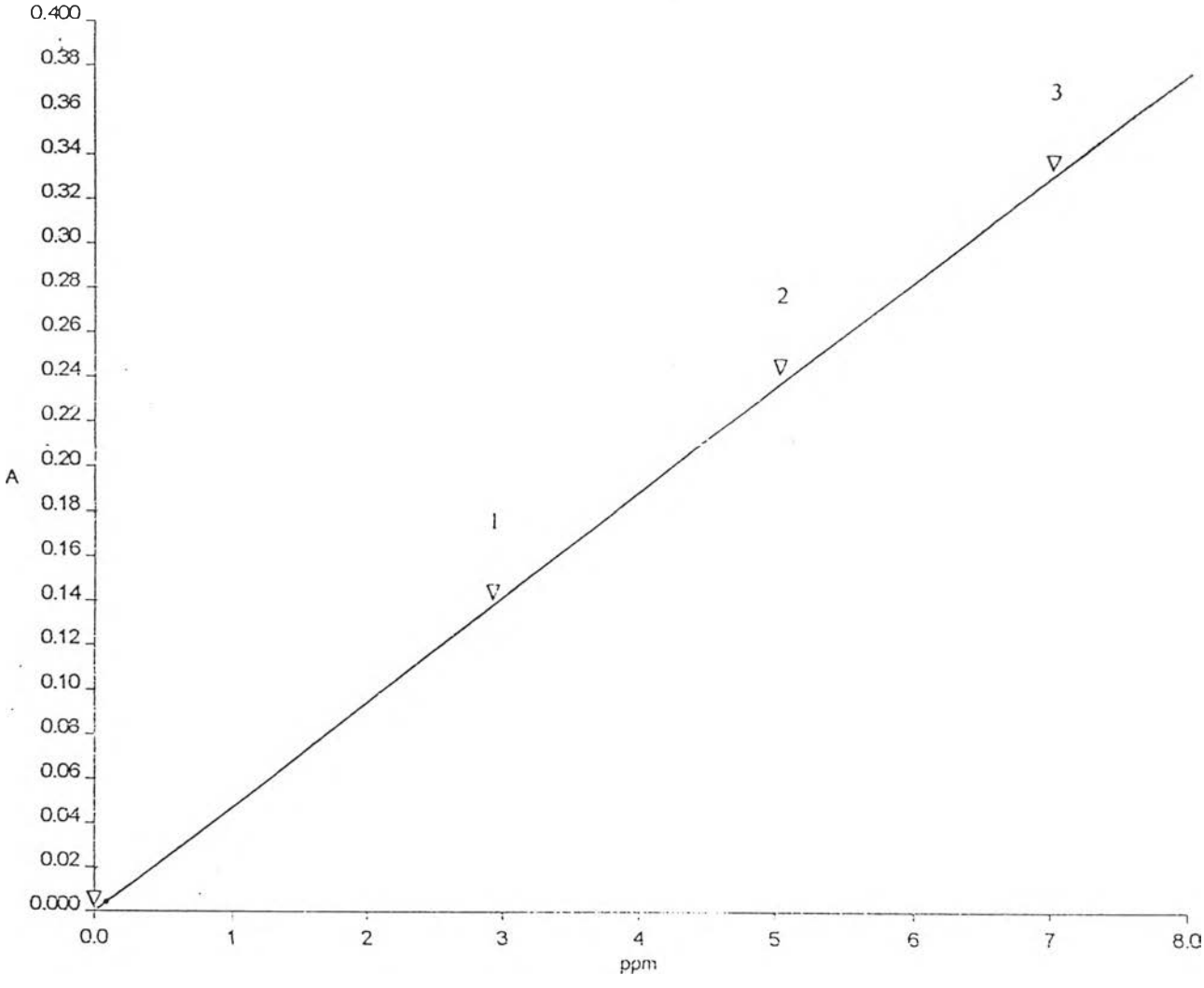
Figure D-18 : The calibration curve of marker dye C_1 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
465.8	s3b2	3.0000ppm	0.2724
465.8	s3b2	5.0000ppm	0.4427
465.8	s3b2	7.0000ppm	0.6128

