REFERENCES

Bai, L., Masukawa, N., Yamaki, M., and Takag, S. (1998). Four stilbenoids from *Pleione bulbocodioides*. *Phytochemistry, 48*(2), 327-331.

Bi, Z. M., Wang, Z. T., and Xu, L. S. (2004). Chemical constituents of *Dendrobium moniliforme*. *Acta Botanica Sinico, 46*(1), 124-126.

Chang, C. C., Ku, A. F., Tseng, Y. Y., Yang, W. B., Fang, J. M., and Wong, C. H. (2010). 6, 8-Di-*C*-glycosyl flavonoids from *Dendrobium huoshanense*. *Journal of Natural Products, 73*(2), 229-232.

Chang, S. J., Lin, T. H., and Chen, C. C. (2001). Constituents from the stems of *Dendrobium clavatum* var. *aurantiacum*. *Journal of Chinese Medicine, 12*(3), 211-218.

Chansriniyom, C., Ruangrungsi, N., Lipipun, V., Kumamoto, T., and Ishikawa, T. (2009). Isolation of acridone alkaloids and *N*-[(4-monoterpenyloxy)phenylethyl]-substituted sulfur-containing propanamide derivatives from *Glycosmis parva* and their anti-herpes simplex virus activity. *Chemical and Pharmaceutical Bulletin, 57*(11), 1246-1250.

Chanvorachote, P., Kowitdamrong, A., Ruanghirun, T., Sritularak, B., Mungmee, C., and Likhitwitayawuid, K. (2013). Anti-metastatic activities of bibenzyls from *Dendrobium pulchellum*. *Natural product communications, 8*(1), 115-118.

Chattopadhyay, D., and Khan, M. T. H. (2008). Ethnomedicines and ethnomedicinal phytophores against herpesviruses. *Biotechnology Annual Review, 14*, 297-348.

Chen, C. C., Wu, L. G., Ko, F. N., and Teng, C. M. (1994). Antiplatele aggregation principles of *Dendrobium loddigesii*. *Journal of Natural Products, 57*(9), 1271-1274.

Chen, X. J., Mei, W. L., Zuo, W. J., Zeng, Y. B., Guo, Z. K., Song, X. Q., *et al*. (2013). A new antibacterial phenanthrenequinone from *Dendrobium sinense*. *Journal of Asian Natural Products Research, 15*(1), 67-70.

Chen, Y., Li, Y., Qing, C., Zhang, Y., Wang, L., and Liu, Y. (2008b). 1,4,5-Trihydroxy-7-methoxy-9H-fluoren-9-one, a new cytotoxic compound from *Dendrobium chrysotoxum*. *Food Chemistry, 108*(3), 973-976.

Chen, Y., Liu, Y., Jiang, J., Zhang, Y., and Yin, B. (2008c). Dendronone, a new phenanthrenequinone from *Dendrobium cariniferum*. *Food Chemistry, 111*(1), 11-12.

Du, Q., Jerz, G., and Winterhalter, P. (2005). Preparation of three flavonoids from the bark of *Salix alba* by high-speed countercurrent chromatographic separation. *Journal of Liquid Chromatography & Related Technologies, 27*(20), 3257-3264.

Fan, C. G., Wang, W., Wang, Y., Qin, G. W., and Zhao, W. (2001). Chemical constituents from *Dendrobium densiflorum*. *Phytochemistry, 57*(8), 1255-1258.

Fan, W. W., Xu, F. Q., Dong, F. W., Li, X. N., Li, Y., Liu, Y. Q., *et al.* (2013). Dendrowardol C, a novel sesquiterpenoid from *Dendrobium wardianum* Warner. *Natural Products and Bioprospecting, 3*(3), 89-92.

Gawell, L., and Leander, K. (1976). The constitution of aduncin, a sesquiterpene related to picrotoxinin, found in *Dendrobium aduncum*. *Phytochemistry, 15*, 1991-1992.

Golstein, P., and Kroemer, G. (2007). Cell death by necrosis: towards a molecular definition. *Trends in Biochemical Sciences, 32*(1), 37-43.

Gong, Y. Q., Fan, Y., Wu, D. Z., Yang, H., Hu, Z. B., and Wang, Z. T. (2004). In vivo and in vitro evaluation of erianin, a novel anti-angiogenic agent. *European Journal of Cancer, 40*(10), 1554-1565.

Hanahan, D., and Weinberg, R. A. (2000). The hallmarks of cancer. *Cell, 100*, 57-70.

Honda, C., and Yamaki, M. (2000). Phenanthrenes from *Dendrobium plicatile*. *Phytochemistry, 53*, 987-990.

Hossain, M. M. (2011). Therapeutic orchids: traditional uses and recent advances. *Fitoterapia, 82*(2), 102-140.

Hu, J. M., Chen, J. J., Yu, H., Zhao, Y. X., and Zhou, J. (2008a). Five new compounds from *Dendrobium longicornu*. *Planta Medica, 74*, 535-539.

Hu, J. M., Chen, J. J., Yu, H., Zhao, Y. X., and Zhou, J. (2008b). Two novel bibenzyls from *Dendrobium trigonopus*. *Journal of Asian Natural Products Research, 10*(7-8), 653-657.

Hu, J. M., Fan, W. W., Dong, F. W., Miao, Z. H., and Zhou, J. (2012). Chemical components of *Dendrobium chrysotoxum*. *Chinese Journal of Chemistry, 30*(6), 1327-1330.

Hu, J. M., Zhao, Y. X., Miao, Z. H., and Zhou, J. (2009). Chemical components of *Dendrobium polyanthum*. *Bulletin of the Korean Chemical Society, 30*(9), 2098-2010.

Hwang, J. S., Lee, S. A., Hong, S. S., Han, X. H., Lee, C., Kang, S. J., *et al.* (2010). Phenanthrenes from *Dendrobium nobile* and their inhibition of the LPS-induced production of nitric oxide in macrophage RAW 264.7 cells. *Bioorganic Medicinal Chemistry Letters, 20*(12), 3785-3787.

Ito, M., Matsuzaki, K., Wang, J., Daikonya, A., Wang, N. L., Yao, X. S., *et al.* (2010). New phenanthrenes and stilbenes from *Dendrobium loddigesii*. *Chemical & Pharmaceutical Bulletin, 58*, 628-633.

Katerere, D. R., Gray, A. I., Nash, R. J., and Waigh, R. D. (2012). Phytochemical and antimicrobial investigations of stilbenoids and flavonoids isolated from three species of Combretaceae. *Fitoterapia, 83*(5), 932-940.

Khan, M. T. H., Ather, A., Thompson, K. D., and Gambari, R. (2005). Extracts and molecules from medicinal plants against herpes simplex viruses. *Antiviral Research, 67*(2), 107-119.

Kim, H. Y., Jung, S. K., Byun, S., Son, J. E., Oh, M. H., Lee, J., *et al.* (2013). Raf and PI3K are the molecular targets for the anti-metastatic effect of luteolin. *Phytotherapy Research, 27*(10), 1481-1488.

Kowitdamrong, A., Chanvorachote, P., Sritularak, B., and Pongrakhananon, V. (2013). Moscatilin inhibits lung cancer cell motility and invasion via suppression of endogenous reactive oxygen species. *BioMed Research International*, 1-11.

Kuo, Y. H., Lee, P. H., and Wein, Y. S. (2002). Four new compounds from the seeds of *Cassia fistula*. *Journal of Natural Products, 65*, 1165-1167.

Li, J. T., Yin, B. L., Liu, Y., Wang, L. Q., and Chen, Y. G. (2009d). Mono-aromatic constituents of *Dendrobium longicornu*. *Chemistry of Natural Compounds, 45*(2), 234-236.

Li, Y., Wang, C. L., Guo, S. X., Yang, J. S., and Xiao, P. G. (2008). Two new compounds from *Dendrobium candidum*. *Chemical & Pharmaceutical Bulletin, 56*, 1477-1479.

Li, Y., Wang, C. L., Wang, F. F., Dong, H. L., Guo, S. X., Yang, J. S., *et al.* (2010). Phenolic components and flavanones from *Dendrobium candidum*. *Chinese Pharmaceutical Journal, 45*(13), 975-979.

Li, Y., Wang, C. L., Wang, Y. J., Guo, S. X., Yang, J. S., Chen, X. M., *et al.* (2009a). Three new bibenzyl derivatives from *Dendrobium candidum*. *Chinese Pharmaceutical Journal, 57*(2), 218—219.

Li, Y., Wang, C. L., Wang, Y. J., Wang, F. F., Guo, S. X., Yang, J. S., *et al.* (2009b). Four new bibenzyl derivatives from *Dendrobium candidum*. *Chemical & Pharmaceutical Bulletin, 57*(9), 997-999.

Li, Y. M., Wang, H. Y., and Liu, G. Q. (2001). Erianin induces apoptosis in human leukemia HL-60 cells. *Acta Pharmacologica Sinica, 22*(11), 1018-1022.

Li, Y. P., Qing, C., Fang, T. T., Liu, Y., and Chen, Y. G. (2009c). Chemical constituents of *Dendrobium chrysotoxum*. *Chemistry of Natural Compounds, 45*(3), 414-416.

Lin, T. H., Chang, S. J., Chen, C. C., Wang, J. P., and Tsao, L. T. (2001). Two phenanthraquinones from *Dendrobium moniliforme*. *Journal of Natural Products, 64*(8), 1084-1086.

Lipipun, V., Kurokawa, M., Suttisri, R., Taweechotipatr, P., Pramyothin, P., Hattori, M., *et al*. (2003). Efficacy of Thai medicinal plant extracts against herpes simplex virus type 1 infection in vitro and in vivo. *Antiviral Research, 60*(3), 175-180.

Liu, M. F., Han, Y., Xing, D. M., Shi, Y., Xu, L. Z., Du, L. J., *et al*. (2004). A new stilbenoid from *Arundina graminifolia*. *Journal of Asian Natural Products Research, 6*(3), 229-232.

Liu, Y., Jiang, J. H., Yin, B. L., and Chen, Y. G. (2009b). Chemical constituents of *Dendrobium cariniferum*. *Chemistry of Natural Compounds, 45*(2), 237-238.

Liu, Y., Jiang, J. H., Zhang, Y., and Chen, Y. G. (2009a). Chemical constituents of *Dendrobium aurantiacum* var. *denneanum*. *Chemistry of Natural Compounds*.

Liu, Y. L., Ho, D. K., and Cassady, J. M. (1992). Isolation of potential cancer chemopreventive agents from *Eriodictyon Californicum*. *Journal of Natural Products, 55*(3), 357-363.

Ma, G. X., Wang, T. S., Yin, L., Pan, Y., Xu, G. J., and Xu, L. S. (1998). Studies on chemical constituents of *Dendrobium chryseum*. *Journal of Chinese Pharmaceutical Sciences, 7*(1), 52-54.

Majumder, P. L., and Chatterjee, S. (1989). Crepidatin, a bibenzyl derivative from the orchid *Dendrobium crepidatum*. *Phytochemistry, 28*(7), 1986-1988.

Majumder, P. L., Guha, S., and Pal, S. (1999). Bibenzyl derivatives from the orchid *Dendrobium amoenum*. *Phytochemistry, 52*, 1365-1369.

Majumder, P. L., and Pal, S. (1992). Rotundatin, a new 9,10-dihydrophenanthrene derivative from *Dendrobium rotundatum*. *Phytochemistry, 31*(9), 3225-3228.

Majumder, P. L., and Pal, S. (1993). Cumulatin and tristin, two bibenzyl derivatives from the orchids *Dendrobium cumulatum* and *Bulbophyllum triste*. *Phytochemistry, 32*, 1561-1565.

Majumder, P. L., and Sen, R. C. (1987). Moscatilin, a bibenzyl derivative from the orchid *Dendrobium moscatum*. *Phytochemistry, 26*(7), 2121-2124.

Martha, R. (2010). Orchids: A review of uses in traditional medicine, its phytochemistry and pharmacology. *Journal of Medicinal Plants Research, 4*(8), 592-638.

Miyazawa, M., Shimamura, H., Nakamura, S. I., and Kameoka, H. (1997). Antimutagenic activity of gigantol from *Dendrobium nobile*. *Journal of Agricultural and Food Chem, 45*, 2849-2853.

Mori, S., Chang, J. T., Andrechek, E. R., Matsumura, N., Baba, T., Yao, G., *et al*. (2009). Anchorage-independent cell growth signature identifies tumors with metastatic potential. *Oncogene, 28*(31), 2796-2805.

National Cancer Institute. (2008). General Knowledge of Cancer [online]. Avaliable from: http://www.nci.go.th/en/Knowledge/index_general.html [2013, August 29].

O′Brien, J., Wilson, I., Orton, T., and Pognan, F. (2000). Investigation of the Alamar Blue (resazurin) fluorescent dye for the assessment of mammalian cell cytotoxicity. *European Journal of Biochemistry, 267*, 5421-5426.

Owen, R. W., Haubner, R., Mier, W., Giacosa, A., Hull, W. E., Spiegelhalder, B., *et al*. (2003). Isolation, structure elucidation and antioxidant potential of the major phenolic and flavonoid compounds in brined olive drupes. *Food and Chemical Toxicology, 41*(5), 703-717.

Pan, H., Chen, B., Li, F., and Wang, M. (2012). Chemical constituents of *Dendrobium denneanum*. *Chemical Journal Application Environment Biology, 18*, 378-380.

Park, Y., Moon, B. H., Lee, E., Lee, Y., Yoon, Y., Ahn, J. H., *et al*. (2007). ^{1}H and ^{13}C-NMR data of hydroxyflavone derivatives. *Magnetic Resonance in Chemistry, 45*(8), 674-679.

Phechrmeekha, T., Sritularak, B., and Likhitwitayawuid, K. (2012). New phenolic compounds from *Dendrobium capillipes* and *Dendrobium secundum*. *Journal of Asian Natural Products Research, 14*(8), 748-754.

Qin, X. D., Qu, Y., Ning, L., Liu, J. K., and Fan, S. K. (2011). A new picrotoxane-type sesquiterpene from *Dendrobium findlayanum*. *Journal of Asian Natural Products Research, 13*(11), 1047-1050.

Reed, J. C. (2000). Mechanisms of apoptosis. *American Journal of Pathology, 157*(5), 1415-1430.

Seidenfaden, G. (1997). *Contributions to the orchid flora of Thailand XIII* (Vol. 13): Olsen & Olsen.

Shanmugathasan, M., and Jothy, S. (2000). Apoptosis, anoikis and their relevance to the pathobiology of colon cancer. *Pathology International, 50*. 273-279.

Shu, Y., Zhang, D. M., and Guo, S. X. (2004). A new sesquiterpene glycoside from *Dendrobium nobile* Lindl. *Journal of Asian Natural Products Research, 6*(4), 311-314.

Slade, D., Ferreira, D., and Marais, J. P. J. (2005). Circular dichroism, a powerful tool for the assessment of absolute configuration of flavonoids. *Phytochemistry, 66*, 2177-2215.

Smitinand, T. (2001). *Thai plant names (botanical names-vernacular names)* (2nd ed.). Bangkok: The Forest Herbarium, Royal Forest Department.

Sritularak, B., Anuwat, M., and Likhitwitayawuid, K. (2011a). A new phenanthrenequinone from *Dendrobium draconis*. *Journal of Asian Natural Products Research, 13*, 251-255.

Sritularak, B., Duangrak, N., and Likhitwitayawuid, K. (2011b). A new bibenzyl from *Dendrobium secundum*. *Z. Naturforsch, 66*, 205-208.

Sritularak, B., and Likhitwitayawuid, K. (2009). New bisbibenzyls from *Dendrobium falconeri*. *Helvetica Chimica Acta, 92*(4), 740-744.

Talapatra, B., Das, A. K., and Talapatra, S. K. (1989). Defuscin, a new phenolic ester from *Dendrobium fuscescens*: conformation of a shikimic acid. *Phytochemistry, 28*(1), 290-292.

The Botanical Garden Organization. (2011). Ueang thong [online]. Available from: http://www.qsbg.org/database/botanic_book%20full%20option/search_detail.asp?botanic_id=1937 [2013, August 29].

Veerraju, P., Rao, N. S. P., Rao, L. J., Rao, K. V. J., and Rao, P. R. M. (1989). Amoenumin, a 9,10-dihydro-5H-phenenthro-(4,5-*b*,*c*,*d*)-pyran from *Dendrobium amoenum*. *Phytochemistry, 28*(3), 950-951.

Venkateswarlu, S., Raju, M. S. S., and Subbaraju, G. V. (2002). Synthesis and biological activity of isoamoenylin, a metabolite of *Dendrobium amoenum*. *Bioscience. Biotechnology. Biochemistry, 66*(10), 2236-2238.

Wang, H., Zhao, T., and Che, C. T. (1985). Dendrobine and 3-hydroxy-2-oxodendrobine from *Dendrobium nobile*. *Journal of Natural Products, 48*(5), 796-801.

Wang, L., Zhang, C. F., Wang, Z. T., Zhang, M., and Xu, L. S. (2009). Five new compounds from *Dendrobium crystallinum*. *Journal of Asian Natural Products Research, 11*(11), 903-911.

Wang, Q., Gong, Q., Wu, Q., and Shi, J. (2010). Neuroprotective effects of *Dendrobium* alkaloids on rat cortical neurons injured by oxygen-glucose deprivation and reperfusion. *Phytomedicine, 17*(2), 108-115.

Xiong, L., Cao, Z. X., Peng, C., Li, X. H., Xie, X. F., Zhang, T. M., *et al*. (2013). Phenolic glucosides from *Dendrobium aurantiacum* var. *denneanum* and their bioactivities. *Molecules, 18*(6), 6153-6160.

Yamaki, M., and Honda, C. (1996). The stilbenoids from *Dendrobium plicatile*. *Phytochemistry, 43*(1), 207-208.

Yang, H., Chou, G. X., Wang, Z. T., Guo, Y. W., Hu, Z. B., and Xu, L. S. (2004). Two new compounds from *Dendrobium chrysotoxum*. *Helvetica Chimica Acta, 87*(2), 394-399.

Yang, H., Sung, S. H., and Kim, Y. C. (2007). Antifibrotic phenanthrenes of *Dendrobium nobile* stems. *Journal of Natural Products, 70*(12), 1925-1929.

Yang, L., Qin, L. H., Bligh, S. W., Bashall, A., Zhang, C. F., Zhang, M., *et al.* (2006b). A new phenanthrene with a spirolactone from *Dendrobium chrysanthum* and its anti-inflammatory activities. *Bioorganic & Medicinal Chemistry, 14*(10), 3496-3501.

Yang, L., Wang, Z., and Xu, L. (2006a). Phenols and a triterpene from *Dendrobium aurantiacum* var. *denneanum* (Orchidaceae). *Biochemical Systematics and Ecology, 34*(8), 658-660.

Ye, Q., Qin, G., and Zhao, W. (2002b). Immunomodulatory sesquiterpene glycosides from *Dendrobium nobile*. *Phytochemistry, 61*, 885-890.

Ye, Q., and Zhao, W. (2002a). New alloaromadendrane, cadinene and cyclocopacamphane type sesquiterpene derivatives and bibenzyls from *Dendrobium nobile*. *Planta Medica, 68*(8), 723-729.

Ye, Q. H., Zhao, W. M., and Qin, G. W. (2004). Lignans from *Dendrobium chrysanthum*. *Journal of Asian Natural Products Research, 6*(1), 39-43.

Zhang, C. F., Wang, M., Wang, L., Iinuma, M., Zhang, M., Xu, L. S., *et al.* (2008a). Chemical constituents of *Dendrobium gratiosissimum* and their cytotoxic activities. *Indian Journal of Chemistry, 47B*, 952-956.

Zhang, G. N., Zhong, L. Y., Bligh, S. W. A., Guo, Y. L., Zhang, C. F., Zhang, M., *et al.* (2005). Bi-bicyclic and bi-tricyclic compounds from *Dendrobium thyrsiflorum*. *Phytochemistry, 66*(10), 1113-1120.

Zhang, L., Zhou, G., Song, W., Tan, X., Guo, Y., Zhou, B., *et al.* (2012). Pterostilbene protects vascular endothelial cells against oxidized low-density lipoprotein-induced apoptosis in vitro and in vivo. *Apoptosis, 17*(1), 25-36.

Zhang, X., Gao, H., Han, H. Y., Liu, H. W., Wang, N. L., Yao, X. S., *et al.* (2007b). Sesquiterpenes from *Dendrobium nobile*. *Chinese Traditional and Herbal Drugs, 38*(12), 1771-1774.

Zhang, X., Gao, H., Wang, N. L., and Yao, X. S. (2006). Three new bibenzyl derivatives from *Dendrobium nobile*. *Journal of Asian Natural Products Research, 8*(1-2), 113-118.

Zhang, X., Tu, F. J., Yu, H. Y., Wang, N. L., Wang, Z., and Yao, X. S. (2008c). Copacamphane, picrotoxane and cyclocopacamphane sesquiterpenes from *Dendrobium nobile*. *Chemical & Pharmaceutical Bulletin, 56*(6), 854-857.

Zhang, X., Xu, J. K., Wang, J., Wang, N. L., Kurihara, H., Kitanaka, S., *et al*. (2007a). Bioactive bibenzyl derivatives and fluorenones from *Dendrobium nobile*. *Journal of Natural Products, 70*(1), 24-28.

Zhang, X., Xu, J. K., Wang, N. L., Kurihara, H., and Yao, X. S. (2008b). Antioxidant phenanthrenes and lignans from *Dendrobium nobile*. *Journal of Chinese Pharmaceutical Sciences, 17*(4), 314-318.

Zhao, C., Liu, Q., Halaweish, F., Shao, B., Ye, Y., and Zhao, W. (2003). Copacamphane, Picrotoxane, and Alloaromadendrane Sesquiterpene Glycosides and Phenolic Glycosides from *Dendrobium moniliforme*. *Journal of Natural Products, 66*(8), 1140-1143.

Zhao, W., Ye, Q., Tan, X., Jiang, H., Li, X., Chen, K., *et al*. (2001). Three new sesquiterpene glycosides from *Dendrobium nobile* with immunomodulatory activity. *Journal of Natural Products, 64*(9), 1196-1200.

