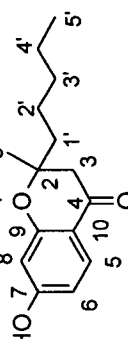
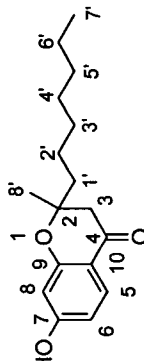
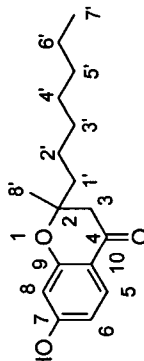
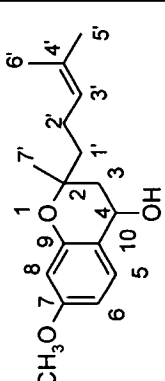
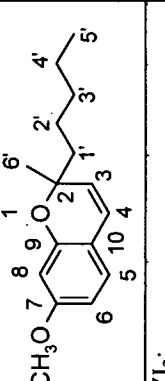
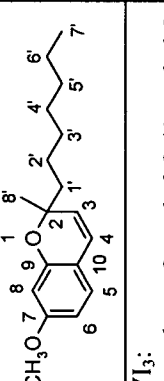
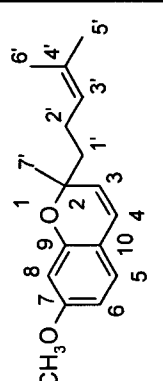
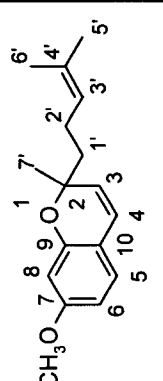


Supplementary Table Physical data for the lead compounds and their derivatives.

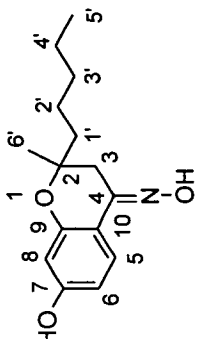
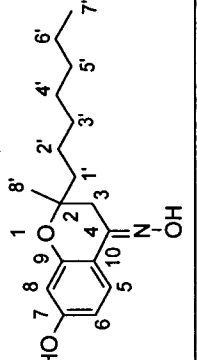
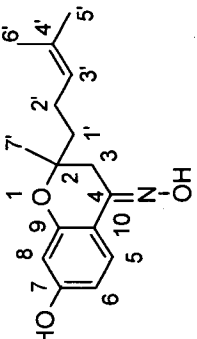
Cmpd	Yield (%)	Physical data
III ₁ : 2,3-dihydro-7-hydroxy-2-methyl-2-p entyl-4H-1-benzopyran-4-one 	62.68	A white powder. ¹ HNMR (CDCl ₃ , TMS) δ : 7.78(d, J=8.6Hz, 1H, 5-H), 6.53(dd, J=2.3, 8.6Hz, 1H, 6-H), 6.40(d, J=2.3Hz, 1H, 8-H), 2.76(d, J=16.6Hz, 1H, 3-Hα), 2.61(d, J=16.6Hz, 1H, 3-Hβ), 1.76~1.65(m, 2H, 1'-H), 1.39(s, 3H, 6'-H), 1.42~1.24(m, 6H, 2'-H~4'-H), 0.87(m, 3H, 5'-H). ¹³ CNMR (CDCl ₃ , TMS) δ: CH ₃ : 13.93(C-5'), 23.99(C-6'), CH ₂ : 22.48(C-4'), 23.24(C-3'), 31.93(C-2'), 39.44(C-1'), 46.87(C-3), CH: 103.64(C-8), 110.04(C-6), 128.83(C-5), C: 81.60(C-2), 113.87(C-10), 162.41(C-9), 164.19(C-7), 192.75(C-4). IR (film, ν ⁻¹), cm ⁻¹ : 3200, 2930, 2860, 1650, 1580, 1460, 1290, 1240, 1130, 1150. MS m/z: 248(M ⁺). High-resolution mass spectrum (HRMS): Calcd for C ₁₅ H ₂₀ O ₃ : 248.141234, Found: 248.140201. Anal. (C ₁₅ H ₂₀ O ₃) C, H.