Equation y= 1.367182e-04 + 8.510000e-02 * x

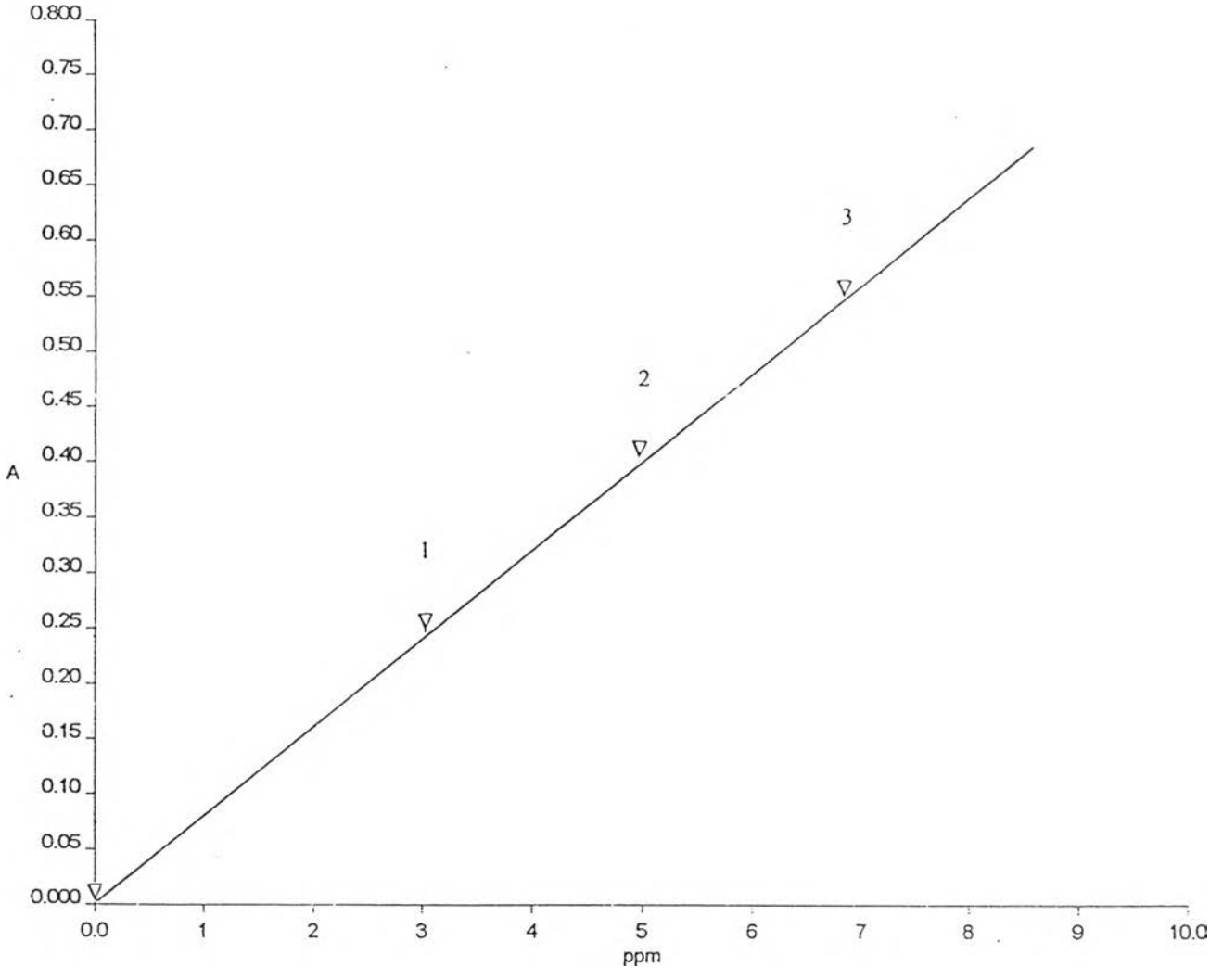
Figure D-19 : The calibration curve of marker dye B_2 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
500.6	s3c2	3.0000ppm	0 1425
500.6	s3c2	5.0000ppm	0.2409
500.6	s3c2	7.0000ppm	0 3393