APPENDIX

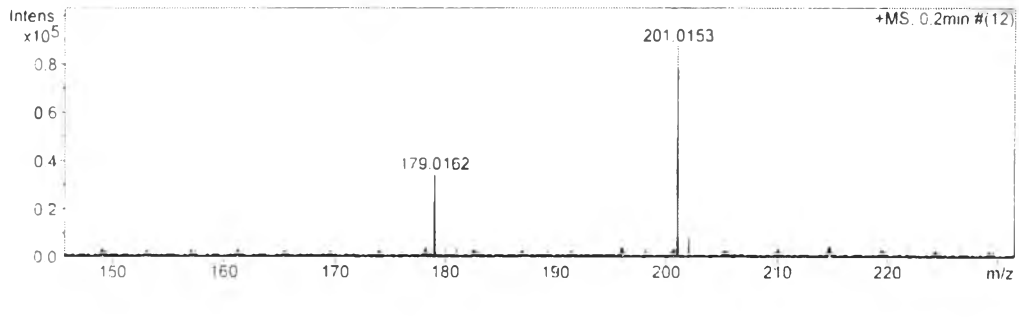

Figure 5 Mass spectrum of compound DE1

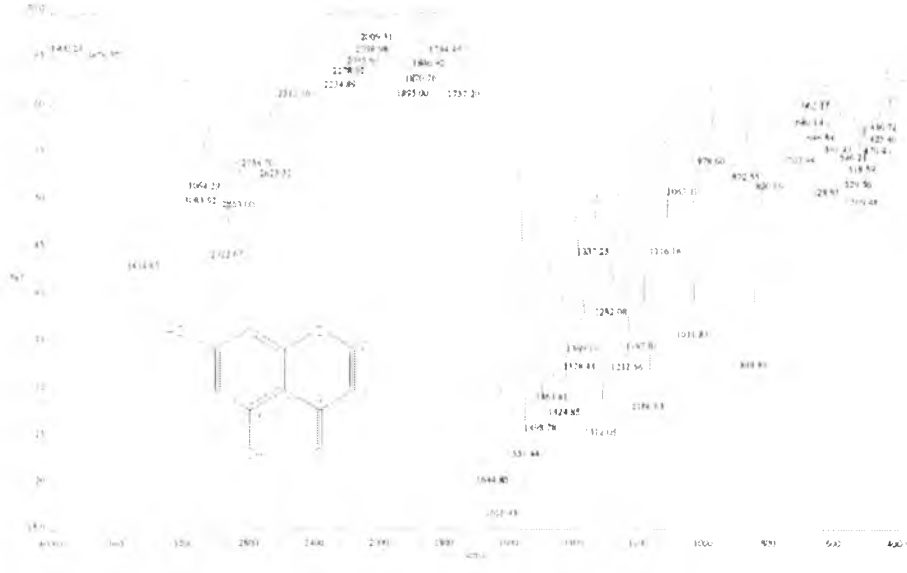

Figure 6 IR Spectrum of compound DE1

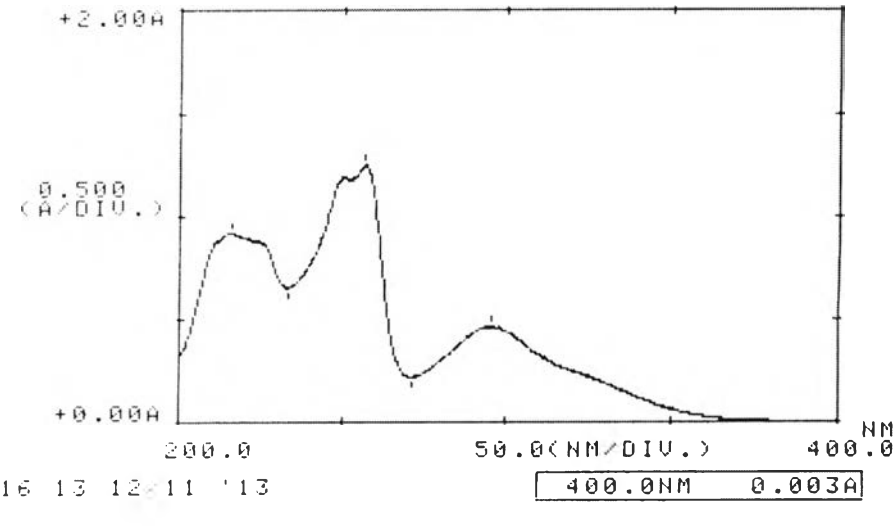

Figure 7 UV Spectrum of compound DE1

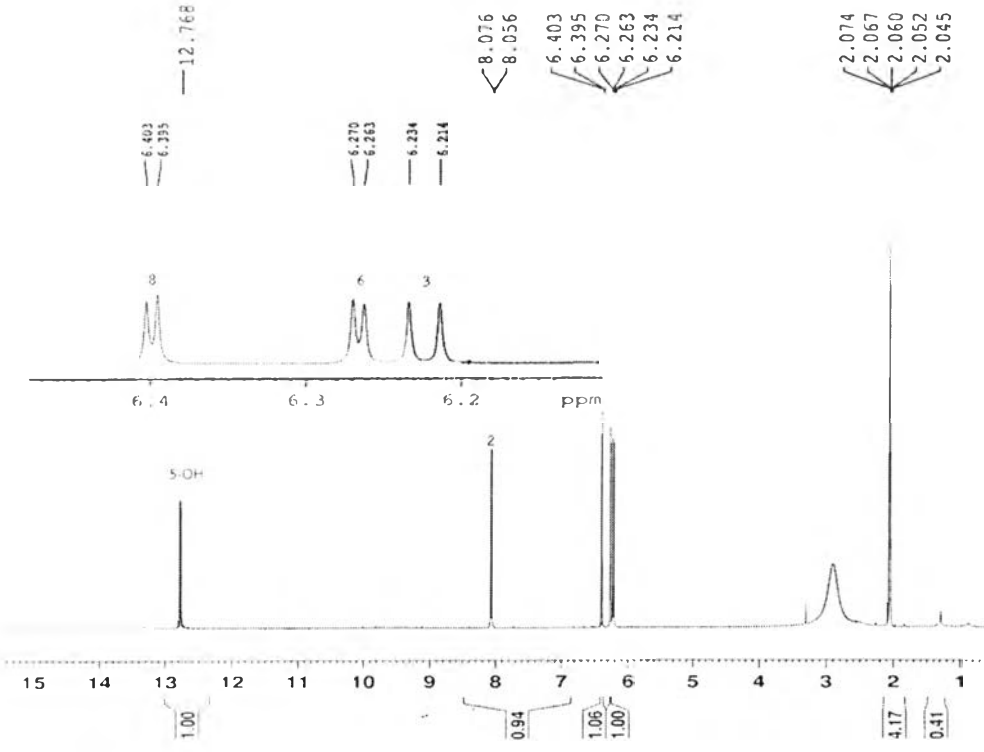

Figure 8 ^{1}H-NMR (300 MHz) Spectrum of compound DE1 (acetone-d_6)

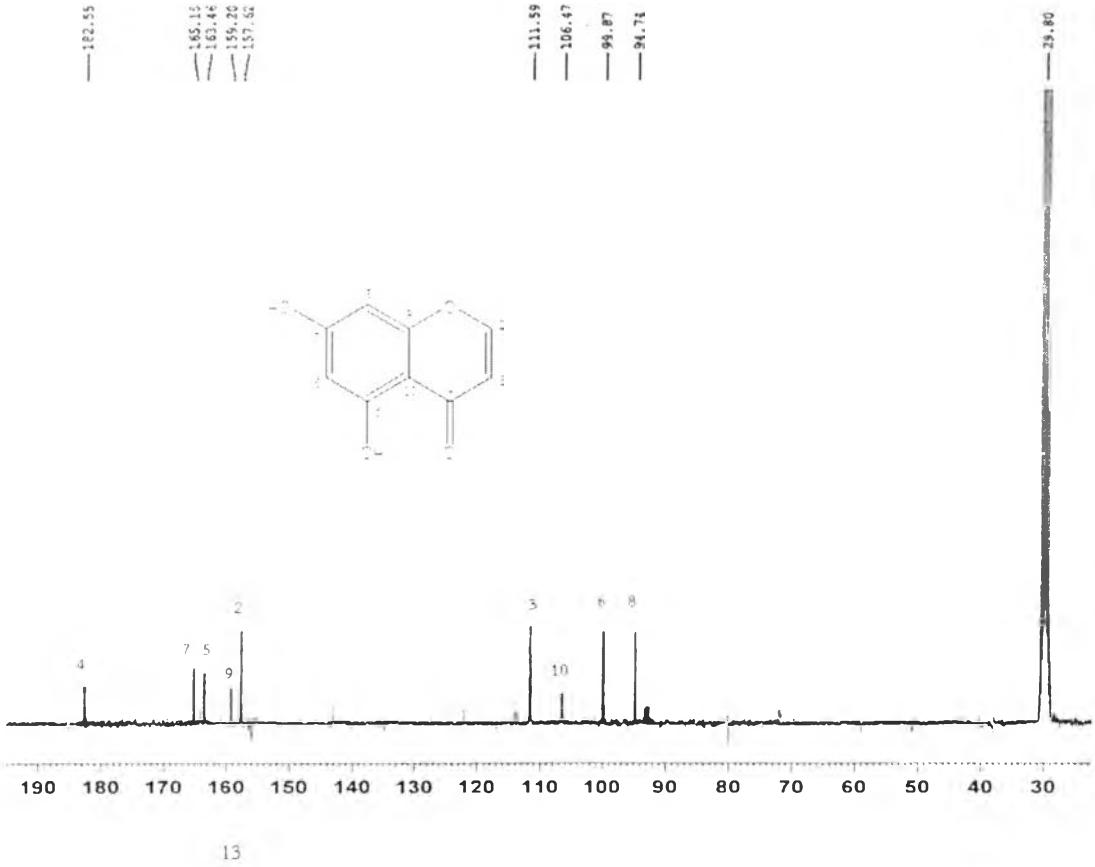

Figure 9 ^{13}C-NMR (75 MHz) Spectrum of compound DE1 (acetone-d_6)

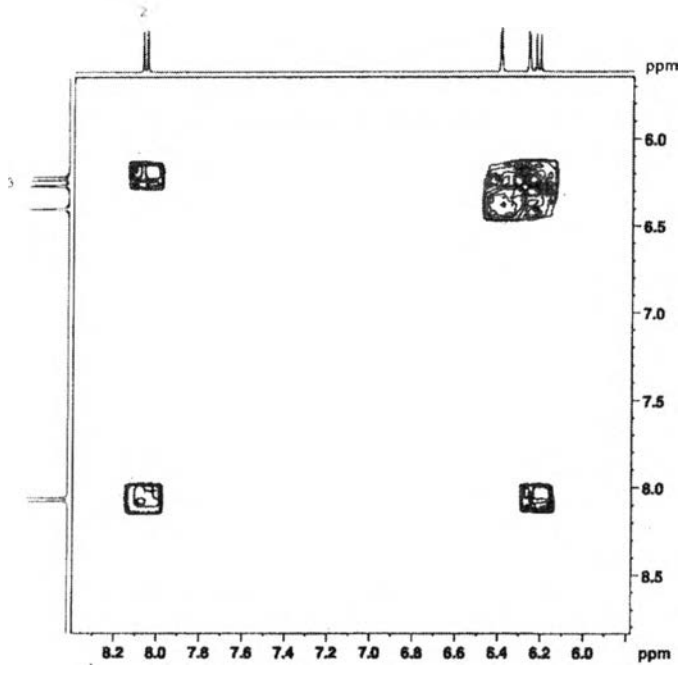

Figure 10 COSY Spectrum of compound DE1 (acetone-d_6)

(δ_H 6.00-8.50, δ_H 6.00-8.50)

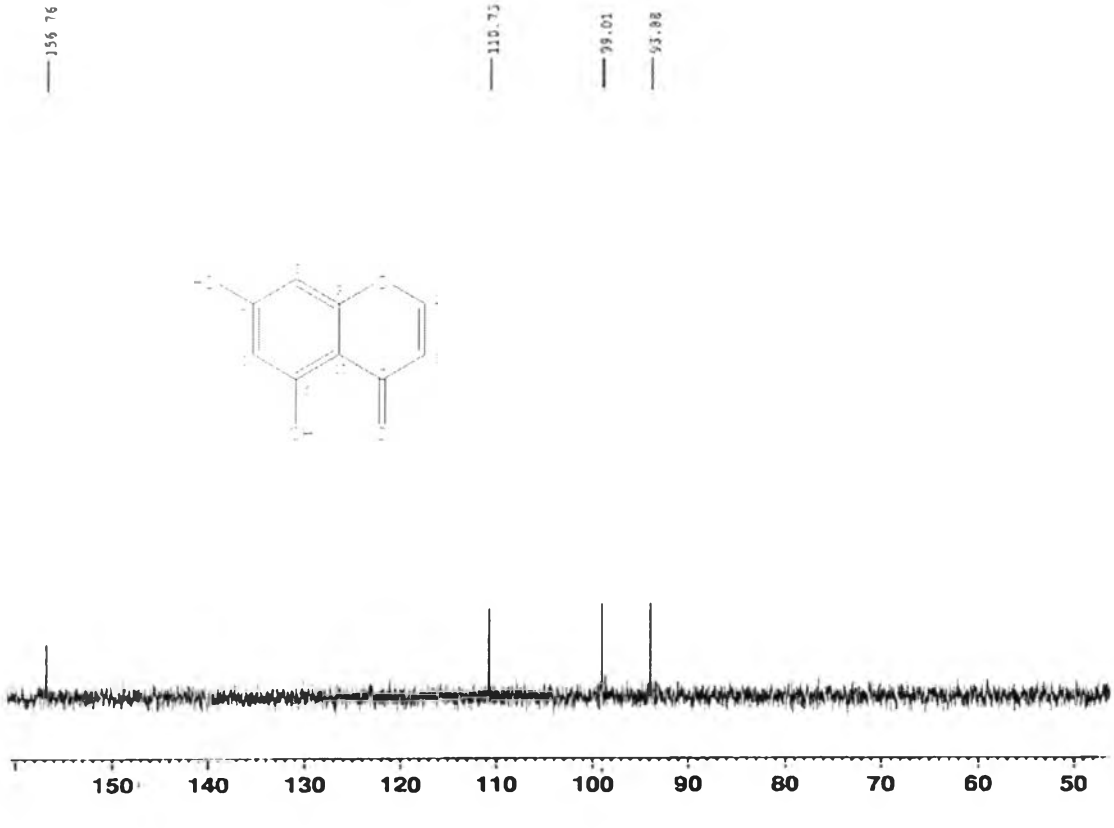

Figure 11 DEPT 135 Spectrum of compound DE1 (acetone-d_6)

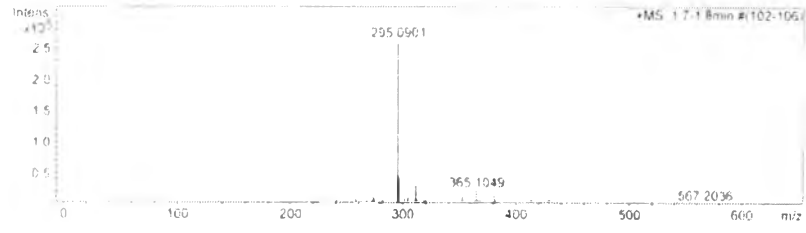

Figure 12 Mass spectrum of compound DE2

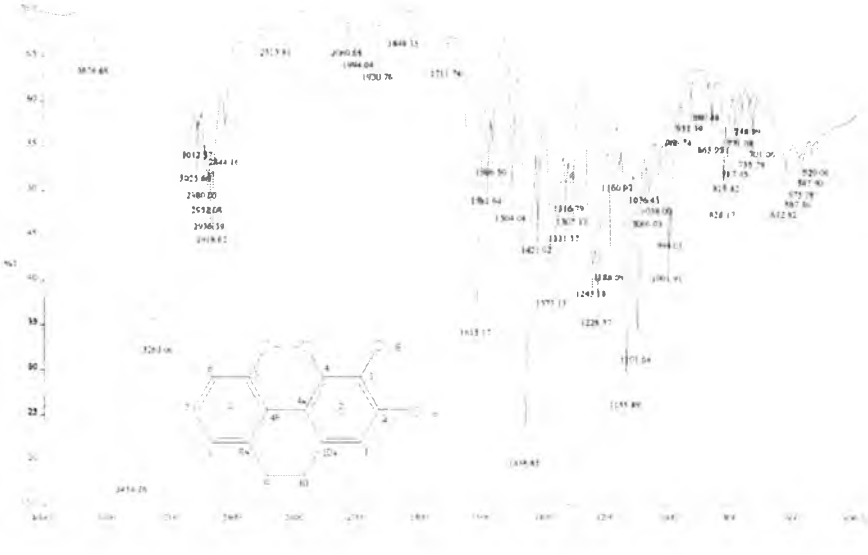

Figure 13 IR Spectrum of compound DE2

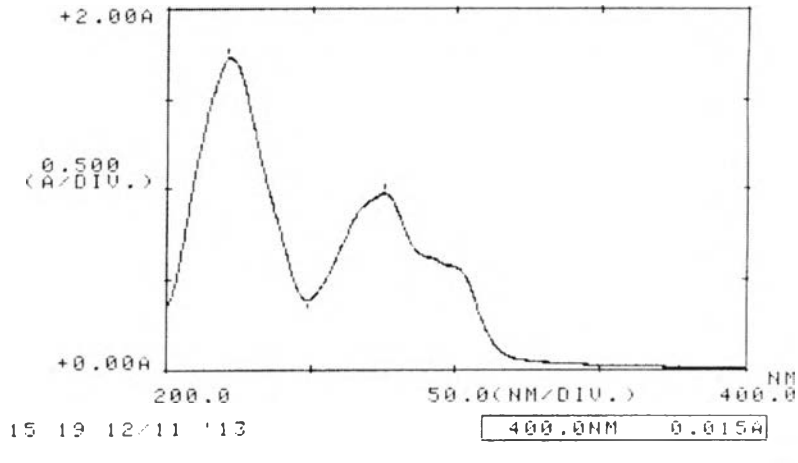

Figure 14 UV spectrum of compound DE2

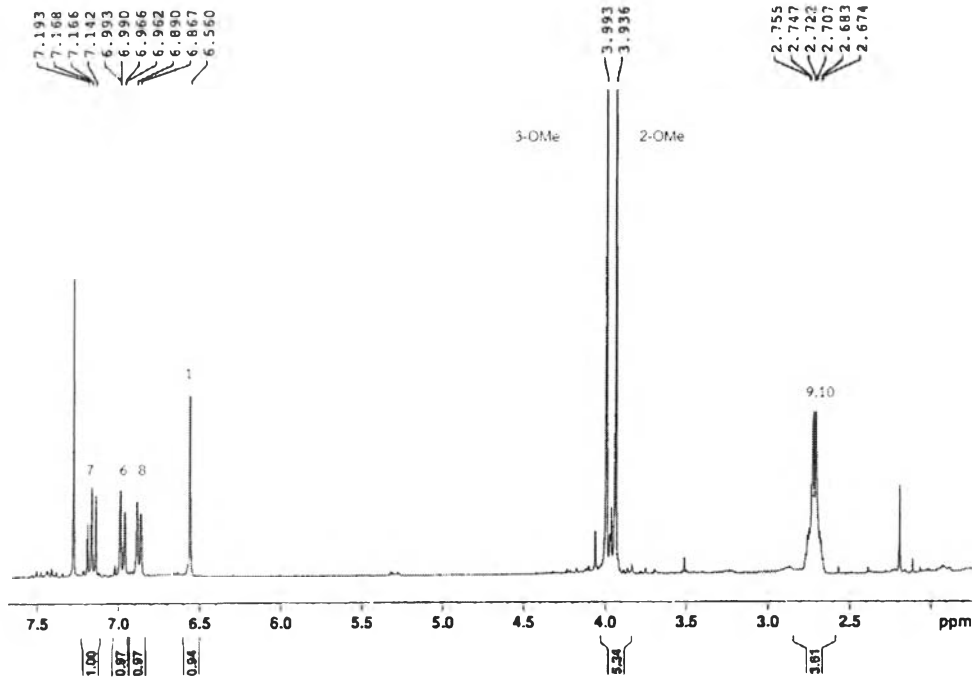

Figure 15 ^{1}H-NMR (300 MHz) Spectrum of compound DE2 ($CDCl_3$)

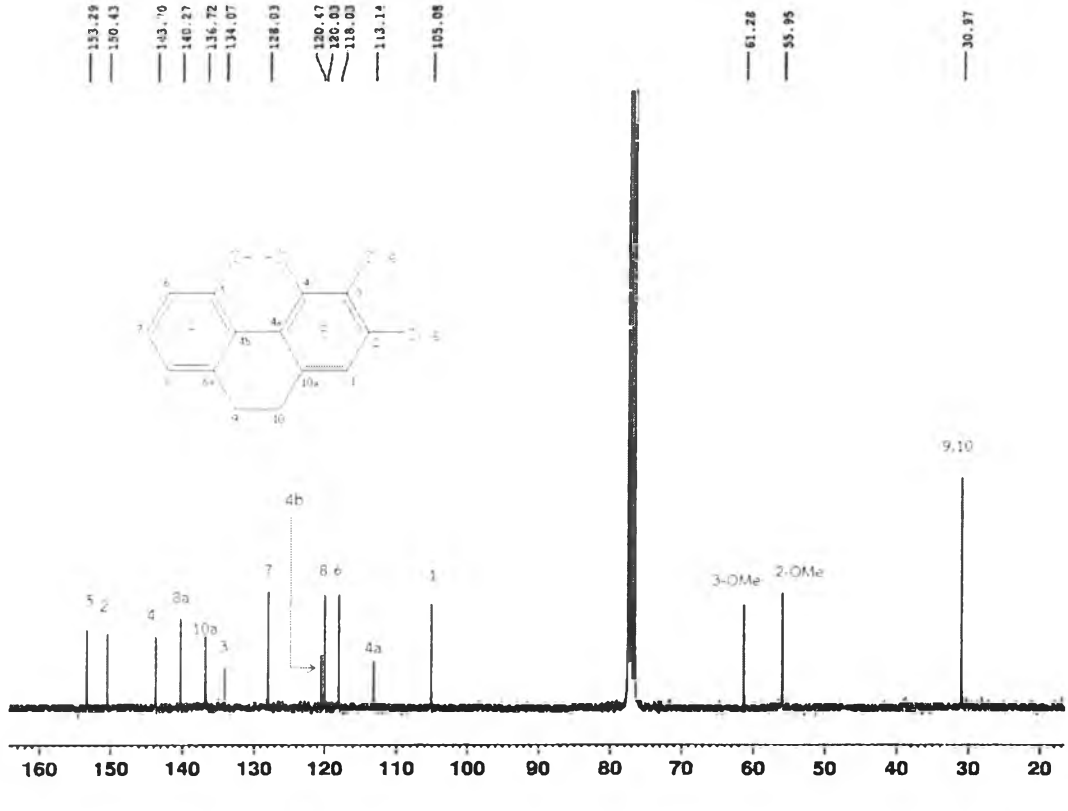

Figure 16 ^{13}C-NMR (75 MHz) Spectrum of compound DE2 ($CDCl_3$)

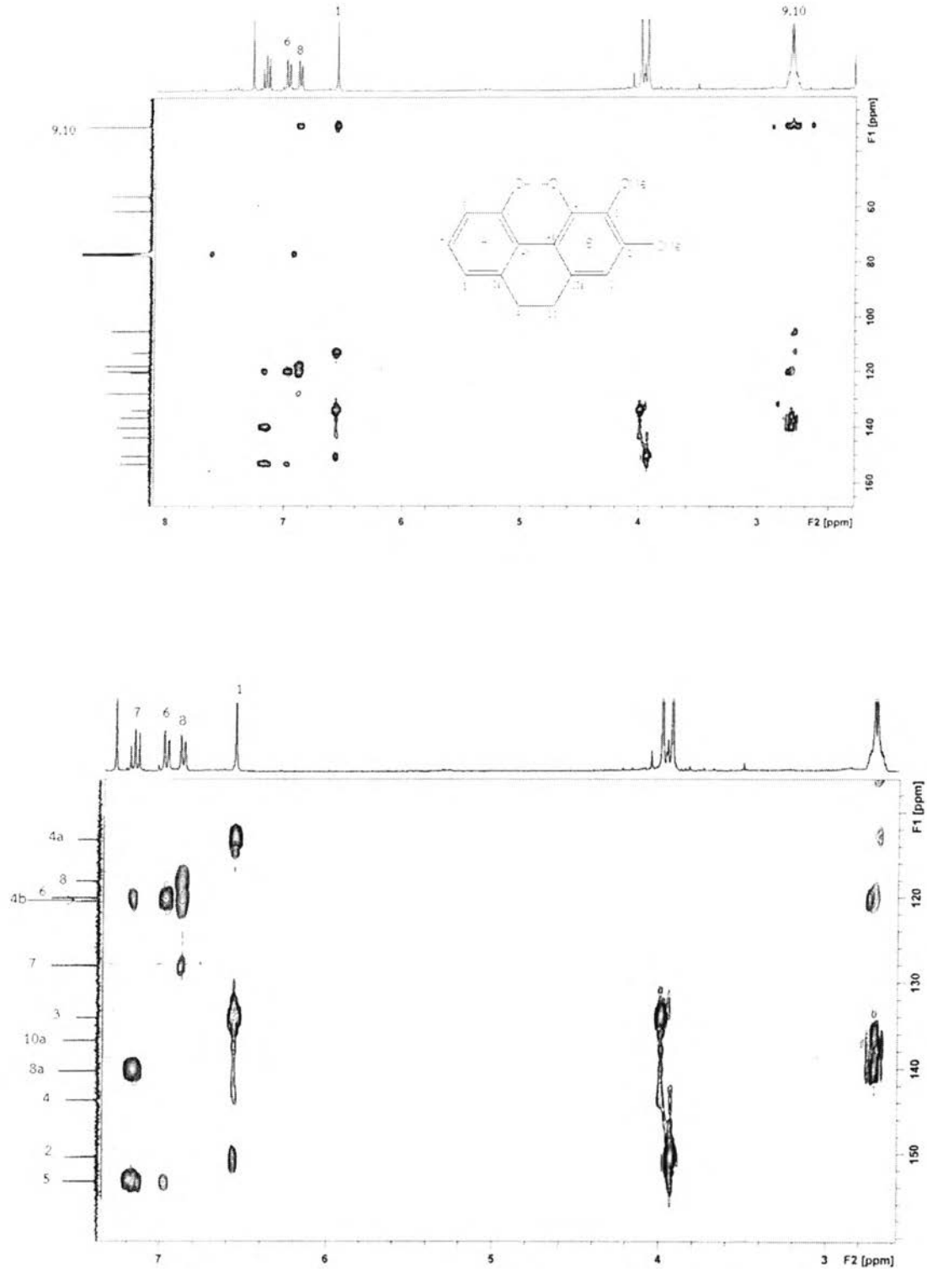

Figure 17 HMBC Spectrum of compound DE2 ($CDCl_3$)

(δ_H 2.00-8.00, δ_C 30.0-160.0)