III ₂ : 2,3-dihydro-2-heptyl-7-hydroxy-2- methyl-4H-1-benzopyran-4-one 	62.31	A white powder. ¹ HNMR (CDCl ₃ , TMS) δ : 8.92(brs, 1H, 7-OH), 7.78(d, J=8.7Hz, 1H, 5-H), 6.56(dd, J=2.3, 8.7Hz, 1H, 6-H), 6.42(d, J=2.3Hz, 1H, 8-H), 2.77(d, J=16.7Hz, 1H, 3-Hα), 2.62(d, J=16.7Hz, 1H, 3-Hβ), 1.77~1.61(m, 2H, 1'-H), 1.39(s, 3H, 8'-H), 1.42~1.18(m, 10H, 2'-H~6'-H), 0.87(m, 3H, 7'-H). ¹³ CNMR (CDCl ₃ , TMS) δ: CH ₃ : 14.0(C-7'), 23.9(C-8'), CH ₂ : 22.6(C-6'), 23.5(C-5'), 29.1(C-4'), 29.7(C-3'), 31.7(C-2'), 39.4(C-1'), 46.7(C-3), CH: 103.6(C-8), 110.2(C-6), 128.8(C-5), C: 81.5(C-2), 113.5(C-10), 162.5(C-9), 164.7(C-7), 193.2(C-4). IR (film, ν ⁻¹), cm ⁻¹ : 3100, 3020, 2920, 2840, 1650, 1540, 1240. MS m/z: 276(M ⁺). High-resolution mass spectrum (HRMS): Calcd for C ₁₇ H ₂₄ O ₃ : 276.172533, Found: 276.172904. Anal. (C ₁₇ H ₂₄ O ₃) C, H.
III ₃ : 2,3-dihydro-7-hydroxy-2-methyl-2- -(4-methyl-3-pentenyl)-4H-1-benz opyran-4-one 	65.34	A white powder. ¹ HNMR (CDCl ₃ , TMS) δ : 8.72(brs, 1H, 7-OH), 7.78(d, J=8.7Hz, 1H, 5-H), 6.56(dd, J=2.3, 8.7Hz, 1H, 6-H), 6.43(d, J=2.3Hz, 1H, 8-H), 5.06(m, 1H, 3'-H), 2.78(d, J=16.7Hz, 1H, 3-Hα), 2.64(d, J=16.7Hz, 1H, 3-Hβ), 2.11~2.06(m, 2H, 1'-H), 1.85~1.70(m, 2H, 2'-H), 1.66(s, 3H, 5'-H), 1.57(s, 3H, 6'-H), 1.41(s, 3H, 7'-H). ¹³ CNMR (CDCl ₃ , TMS) δ: CH ₃ : 17.54(C-5'), 23.97(C-6'), 25.58(C-7'), CH ₂ : 22.23(C-2'), 39.23(C-1'), 46.84(C-3), CH: 103.66(C-8), 110.24(C-6), 123.21(C-3),

		128.83(C-5), C: 81.31(C-2), 123.21(C-10), 132.29(C-4'), 162.46(C-9), 164.64(C-7), 193.00(C-4). IR (film, ν): 3120, 2920, 2860, 2840, 2600, 1650, 1570, 1490, 1260, 1230, 1120, 855. MS m/z: 260(M^+). High-resolution mass spectrum (HRMS): Calcd for C₁₆H₂₀O₃: 260.141234, Found: 260.140685. Anal. (C₁₆H₂₀O₃) C, H.
III₄: 2,3-dihydro-7-hydroxy-2-methyl-2-nonyl-4H-1-benzopyran-4-one	71.41	A white powder. ¹HNMR (CDCl₃, TMS) δ: 7.78(d, J=8.6Hz, 1H, 5-H), 6.52(dd, J=2.3, 8.6Hz, 1H, 6-H), 6.39(d, J=2.3Hz, 1H, 8-H), 2.75(d, J=16.6Hz, 1H, 3-Hα), 2.61(d, J=16.6Hz, 1H, 3-Hβ), 1.76-1.61(m, 2H, 1'-H), 1.39(s, 3H, 10'-H), 1.30-1.25(m, 14H, 2'-H-8'-H), 0.87(m, 3H, 9'-H). ¹³CNMR (CDCl₃, TMS) δ: CH₃: 14.07(C-9'), 24.00(C-10'), CH₂: 22.64(C-8'), 23.58(C-7'), 29.26(C-6'), 29.47(C-5'), 29.47(C-4'), 29.79(C-3'), 31.84(C-2'), 39.53(C-1'), 46.95(C-3), CH: 103.63(C-8), 109.92(C-6), 128.81(C-5), C: 81.62(C-2), 114.05(C-10), 162.32(C-9), 163.91(C-7), 192.41(C-4). IR (film, ν): 3090, 3030, 2815, 2740, 1645, 1570, 1245. MS m/z: 304(M^+). Anal. (C₁₉H₂₈O₃) C, H.