Equation y= 1.932716e-04 + 4.921281e-02 * x

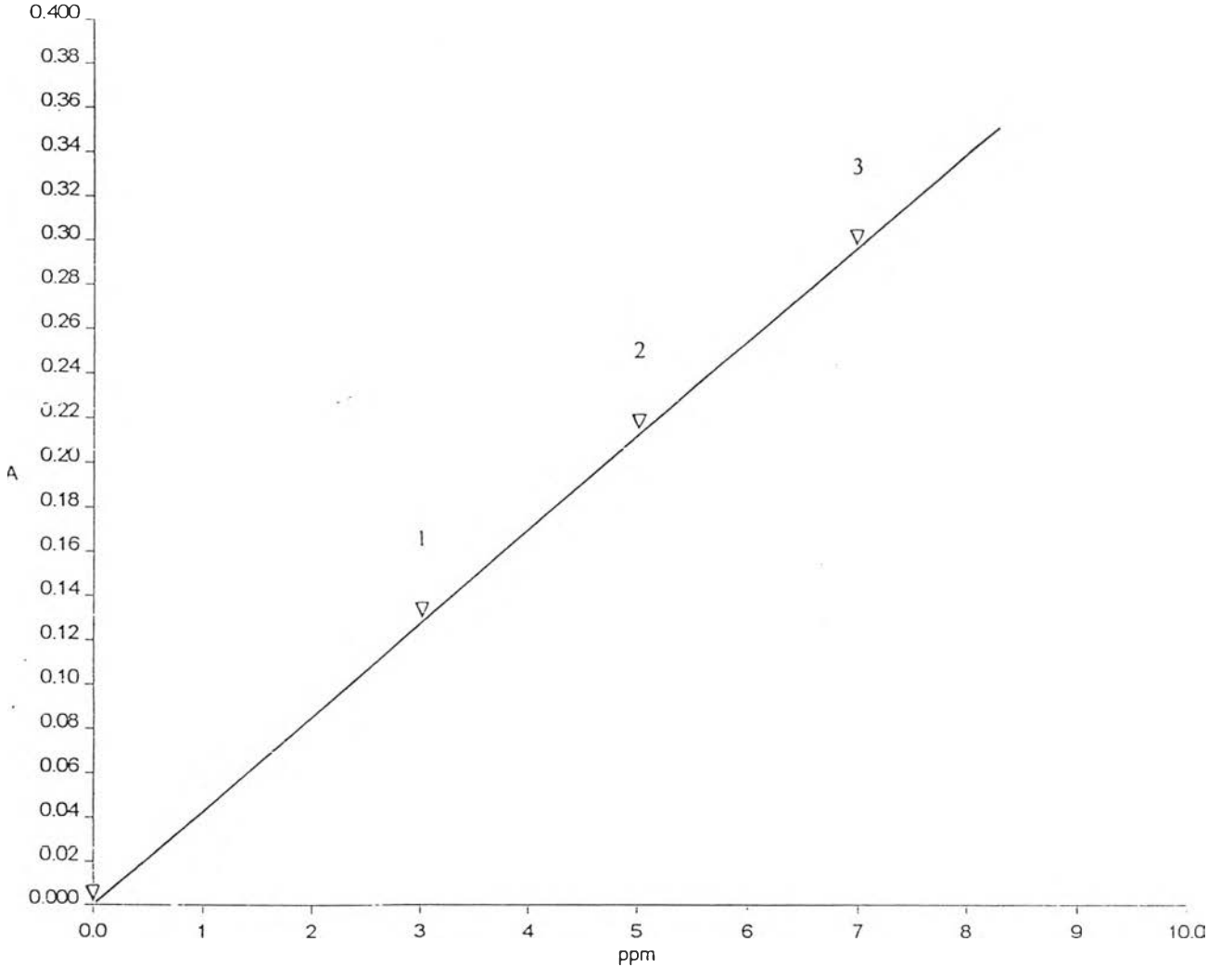
Figure D-20 : The calibration curve of marker dye C_2 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
465.9	s3b3	3.0000ppm	0.2461
465.9	s3b3	5.0000ppm	0.4072
465.9	s3b3	7.0000ppm	0.5683