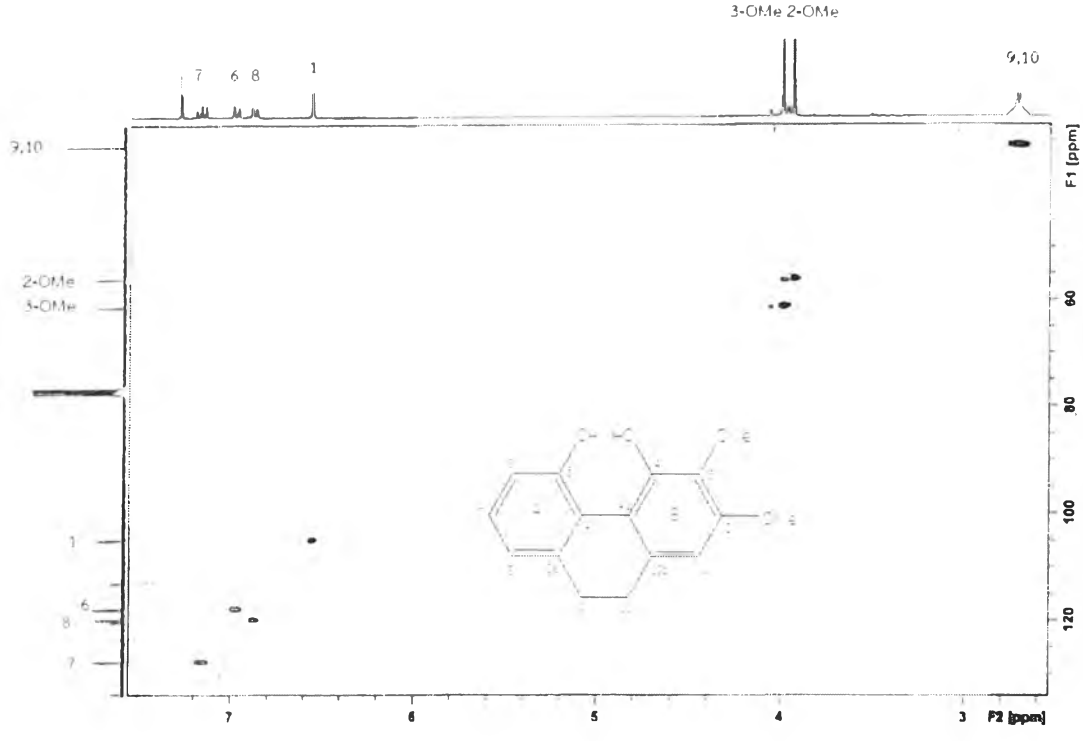

Figure 18 HSQC Spectrum of compound DE2 ($CDCl_3$)

(δ_H 2.00-8.00, δ_C 50.0-145.0)

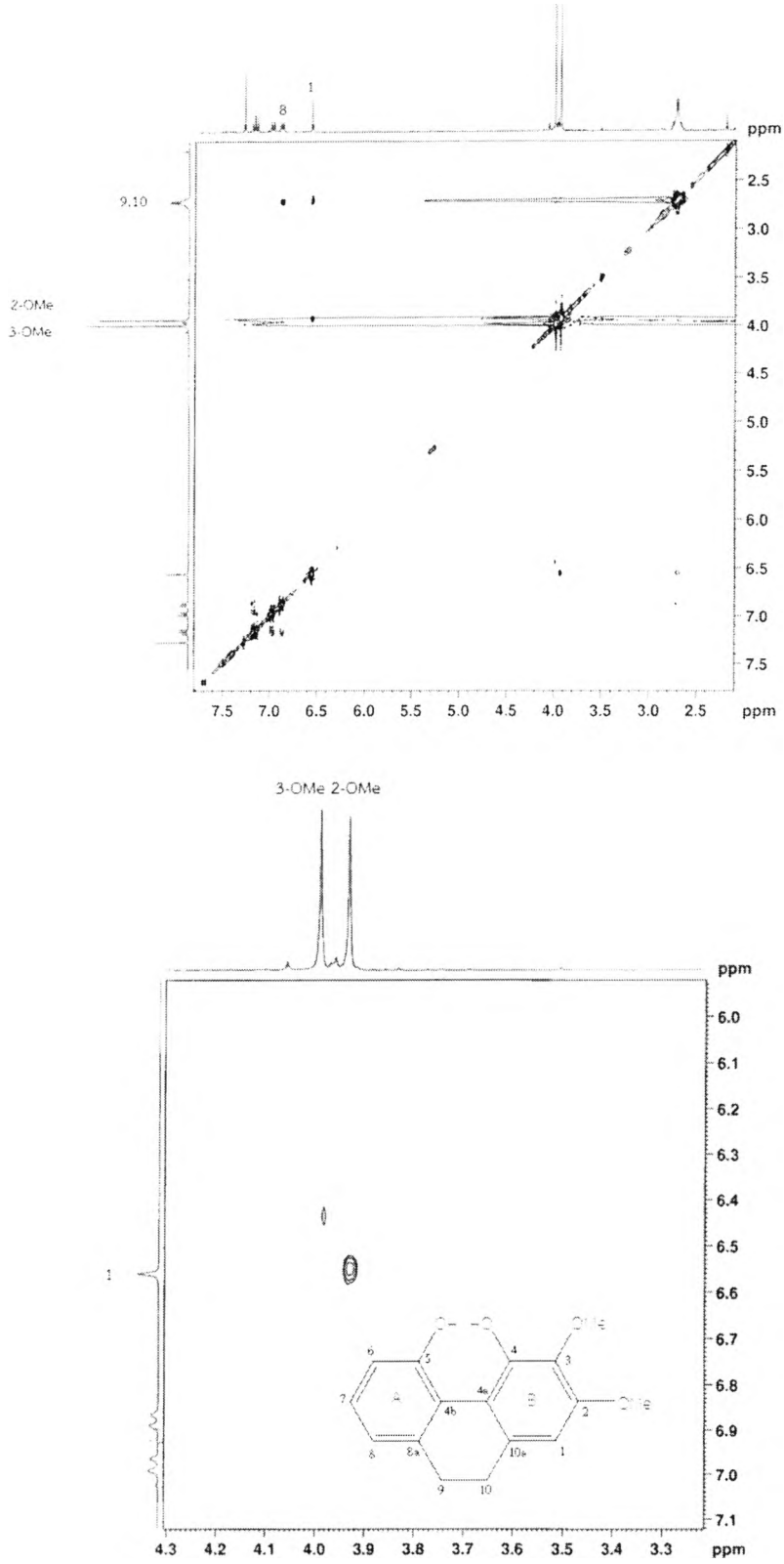

Figure 19 NOESY Spectrum of compound DE2 ($CDCl_3$)

(δ_H 2.00-8.00, δ_H 2.00-8.00)

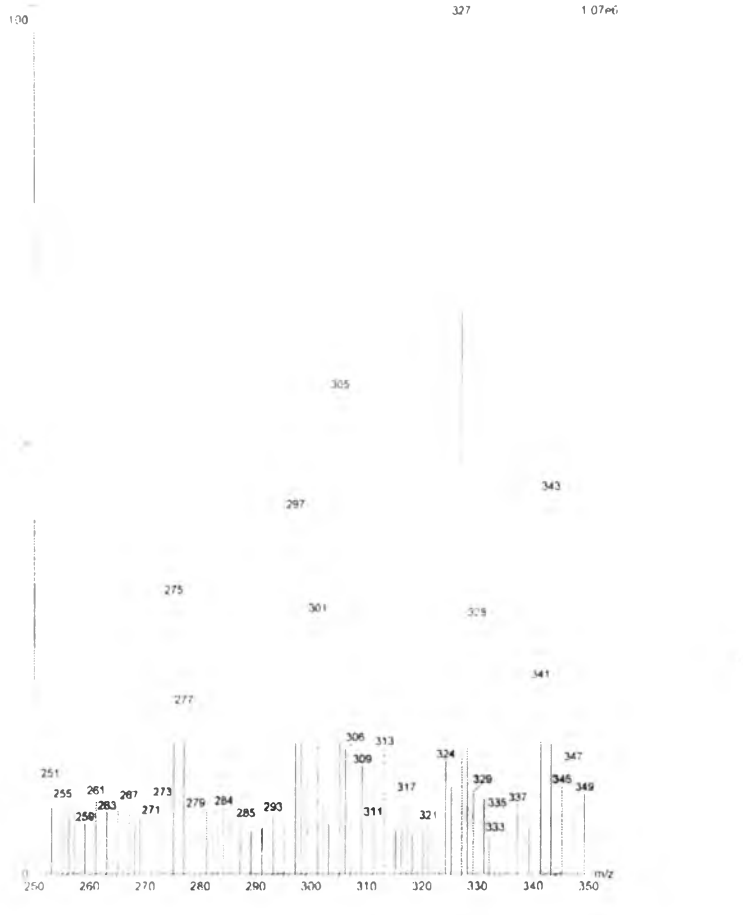

Figure 20 Mass spectrum of compound DE3

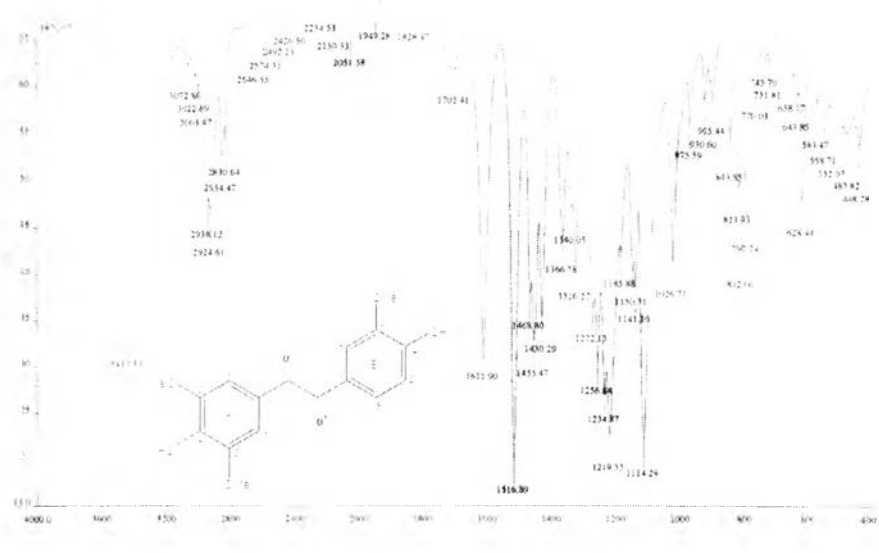

Figure 21 IR Spectrum of compound DE3

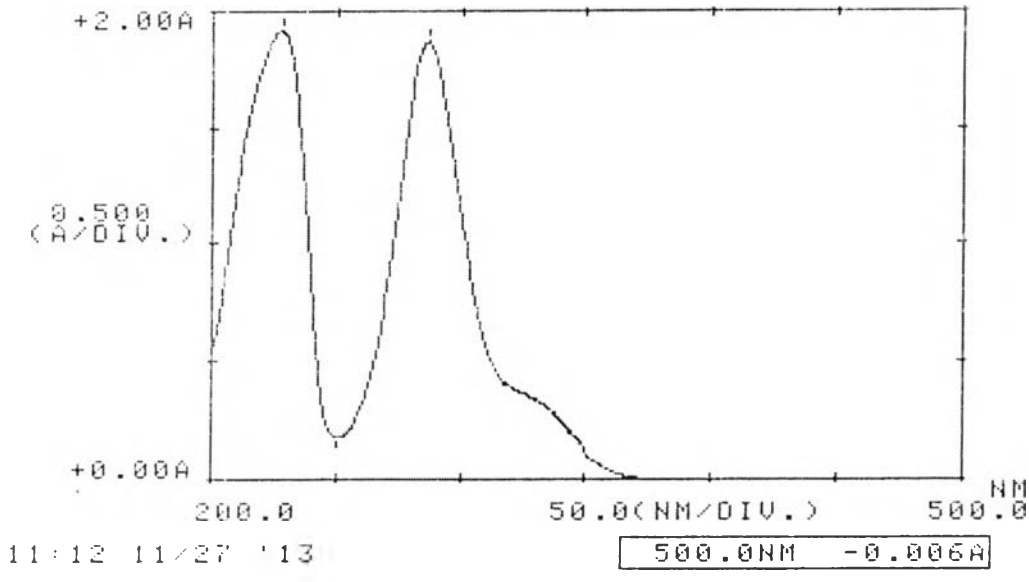

Figure 22 UV Spectrum of compound DE3

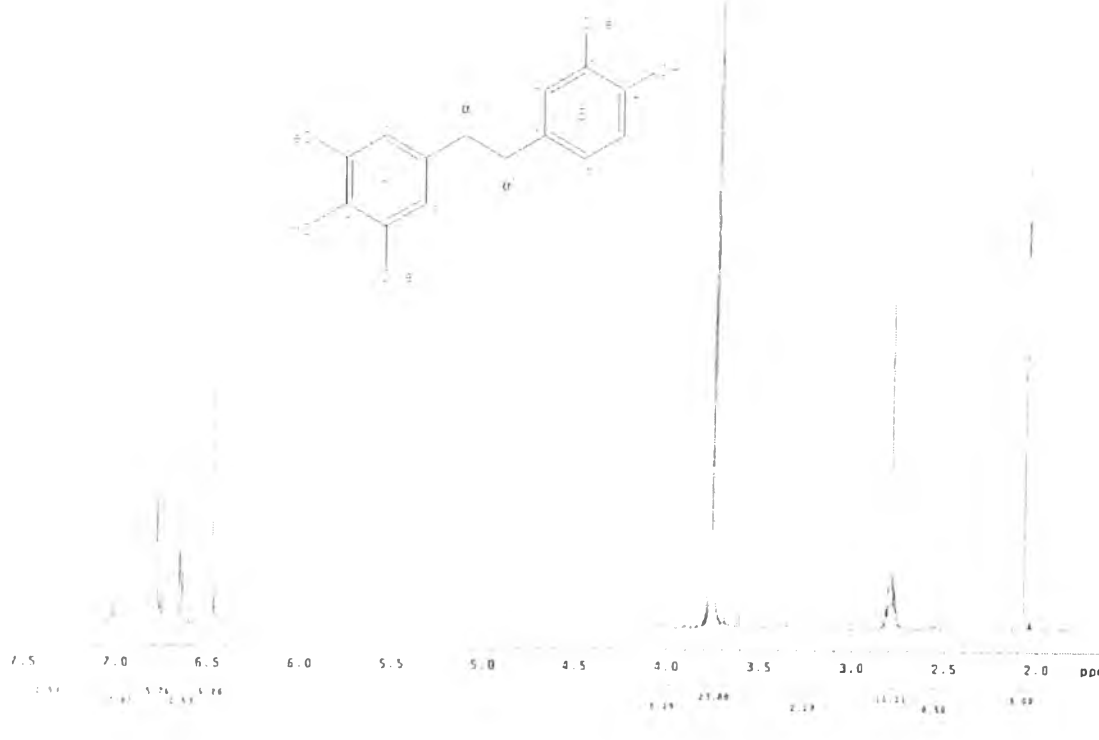

Figure 23 H-NMR (500 MHz) Spectrum of compound DE3 (acetone-d_6)

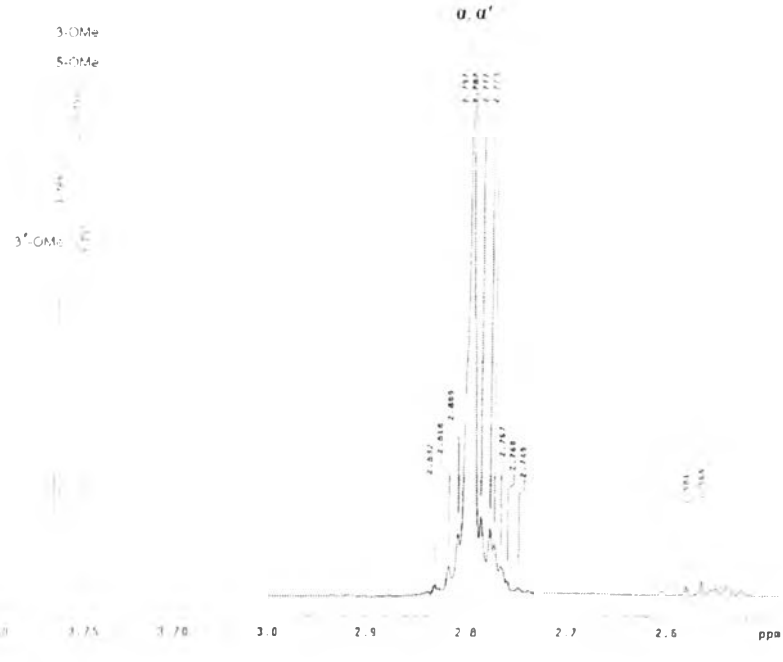

Figure 24 H-NMR (500 MHz) Spectrum of compound DE3 (acetone-d_6)

(δ_H 2.50-3.00, δ_H 3.70-3.80)

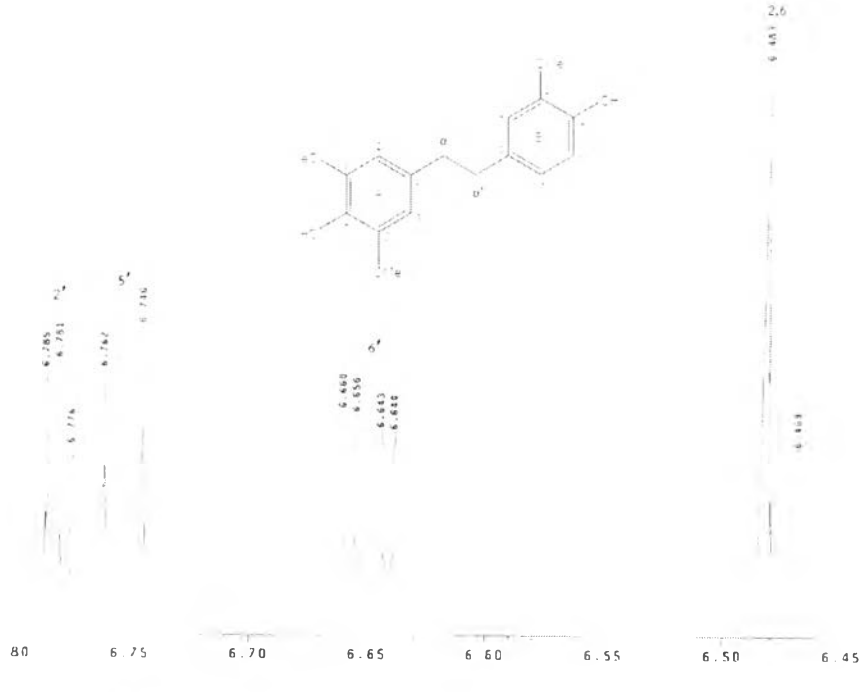

Figure 25 H-NMR (500 MHz) Spectrum of compound DE3 (acetone-d_6)

(δ_H 6.45-6.80)

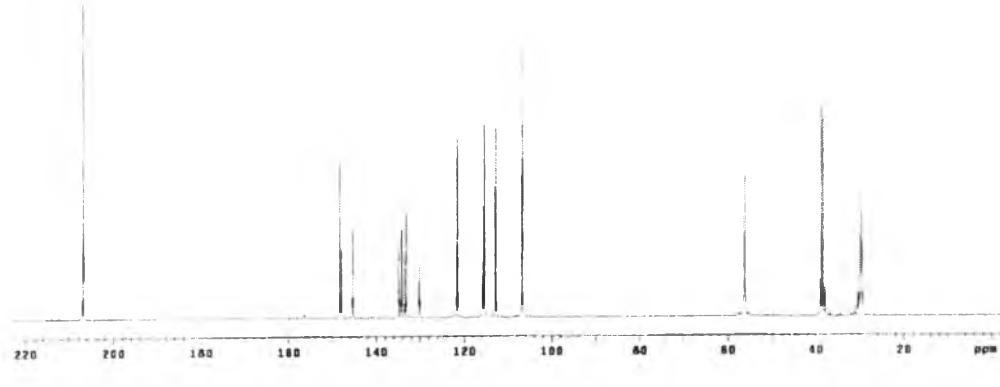

Figure 26 ^{13}C-NMR (125 MHz) Spectrum of compound DE3 (acetone-d_6)

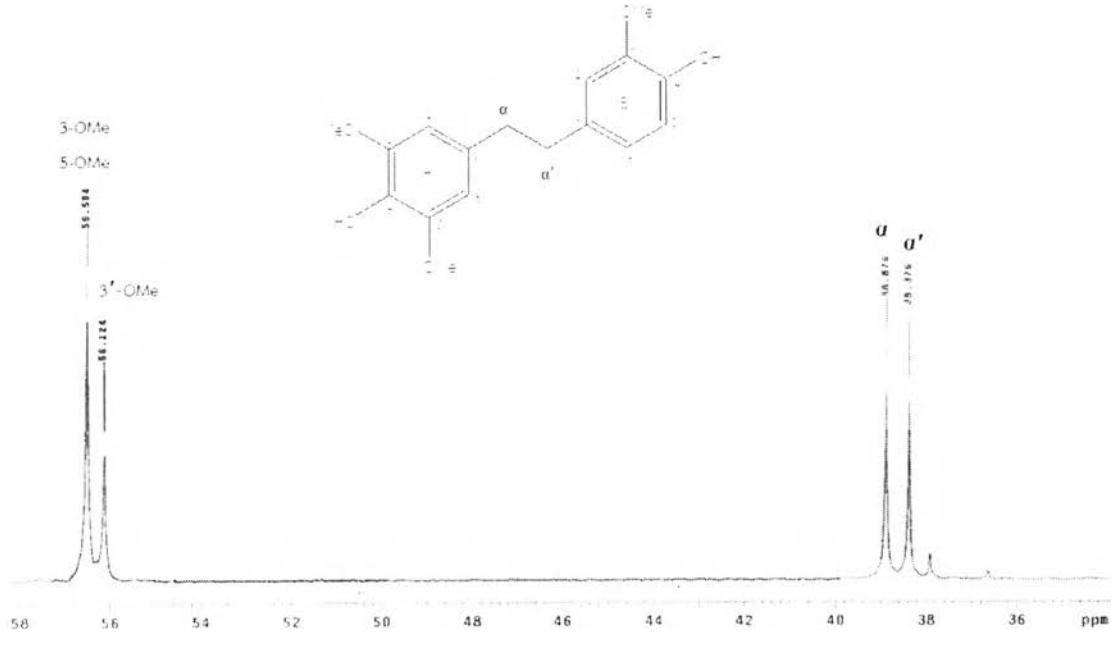

Figure 27 ^{13}C-NMR (125 MHz) Spectrum of compound DE3 (acetone-d_6)

(δ_C 36.0-58.0)

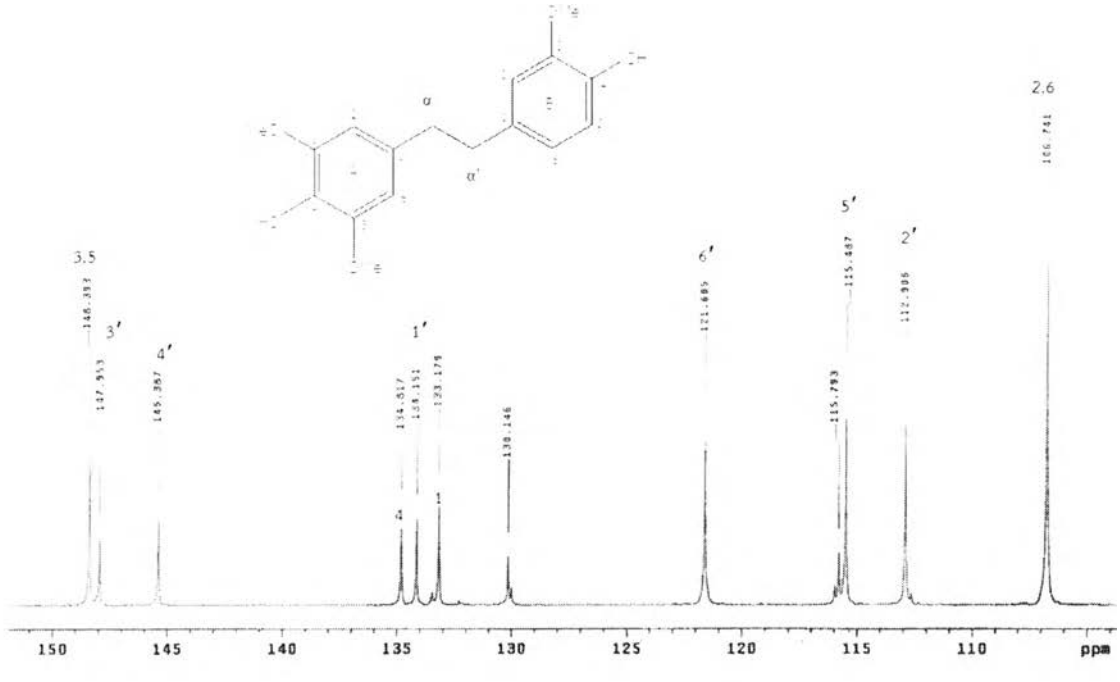

Figure 28 ^{13}C-NMR (125 MHz) Spectrum of compound DE3 (acetone-d_6) (δ_C 100.0-150.0)