III₅: 2,3-dihydro-7-hydroxy-2-methyl-2-(2-methylpropyl)-4H-1-benzopyran-4-one	49.39	A white powder. ¹HNMR (CDCl₃, TMS) δ: 7.77(d, J=8.7Hz, 1H, 5-H), 6.51(dd, J=2.3, 8.7Hz, 1H, 6-H), 6.36(d, J=2.3Hz, 1H, 8-H), 2.75(d, J=16.5Hz, 1H, 3-Hα), 2.62(d, J=16.5Hz, 1H, 3-Hβ), 1.89(m, 1H, 2'-H), 1.71(dd, J=5.4Hz, J=14.5Hz, 1H, 1'-H), 1.54(dd, J=5.4Hz, J=14.5Hz, 1H, 1'-H), 1.42(s, 3H, 5'-H), 0.96(d, J=0.9Hz, 3H, 3'-H), 0.94(d, J=1.0Hz, 3H, 4'-H). ¹³CNMR (CDCl₃, TMS) δ: CH₃: 23.9(C-3'), 24.4(C-4'), 24.5(C-5'), CH₂: 47.4(C-1'), 47.8(C-3), CH: 103.7(C-8), 110.0(C-6), 128.8(C-5), C: 82.0(C-2), 113.9(C-10), 162.3(C-9), 164.1(C-7), 192.6(C-4). IR (film, ν): 3140, 2950, 1650, 1610, 1560, 1450, 1280, 1160, 1130. MS m/z: 234(M^+). Anal. (C₁₄H₁₈O₃) C, H.
IV₁: 2,3-dihydro-7-methoxy-2-methyl-2-pentyl-4H-1-benzopyran-4-one	76.43	A brown oil. ¹HNMR (CDCl₃, TMS) δ: 7.78(d, J=8.8Hz, 1H, 5-H), 6.53(dd, J=2.4, 8.8Hz, 1H, 6-H), 6.37(d, J=2.4Hz, 1H, 8-H), 3.84(s, 3H, CH₃O-), 2.66(dd, J=16.5, 44.3Hz, 2H, 3-H), 1.74-1.66(m, 2H, 1'-H), 1.39(s, 3H, 6'-H), 1.44-1.23(m, 6H, 2'-H-4'-H), 0.87(m, 3H, 5'-H). IR (film, ν): 2940, 2860, 1680, 1620, 1575, 1440, 1260, 1150. MS m/z: 262(M^+). Anal. (C₁₆H₂₂O₃) C, H.
IV₂: 2,3-dihydro-2-heptyl-7-methoxy-2-	72.65	A brown oil. ¹HNMR (CDCl₃, TMS) δ: 7.78(d, J=8.8Hz, 1H, 5-H), 6.53(dd, J=2.4, 8.8Hz, 1H, 6-H), 6.37(d, J=2.4Hz, 1H, 8-H), 3.82(s, 3H, CH₃O-), 2.66(dd, J=16.5, 43.7Hz, 2H, 3-H), 1.78-1.62(m, 2H,

methy l-4H-1-benzopyran-4-one		1'-H), 1.42(s,3H,8'-H), 1.44~1.17(m,10H,2'-H~6'-H), 0.87(m, 3H, 7'-H). IR(film,v⁻¹),cm⁻¹: 2920, 2850,1675,1605, 1575, 1440,1260,1160. MS m/z: 290(M⁺). Anal. (C18H26O3) C, H.