Equation y= 1.705162e-04 + 8.055161e-02 * x

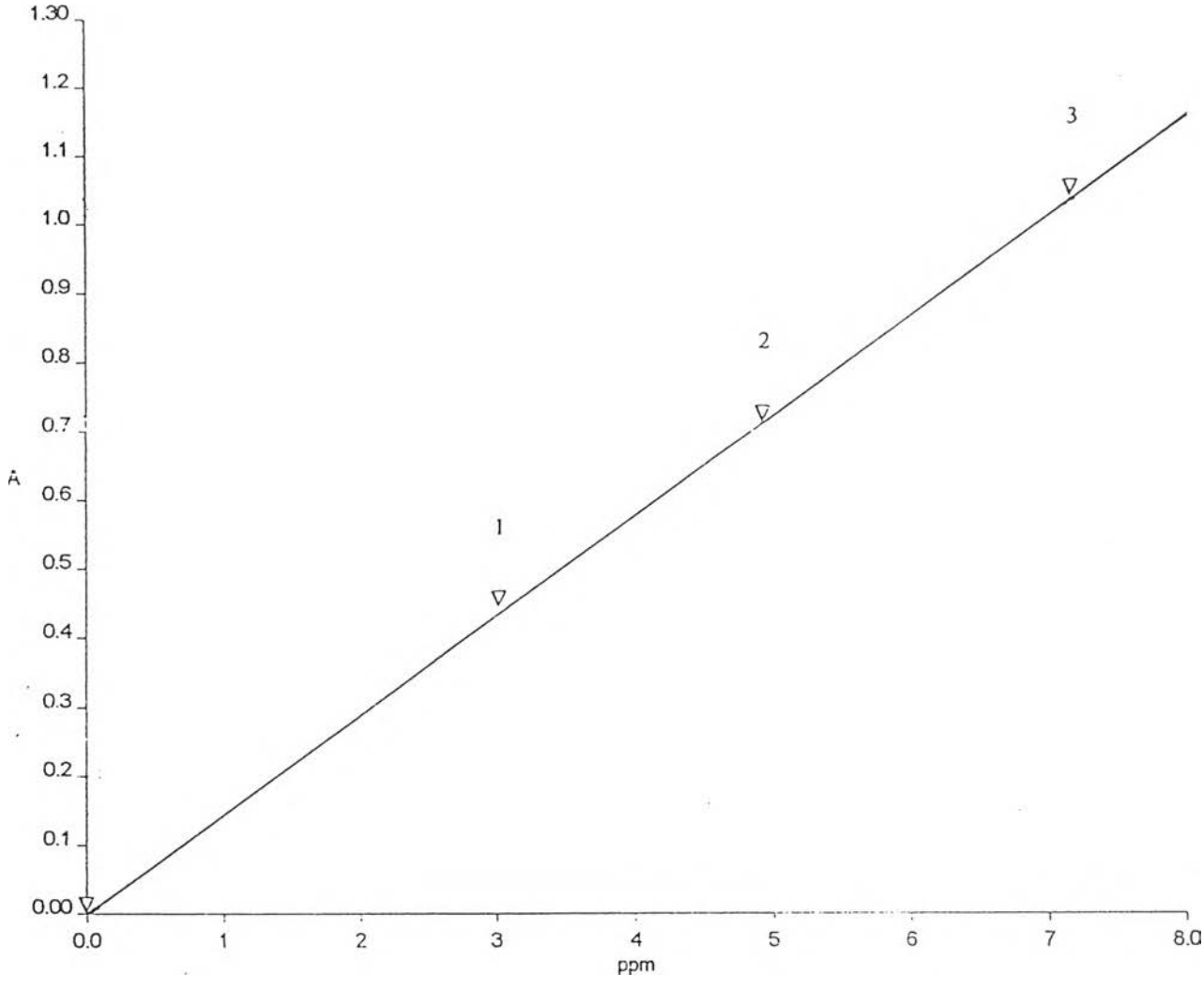
Figure D-21 : The calibration curve of marker dye B_3 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
502.0	s3c3	3.0000ppm	0.1287
502.0	s3c3	5.0000ppm	0.2122
502.0	s3c3	7.0000ppm	0.2956