Figure 29 Mass spectrum of compound DE4

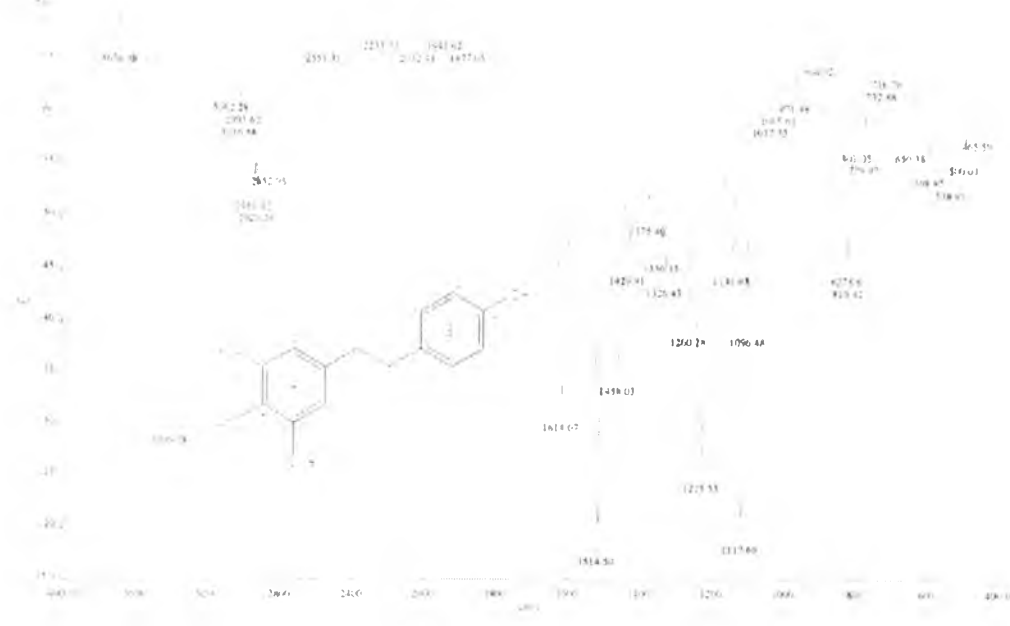

Figure 30 IR Spectrum of compound DE4

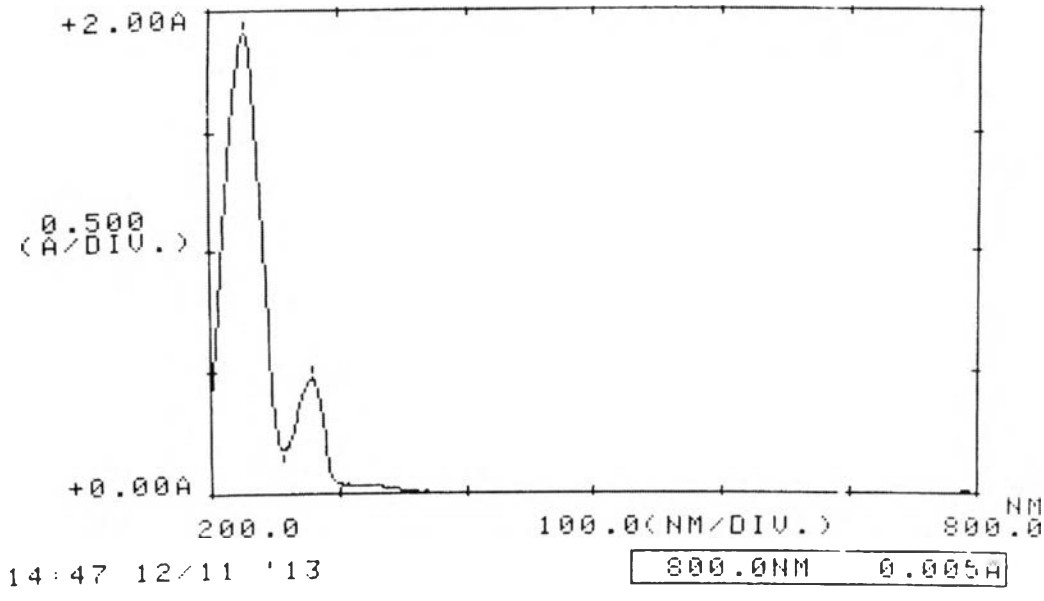

Figure 31 UV Spectrum of compound DE4

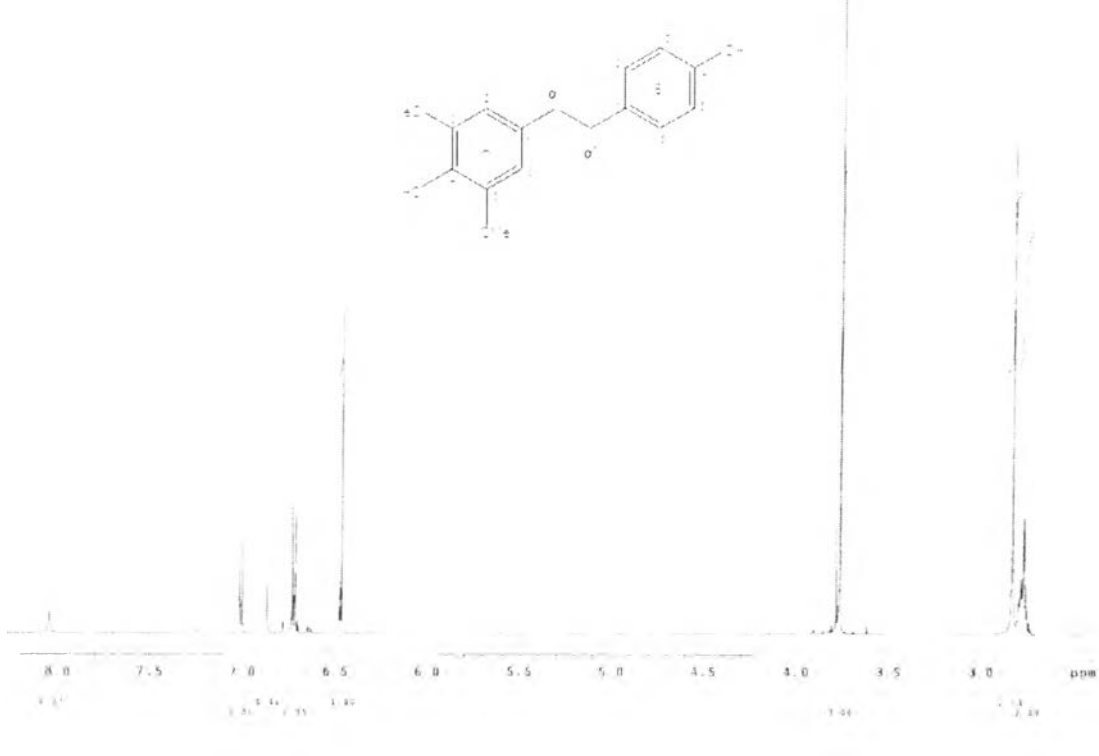

Figure 32 H-NMR (500 MHz) Spectrum of compound DE4 (acetone-d_6)

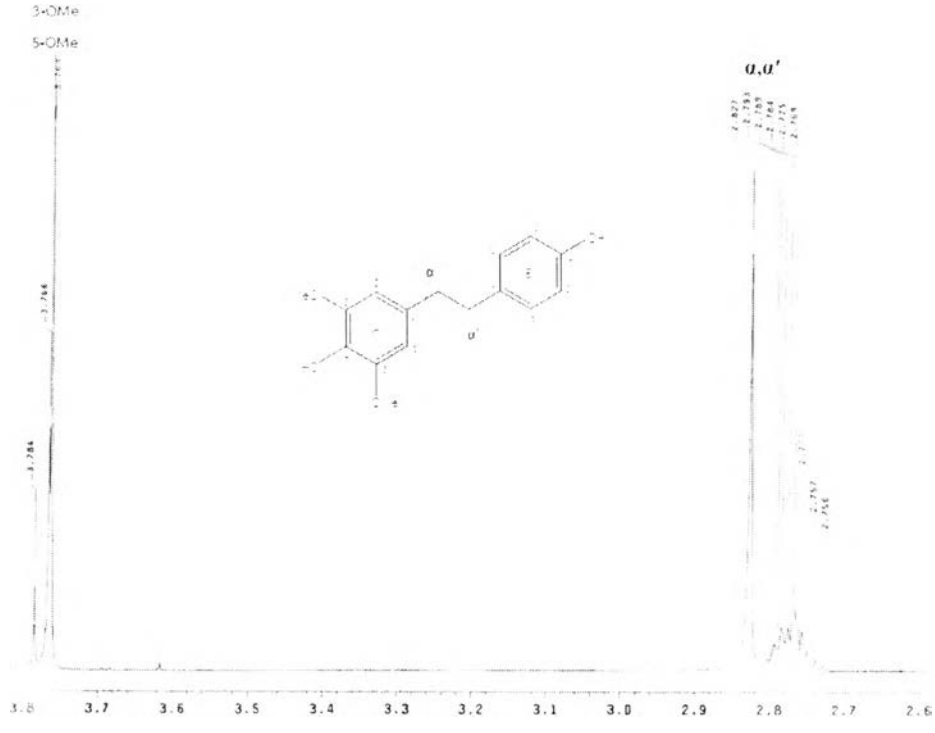

Figure 33 ^{1}H-NMR (500 MHz) Spectrum of compound DE4 (acetone-d_6)

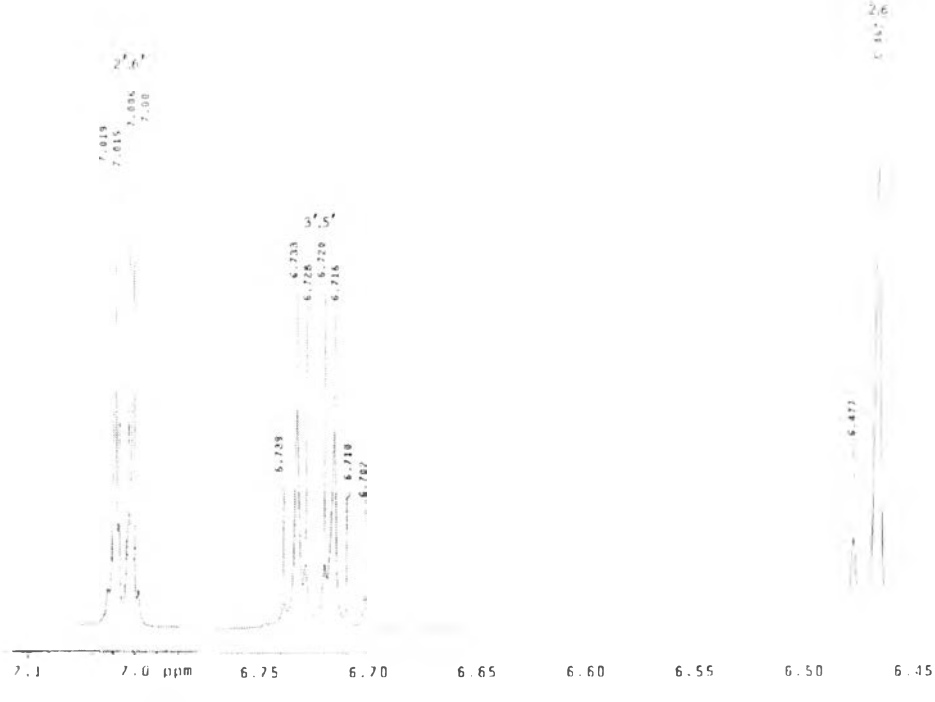

Figure 34 ^{1}H-NMR (500 MHz) Spectrum of compound DE4 (acetone-d_6)
(δ_H 6.45-6.75, δ_H 6.50-7.10)

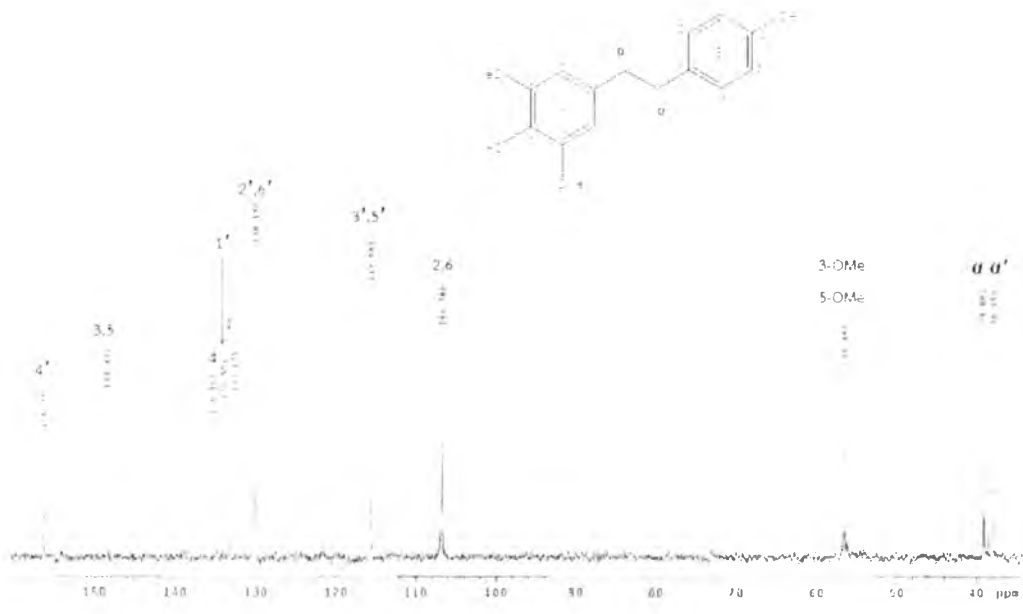

Figure 35 ^{13}C-NMR (125 MHz) Spectrum of compound DE4 (acetone-d_6)

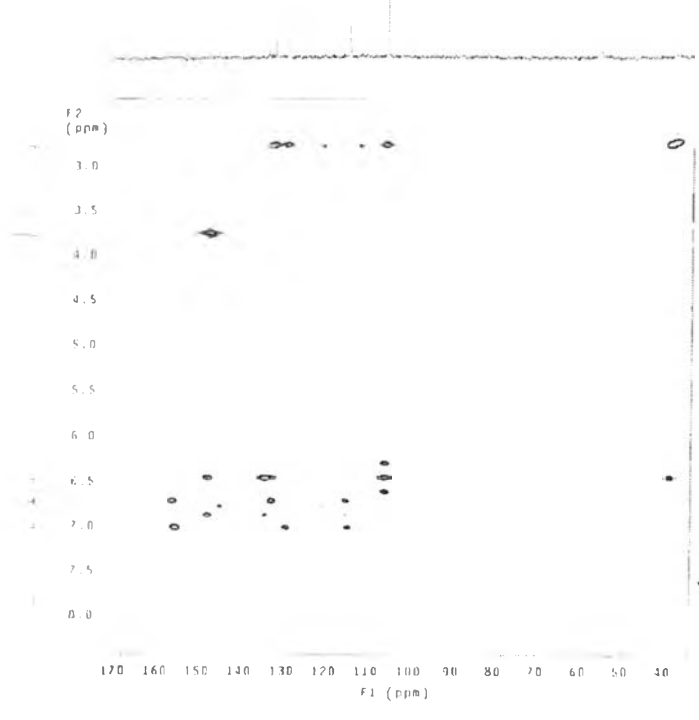

Figure 36 HMBC Spectrum of compound DE4 (acetone-d_6)

(δ_H 2.50-8.00, δ_C 35.0-170.0)

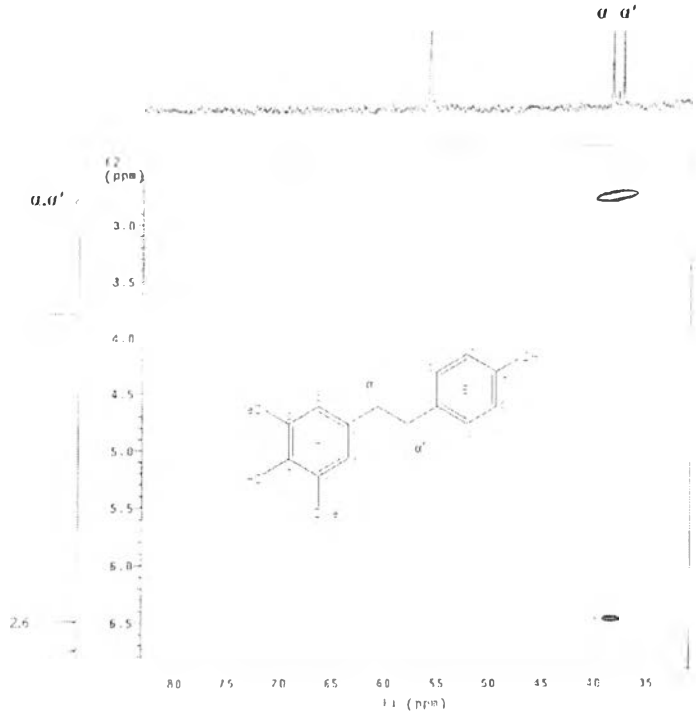

Figure 37 HMBC Spectrum of compound DE4 (acetone-d_6)

(δ_H 2.50-7.00, δ_C 35.0-80.0)

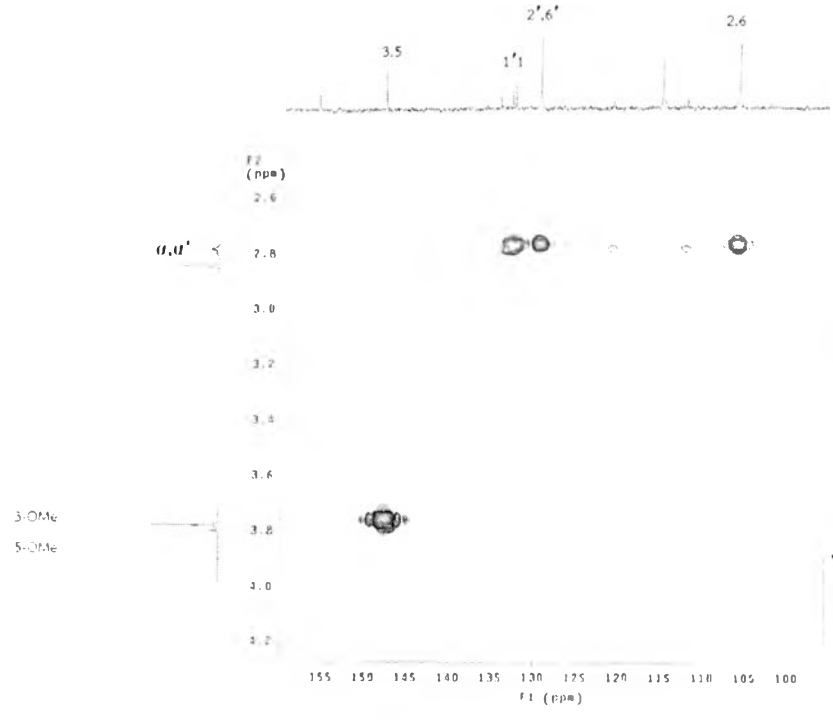

Figure 38 HMBC Spectrum of compound DE4 (acetone-d_6)

(δ_H 2.60-4.20, δ_C 100.0-155.0)

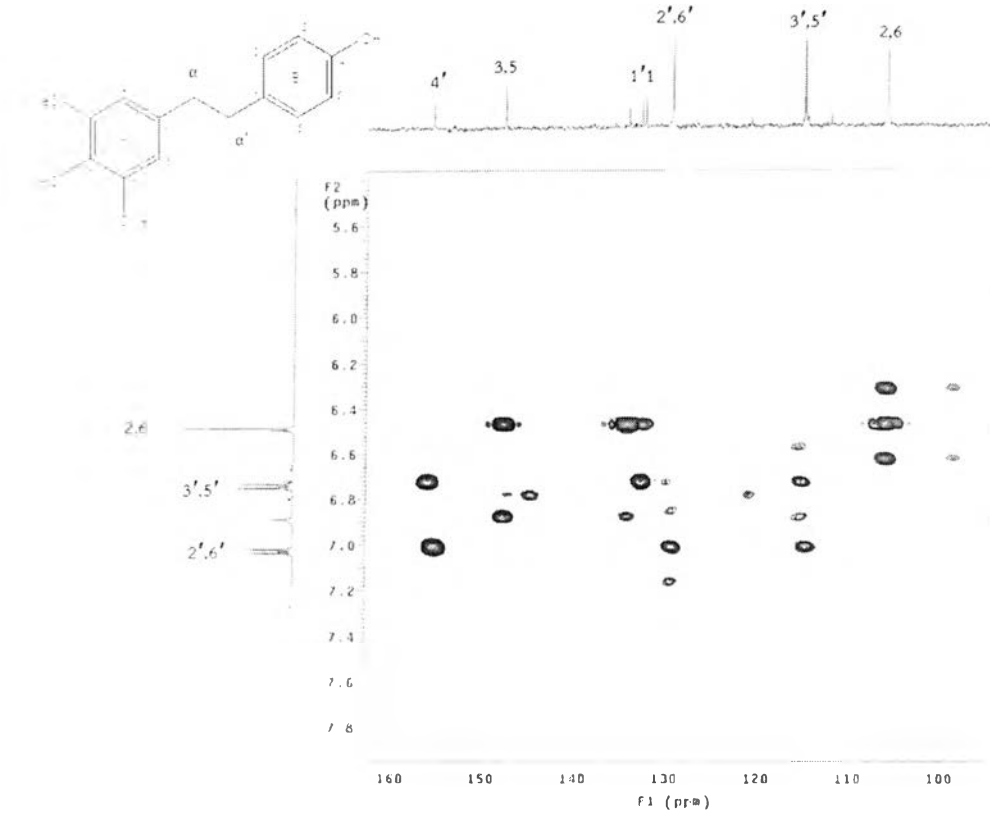

Figure 39 HMBC Spectrum of compound DE4 (acetone-d_6)

(δ_H 5.60-7.80, δ_C 100.0-160.0)