IV₃: 2,3-dihydro-7-methoxy-2-methyl-2-(4-methyl-3-pentenyl)-4H-1-benzopyran-4-one	70.03	A brown oil. ¹HNMR (CDCl₃,TMS) δ : 7.79(d,J=8.8Hz, 1H, 5-H), 6.53(dd, J=2.4, 8.8Hz, 1H, 6-H), 6.38(d, J=2.4Hz, 1H, 8-H), 5.07(m,1H,3'-H), 3.83(s,3H,CH₃O-), 2.67(dd, J=16.5, 43.3Hz, 2H, 3-H), 2.12~2.08(m, 2H, 1'-H), 1.83~1.71(m,2H,2'-H), 1.41(s,3H,7'-H), 1.59(s,3H,5'-H), 1.67(s,3H,6'-H). IR (film,v⁻¹),cm⁻¹: 2960, 2920,1680,1620, 1440, 1260,1160. MS m/z: 274(M⁺). Anal. (C17H22O3) C, H.
V₁: 3,4-dihydro-7-methoxy-2-methyl-2-pentyl-2H-1-benzopyran-4-ol	99.42	A colorless oil. ¹HNMR (CDCl₃,TMS) δ : 7.34(m,1H,5-H), 6.51(m,1H,6-H), 6.34(m,1H,8-H), 4.79(m,1H,4-H), 3.76(s,3H,CH₃O-), 2.19~2.04(m,1H,3-H), 1.84~1.54(m,3H,3-H,1'-H,1'-H), 1.36(s,3H,6'-H), 1.38~1.23(m, 6H, 2'-H~4'-H), 0.88(m, 3H, 5'-H). IR(film,v⁻¹),cm⁻¹: 3320, 2940, 2860,1620, 1580, 1500,1440,1200,1160,1125. MS m/z: 264(M⁺). Anal. (C16H24O3) C, H.
V₂: 3,4-dihydro-2-heptyl-7-methoxy-2-methyl-2H-1-benzopyran-4-ol	99.00	A colorless oil. ¹HNMR (CDCl₃,TMS) δ : 7.32(m,1H,5-H), 6.50(m,1H,6-H), 6.33(m,1H,8-H), 4.77(m,1H,4-H), 3.75(s,3H,CH₃O-), 2.22~2.03(m,1H,3-H), 1.84~1.75(m,2H,3-H,1'-H), 1.70~1.65(m,1H, 1'-H), 1.40(s,3H,8'-H), 1.42~1.25(m,10H,2'-H~6'-H), 0.87(m, 3H, 7'-H). IR(film,v⁻¹),cm⁻¹: 3300, 2920, 2850,1620, 1580, 1500,1440,1200,1160,1130,1110. MS m/z: 292(M⁺). Anal. (C18H28O3) C, H.
V₃: 3,4-dihydro-7-methoxy-2-methyl-2-(4-methyl-3-pentenyl)-2H-1-benzopyran-4-ol	96.37	A colorless oil. ¹HNMR (CDCl₃,TMS) δ : 7.33(m,1H,5-H), 6.51(m,1H,6-H), 6.33(m,1H,8-H), 5.09(m, 1H, 3'-H), 4.80(m, 1H, 4-H) 3.76(s, 3H, CH₃O-), 2.20~2.05(m, 4H, 3-H, 1'-H), 1.89~1.79(m, 2H, 2'-H), 1.41(s, 3H, 7'-H), 1.73(s, 3H, 5'-H), 1.68(s, 3H, 6'-H). IR (film,v⁻¹), cm⁻¹: 3320, 2960,

		2920, 1620, 1580, 1500, 1440, 1200, 1160, 1110. MS m/z: 276(M ⁺). Anal. (C ₁₇ H ₂₄ O ₃) C, H.
VI₁: 7-methoxy-2-methyl-2-pentyl-2H-1-benzopyran 	92.30	A colorless oil. ¹ H NMR (CDCl ₃ , TMS) δ : 6.86(d, J=8.5Hz, 1H, 5-H), 6.51(dd, J=2.5, 8.5Hz, 1H, 6-H), 6.40(d, J=2.5Hz, 1H, 8-H), 6.29(d, J=9.9Hz, 1H, 4-H), 5.42(d, J=9.9Hz, 1H, 3-H), 3.76(s, 3H, CH ₃ O-), 1.68~1.60(m, 2H, 1'-H), 1.43~1.24(m, 6H, 2'-H~4'-H), 1.39(s, 3H, 6'-H), 0.87(m, 3H, 5'-H). IR (film, ν ⁻¹), cm ⁻¹ : 2920, 2860, 1610, 1500, 1160, 1130. MS m/z: 246(M ⁺). Anal. (C ₁₆ H ₂₂ O ₂) C, H.
