MODIFIED COUMARINS. 8. SYNTHESIS OF SUBSTITUTED 5-(4-METHOXYPHENYL)-7*H*-FURO[3,2-*g*]CHROMEN-7-ONES

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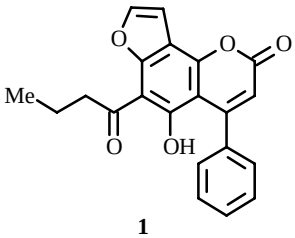
The MacLeod method was used to synthesize a series of substituted 5-(4-methoxyphenyl)-7H-furo[3,2-g]chromen-7-ones, modified analogs of psoralen, from 7-hydroxy-4-(4-methoxyphenyl)coumarins.

Key words: coumarins, psoralen, neoflavones, 4-phenylcoumarins, furocoumarins, 5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-ones.

Derivatives of 4-phenylcoumarin, which are known as neoflavones, are widely distributed among plants, especially the families Clusiaceae (Guttiferae), Leguminosae, Rubiaceae, and Thelypteridaceae. More than 130 neoflavones have been isolated from natural sources. Furanoracemosone (**1**) [1], disparfuran B (**2**) [2], disparacetylfuran A (**3**) [2], and isodisparfuran A (**4**) [2], which are furocoumarins based on the 4-phenylcoumarin skeleton, were isolated from *Mesua racemosa* and *Calophyllum dispar*, which belong to the Clusiaceae (Guttiferae) family.



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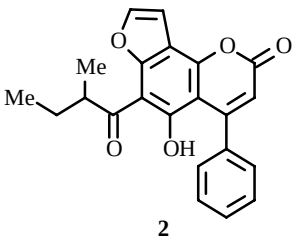

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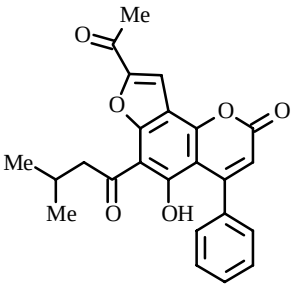

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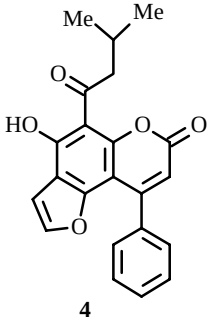

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Both natural and synthetic 4-phenylcoumarins possess wide spectra of biological activities. Neoflavones that are isolated from natural raw material exhibit antibactericidal and insecticidal [3, 4], antimalarial [5], sugar-reducing [6], antitumor [7], and cytoxic [2] activities. They inhibit HIV-1 reverse transcriptase [8]. Synthetic derivatives of 4-phenylcoumarins typically have vasodilating [9], analeptic [10], antiatherosclerotic [11], and antibacterial [12, 13] activities.

Therefore, our goal was to modify the structures of 4-phenylcoumarins by fusing a furan ring to them to form substituted 5-(4-methoxyphenyl)psoralens.

The key compounds 7-hydroxy-4-(4-methoxyphenyl)coumarin (**5**) and 7-hydroxy-8-methyl-4-(4-methoxyphenyl)coumarin (**6**) were prepared in high yields by Pechmann condensation of ethyl-4-methoxybenzoylacetate with resorcinol and 2-methylresorcinol, respectively, in the presence of conc. H_2SO_4 as a condensing agent. We used a two-step MacLeod method to form the furocoumarin ring. This enables the modification of the target furocoumarins on the furan and coumarin fragments under mild conditions and in high yields without limitations.

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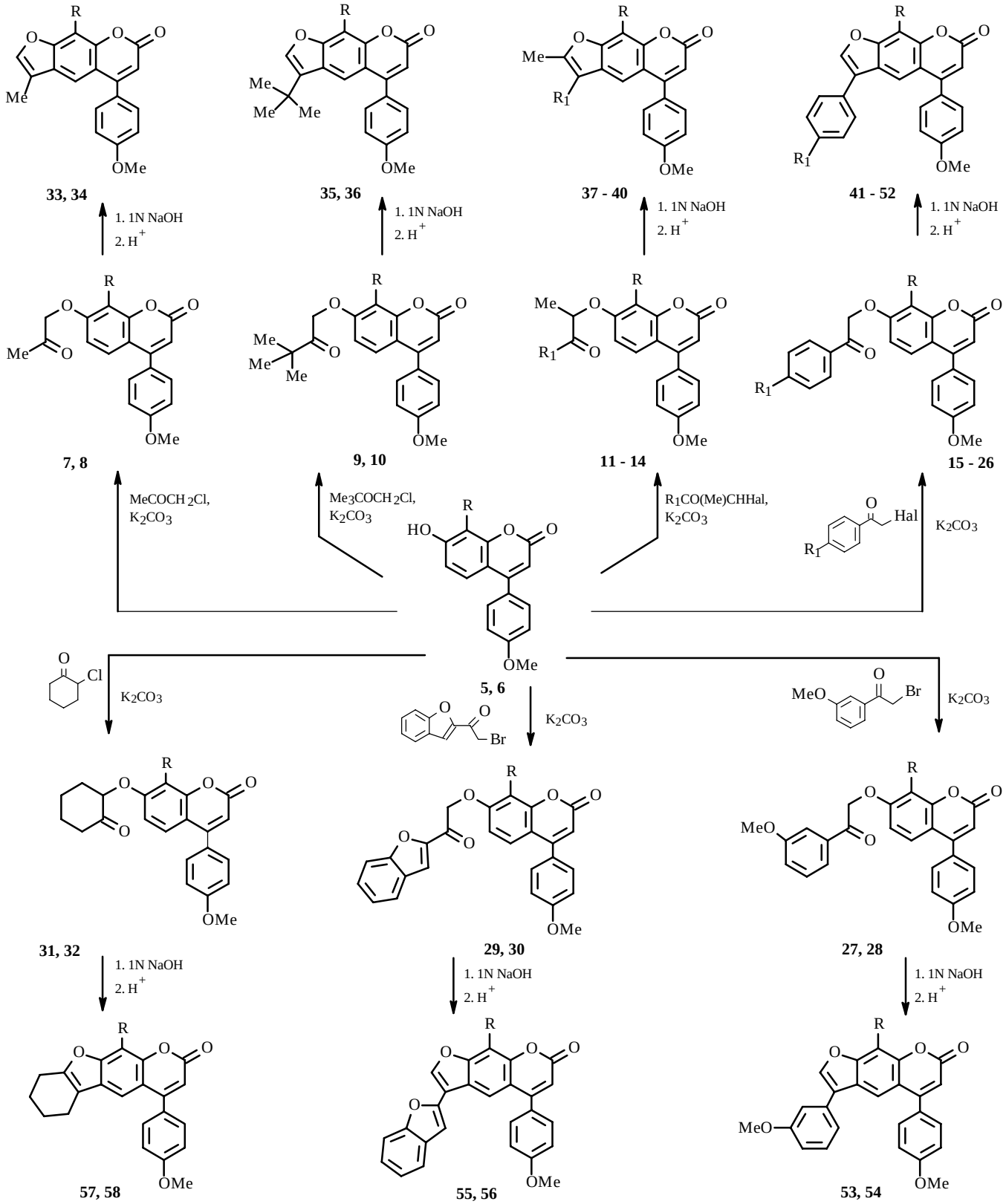

5,7, 9, 27, 29, 31, 33, 35, 53, 55, 57: R = H; **6, 8, 10, 28, 30, 32, 34, 36, 54, 56, 58:** R = Me;