Figure 40 Mass spectrum of compound DE5

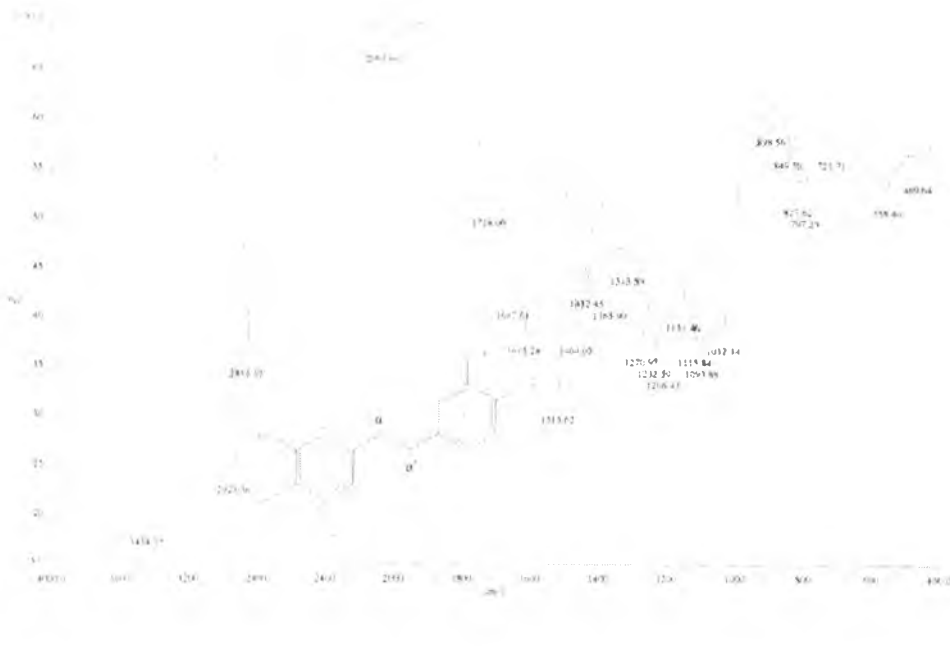

Figure 41 IR Spectrum of compound DE5

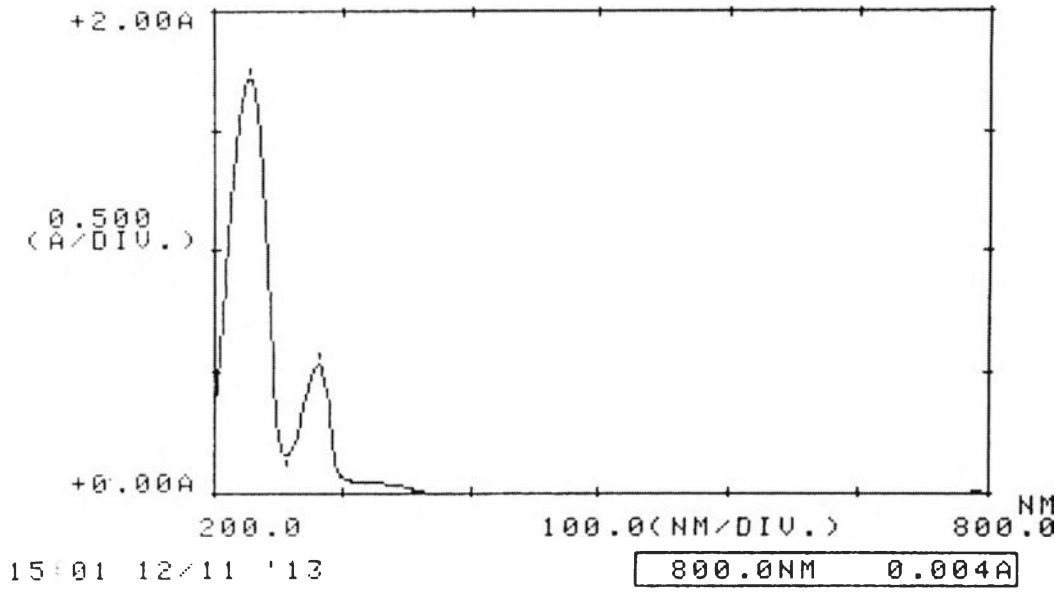

Figure 42 UV Spectrum of compound DE5

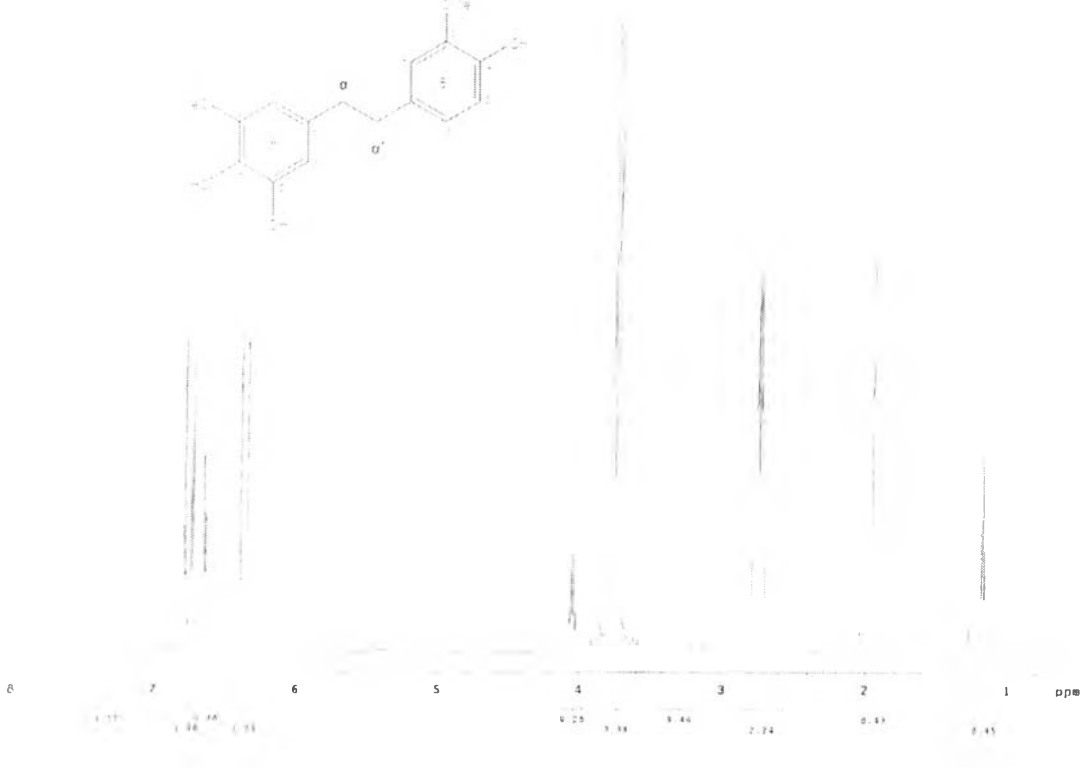

Figure 43 ^{1}H-NMR (500 MHz) Spectrum of compound DE5 (acetone-d_6)

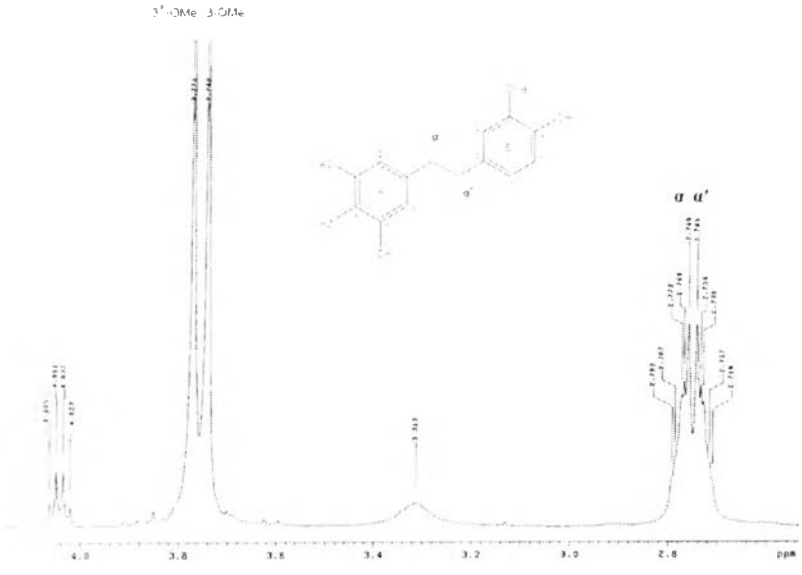

Figure 44 ^{1}H-NMR (500 MHz) Spectrum of compound DE5 (acetone-d_6) (δ_H 2.60-4.20)

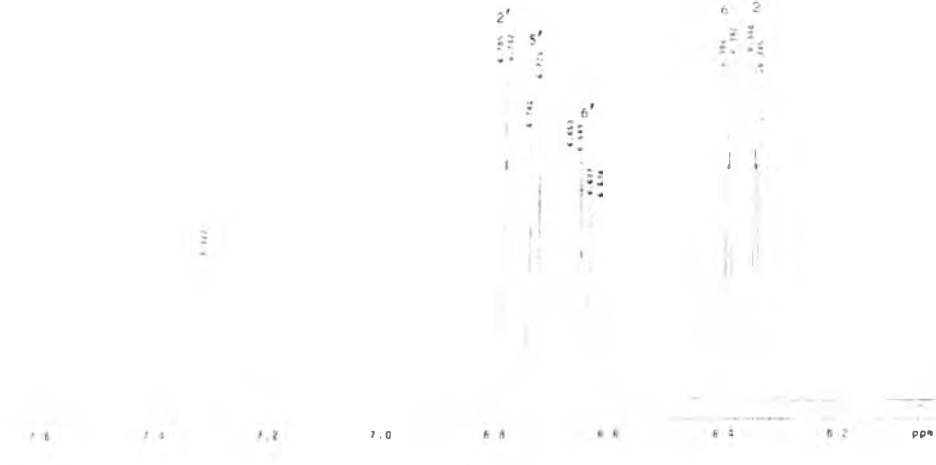

Figure 45 ^{1}H-NMR (500 MHz) Spectrum of compound DE5 (acetone-d_6) (δ_H 6.20-7.60)

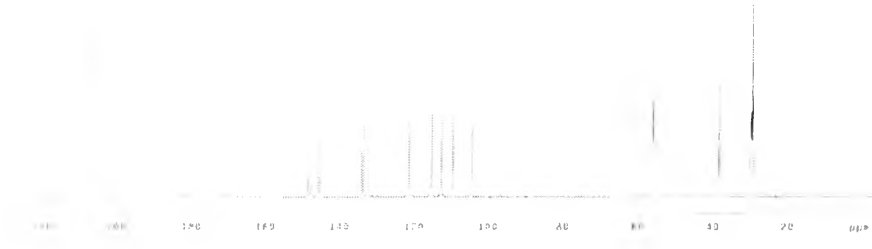

Figure 46 ^{13}C-NMR (125 MHz) Spectrum of compound DE5 (acetone-d_6)

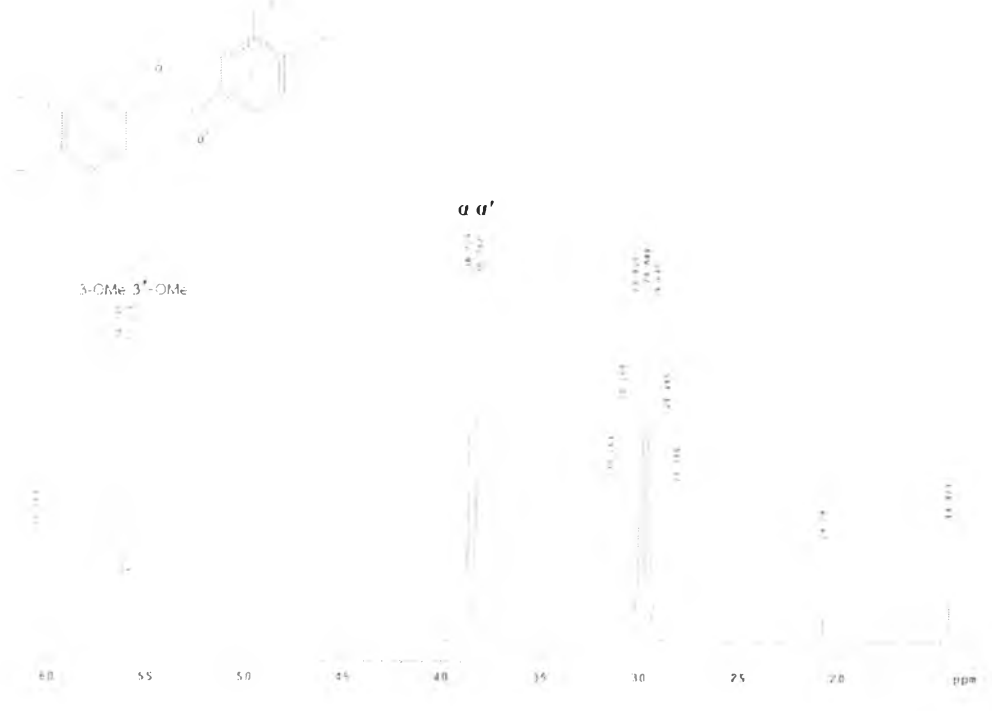

Figure 47 ^{13}C-NMR (125 MHz) Spectrum of compound DE5 (acetone-d_6) (δ_C 14.0-65.0)

Figure 48 ^{13}C-NMR (125 MHz) Spectrum of compound DE5 (acetone-d_6)

(δ_C 102.0-172.0)

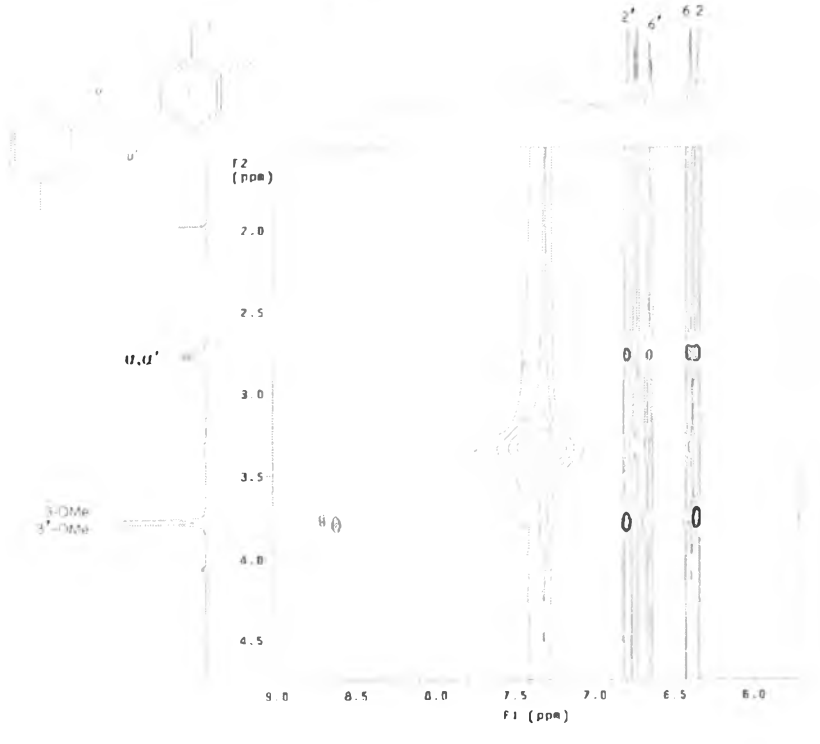

Figure 49 NOESY Spectrum of compound DE5 (acetone-d_6)

(δ_H 2.00-4.50, δ_H 6.00-9.00)

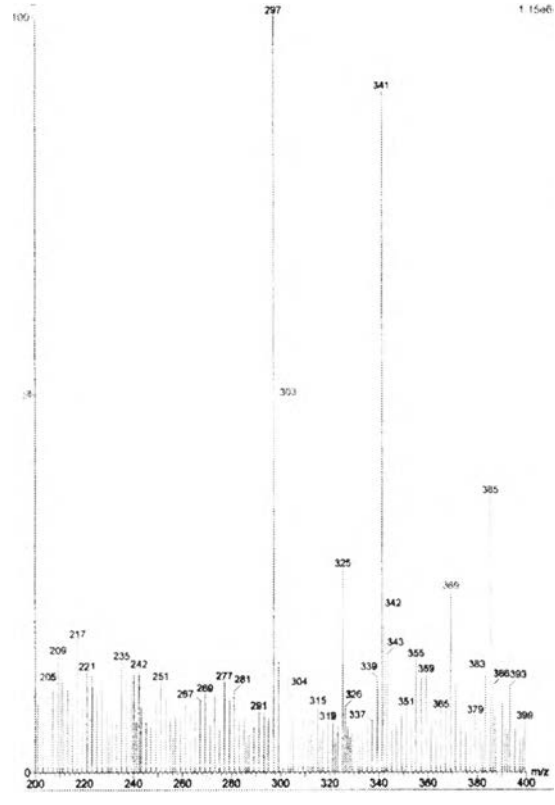

Figure 50 Mass spectrum of compound DE6

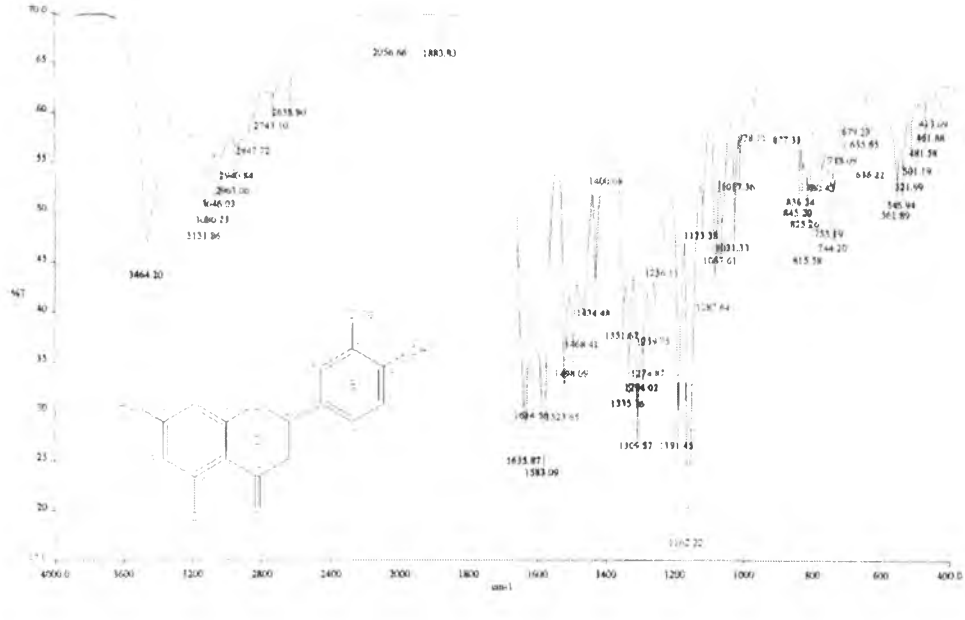

Figure 51 IR Spectrum of compound DE6

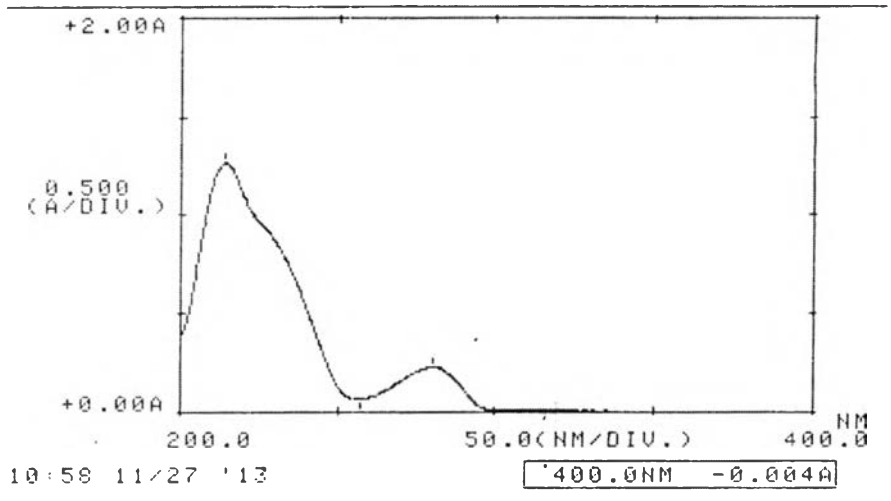

Figure 52 UV Spectrum of compound DE6

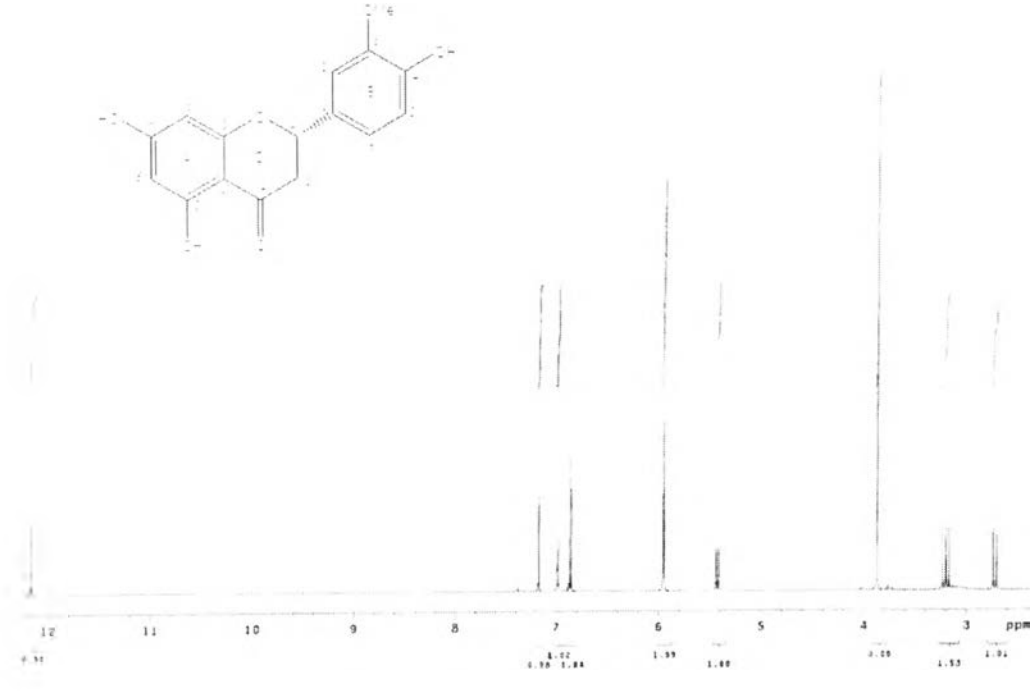

Figure 53 ^{1}H-NMR (500 MHz) Spectrum of compound DE6 (acetone-d_6)

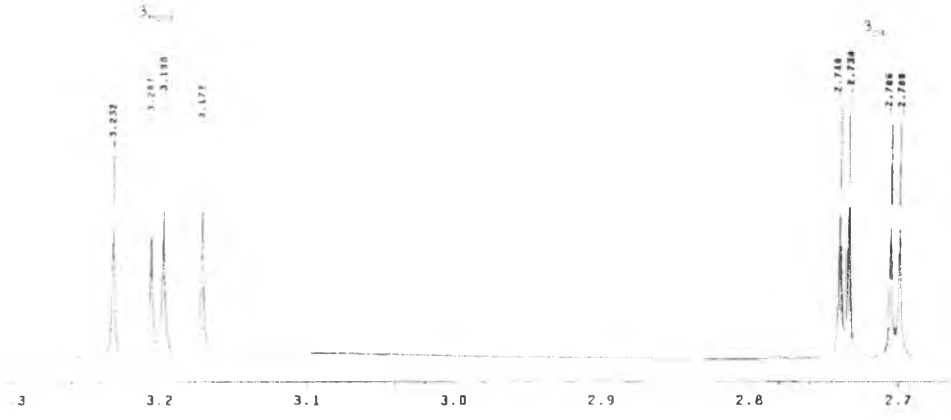

Figure 54 H-NMR (500 MHz) Spectrum of compound DE6 (acetone-d_6)

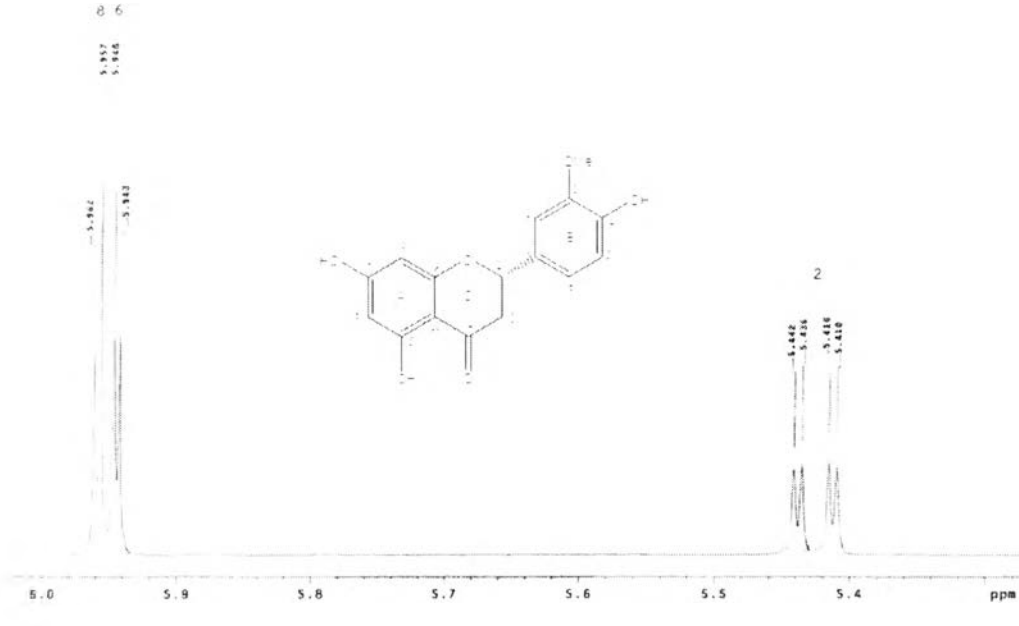

Figure 55 H-NMR (500 MHz) Spectrum of compound DE6 (acetone-d_6)

(δ_H 5.30-6.00)

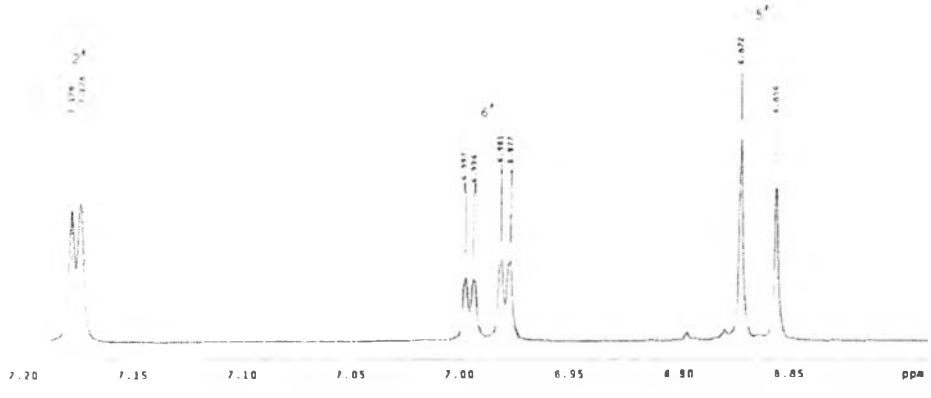

Figure 56 ^{1}H-NMR (500 MHz) Spectrum of compound DE6 (acetone-d_6) (δ_H 6.80-7.20)