VI₂: 2-heptyl-7-methoxy-2-methyl-2H-1-benzopyran 	89.87	A colorless oil. ¹ H NMR (CDCl ₃ , TMS) δ : 6.86(d, J=8.0Hz, 1H, 5-H), 6.38(dd, J=2.5, 8.0Hz, 1H, 6-H), 6.35(d, J=2.5Hz, 1H, 8-H), 6.29(d, J=9.9Hz, 1H, 4-H), 5.41(d, J=9.9Hz, 1H, 3-H), 3.76(s, 3H, CH ₃ O-), 1.72~1.55(m, 2H, 1'-H), 1.44~1.25(m, 10H, 2'-H~6'-H), 1.40(s, 3H, 8'-H), 0.87(m, 3H, 7'-H). IR (film, ν ⁻¹), cm ⁻¹ : 2920, 2860, 1610, 1500, 1160, 1130. MS m/z: 274(M ⁺). Anal. (C ₁₈ H ₂₆ O ₂) C, H.
VI₃: 7-methoxy-2-methyl-2-(4-methyl-3-pentenyl)-2H-1-benzopyran 	80.48	A colorless oil. ¹ H NMR (CDCl ₃ , TMS) δ : 6.88(d, J=7.9Hz, 1H, 5-H), 6.40(dd, J=2.4, 7.9Hz, 1H, 6-H), 6.37(d, J=2.4Hz, 1H, 8-H), 6.32(d, J=9.8Hz, 1H, 4-H), 5.43(d, J=9.8Hz, 1H, 3-H), 5.11(m, 1H, 3'-H), 3.76 (s, 3H, CH ₃ O-), 2.19~2.11(m, 2H, 1'-H), 1.93~1.87(m, 2H, 2'-H), 1.39(s, 3H, 7'-H), 1.66(s, 3H, 5'-H), 1.73(s, 3H, 6'-H). IR (film, ν ⁻¹), cm ⁻¹ : 2980, 2940, 1610, 1500, 1440, 1160. MS m/z: 258(M ⁺). Anal. (C ₁₇ H ₂₂ O ₂) C, H.
I₁: 3,4-dihydro-2-methyl-2-pentyl-2H-1-benzopyran-4,7-diol 	85.80	A white powder. ¹ H NMR (CDCl ₃ , TMS) δ : 9.17 (s, 1H, 7-OH), 7.15 (d, J=8.9Hz, 1H, 5-H), 6.28 (dd, J=2.4Hz, 8.3Hz, 1H, 6-H), 6.05 (d, J=2.3Hz, 1H, 8-H), 5.07 (d, J=6.4Hz, 1H, 4-OH), 4.56 (m, 1H, 4-H), 2.06~1.99 (m, 2H, 3-H), 1.98~1.91 (m, 2H, 1'-H), 1.36 (s, 3H, 6'-H), 1.36~1.06 (m, 6H, 2'-H~4'-H), 0.94~0.82 (m, 3H, 5'-H). IR (KBr, ν ⁻¹), cm ⁻¹ : 3330, 3121, 2950, 2931, 2858, 1617, 1504, 1155, 1109, 983.

		836. MS m/z: 250(M ⁺). Anal. (C ₁₅ H ₂₂ O ₃) C, H.
I₂: 3,4-dihydro-2-methyl-2-methyl-1-benzopyran-4,7-diol	87.31	A white powder. ¹H NMR (CDCl₃, TMS) δ: 9.17 (s, 1H, 7-OH), 7.15 (d, J=8.4 Hz, 1H, 5-H), 6.28 (dd, J=2.4 Hz, 8.3 Hz, 1H, 6-H), 6.05 (d, J=2.4 Hz, 1H, 8-H), 5.07 (d, J=6.4 Hz, 1H, 4-OH), 4.56 (m, 1H, 4-H), 2.04~1.56 (m, 4H, 3-H, 1'-H), 1.35 (s, 3H, 8'-H), 1.47~1.15 (m, 10H, 2'-H~6'-H), 0.85 (m, 3H, 7'-H). IR (KBr, ν⁻¹), cm⁻¹: 3406, 3126, 2952, 2922, 2849, 1618, 1507, 1455, 1154, 1130, 989, 836. MS m/z: 278(M⁺). Anal. (C₁₇H₂₆O₃) C, H.