1, 37: R = H, R_1 = Me; **12, 38:** R = R_1 = Me; **13, 39:** R = H, R_1 = Ph; **14, 40:** R = Me, R_1 = Ph;

15, 41: R = R_1 = H; **16, 42:** R = Me, R_1 = H; **17, 43:** R = H, R_1 = Me; **18, 44:** R = R_1 = Me;

19, 45: R = H, R_1 = F; **20, 46:** R = Me, R_1 = F; **21, 47:** R = H, R_1 = Cl; **22, 48:** R = Me, R_1 = Cl;

23, 49: R = H, R_1 = Br; **24, 50:** R = Me, R_1 = Br; **25, 51:** R = H, R_1 = OMe; **26, 52:** R = Me, R_1 = OMe

The Williamson reaction of **5** and **6** with α-haloketones in the presence of potash leads in high yields (54-96%) to substituted oxoethers **7**-**32**. The alkylating agents in this reaction were chloroacetone (**7**, **8**), 1-chloropinacolone (**9**, **10**), 3-chloro-2-butanone (**11**, **12**), 2-bromopropiophenone (**13**, **14**), phenacylbromide (**15**, **16**), 2-bromo-4′-methylacetophenone (**17**, **18**), 2-chloro-4′-fluoroacetophenone (**19**, **20**), 2,4′-dichloroacetophenone (**21**, **22**), 4-bromophenacylbromide (**23**, **24**), 4-methoxyphenacylbromide (**25**, **26**), 2-bromo-3′-methoxyacetophenone (**27**, **28**), 1-(1-benzofuran-2-yl)-2-bromo-1-ethanone (**29**, **30**), and 2-chlorocyclohexanone (**31**, **32**). PMR spectra of ketoethers **7**-**32** have signals for the 7-O-aklyl substitutents and the 4-phenylcoumarin system. The IR spectra exhibit two bands in the range 1692-1733 cm^{-1}, which are characteristic of C=O stretches of the coumarin ring and the alkoxyl carbonyl [14]. The UV spectra of **7**-**32** contain three strong maxima at 202-211, 240-284, and 310-324 nm, which are typical of this type of compounds [14].

Solutions of ketones **7**-**32** in NaOH (1 N) were heated and acidified to cyclize smoothly and in high yields (74-95%) to the corresponding substituted 5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-ones **33**-**58**, synthetic analogs of psoralen furocoumarins. The linear addition of the furan ring at the 6,7-position of the 4-phenylcoumarin was confirmed by PMR spectroscopy. The PMR spectra of **33**-**58** exhibit a simplified splitting for the aromatic protons compared with the starting ketones owing to the lack of coupling to H-6 of the coumarin ring. For 9-methyl-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-ones, H-4 appears as a singlet at 7.21-7.71 ppm. In the spectra of furocoumarins that do not have a methyl in the 9-position, H-4 and H-9 resonate as two singlets at 7.47-7.89 ppm. Furthermore, for **33**-**36** and **41**-**56**, which are not substituted in the 2-position, a singlet is observed for H-2. This is also a characteristic feature of the formation of a furocoumarin ring. If an alkyl substituent is present in the 3-position of 5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (**33**-**36**), the singlet of H-2 occurs at 7.70-7.87 ppm. Aryl substituents in the 3-position (**41**-**56**) shift the signal of H-2 to weaker field (8.31-8.50 ppm). The UV spectra of the synthesized furocoumarins have absorption bands at 254-259 nm that are stronger than the longer wavelength band (298-312 nm). This is also evidence of the addition of a furan ring to the 4-phenylcoumarin [14].

EXPERIMENTAL

The course of reactions and purity of products were monitored by TLC on Merck 60 F254 plates using $CHCl_3$—CH_3OH (9:1 and 95:5). IR and UV spectra were measured on Nicolet FTIR Nexus 475 and Specord M40 spectrophotometers, respectively. PMR spectra were recorded on a Varian Mercury-400 spectrometer relative to TMS (internal standard). Elemental analyses of all compounds corresponded to those calculated.

7-Hydroxy-4-(4-methoxyphenyl)-2*H*-2-chromenone (5). A cooled (0°C) solution of resorcinol (22.0 g, 0.2 mole) and ethyl-4-methoxybenzoylacetate (38.3 mL, 0.2 mole) in ethanol (50 mL) was vigorously stirred, cooled, and treated dropwise with conc. H_2SO_4 (20 mL). The reaction mixture was stirred until thickened and left overnight at room temperature. The mixture was poured into icewater (500 mL). The resulting precipitate was filtered off and crystallized from propan-2-ol. Yield 34.34 g (64%), $C_{16}H_{12}O_4$, mp 265-266°C (lit. 260.5°C [15], 261-262°C [16]). IR spectrum (KBr, cm^{-1}): 3199, 1705, 1622, 1608, 1511, 1443, 1382, 1273, 1254, 1230, 1186, 1122, 1037, 842, 828. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.83), 311 (4.25). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.83 (3H, s, OMe-4′), 6.10 (1H, s, H-3), 6.77 (1H, dd, J = 2.4, J = 9.2, H-6), 6.79 (1H, d, J = 2.4, H-8), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.35 (1H, d, J = 9.2, H-5), 7.47 (2H, d, J = 8.4, H-2′, H-6′), 10.63 (1H, br.s, OH-7).

7-Hydroxy-4-(4-methoxyphenyl)-8-methyl-2*H*-chromenone (6). Prepared analogously to **5** from 2-methylresorcinol (24.8 g, 0.2 mole) and ethyl-4-methoxybenzoylacetate (38.3 mL, 0.2 mole). Yield 42.91 g (76%), $C_{17}H_{14}O_4$, mp 262-263°C. IR spectrum (KBr, cm^{-1}): 3222, 1698, 1604, 1575, 1562, 1517, 1506, 1371, 1325, 1312, 1300, 1265, 1244, 1180, 1092, 1027, 835, 820. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.88), 310 (4.35). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.19 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 6.08 (1H, s, H-3), 6.83 (1H, d, J = 8.8, H-6), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.19 (1H, d, J = 8.8, H-5), 7.44 (2H, d, J = 8.4, H-2′, H-6′), 10.49 (1H, br.s, OH-7).

4-(4-Methoxyphenyl)-7-(2-oxopropoxy)-2*H*-2-chromenone (7). A hot solution of **5** (1.07 g, 4 mmole) in absolute acetone (30 mL) was treated with freshly calcined potash (1.66 g, 12 mmole), stirred vigorously and heated (50-56°C), and treated with chloroacetone (0.35 mL, 4.4 mmole). The reaction mixture was left for 1 h with heating and vigorous stirring (completion of the reaction determined by TLC). The reaction mixture was poured into H_2SO_4 solution (300 mL, 1 N). The resulting precipitate was filtered off and crystallized from propan-2-ol. Yield 1.01 g (78%), $C_{19}H_{16}O_5$, mp 151-152°C. IR spectrum (KBr, cm^{-1}): 1733, 1715, 1608, 1517, 1419, 1377, 1305, 1281, 1267, 1249, 1185, 1150, 1116, 1067, 1029, 1005, 843.

UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.91), 313 (4.35). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.18 (3H, s, CH_3-3″), 3.84 (3H, s, OMe-4′), 5.00 (2H, s, CH_2-1″), 6.19 (1H, s, H-3), 6.93 (1H, dd, J = 2.4, J = 9.2, H-6), 7.05 (1H, d, J = 2.4, H-8), 7.12 (2H, d, J = 8.4, H-3′, H-5′), 7.42 (1H, d, J = 9.2, H-5), 7.49 (2H, d, J = 8.4, H-2′, H-6′).