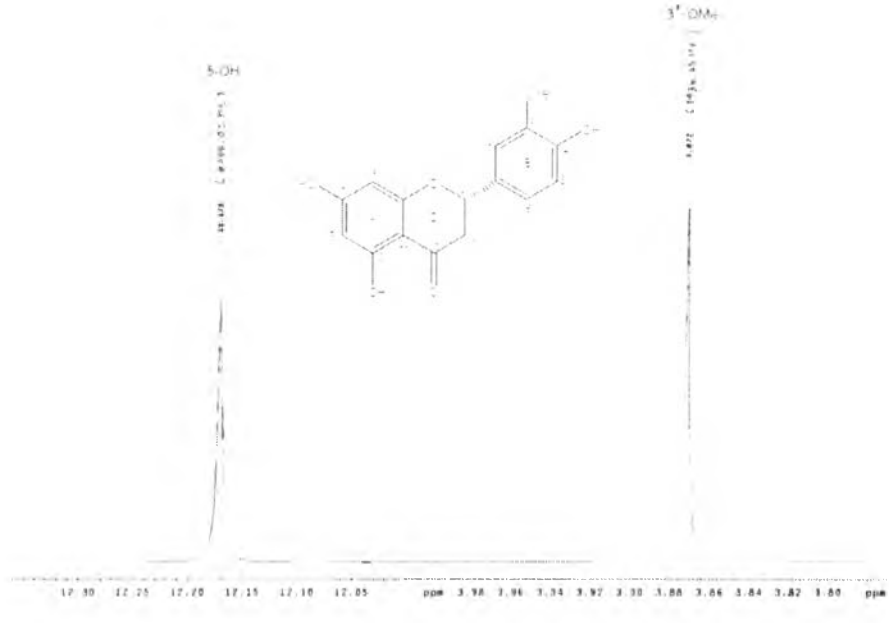

Figure 57 ^{1}H-NMR (500 MHz) Spectrum of compound DE6 (acetone-d_6) (δ_H 3.80-3.90, δ_H 12.05-12.25)

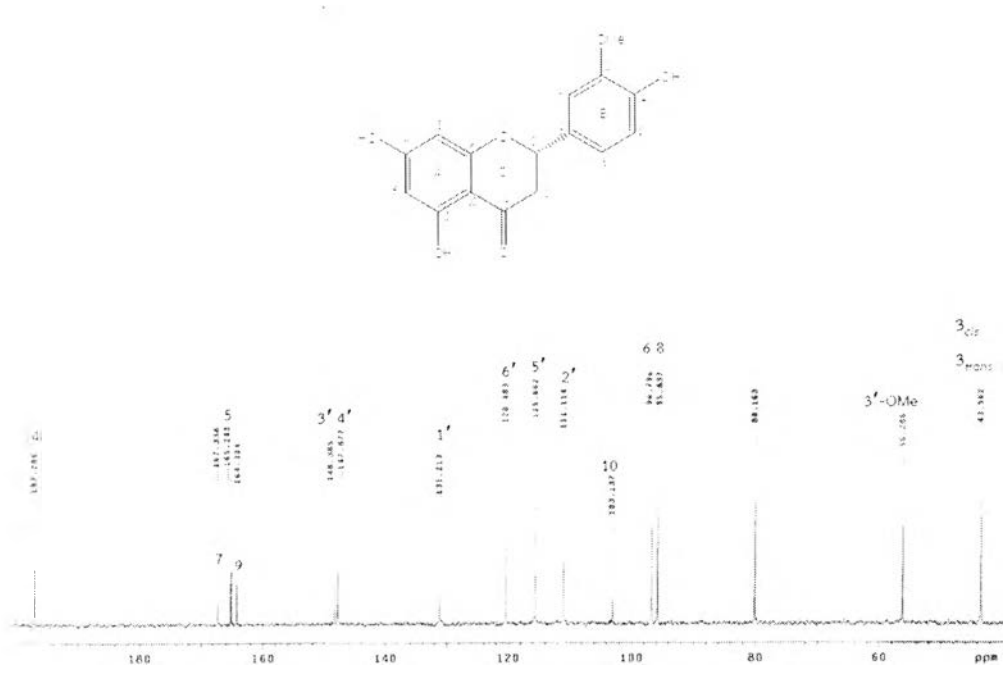

Figure 58 ^{13}C-NMR (125 MHz) Spectrum of compound DE6 (acetone-d_6)

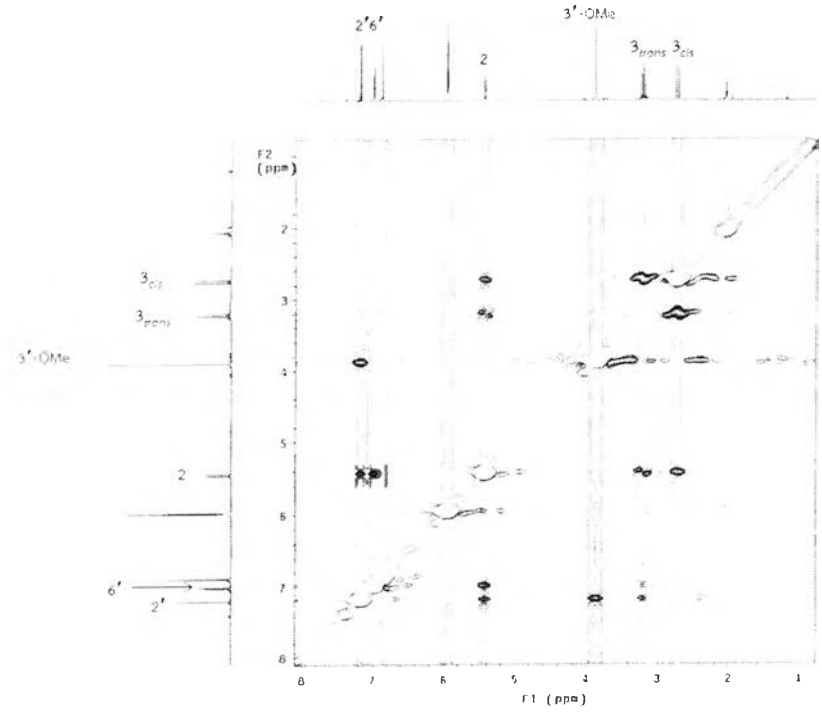

Figure 59 NOESY Spectrum of compound DE6 (acetone-d_6)

(δ_H 1.00-8.00, δ_H 1.00-8.00)

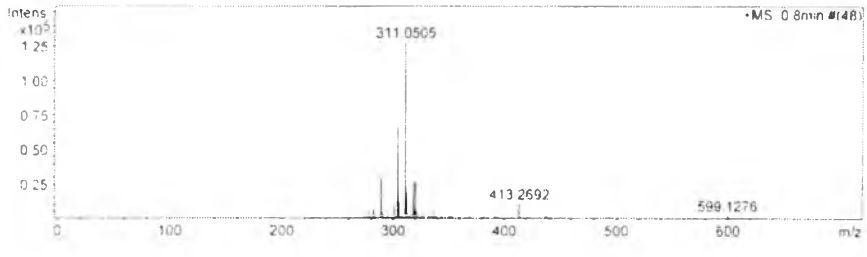

Figure 60 Mass spectrum of compound DE7

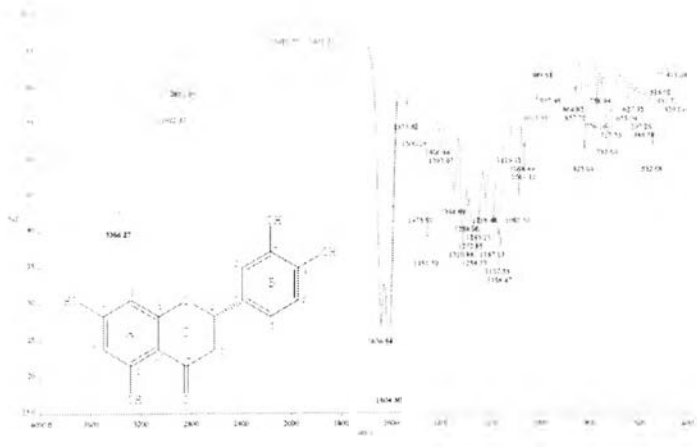

Figure 61 IR Spectrum of compound DE7

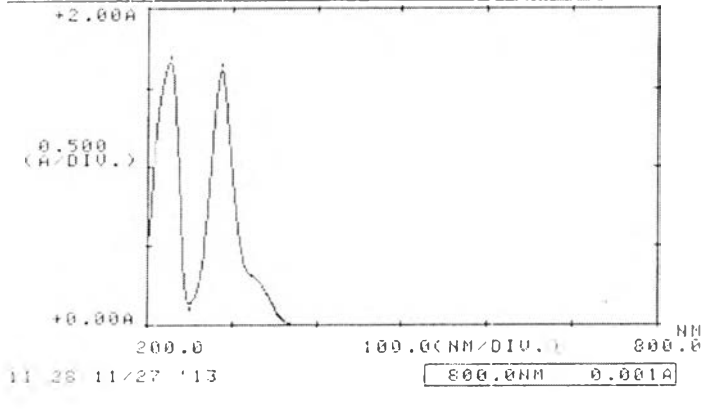

Figure 62 UV Spectrum of compound DE7

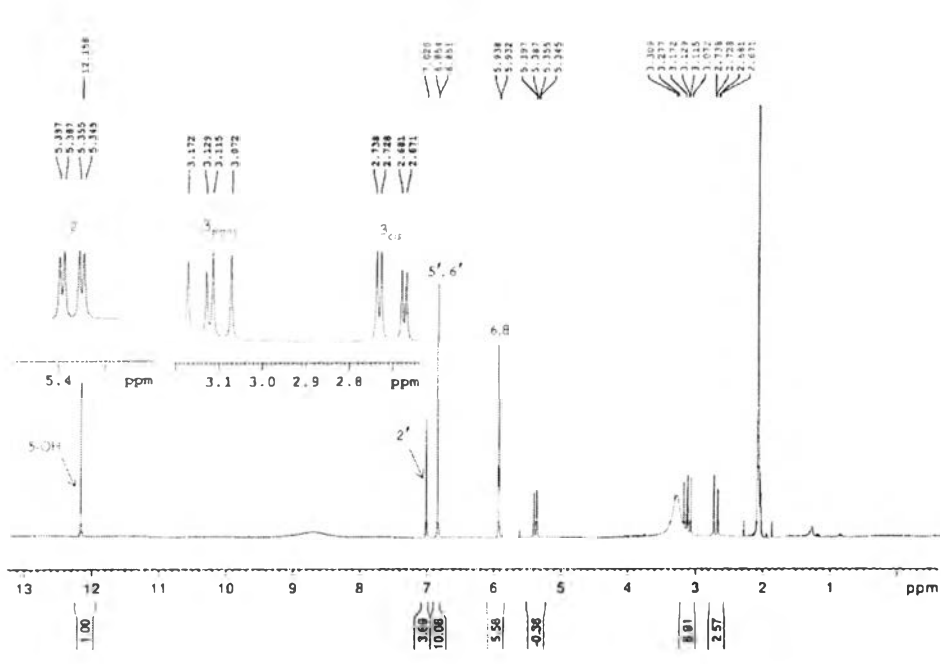

Figure 63 ^{1}H-NMR (500 MHz) Spectrum of compound DE7 (acetone-d_6)

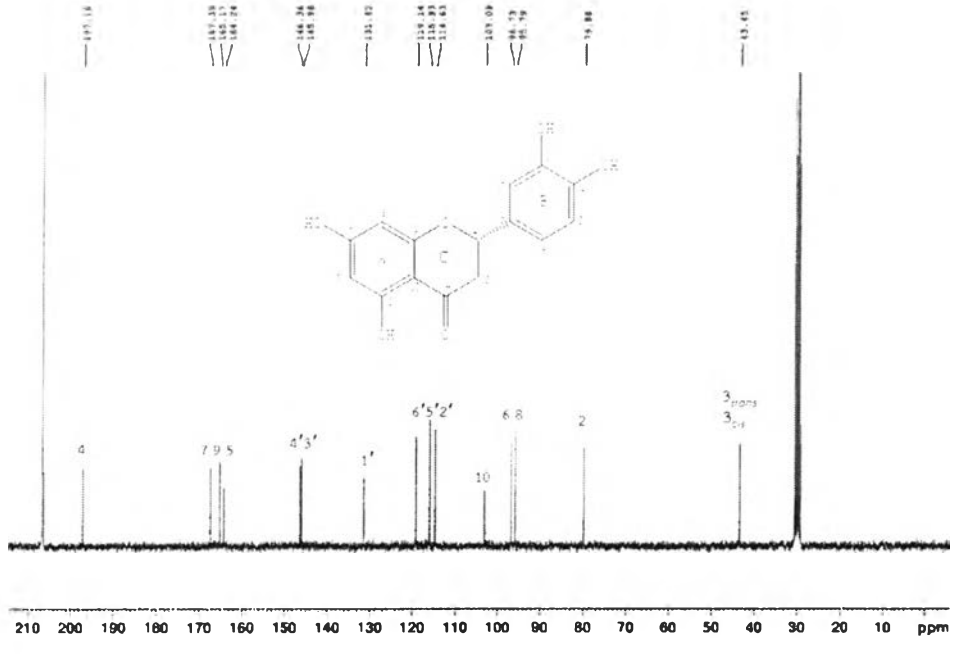

Figure 64 ^{13}C-NMR (125 MHz) Spectrum of compound DE7 (acetone-d_6)

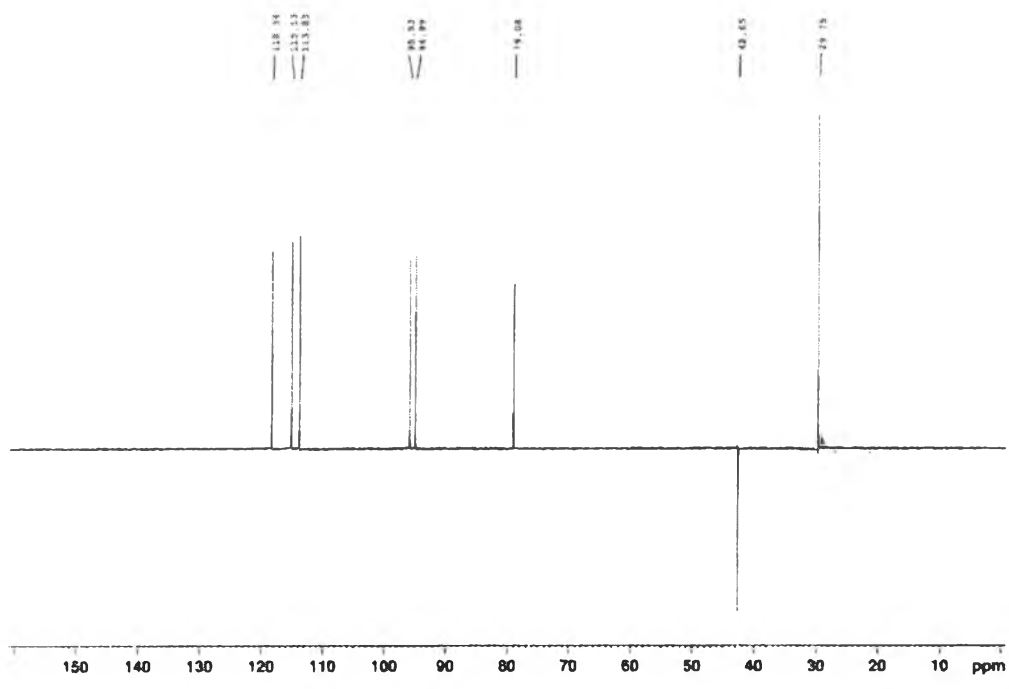

Figure 65 DEPT 135 Spectrum of compound DE7 (acetone-d_6)

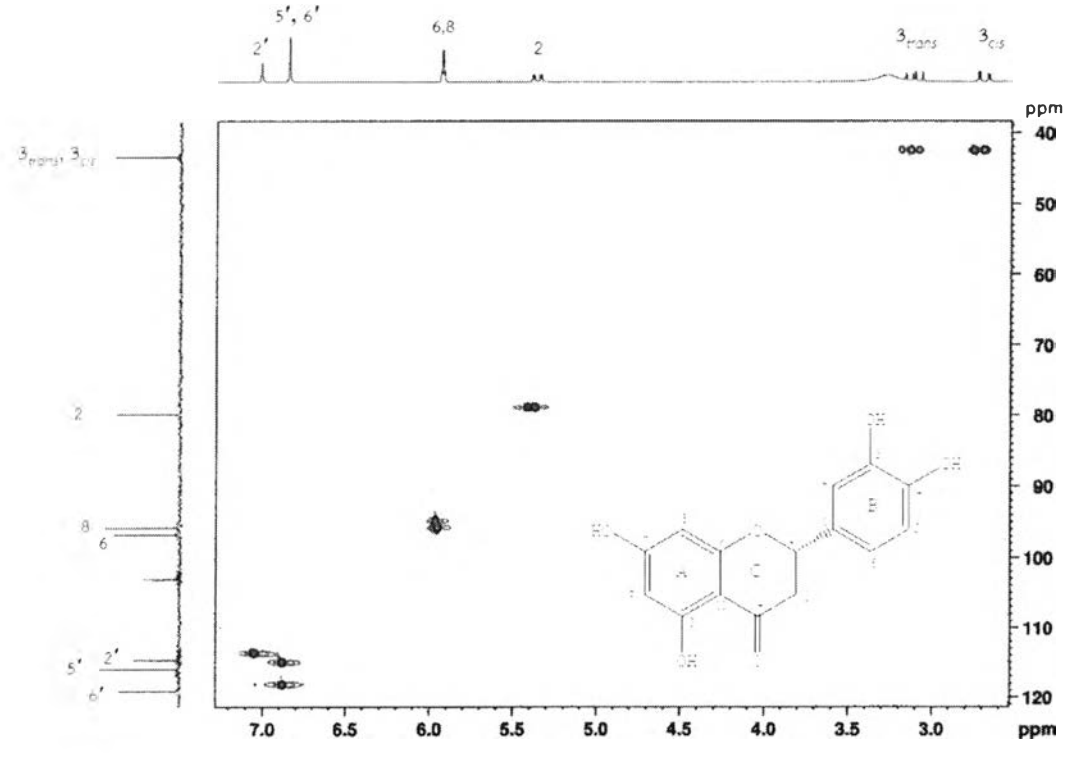

Figure 66 HSQC Spectrum of compound DE7 (acetone-d_6)

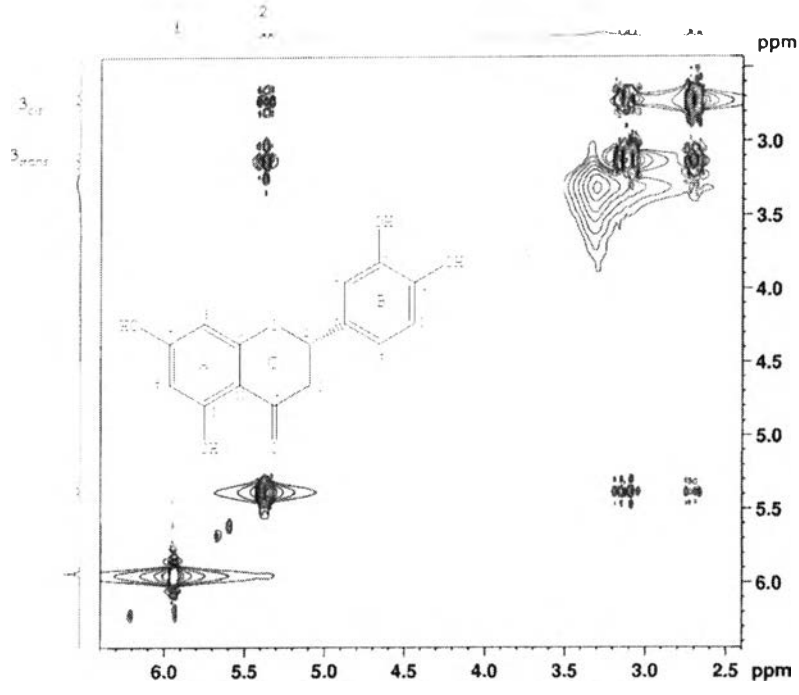

Figure 67 NOESY Spectrum of compound DE7 (acetone-d_6)

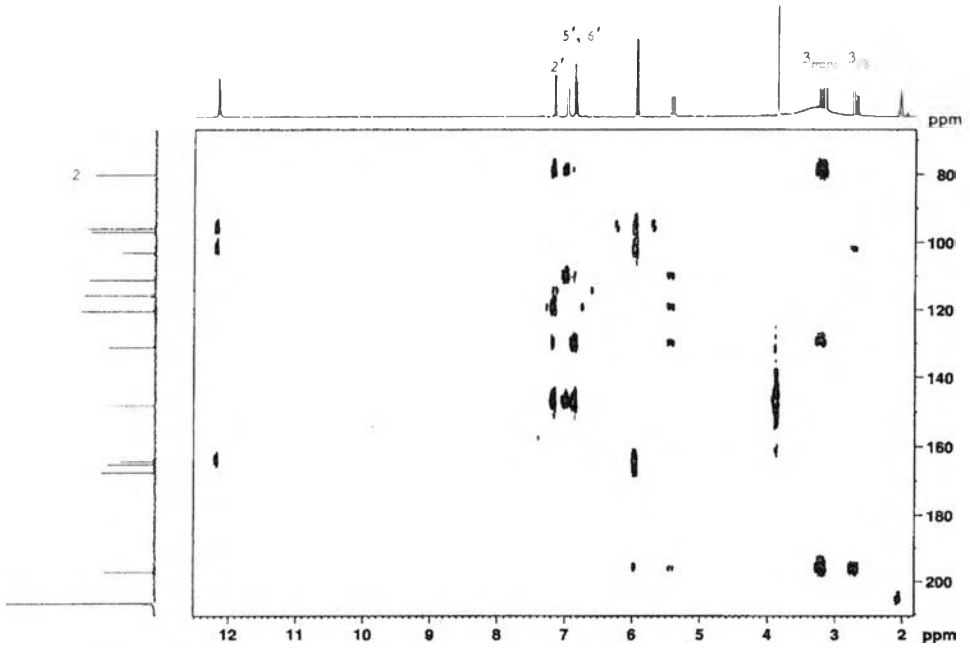

Figure 68 HMBC Spectrum of compound DE7 (acetone-d_6)

(δ_H 2.70-12.50, δ_C 75.0-200.0)

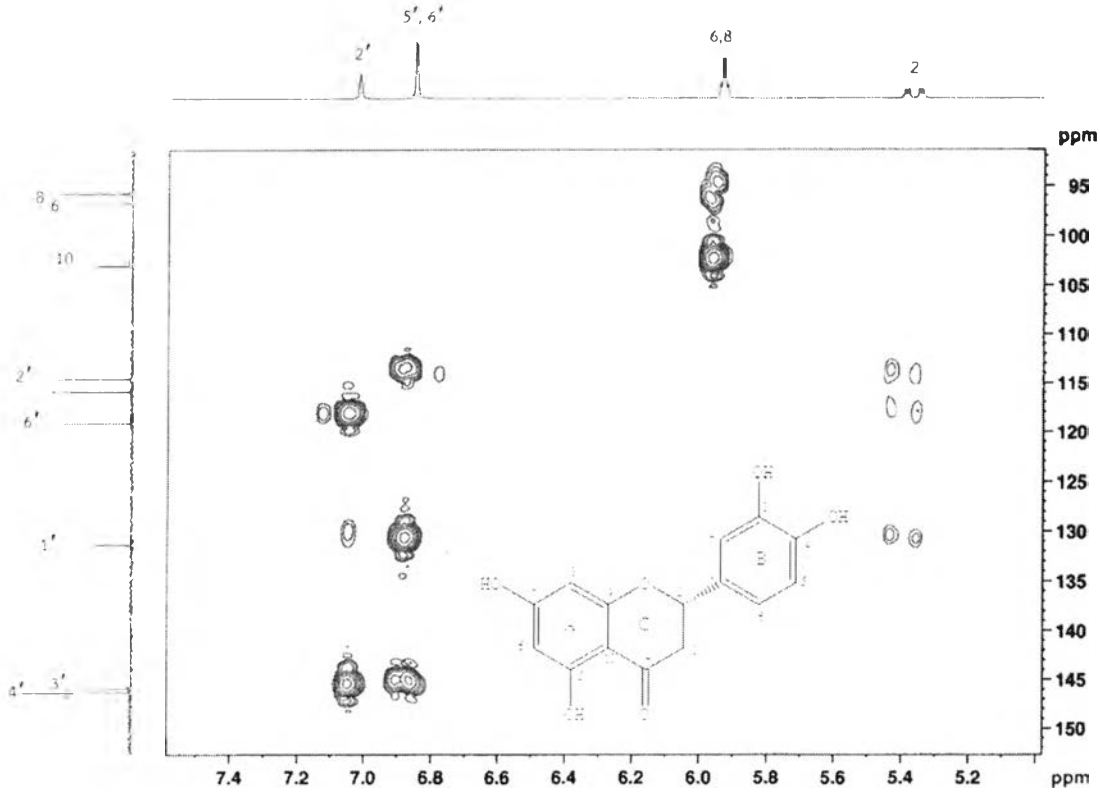

Figure 69 HMBC Spectrum of compound DE7 (acetone-d_6)