I₃: 3,4-dihydro-2-methyl-2-(4-methyl-3-pentenyl)-2H-1-benzopyran-4,7-diol	84.29	A white powder. ¹H NMR (CDCl₃, TMS) δ: 9.18 (s, 1H, 7-OH), 7.16 (d, J=8.4 Hz, 1H, 5-H), 6.29 (dd, J=2.4 Hz, 8.4 Hz, 1H, 6-H), 6.07 (d, J=2.4 Hz, 1H, 8-H), 5.09 (m, 2H, 4-OH, 3'-H), 4.58 (m, 1H, 4-H), 2.06~2.02 (m, 2H, 3-H), 2.00~1.54 (m, 4H, 1'-H, 2'-H), 1.67 (s, 3H, 7'-H), 1.61 (s, 3H, 6'-H), 1.20 (s, 3H, 5'-H). IR (KBr, ν⁻¹), cm⁻¹: 3396, 3158, 2968, 2918, 2851, 1618, 1506, 1158, 1112, 988, 841. MS m/z: 262(M⁺). Anal. (C₁₆H₂₂O₃) C, H.
II: 2,3-dihydro-2-methyl-4-hydroxyimino-2-pentyl-4H-1-benzopyran-7-ol	94.30	A white powder. ¹H NMR (CDCl₃, TMS) δ: 7.61 (d, J=8.6 Hz, 1H, 5-H), 6.41 (dd, J=2.4 Hz, 8.6 Hz, 1H, 6-H), 6.33 (d, J=2.4 Hz, 1H, 8-H), 2.85 (s, 2H, 3-H), 2.06~1.54 (m, 2H, 1'-H), 1.32 (s, 3H, 6'-H), 1.42~1.24 (m, 6H, 2'-H~4'-H), 0.87 (m, 3H, 5'-H). IR (KBr, ν⁻¹), cm⁻¹: 3347, 2933, 2864, 2691, 2592, 1606, 1460, 1302, 1157, 951. MS m/z: 263(M⁺). Anal. (C₁₅H₂₁NO₃) C, H, N.

	II₂: 2,3-dihydro-2-(4-hydroxyimino-2-methyl-4H-1-benzopyran-7-yl)-2-methyl-4H-1-benzopyran-7-ol 	95.00 A white powder. ¹HNMR (CDCl₃, TMS) δ : 7.63 (d, J=8.6Hz, 1H, 5-H), 6.41 (dd, J=2.4Hz, 8.3Hz, 1H, 6-H), 6.32 (d, J=2.4Hz, 1H, 8-H), 2.84 (s, 2H, 3-H), 1.69~1.54 (m, 2H, 1'-H), 1.40~1.26 (m, 10H, 2'-H-6'-H), 1.33(s, 3H, 8'-H), 0.87 (m, 3H, 7'-H). IR (KBr, ν¹), cm⁻¹, 3339, 2934, 2852, 2692, 2591, 1613, 1459, 1303, 1159, 946. MS m/z: 291(M⁺). Anal. (C₁₇H₂₅NO₃) C, H, N.
II₃: 2,3-dihydro-2-methyl-2-(4-methyl-3-pentenyl)-4-hydroxyimino-4H-1-benzopyran-7-ol 	95.20 A white powder. ¹HNMR (CDCl₃, TMS) δ : 7.64 (d, J=8.6Hz, 1H, 5-H), 6.42 (dd, J=2.4Hz, 8.6Hz, 1H, 6-H), 6.33 (d, J=2.4Hz, 1H, 8-H), 5.07 (m, 1H, 3'-H), 2.92 (d, J=16.5Hz, 1H, 3-H_a), 2.81 (d, J=16.5Hz, 1H, 3-H_b), 2.10~2.00 (m, 2H, 1'-H), 1.69 (s, 3H, 7'-H), 1.77~1.58 (m, 2H, 2'-H), 1.58 (s, 3H, 6'-H), 1.35 (s, 3H, 5'-H). IR (KBr, ν¹), cm⁻¹, 3340, 2933, 2861, 2690, 1608, 1460, 1320, 1158, 951. MS m/z: 275(M⁺). Anal. (C₁₆H₂₁NO₃) C, H, N.	