4-(4-Methoxyphenyl)-8-methyl-7-(2-oxopropoxy)-2*H*-2-chromenone (8). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and chloroacetone (0.35 mL, 4.4 mmole). Yield 1.14 g (84%), $C_{20}H_{18}O_5$, mp 181-182°C. IR spectrum (KBr, cm^{-1}): 1722, 1692, 1605, 1576, 1512, 1423, 1372, 1289, 1250, 1220, 1180, 1124, 1047, 1025, 820. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.81), 310 (4.31). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.18 (3H, s, CH_3-3″), 2.28 (3H, s, Me-8), 3.84 (3H, s, OMe-4′), 4.97 (2H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.88 (1H, d, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.27 (1H, d, J = 9.2, H-5), 7.44 (2H, d, J = 8.4, H-2′, H-6′).

7-(3,3-Dimethyl-2-oxobutoxy)-4-(4-methoxyphenyl)-2*H*-2-chromenone (9). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 1-chloropinacolone (0.61 mL, 4.4 mmole). Yield 1.19 g (81%), $C_{22}H_{22}O_5$, mp 140-141°C. IR spectrum (KBr, cm^{-1}): 1725, 1706, 1607, 1514, 1377, 1293, 1282, 1253, 1200, 1184, 1150, 1126, 1047, 1026, 1001, 982, 839, 826. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.91), 232 (4.49), 311 (4.39). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.20 [9H, s, $(CH_3)_3$], 3.85 (3H, s, OMe-4′), 5.22 (2H, s, CH_2-1″), 6.12 (1H, s, H-3), 6.85 (1H, dd, J = 2.4, J = 9.2, H-6), 6.98 (1H, d, J = 2.4, H-8), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.41 (1H, d, J = 9.2, H-5), 7.44 (2H, d, J = 8.4, H-2′, H-6′).

7-(3,3-Dimethyl-2-oxobutoxy)-4-(4-methoxyphenyl)-8-methyl-2*H*-2-chromenone (10). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 1-chloropinacolone (0.61 mL, 4.4 mmole). Yield 1.26 g (83%), $C_{23}H_{24}O_5$, mp 161-162°C. IR spectrum (KBr, cm^{-1}): 1725, 1701, 1608, 1514, 1423, 1368, 1291, 1261, 1246, 1177, 1135, 1078, 997, 840, 812. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.76), 311 (4.28). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.18 [9H, s, $(CH_3)_3$], 2.28 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 5.31 (2H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.81 (1H, d, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.27 (1H, d, J = 9.2, H-5), 7.46 (2H, d, J = 8.4, H-2′, H-6′).

4-(4-Methoxyphenyl)-7-(1-methyl-2-oxopropoxy)-2*H*-2-chromenone (11). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 3-chloro-2-butanone (0.44 mL, 4.4 mmole). Yield 0.92 g (68%), $C_{20}H_{18}O_5$, mp 103-104°C. IR spectrum (KBr, cm^{-1}): 1725, 1606, 1513, 1421, 1375, 1305, 1268, 1251, 1201, 1184, 1151, 1118, 1089, 1033, 1005, 832. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.91), 313 (4.44). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.48 (1H, d, J = 7.2, CH_3-1″), 2.21 (3H, s, CH_3-3″), 3.83 (3H, s, OMe-4′), 5.17 (1H, q, H-1″), 6.19 (1H, s, H-3), 6.92 (1H, dd, J = 2.4, J = 9.2, H-6), 6.99 (1H, d, J = 2.4, H-8), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.42 (1H, d, J = 9.2, H-5), 7.48 (2H, d, J = 8.4, H-2′, H-6′).

4-(4-Methoxyphenyl)-8-methyl-7-(1-methyl-2-oxopropoxy)-2*H*-2-chromenone (12). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 3-chloro-2-butanone (0.44 mL, 4.4 mmole). Yield 1.04 g (74%), $C_{21}H_{20}O_5$, mp 89-90°C. IR spectrum (KBr, cm^{-1}): 1721, 1602, 1513, 1426, 1370, 1278, 1255, 1180, 1127, 1110, 1019, 839. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.66), 311 (4.36). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.48 (1H, d, J = 7.2, CH_3-1″), 2.20 (3H, s, CH_3-3″), 2.28 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 5.08 (1H, q, H-1″), 6.17 (1H, s, H-3), 6.84 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.44 (2H, d, J = 8.4, H-2′, H-6′).

4-(4-Methoxyphenyl)-7-(1-methyl-2-oxo-2-phenylethoxy)-2*H*-2-chromenone (13). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 2-bromopropiophenone (0.66 mL, 4.4 mmole). The oil that formed after pouring the reaction mixture into H_2SO_4 (1 N) was extracted with ethylacetate (50 mL). The organic layer was successively washed with $NaHCO_3$ solution (5%, 25 mL), water (25 mL), H_2SO_4 (1 N, 25 mL), water (25 mL), and saturated NaCl solution (25 mL). The organic layer was dried over anhydrous $MgSO_4$. The solvent was removed in vacuum. The solid was ground with petroleum ether. The mother liquor was poured off. The resulting oil was dried in vacuum. Yield 1.04 g (65%), $C_{25}H_{20}O_5$, yellow oil. PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.61 (1H, d, J = 7.2, CH_3-1″), 3.82 (3H, s, OMe-4′), 6.17 (1H, s, H-3), 6.19 (1H, q, H-1″), 6.92 (1H, dd, J = 2.4, J = 9.2, H-6), 6.99 (1H, d, J = 2.4, H-8), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.40 (1H, d, J = 9.2, H-5), 7.47 (2H, d, J = 8.4, H-2′, H-6′), 7.58 (2H, t, J = 7.6, H-3‴, H-5‴), 7.68 (1H, t, J = 7.6, H-4‴), 8.07 (2H, d, J = 7.6, H-2″, H-6‴).