(δ_H 5.20-7.40, δ_C 90.0-150.0)

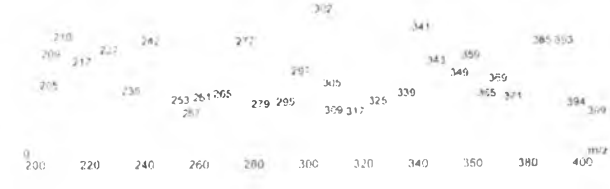

Figure 70 Mass spectrum of compound DE8

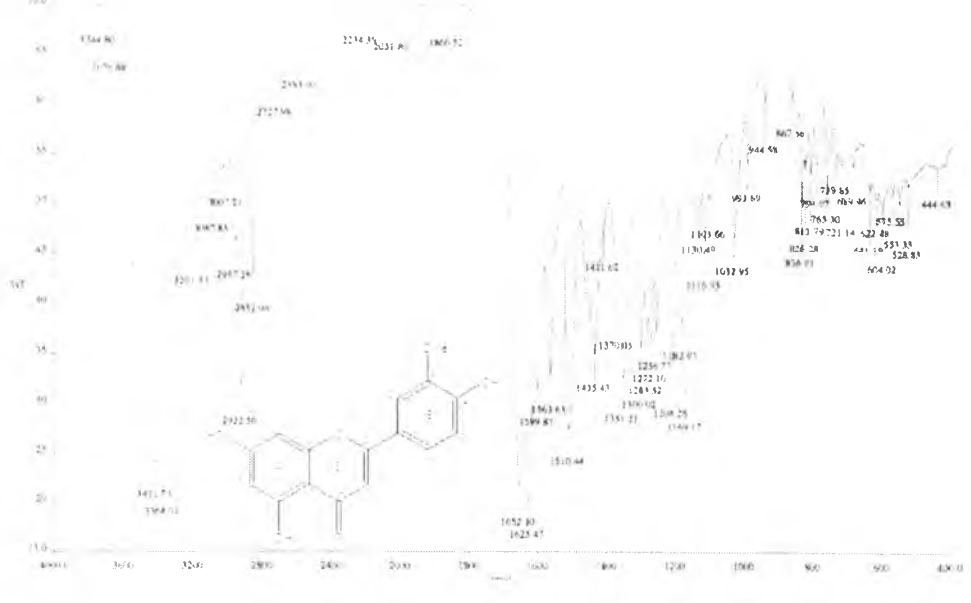

Figure 71 IR Spectrum of compound DE8

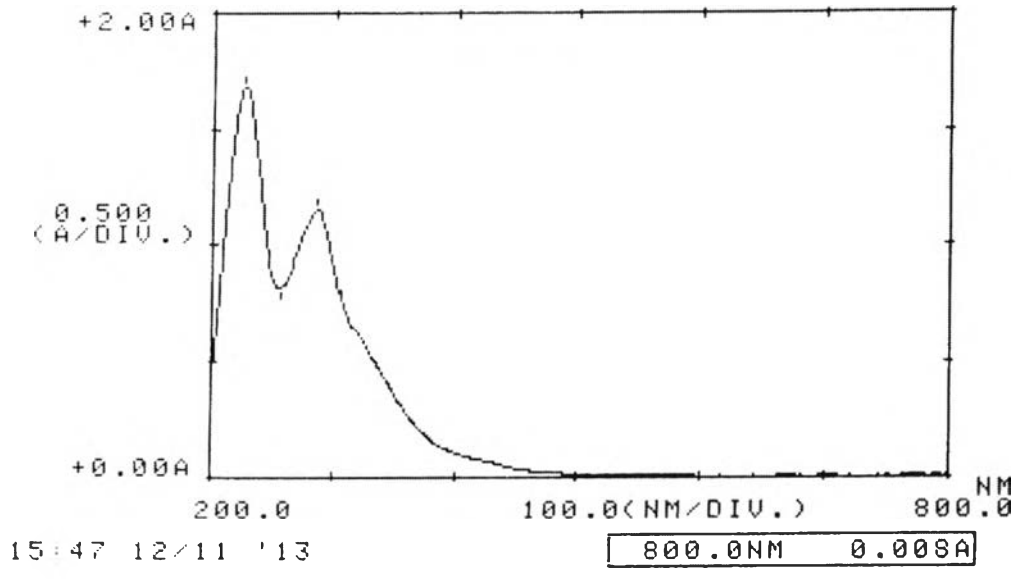

Figure 72 UV Spectrum of compound DE8

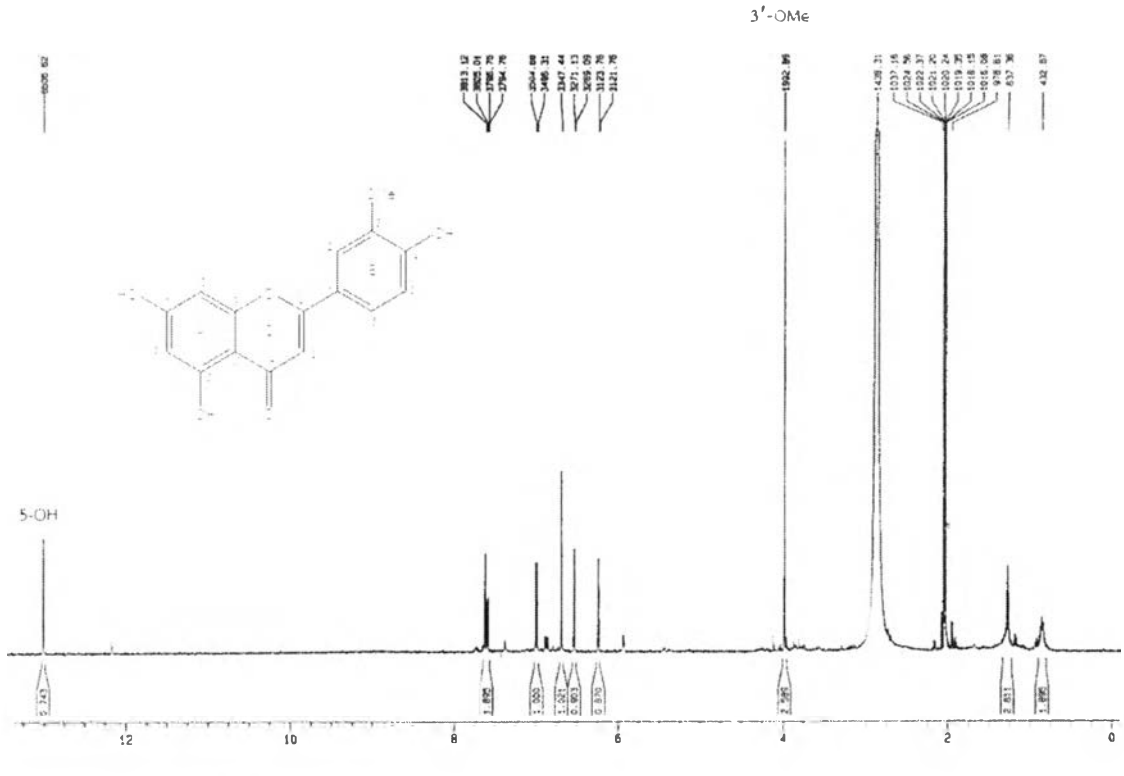

Figure 73 H-NMR (500 MHz) Spectrum of compound DE8 (acetone-d_6)

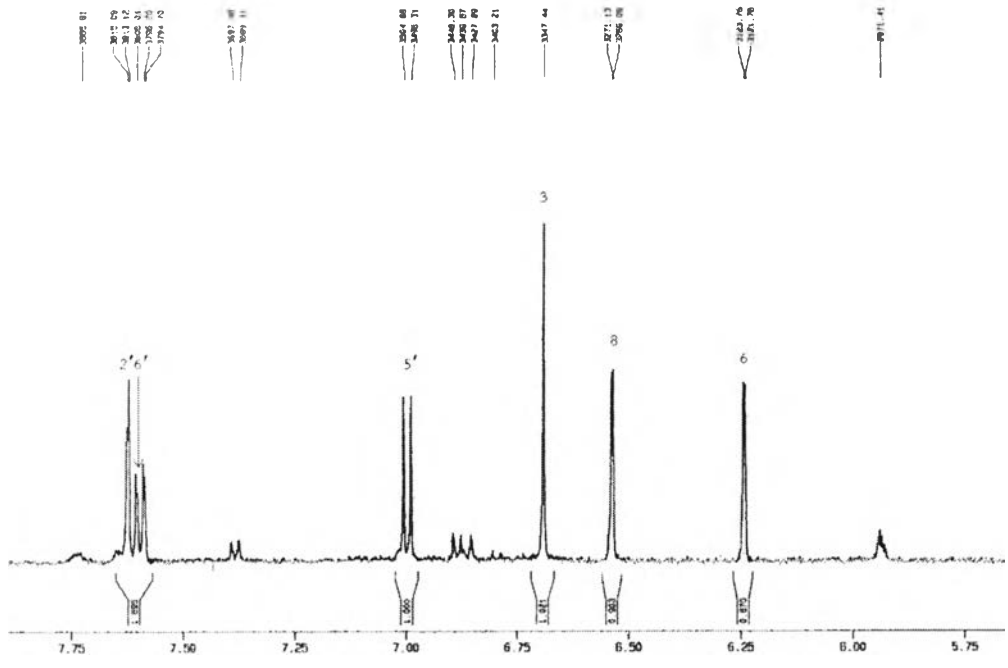

Figure 74 ^{1}H-NMR (500 MHz) Spectrum of compound DE8 (acetone-d_6) (δ_H 5.75-7.75)

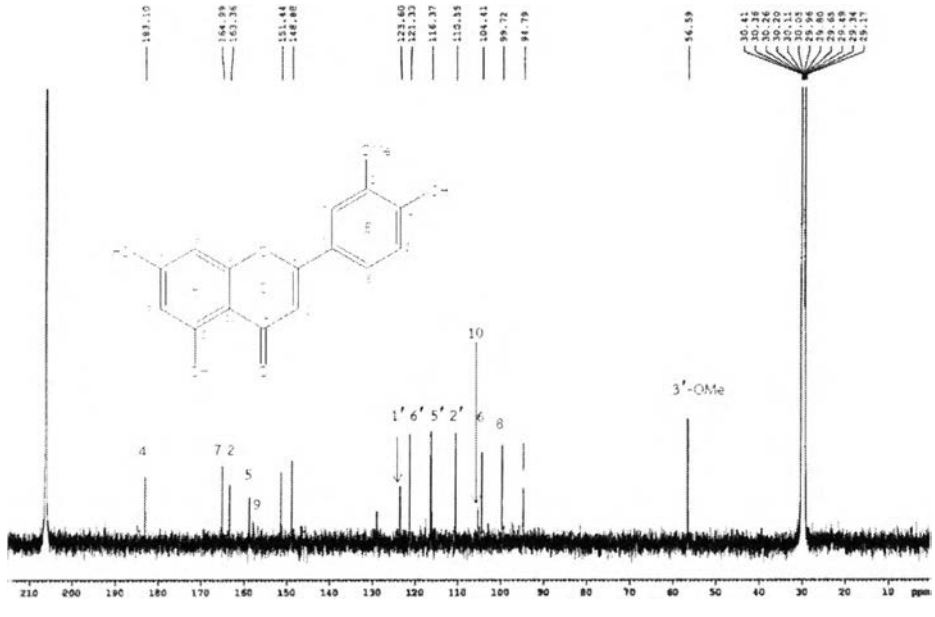

Figure 75 ^{13}C-NMR (125 MHz) Spectrum of compound DE8 (acetone-d_6)

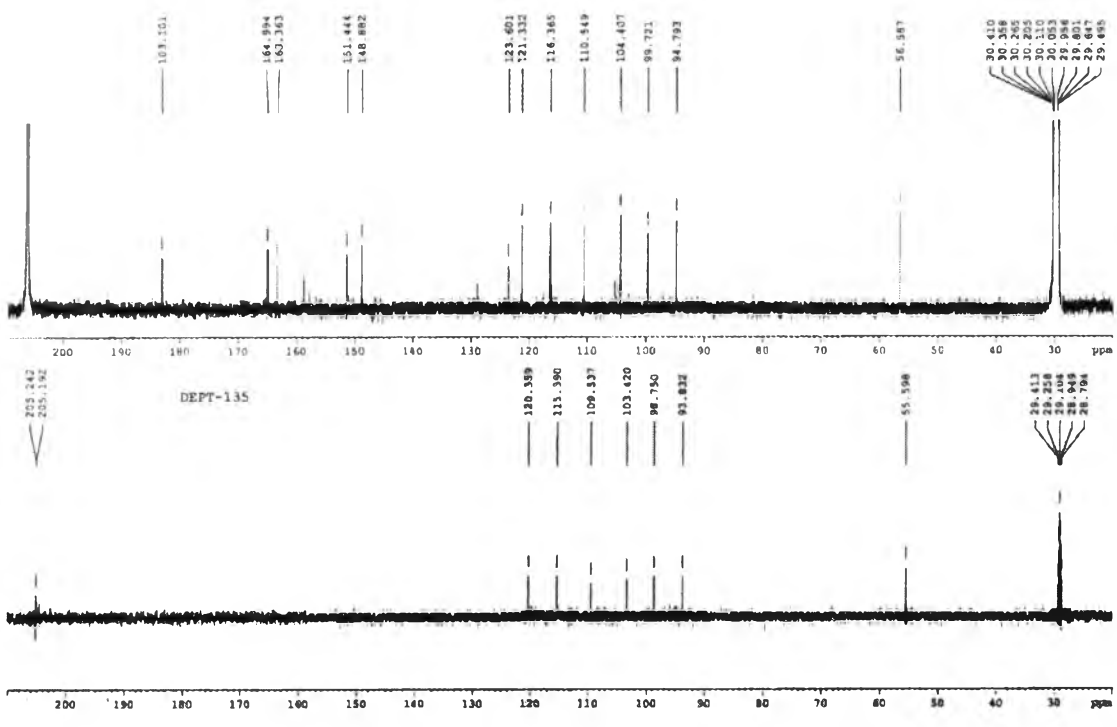

Figure 76 DEPT135 Spectrum of compound DE8 (acetone-d_6)

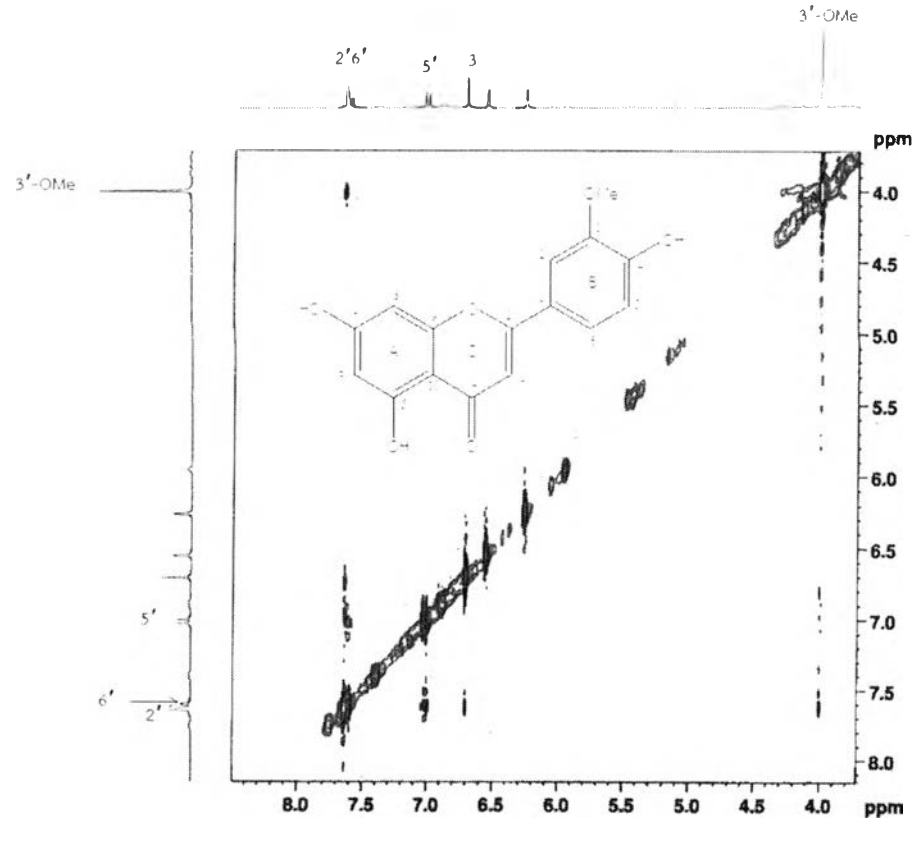

Figure 77 NOESY Spectrum of compound DE8 (acetone-d_6)

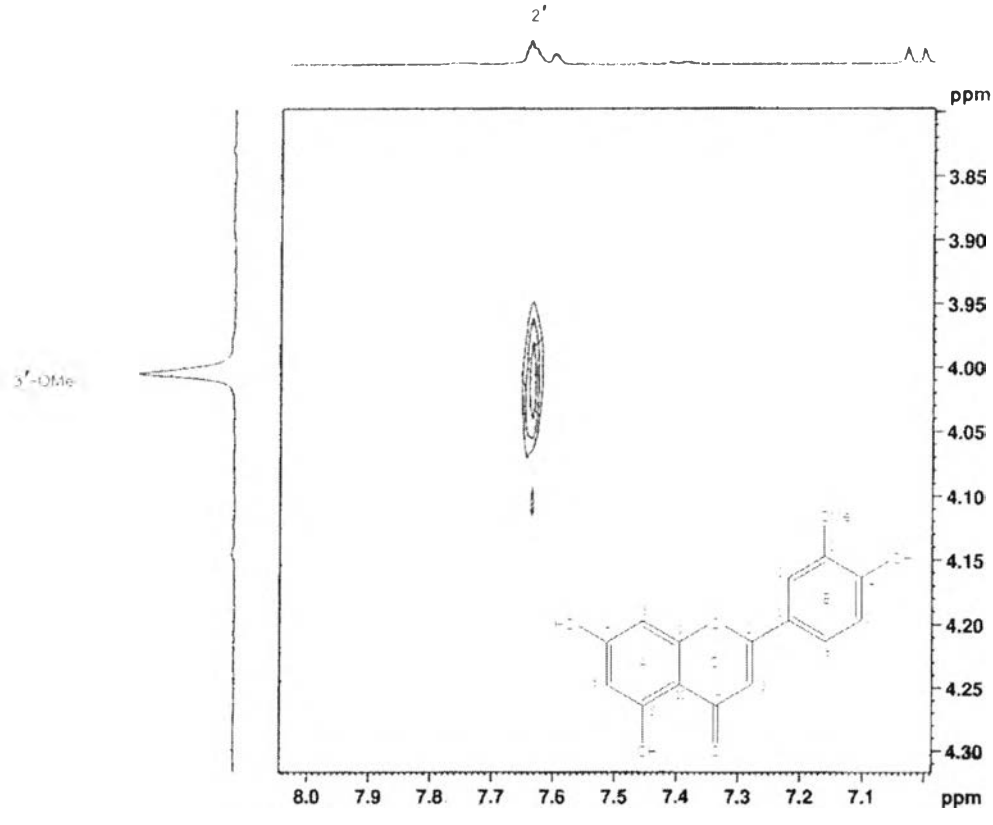

Figure 78 NOESY Spectrum of compound DE8 (acetone-d_6)

(δ_H 3.85-4.30, δ_H 7.10-8.00)

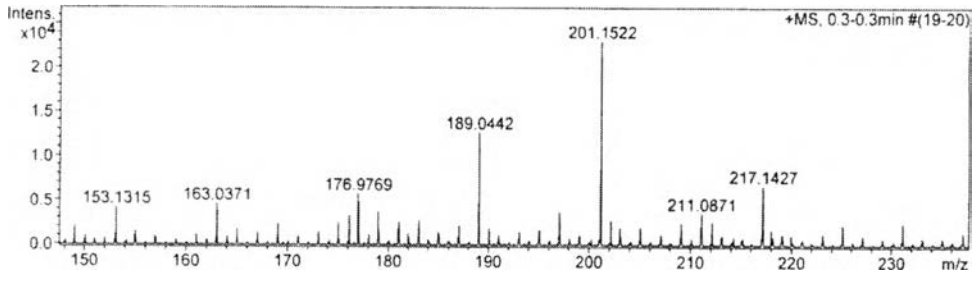

Figure 79 Mass spectrum of compound DE9

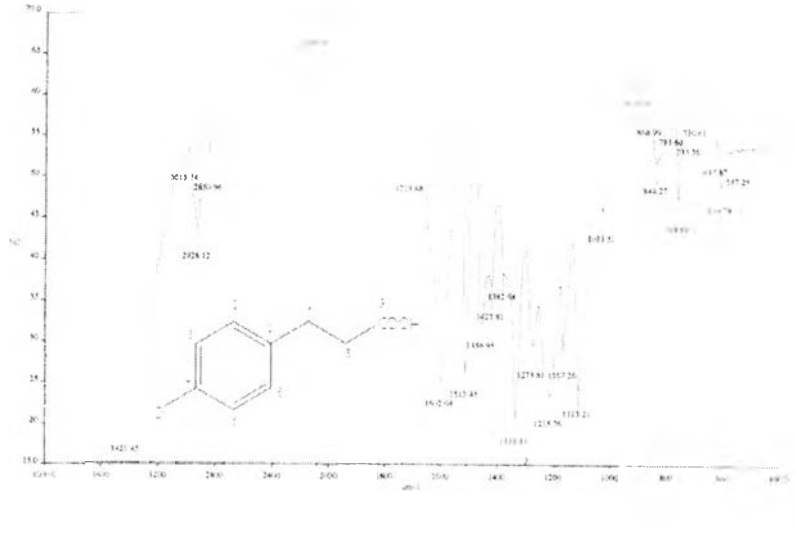

Figure 80 IR Spectrum of compound DE9

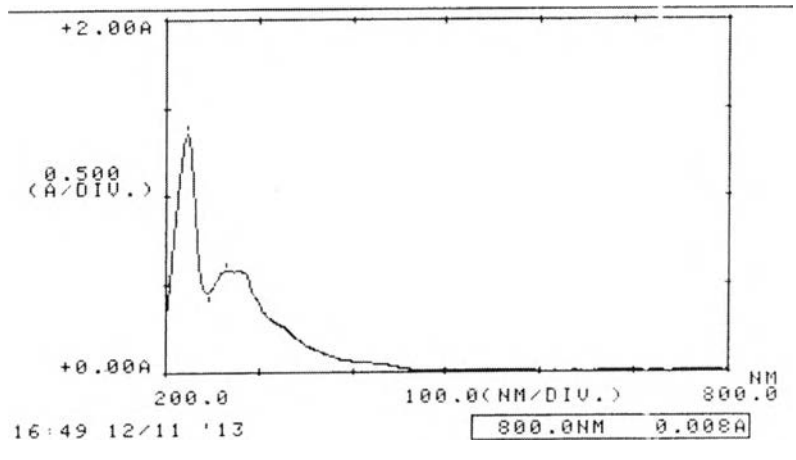

Figure 81 UV Spectrum of compound DE9

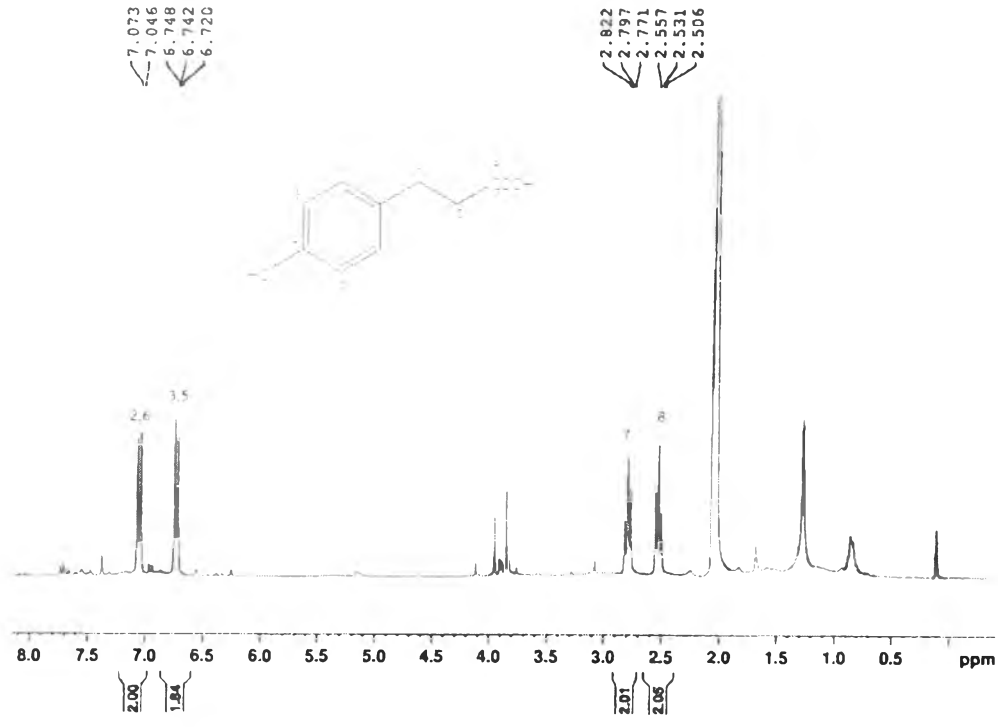

Figure 82 H-NMR (300 MHz) Spectrum of compound DE9 (acetone-d_6)