Equation y= 1.232516e-04 + 4.172501e-02 * x

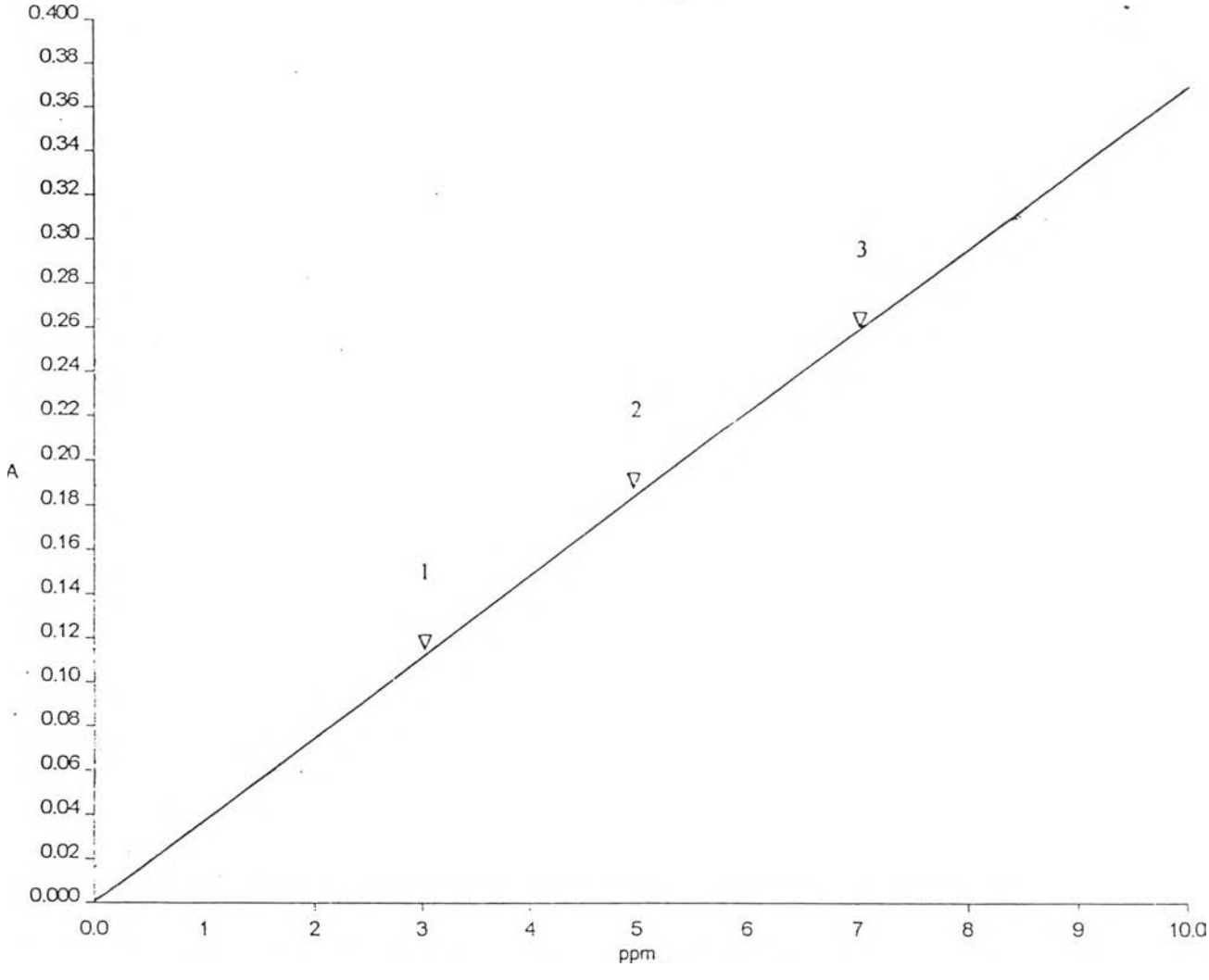
Figure D-22 : The calibration curve of marker dye C_3 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
460.8	s3b4	3.0000ppm	0.4560
460.8	s3b4	5.0000ppm	0.7440
460.8	s3b4	7.0000ppm	1.032

Equation y= 1.021812e-04 + 1.440000e-02* x

Figure D-23 : The calibration curve of marker dye B_4 extracted with solvent 3



Wavelength (s)	Sample	Concentration	Absorbance
492.1	s3c4	3.0000ppm	0.1180
492.1	s3c4	5.0000ppm	0.1895
492.1	s3c4	7.0000ppm	0.2609

Equation y= 1.619800e-04 + 2.572500e-02 * x

Figure D-24 : The calibration curve of marker dye C_4 extracted with solvent 3

VITA

MISS SEWIKA CHONGPIYAWARANG was born on April 3, 1976 in Bangkok, Thailand. She recieved her Bachelor Degree of Science in major Chemistry from Chulalongkorn University in 1996. She continued her study towards her Master Degree at Chulalongkorn University, Program of Petrochemistry and Polymer Science in 1997 and she completed in the Master Degree of Petrochemistry in 1999.