4-(4-Methoxyphenyl)-8-methyl-7-(1-methyl-2-oxo-2-phenylethoxy)-2*H*-2-chromenone (14). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 2-bromopropiophenone (0.66 mL, 4.4 mmole). Yield 1.39 g (84%), $C_{26}H_{22}O_5$, mp 140-141°C. IR spectrum (KBr, cm^{-1}): 1720, 1680, 1604, 1513, 1445, 1371, 1293, 1272, 1251, 1182, 1134, 1104, 1024, 837. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.90), 244 (4.37), 310 (4.31). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.60 (1H, d, J = 7.2, CH_3-1″), 2.29 (3H, s, Me-8), 3.81 (3H, s, OMe-4′), 6.17 (1H, s, H-3), 6.19 (1H, q, H-1″), 6.85 (1H, d, J = 9.2, H-6), 7.06 (2H, d, J = 8.4, H-3′, H-5′),, 7.24 (1H, d, J = 9.2, H-5), 7.43 (2H, d, J = 8.4, H-2′, H-6′), 7.56 (2H, t, J = 7.6, H-3‴, H-5‴), 7.69 (1H, t, J = 7.6, H-4‴), 8.06 (2H, d, J = 7.6, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-7-(2-oxo-2-phenylethoxy)-2*H*-2-chromenone (15). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and phenacylbromide (0.84 g, 4.2 mmole). Yield 1.38 g (89%), $C_{24}H_{18}O_5$, mp 192-193°C. IR spectrum (KBr, cm^{-1}): 1721, 1699, 1605, 1547, 1511, 1416, 1379, 1290, 1251, 1235, 1216, 1180, 1159, 1121, 1032, 1010, 978, 831. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 202 (4.94), 240 (4.56), 313 (4.42). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 5.76 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 7.00 (1H, dd, J = 2.4, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.17 (1H, d, J = 2.4, H-8), 7.43 (1H, d, J = 9.2, H-5), 7.49 (2H, d, J = 8.4, H-2′, H-6′), 7.58 (2H, t, J = 7.6, H-3‴, H-5‴), 7.71 (1H, t, J = 7.6, H-4‴), 8.04 (2H, d, J = 7.6, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-8-methyl-7-(2-oxo-2-phenylethoxy)-2*H*-2-chromenone (16). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and phenacylbromide (0.84 g, 4.2 mmole). Yield 1.49 g (93%), $C_{25}H_{20}O_5$, mp 181-182°C. IR spectrum (KBr, cm^{-1}): 1721, 1699, 1608, 1513, 1425, 1370, 1294, 1262, 1246, 1231, 1179, 1132, 1025, 822. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 202 (4.96), 240 (4.47), 310 (4.36). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.33 (3H, s, Me-8), 3.82 (3H, s, OMe-4′), 5.77 (1H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.98 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.46 (2H, d, J = 8.4, H-2′, H-6′), 7.57 (2H, t, J = 7.6, H-3‴, H-5‴), 7.70 (1H, t, J = 7.6, H-4‴), 8.02 (2H, d, J = 7.6, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-7-[2-(4-methylphenyl)-2-oxoethoxy]-2*H*-2-chromenone (17). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 4-methylphenacylbromide (0.89 g, 4.2 mmole). Yield 1.44 g (90%), $C_{25}H_{20}O_5$, mp 170-171°C. IR spectrum (KBr, cm^{-1}): 1713, 1700, 1609, 1514, 1422, 1378, 1289, 1262, 1245, 1221, 1184, 1165, 1121, 1027, 1011, 977, 812. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.93), 255 (4.42), 313 (4.35). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.40 (3H, s, Me-4‴), 3.84 (3H, s, OMe-4′), 5.72 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 7.00 (1H, dd, J = 2.4, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.15 (1H, d, J = 2.4, H-8), 7.39 (2H, d, J = 7.6, H-3‴, H-5‴), 7.43 (1H, d, J = 9.2, H-5), 7.49 (2H, d, J = 8.4, H-2′, H-6′), 7.94 (2H, d, J = 7.6, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-8-methyl-7-[2-(4-methylphenyl)-2-oxoethoxy]-2*H*-2-chromenone (18). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 4-methylphenacylbromide (0.89 g, 4.2 mmole). Yield 1.46 g (88%), $C_{26}H_{22}O_5$, mp 207-208°C. IR spectrum (KBr, cm^{-1}): 1712, 1700, 1610, 1513, 1427, 1370, 1296, 1261, 1246, 1180, 1131, 1022, 811. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.91), 257 (4.40), 311 (4.34). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.33 (3H, s, Me-8), 2.39 (3H, s, Me-4‴), 3.82 (3H, s, OMe-4′), 5.73 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 6.96 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.37 (2H, d, J = 8.0, H-3‴, H-5‴), 7.46 (2H, d, J = 8.4, H-2′, H-6′), 7.91 (2H, d, J = 8.0, H-2‴, H-6‴).

7-[2-(4-Fluorophenyl)-2-oxoethoxy]-4-(4-methoxyphenyl)-2*H*-2-chromenone (19). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 4-fluorophenacylchloride (0.72 g, 4.2 mmole). Yield 1.47 g (91%), $C_{24}H_{17}FO_5$, mp 196-197°C. IR spectrum (KBr, cm^{-1}): 1712, 1695, 1600, 1510, 1416, 1378, 1290, 1252, 1234, 1217, 1181, 1157, 1121, 1032, 1011, 985, 837. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 202 (4.97), 240 (4.47), 313 (4.36). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 5.74 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 6.99 (1H, dd, J = 2.4, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.17 (1H, d, J = 2.4, H-8), 7.41 (2H, m, H-3‴, H-5‴), 7.44 (1H, d, J = 9.2, H-5), 7.49 (2H, d, J = 8.4, H-2′, H-6′), 8.12 (2H, m, H-2‴, H-6‴).

7-[2-(4-Fluorophenyl)-2-oxoethoxy]-4-(4-methoxyphenyl)-8-methyl-2*H*-2-chromenone (20). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 4-fluorophenacylchloride (0.72 g, 4.2 mmole). Yield 1.56 g (93%), $C_{25}H_{19}FO_5$, mp 199-200°C. IR spectrum (KBr, cm^{-1}): 1714, 1699, 1611, 1514, 1427, 1371, 1299, 1261, 1243, 1233, 1181, 1133, 1029, 835. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.84), 240 (4.37), 310 (4.27). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.33 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 5.75 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 6.98 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.41 (2H, m, H-3‴, H-5‴), 7.46 (2H, d, J = 8.4, H-2′, H-6′), 8.10 (2H, m, H-2‴, H-6‴).

7-[2-(4-Chlorophenyl)-2-oxoethoxy]-4-(4-methoxyphenyl)-2*H*-2-chromenone (21). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 4-chlorophenacylchloride (0.79 g, 4.2 mmole). Yield 1.45 g (86%), $C_{24}H_{17}ClO_5$, mp 202-203°C. IR spectrum (KBr, cm^{-1}): 1710, 1694, 1617, 1514, 1419, 1383, 1293, 1252, 1220, 1181, 1162, 1125, 1088, 1036, 1010, 985, 826. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.67), 252 (4.41), 313 (4.38). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 5.75 (1H, s, CH_2-1″), 6.20 (1H, s, H-3), 7.01 (1H, dd, J = 2.4, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.19 (1H, d, J = 2.4, H-8), 7.43 (1H, d, J = 9.2, H-5), 7.50 (2H, d, J = 8.4, H-2′, H-6′), 7.67 (2H, d, J = 8.4, H-3‴, H-5‴), 8.05 (2H, d, J = 8.4, H-2‴, H-6‴).

7-[2-(4-Chlorophenyl)-2-oxooethoxy]-4-(4-methoxyphenyl)-8-methyl-2*H*-2-chromenone (22). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 4-chlorophenacylchloride (0.79 g, 4.2 mmole). Yield 1.58 g (91%), $C_{25}H_{19}ClO_5$, mp 206-

207°C. IR spectrum (KBr, cm^{-1}): 1711, 1700, 1602, 1573, 1512, 1427, 1368, 1293, 1257, 1243, 1176, 1132, 1092, 1026, 983, 824. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.62), 250 (4.13), 310 (4.03). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.31 (3H, s, Me-8), 3.82 (3H, s, OMe-4′), 5.75 (1H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.98 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.45 (2H, d, J = 8.4, H-2′, H-6′), 7.65 (2H, d, J = 8.0, H-3‴, H-5‴), 8.02 (2H, d, J = 8.0, H-2‴, H-6‴).

7-[2-(4-Bromophenyl)-2-oxoethoxy]-4-(4-methoxyphenyl)-2*H*-2-chromenone (23). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 4-bromophenacylbromide (1.17 g, 4.2 mmole). Yield 1.75 g (94%), $C_{24}H_{17}BrO_5$, mp 212-213°C. IR spectrum (KBr, cm^{-1}): 1716, 1696, 1615, 1587, 1513, 1419, 1382, 1292, 1251, 1219, 1179, 1162, 1125, 1035, 1010, 984, 829. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.93), 256 (4.47), 312 (4.34). PMR spectrum (400 MHz), DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 5.74 (1H, s, CH_2-1″), 6.20 (1H, s, H-3), 7.01 (1H, dd, J = 2.4, J = 9.2, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.20 (1H, d, J = 2.4, H-8), 7.43 (1H, d, J = 9.2, H-5), 7.50 (2H, d, J = 8.4, H-2′, H-6′), 7.81 (2H, d, J = 8.0, H-3‴, H-5‴), 7.97 (2H, d, J = 8.0, H-2‴, H-6‴).