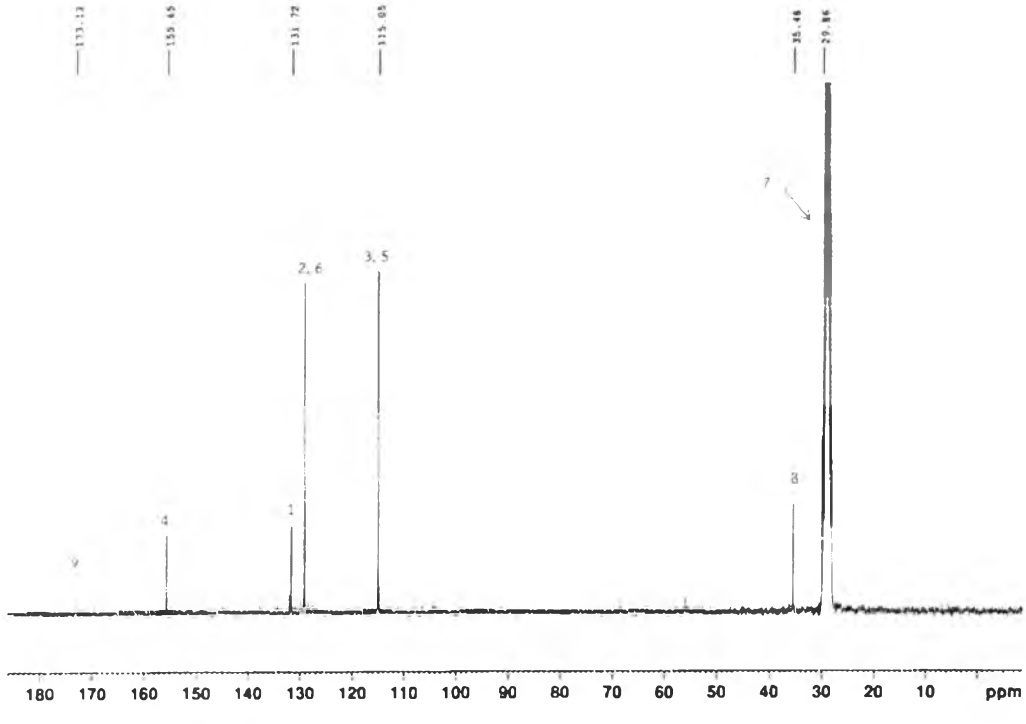

Figure 83 C-NMR (75 MHz) Spectrum of compound DE9 (acetone-d_6)

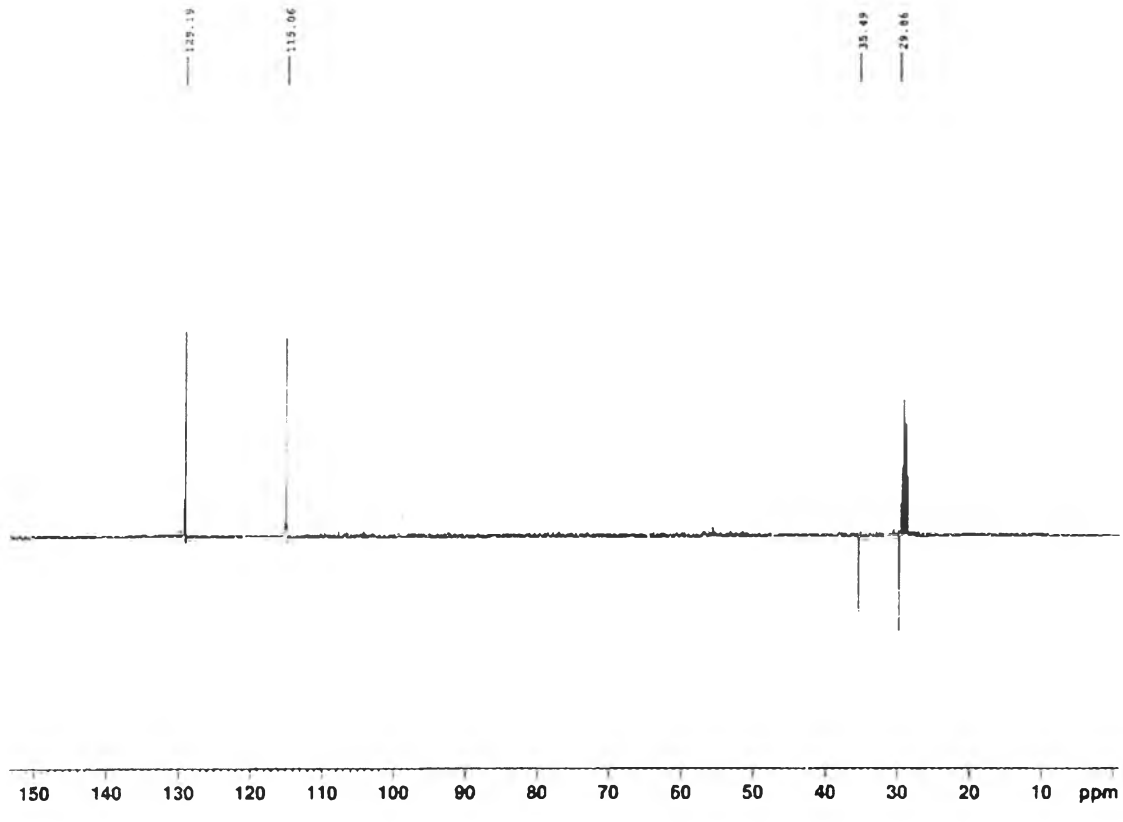

Figure 84 DEPT 135 Spectrum of compound DE9 (acetone-d_6)

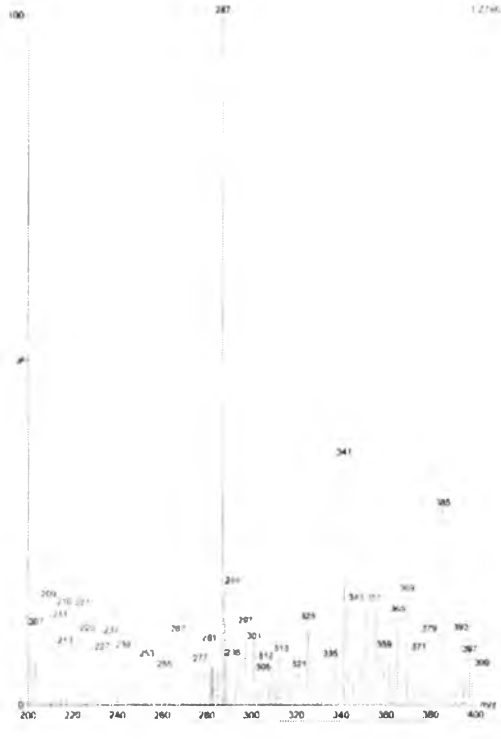

Figure 85 Mass spectrum of compound DE10

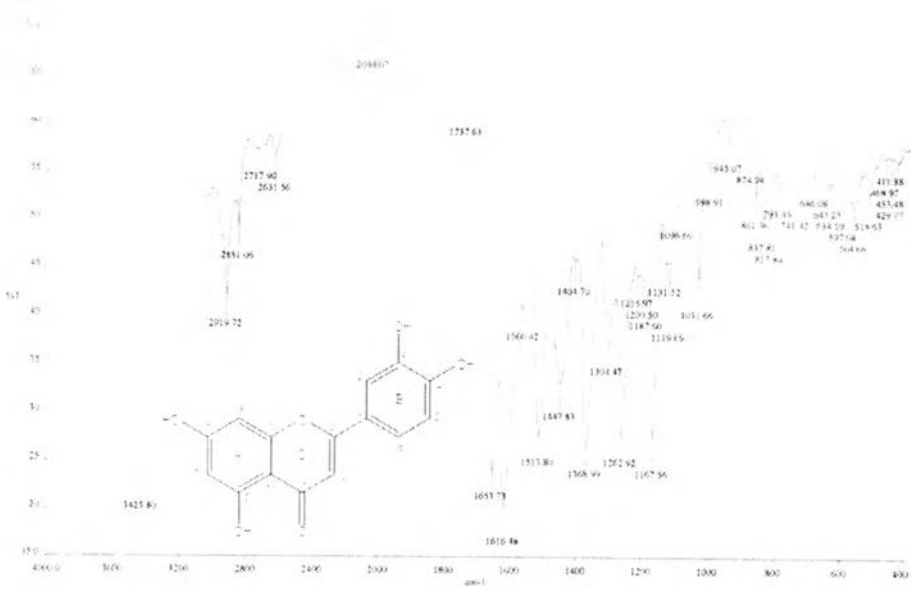

Figure 86 IR Spectrum of compound DE10

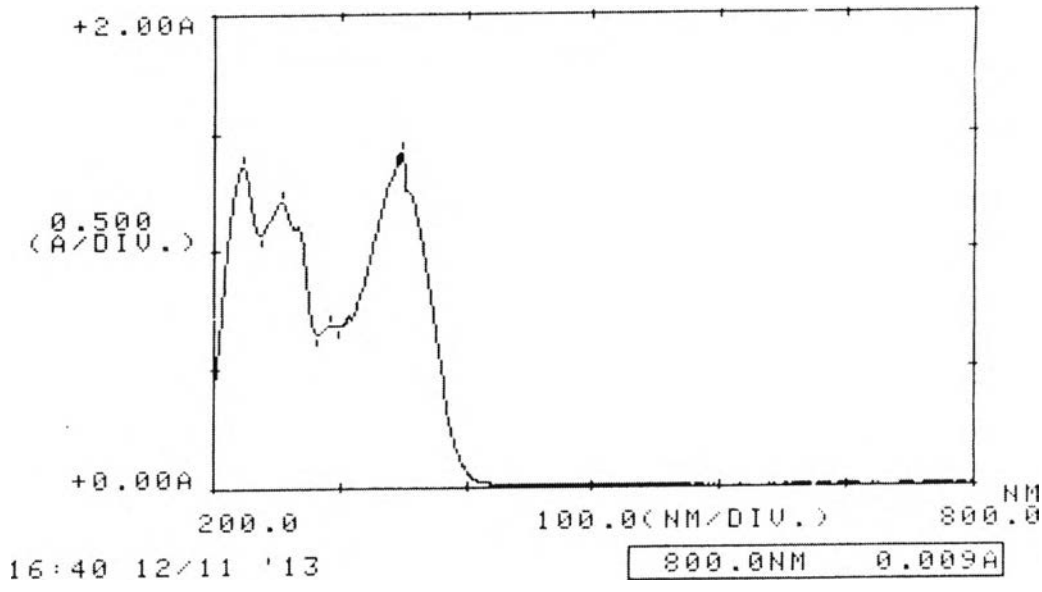

Figure 87 UV Spectrum of compound DE10

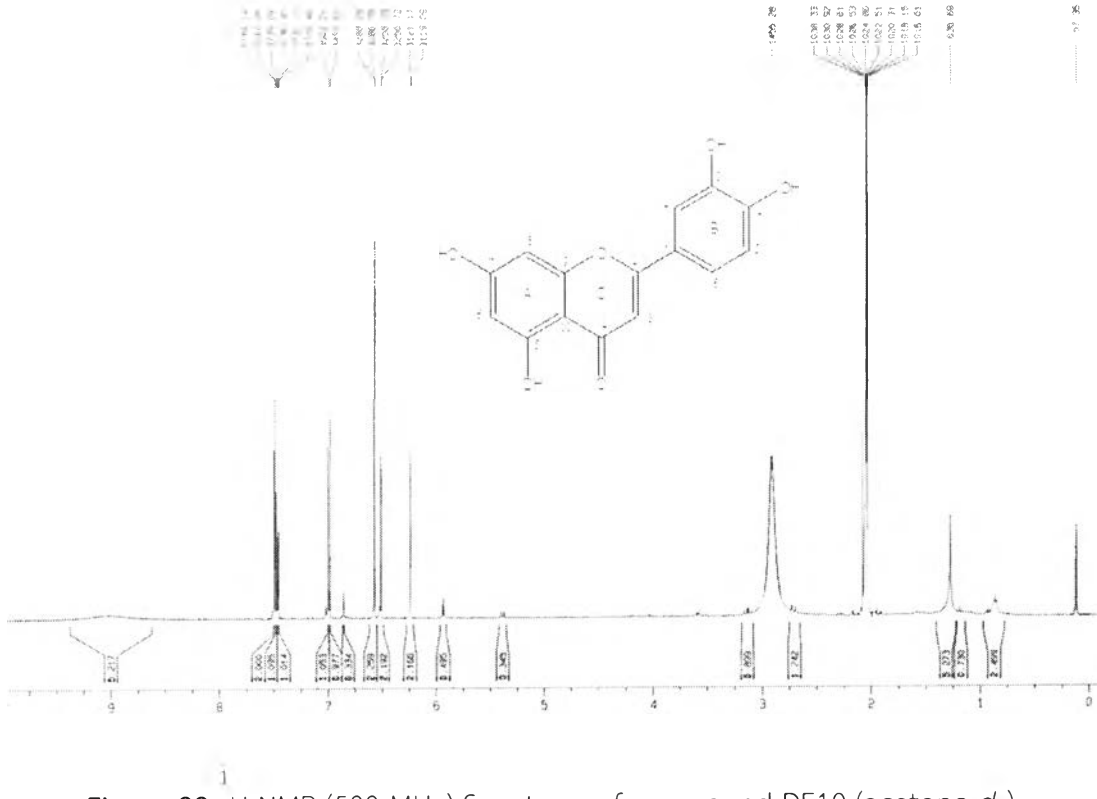

Figure 88 H-NMR (500 MHz) Spectrum of compound DE10 (acetone-d_6)

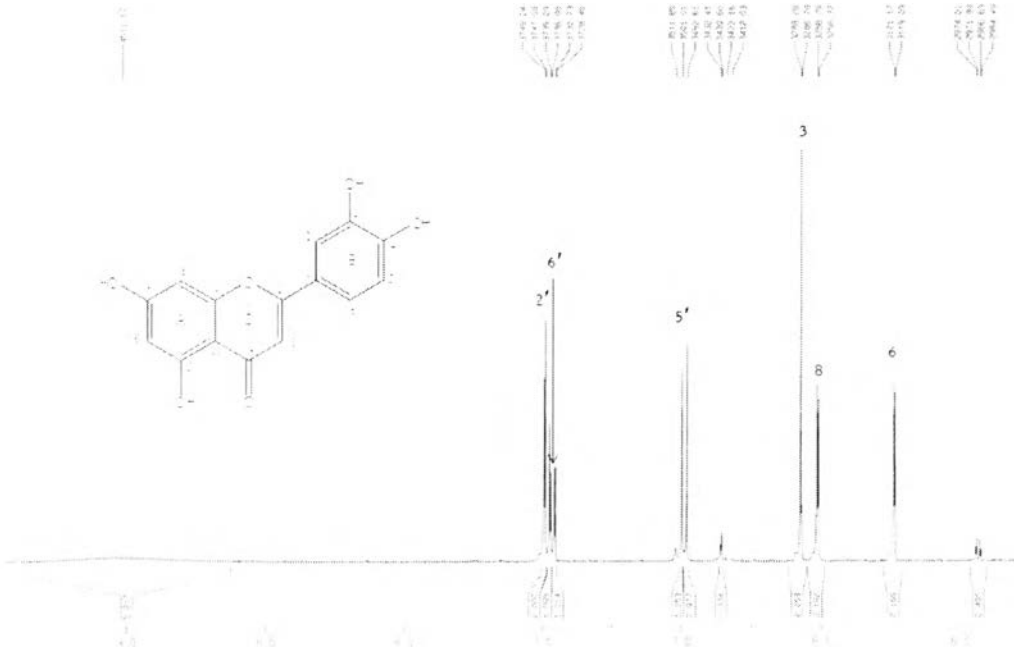

Figure 89 ^{1}H-NMR (500 MHz) Spectrum of compound DE10 (acetone-d_6)
(δ_H 5.50-9.50)

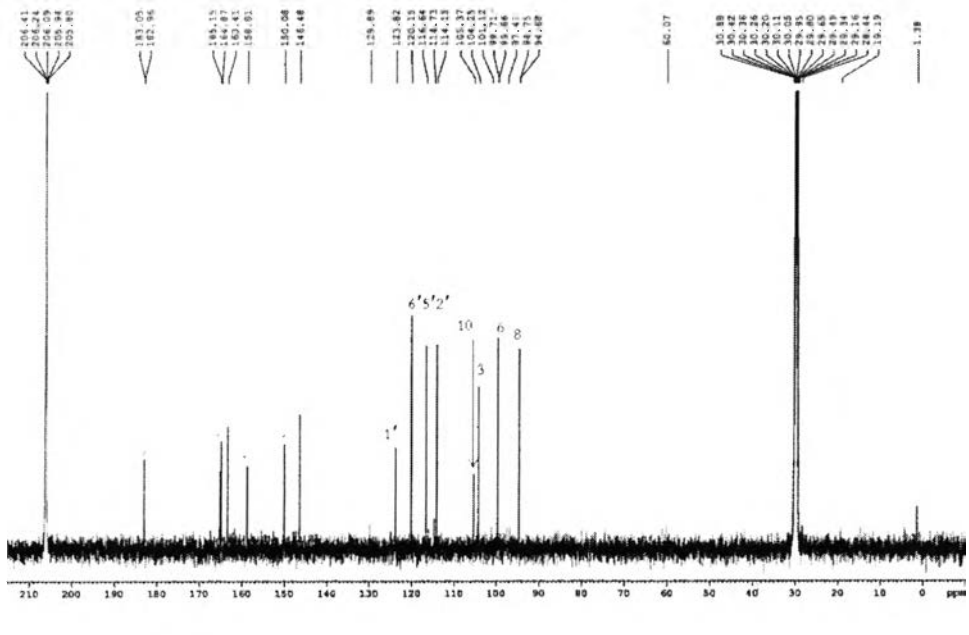

Figure 90 ^{13}C-NMR (125 MHz) Spectrum of compound DE10 (acetone-d_6)

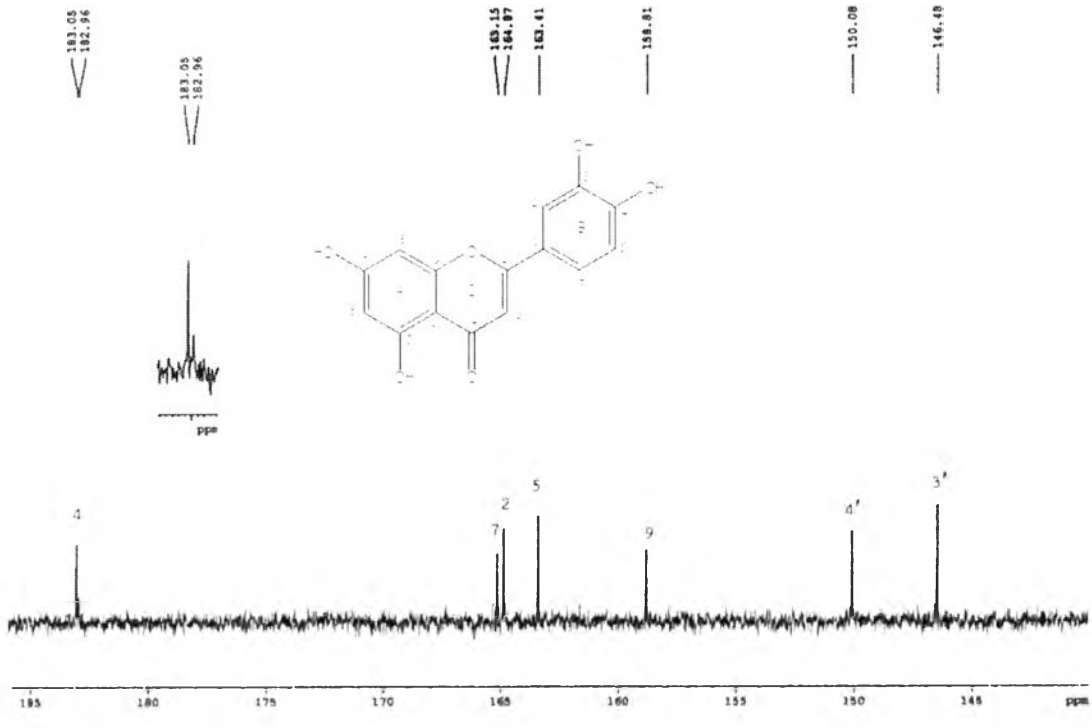

Figure 91 ^{13}C-NMR (125 MHz) Spectrum of compound DE10 (acetone-d_6)

(δ_C 145.0-185.0)

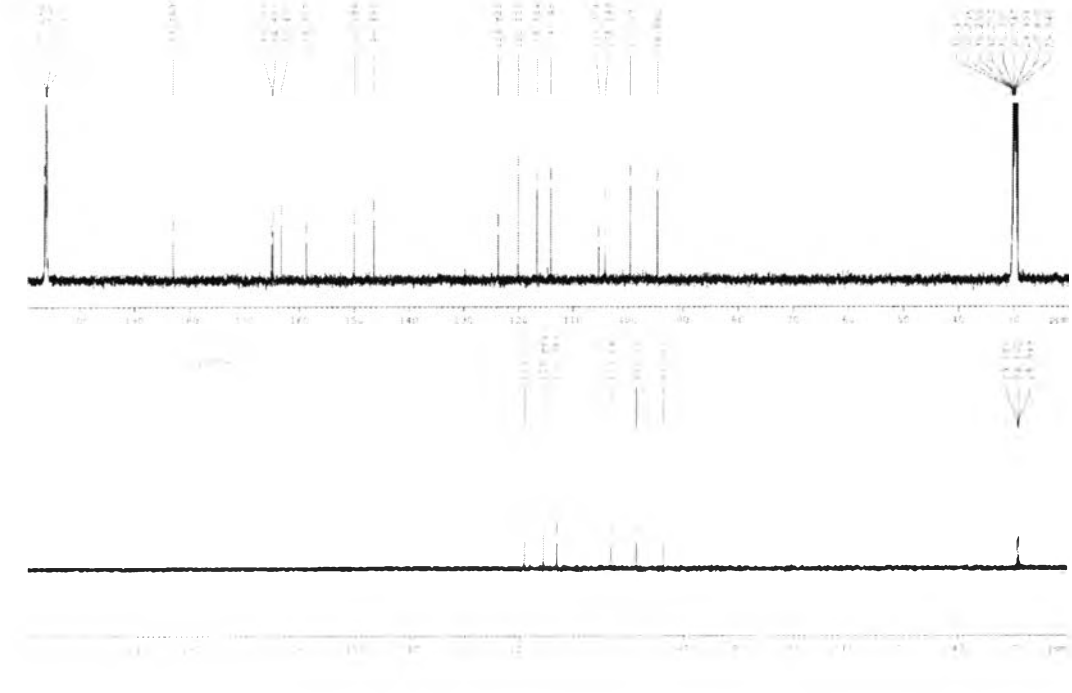

Figure 92 DEPT135 Spectrum of compound DE10 (acetone-d_6)

VITA

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Posta Presentation

Chemical constituents of Dendrobium Ellipsophyllum and Their Cytotoxic Activitiy on KB cells. Proceedings of the 15th Graduate Research Conference, 28 March 2014 in Khon Kaen University, Khon Kaen, Thailand. p 257.