7-[2-(4-Bromophenyl)-2-oxoethoxy]-4-(4-methoxyphenyl)-8-methyl-2*H*-2-chromenone (24). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 4-bromophenacylbromide (1.17 g, 4.2 mmole). Yield 1.78 g (93%), $C_{25}H_{19}BrO_5$, mp 224-225°C. IR spectrum (KBr, cm^{-1}): 1702, 1606, 1512, 1368, 1292, 1246, 1226, 1177, 1133, 1071, 982, 825. UV spectrum (dioxane, λ_{max}, nm, log ε): 211 (4.71), 257 (4.31), 302 (4.17). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.35 (3H, s, Me-8), 3.84 (3H, s, OMe-4′), 5.68 (1H, s, CH_2-1″), 6.12 (1H, s, H-3), 6.90 (1H, d, J = 9.2, H-6), 7.06 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.42 (2H, d, J = 8.4, H-2′, H-6′), 7.73 (2H, d, J = 8.0, H-3‴, H-5‴), 7.95 (2H, d, J = 8.0, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-7-[2-(4-methoxyphenyl)-2-oxoethoxy]-2*H*-2-chromenone (25). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 4-methoxyphenacylbromide (0.96 g, 4.2 mmole). Yield 1.58 g (95%), $C_{25}H_{20}O_6$, mp 200-201°C. IR spectrum (KBr, cm^{-1}): 1731, 1715, 1680, 1603, 1512, 1382, 1319, 1291, 1269, 1243, 1171, 1156, 1121, 1031, 967, 825. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.94), 222 (4.65), 284 (4.55), 321 (4.35). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 3.87 (3H, s, OMe-4‴), 5.68 (1H, s, CH_2-1″), 6.19 (1H, s, H-3), 6.99 (1H, dd, J = 2.4, J = 2.4, J = 8.4, H-6), 7.09 (2H, d, J = 9.2, H-3‴, H-5‴), 7.11 (2H, d, J = 9.2, H-3′, H-5′), 7.13 (1H, d, J = 2.4, H-8), 7.43 (1H, d, J = 8.4, H-5), 7.49 (2H, d, J = 9.2, H-2′, H-6′), 8.02 (2H, d, J = 9.2, H-2‴, H-6‴).

4-(4-methoxyphenyl)-7-[2-(4-methoxyphenyl)-2-oxoethoxy]-8-methyl-2*H*-2-chromenone (26). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 4-methoxyphenacylbromide (0.96 g, 4.2 mmole). Yield 1.53 g (89%), $C_{26}H_{22}O_6$, mp 206-207°C. IR spectrum (KBr, cm^{-1}): 1716, 1698, 1600, 1557, 1514, 1423, 1369, 1293, 1261, 1240, 1177, 1134, 1025, 984, 836. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 203 (4.95), 284 (4.61), 312 (4.45). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.32 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 3.85 (3H, s, OMe-4‴), 5.69 (1H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.94 (1H, d, J = 9.2, H-6), 7.07 (2H, d, J = 8.8, H-3‴, H-5‴), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.26 (1H, d, J = 9.2, H-5), 7.46 (2H, d, J = 8.4, H-2′, H-6′), 7.99 (2H, d, J = 8.8, H-2‴, H-6‴).

4-(4-Methoxyphenyl)-7-[2-(3-methoxyphenyl)-2-oxoethoxy]-2*H*-2-chromenone (27). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 3-methoxyphenacylbromide (0.96 g, 4.2 mmole). Yield 1.45 g (87%), $C_{25}H_{20}O_6$, mp 202-203°C. IR spectrum (KBr, cm^{-1}): 1704, 1610, 1588, 1516, 1378, 1288, 1262, 1207, 1189, 1165, 1013, 989, 865. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.83), 218 (4.69), 247 (4.28), 312 (4.35). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 3.85 (3H, s, OMe-4‴), 5.76 (1H, s, CH_2-1″), 6.20 (1H, s, H-3), 7.01 (1H, dd, J = 2.4, J = 8.4, H-6), 7.12 (2H, d, J = 9.2, H-3′, H-5′), 7.18 (1H, d, J = 2.4, H-8), 7.26 (1H, dd, J = 2.4, J = 8.4, H-4‴), 7.44 (1H, d, J = 8.4, H-5), 7.49 (2H, d, J = 9.2, H-2′, H-6′), 7.52 (2H, m, H-2‴, H-5‴), 7.64 (1H, d, J = 7.6, H-6‴).

4-(4-Methoxyphenyl)-7-[2-(3-methoxyphenyl)-2-oxoethoxy]-8-methyl-2*H*-2-chromenone (28). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 3-methoxyphenacylbromide (0.96 g, 4.2 mmole). Yield 1.65 g (96%), $C_{26}H_{22}O_6$, mp 177-178°C. IR spectrum (KBr, cm^{-1}): 1700, 1609, 1586, 1514, 1426, 1371, 1299, 1261, 1206, 1181, 1127, 1054, 1023, 991, 827. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 205 (4.76), 220 (4.66), 248 (4.18), 311 (4.31). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.32 (3H, s, Me-8), 3.83 (6H, s, OMe-4′, OMe-4‴), 5.75 (1H, s, CH_2-1″), 6.18 (1H, s, H-3), 6.97 (1H, d, J = 9.2, H-6), 7.09 (2H, d, J = 8.4, H-3′, H-5′), 7.27 (2H, m, H-5, H-4‴), 7.45 (2H, d, J = 8.4, H-2′, H-6′), 7.49 (2H, m, H-2‴, H-5‴), 7.60 (1H, d, J = 8.0, H-6‴).

7-(2-Benzo[*b*]furan-2-yl-2-oxoethoxy)-4-(4-methoxyphenyl)-2*H*-2-chromenone (29). Prepared analogously to **7** from **5** (1.07 g, 4 mmole) and 1-(1-benzofuran-2-yl)-2-bromo-1-ethanol (1.00 g, 4.2 mmole). Yield 1.42 g (83%), $C_{26}H_{18}O_6$, mp 191-192°C. IR spectrum (KBr, cm^{-1}): 1699, 1611, 1551, 1512, 1381, 1277, 1248, 1179, 1158, 1119, 1014, 995, 832. UV spectrum

(CH_3CN, λ_{max}, nm, log ε): 202 (4.90), 236 (4.40), 302 (4.65). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.85 (3H, s, OMe-4′), 5.69 (1H, s, CH_2-1″), 6.23 (1H, s, H-3), 7.06 (1H, dd, J = 2.4, J = 9.2, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.23 (1H, d, J = 2.4, H-8), 7.42 (1H, t, J = 8.0, H-5″), 7.46 (1H, d, J = 9.2, H-5), 7.52 (2H, d, J = 8.4, H-2′, H-6′), 7.60 (1H, t, J = 8.0, H-6″), 7.78 (1H, d, J = 8.0, H-7″), 7.92 (1H, d, J = 8.0, H-4″), 8.10 (1H, s, H-3″).

7-(2-Benzo[*b*]furan-2-yl-2-oxoethoxy)-4-(4-methoxyphenyl)-8-methyl-2*H*-2-chromenone (30). Prepared analogously to **7** from **6** (1.13 g, 4 mmole) and 1-benzo[*b*]furan-2-yl-2-bromo-1-ethanone (1.00 g, 4.2 mmole). Yield 1.60 g (91%), $C_{27}H_{20}O_6$, mp 182-183°C. IR spectrum (KBr, cm^{-1}): 1711, 1694, 1609, 1557, 1513, 1427, 1370, 1288, 1248, 1179, 1127, 1062, 1014, 822. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 201 (4.81), 226 (4.43), 305 (4.55). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.38 (3H, s, Me-8), 3.83 (3H, s, OMe-4′), 5.60 (1H, s, CH_2-1″), 6.12 (1H, s, H-3), 6.94 (1H, d, J = 9.2, H-6), 7.06 (1H, dd, J = 2.4, J = 9.2, H-6), 7.28 (1H, d, J = 9.2, H-6), 7.37 (1H, t, J = 8.0, H-5″), 7.42 (2H, d, J = 8.4, H-2′, H-6′), 7.55 (1H, t, J = 8.0, H-6″), 7.68 (1H, d, J = 8.0, H-7″), 7.85 (1H, d, J = 8.0, H-4″), 8.00 (1H, s, H-3″).

4-(4-Methoxyphenyl)-7-(2-oxocyclohexyloxy)-2*H*-2-chromenone (31). A solution of **5** (1.61 g, 6 mmole) in absolute DMF (30 mL) was treated with freshly calcined potash (2.48 g, 18 mmole), stirred vigorously and heated (70-80°C), and treated with 2-chlorocyclohexanone (1.15 mL, 10 mmole). The reaction mixture was heated and vigorously stirred for 24 h and poured into H_2SO_4 (300 mL, 1 N). The resulting precipitate was filtered off and crystallized from propan-2-ol. Yield 1.18 g (54%), $C_{22}H_{20}O_5$, mp 185-186°C. IR spectrum (KBr, cm^{-1}): 2941, 1733, 1712, 1605, 1515, 1374, 1284, 1250, 1181, 1109, 1028, 841. UV spectrum (EtOH, λ_{max}, nm, log ε): 205 (4.47), 324 (4.12). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.62-2.68 (8H, m, CH_2-3″, CH_2-4″, CH_2-5″, CH_2-6″), 3.85 (3H, s, OMe-4′), 5.19 (1H, m, H-2″), 6.10 (1H, s, H-3), 6.83 (1H, dd, J = 2.4, J = 9.2, H-6), 6.96 (1H, d, J = 2.4, H-8), 7.08 (2H, d, J = 8.4, H-3′, H-5′), 7.39 (1H, d, J = 9.2, H-5), 7.44 (2H, d, J = 8.4, H-2′, H-6′).

4-(4-Methoxyphenyl)-8-methyl-7-(2-oxocyclohexyloxy)-2*H*-2-chromenone (32). Prepared analogously to **31** from **6** (1.69 g, 6 mmole) and 2-chlorocyclohexanone (1.15 mL, 10 mmole). Yield 1.39 g (61%), $C_{23}H_{22}O_5$, mp 190-191°C. IR spectrum (KBr, cm^{-1}): 2942, 1730, 1710, 1600, 1561, 1512, 1370, 1283, 1250, 1177, 1123, 1105, 1029, 838. UV spectrum (EtOH, λ_{max}, nm, log ε): 205 (4.71), 318 (4.22). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.65-2.60 (8H, m, CH_2-3″, CH_2-4″, CH_2-5″, CH_2-6″), 2.29 (3H, s, Me-8), 3.84 (3H, s, OMe-4′), 5.14 (1H, m, H-2″), 6.10 (1H, s, H-3), 6.77 (1H, d, J = 9.2, H-6), 7.07 (2H, d, J = 8.4, H-3′, H-5′), 7.22 (1H, d, J = 9.2, H-5), 7.41 (2H, d, J = 8.4, H-2′, H-6′).

5-(4-Methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-ones 33-58. A solution or suspension of ketone **7**-**32** (2 mmole) in propan-2-ol (10 mL) was treated with NaOH solution (10 mL, 1 N). The reaction mixture was heated for 4 h until the ketone dissolved completely. The course of the reaction was monitored by TLC, after which H_2SO_4 (20 mL, 1 N) was added. The resulting precipitate was filtered off and crystallized from propan-2-ol.

5-(4-Methoxyphenyl)-3-methyl-7*H*-furo[3,2-*g*]chromen-7-one (33). Yield 0.50 g (82%), $C_{19}H_{14}O_4$, mp 200-201°C. IR spectrum (KBr, cm^{-1}): 1720, 1609, 1514, 1372, 1341, 1258, 1243, 1188, 1136, 1062, 1036, 830. UV spectrum (dioxane, λ_{max}, nm, log ε): 213 (4.42), 238 (4.39), 254 (4.33), 298 (4.14). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.14 (3H, s, Me-3), 3.86 (3H, s, OMe-4′), 6.29 (1H, s, H-6), 7.14 (2H, d, J = 8.4, H-3′, H-5′), 7.55 (2H, d, J = 8.4, H-2′, H-6′), 7.60 (1H, s, H-9), 7.71 (1H, s, H-4), 7.86 (1H, s, H-2).

5-(4-Methoxyphenyl)-3,9-dimethyl-7*H*-furo[3,2-*g*]chromen-7-one (34). Yield 0.51 g (80%), $C_{20}H_{16}O_4$, mp 178-179°C. IR spectrum (KBr, cm^{-1}): 1719, 1608, 1589, 1513, 1389, 1289, 1240, 1181, 1111, 1027, 849. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.77), 271 (4.69), 232 (4.62), 253 (4.58), 302 (4.14). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.13 (3H, s, Me-3), 2.51 (3H, s, Me-9), 3.86 (3H, s, OMe-4′), 6.27 (1H, s, H-6), 7.14 (2H, d, J = 8.4 Hz, H-3′, H-5′), 7.44 (1H, s, H-4), 7.53 (2H, d, J = 8.4, H-2′, H-6′), 7.87 (1H, s, H-2).

3-(*t*-Butyl)-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (35). Yield 0.59 g (85%), $C_{22}H_{20}O_4$, mp 193-194°C. IR spectrum (KBr, cm^{-1}): 1728, 1626, 1608, 1575, 1509, 1442, 1379, 1344, 1293, 1253, 1174, 1137, 1116, 1073, 1038, 835. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 205 (4.73), 216 (4.64), 238 (4.55), 254 (4.45), 299 (4.34). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.33 [9H, s, $(CH_3)_3$], 3.89 (3H, s, OMe-4′), 6.26 (1H, s, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.52 (2H, d, J = 8.4, H-2′, H-6′), 7.64 (1H, s, H-9), 7.71 (1H, s, H-4), 7.80 (1H, s, H-2).

3-(*t*-Butyl)-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (36). Yield 0.62 g (86%), $C_{23}H_{22}O_4$, mp 174-175°C. IR spectrum (KBr, cm^{-1}): 1720, 1606, 1586, 1512, 1383, 1349, 1295, 1260, 1244, 1178, 1115, 1075, 1021, 841. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 204 (4.72), 217 (4.66), 238 (4.53), 254 (4.48), 301 (4.33). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.31 [9H, s, $(CH_3)_3$], 2.55 (3H, s, Me-9), 3.89 (3H, s, OMe-4′), 6.23 (1H, s, H-6), 7.12 (2H, d, J = 8.4, H-3′, H-5′), 7.48 (2H, d, J = 8.4, H-2′, H-6′), 7.63 (1H, s, H-4), 7.70 (1H, s, H-2).

5-(4-Methoxyphenyl)-2,3-dimethy-7*H*-furo[3,2-*g*]chromen-7-one (37). Yield 0.47 g (74%), $C_{20}H_{16}O_4$, mp 208-209°C. IR spectrum (KBr, cm^{-1}): 1736, 1609, 1514, 1456, 1377, 1346, 1263, 1239, 1180, 1143, 1021, 829. UV spectrum (CH_3CH, λ_{max}, nm, log ε): 203 (4.70), 216 (4.60), 232 (4.53), 257 (4.51), 299 (4.28). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.06 (3H, s, Me-3), 2.39 (3H, s, Me-2), 3.86 (3H, s, OMe-4′), 6.27 (1H, s, H-6), 7.14 (2H, d, J = 8.4, H-3′, H-5′), 7.47 (1H, s, H-9), 7.54 (2H, d, J = 8.4, H-2′, H-6′), 7.63 (1H, s, H-4).

5-(4-Methoxyphenyl)-2,3,9-trimethyl-7*H*-furo[3,2-*g*]chromen-7-one (38). Yield 0.54 g (81%), $C_{21}H_{18}O_4$, mp 224-225°C. IR spectrum (KBr, cm^{-1}): 1734, 1609, 1586, 1515, 1399, 1378, 1263, 1179, 1155, 1101, 1022, 827. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 218 (4.56), 233 (4.51), 257 (4.50), 302 (4.26). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.03 (3H, s, Me-3), 2.39 (3H, s, Me-2), 2.45 (3H, s, Me-9), 3.86 (3H, s, OMe-4′), 6.23 (1H, s, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.27 (1H, s, H-4), 7.50 (2H, d, J = 8.4, H-2′, H-6′).

5-(4-Methoxyphenyl)-2-methyl-3-phenyl-7*H*-furo[3,2-*g*]chromen-7-one (39). Yield 0.63 g (82%), $C_{25}H_{18}O_4$, mp 223-224°C. IR spectrum (KBr, cm^{-1}): 1726, 1608, 1568, 1513, 1437, 1376, 1340, 1262, 1177, 1143, 844. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 223 (4.60), 258 (4.50), 302 (4.30). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.52 (3H, s, Me-2), 3.83 (3H, s, OMe-4′), 6.27 (1H, s, H-6), 7.08 (2H, d, J = 8.4, H-3′, H-5′), 7.37 (1H, m, H-4″), 7.46 (4H, m, H-2″, H-3″, H-5″, H-6″), 7.50 (2H, d, J = 8.4, H-2′, H-6′), 7.58 (1H, s, H-9), 7.72 (1H, s, H-4).

5-(4-Methoxyphenyl)-2,9-dimethyl-3-phenyl-7*H*-furo[3,2-*g*]chromen-7-one (40). Yield 0.68 g (86%), $C_{26}H_{20}O_4$, mp 246-247°C. IR spectrum (KBr, cm^{-1}): 1726, 1606, 1585, 1513, 1393, 1375, 1336, 1297, 1264, 1177, 1120, 841. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.61), 258 (4.54), 304 (4.33). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.54 (6H, s, Me-2, Me-9), 3.82 (3H, s, OMe-4′), 6.28 (1H, s, H-6), 7.08 (2H, d, J = 8.4, H-3′, H-5′), 7.37 (1H, m, H-4″), 7.44 (1H, s, H-4), 7.46 (4H, m, H-2″, H-3″, H-5″, H-6″), 7.50 (2H, d, J = 8.4, H-2′, H-6′).

5-(4-Methoxyphenyl)-3-phenyl-7*H*-furo[3,2-*g*]chromen-7-one (41). Yield 0.63 g (85%), $C_{24}H_{16}O_4$, mp 197-198°C. IR spectrum (KBr, cm^{-1}): 1728, 1628, 1607, 1563, 1512, 1438, 1374, 1342, 1300, 1247, 1194, 1185, 1164, 1137, 1073, 1030, 844. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.66), 257 (4.44), 302 (4.32). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.84 (3H, s, OMe-4′), 6.33 (1H, s, H-6), 7.12 (2H, d, J = 8.4, H-3′, H-5′), 7.37 (1H, m, H-4″), 7.49 (2H, t, J = 7.6, H-3″, H-5″), 7.58 (4H, d, J = 8.4, H-2′, H-6′, H-2″, H-6″), 7.86 (1H, s, H-9), 7.89 (1H, s, H-4), 8.43 (1H, s, H-2).

5-(4-Methoxyphenyl)-9-methyl-3-phenyl-7*H*-furo[3,2-*g*]chromen-7-one (42). Yield 0.67 g (88%), $C_{25}H_{18}O_4$, mp 235-236°C. IR spectrum (KBr, cm^{-1}): 1723, 1606, 1585, 1512, 1380, 1295, 1261, 1247, 1177, 1117, 1094, 1024, 841. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.66), 257 (4.47), 304 (4.33). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.51 (3H, s, Me-9), 3.83 (3H, s, OMe-4′), 6.27 (1H, s, H-6), 7.08 (2H, d, J = 8.4, H-3′, H-5′), 7.35 (1H, m, H-4″), 7.43 (2H, t, J = 7.6, H-3″, H-5″), 7.49 (2H, d, J = 9.2, H-2″, H-6″), 7.52 (2H, d, J = 8.4, H-2′, H-6′), 7.67 (1H, s, H-4), 8.40 (1H, s, H-2).

5-(4-Methoxyphenyl)-3-(4-methylphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (43). Yield 0.60 g (79%), $C_{25}H_{18}O_4$, mp 201-202°C. IR spectrum (KBr, cm^{-1}): 1708, 1626, 1606, 1582, 1511, 1444, 1376, 1345, 1293, 1252, 1179, 1162, 1137, 1072, 1024, 833. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 225 (4.69), 257 (4.48), 304 (4.36). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.31 (3H, s, Me-4″). 3.84 (3H, s, OMe-4′), 6.30 (1H, s, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.24 (2H, d, J = 8.0, H-3″, H-5″), 7.43 (2H, d, J = 8.0, H-2″, H-6″), 7.53 (2H, d, J = 8.4, H-2′, H-6′), 7.79 (1H, s, H-9), 7.84 (1H, s, H-4), 8.34 (1H, s, H-2).

5-(4-Methoxyphenyl)-9-methyl-3-(4-methylphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (44). Yield 0.65 g (82%), $C_{26}H_{20}O_4$, mp 213-214°C. IR spectrum (KBr, cm^{-1}): 1731, 1720, 1605, 1585, 1512, 1460, 1379, 1292, 1253, 1179, 1118, 1096, 1041, 1024, 838. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 224 (4.67), 237 (4.61), 255 (4.51), 305 (4.38). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.32 (3H, s, Me-4″), 2.53 (3H, s, Me-9), 3.85 (3H, s, OMe-4′), 6.28 (1H, s, H-6), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.24 (2H, d, J = 8.0, H-3″, H-5″), 7.41 (2H, d, J = 8.0, H-2″, H-6″), 7.52 (2H, d, J = 8.4, H-2′, H-6′), 7.67 (1H, s, H-4), 8.36 (1H, s, H-2).

3-(4-Fluorophenyl)-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (45). Yield 0.64 g (83%), $C_{24}H_{15}FO_4$, mp 204-205°C. IR spectrum (KBr, cm^{-1}): 1726, 1629, 1608, 1573, 1511, 1447, 1376, 1344, 1301, 1263, 1251, 1227, 1190, 1163, 1138, 1073, 1027, 832. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 224 (4.56), 257 (4.37), 302 (4.26). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.85 (3H, s, OMe-4′), 6.35 (1H, s, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.32 (2H, m, H-3″, H-5″), 7.59 (2H, d, J = 8.4, H-2′, H-6′), 7.63 (2H, m, H-2″, H-6″), 7.86 (1H, s, H-9), 7.87 (1H, s, H-4), 8.43 (1H, s, H-2).

3-(4-Fluorophenyl)-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (46). Yield 0.71 g (89%), $C_{25}H_{17}FO_4$, mp 258-259°C. IR spectrum (KBr, cm^{-1}): 1721, 1604, 1585, 1511, 1381, 1259, 1245, 1224, 1184, 1119, 1097, 1020, 841. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 223 (4.47), 257 (4.43), 304 (4.18). PMR spectrum (400 MHz, DMSO-d_6,

δ, ppm, J/Hz): 2.54 (3H, s, Me-9), 3.85 (3H, s, OMe-4′), 6.31 (1H, s, H-6), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.31 (2H, m, H-3″, H-5″), 7.53 (2H, d, J = 8.4, H-2′, H-6′), 7.58 (2H, m, H-2″, H-6″), 7.67 (1H, s, H-4), 8.42 (1H, s, H-2).

3-(4-Chlorophenyl)-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (47). Yield 0.69 g (86%), $C_{24}H_{15}ClO_4$, mp 244-245°C. IR spectrum (KBr, cm^{-1}): 1726, 1629, 1608, 1578, 1513, 1447, 1376, 1344, 1302, 1265, 1250, 1190, 1166, 1138, 1094, 1073, 1026, 831. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.56), 240 (4.52), 257 (4.44), 302 (4.31). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.87 (3H, s, OMe-4′), 6.30 (1H, s, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.50 (2H, d, J = 8.0, H-3″, H-5″), 7.55 (2H, d, J = 8.4, H-2′, H-6′), 7.58 (2H, d, J = 8.0, H-2″, H-6″), 7.78 (1H, s, H-9), 7.85 (1H, s, H-4), 8.38 (1H, s, H-2).

3-(4-Chlorophenyl)-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (48). Yield 0.68 g (81%), $C_{25}H_{17}ClO_4$, mp 262-263°C. IR spectrum (KBr, cm^{-1}): 1721, 1606, 1588, 1513, 1493, 1382, 1260, 1248, 1182, 1122, 1097, 1024, 832. UV spectrum (dioxane, λ_{max}, nm, log ε): 223 (4.65), 242 (4.61), 258 (4.52), 302 (4.39). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.51 (3H, s, Me-9), 3.86 (3H, s, OMe-4′), 6.30 (1H, s, H-6), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.49 (6H, m, H-2′, H-6′, H-2″, H-3″, H-5″, H-6″), 7.65 (1H, s, H-4), 8.40 (1H, s, H-2).

3-(4-Bromophenyl)-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (49). Yield 0.81 g (91%), $C_{24}H_{15}BrO_4$, mp 243-244°C. IR spectrum (KBr, cm^{-1}): 1726, 1608, 1576, 1513, 1376, 1344, 1301, 1265, 1249, 1189, 1165, 1137, 1078, 1025, 831. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.58), 241 (4.55), 256 (4.48), 302 (4.32). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.87 (3H, s, OMe-4′), 6.34 (1H, s, H-6), 7.14 (2H, d, J = 8.4, H-3′, H-5′), 7.54 (2H, d, J = 8.0, H-3″, H-5″), 7.58 (2H, d, J = 8.4, H-2′, H-6′), 7.66 (2H, d, J = 8.0, H-2″, H-6″), 7.86 (1H, s, H-9), 7.88 (1H, s, H-4), 8.46 (1H, s, H-2).

3-(4-Bromophenyl)-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (50). Yield 0.88 g (95%), $C_{25}H_{17}BrO_4$, mp 267-268°C. IR spectrum (KBr, cm^{-1}): 1722, 1606, 1513, 1382, 1260, 1248, 1182, 1123, 1098, 1078, 1024, 831. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 222 (4.78), 241 (4.69), 257 (4.64), 302 (4.47). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.56 (3H, s, Me-9), 3.86 (3H, s, OMe-4′), 6.33 (1H, s, H-6), 7.13 (2H, d, J = 8.4, H-3′, H-5′), 7.52 (2H, d, J = 8.0, H-3″, H-5″), 7.55 (2H, d, J = 8.4, H-2′, H-6′), 7.66 (2H, d, J = 8.0, H-2″, H-6″), 7.71 (1H, s, H-4), 8.50 (1H, s, H-2).

3,5-Di(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (51). Yield 0.64 g (80%), $C_{25}H_{18}O_5$, mp 202-203°C. IR spectrum (KBr, cm^{-1}): 1727, 1628, 1606, 1565, 1512, 1376, 1298, 1248, 1188, 1164, 1137, 1073, 1037, 1027, 835. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 229 (4.78), 237 (4.76), 258 (4.64), 310 (4.52). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.79 (3H, s, OMe-4″), 3.86 (3H, s, OMe-4′), 6.34 (1H, s, H-6), 7.03 (2H, d, J = 8.4, H-3″, H-5″), 7.14 (2H, d, J = 8.4, H-3′, H-5′), 7.52 (2H, d, J = 8.4, H-2″, H-6″), 7.59 (2H, d, J = 8.4, H-2′, H-6′), 7.85 (1H, s, H-9), 7.88 (1H, s, H-4), 8.34 (1H, s, H-2).

3,5-Di(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (52). Yield 0.73 g (88%), $C_{26}H_{20}O_5$, mp 238-239°C. IR spectrum (KBr, cm^{-1}): 1723, 1607, 1585, 1512, 1460, 1381, 1296, 1255, 1230, 1179, 1116, 1025, 841. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 228 (4.59), 240 (4.56), 259 (4.41), 311 (4.18). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.53 (3H, s, Me-9), 3.78 (3H, s, OMe-4″), 3.86 (3H, s, OMe-4′), 6.28 (1H, s, H-6), 7.00 (2H, d, J = 8.4, H-3″, H-5″), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.45 (2H, d, J = 8.4, H-2″, H-6″), 7.51 (2H, d, J = 8.4, H-2′, H-6′), 7.66 (1H, s, H-4), 8.31 (1H, s, H-2).

3-(3-Methoxyphenyl)-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (53). Yield 0.68 g (85%), $C_{25}H_{18}O_5$, mp 187-188°C. IR spectrum (KBr, cm^{-1}): 1729, 1609, 1568, 1515, 1428, 1377, 1348, 1257, 1224, 1187, 1139, 1071, 1050, 1023, 824. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 219 (4.82), 241 (4.61), 258 (4.51), 302 (4.45). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.76 (3H, s, OMe-3″), 3.84 (3H, s, OMe-4′), 6.34 (1H, s, H-6), 6.92 (1H, dd, J = 2.4, J = 8.4, H-4‴), 7.10 (2H, d, J = 8.4, H-3′, H-5′), 7.15 (2H, m, H-2‴, H-5‴), 7.36 (1H, m, H-6‴), 7.58 (2H, d, J = 8.4, H-2′, H-6′), 7.85 (1H, s, H-9), 7.89 (1H, s, H-4), 8.46 (1H, s, H-2).

3-(3-Methoxyphenyl)-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (54). Yield 0.67 g (81%), $C_{26}H_{20}O_5$, mp 183-184°C. IR spectrum (KBr, cm^{-1}): 1733, 1721, 1607, 1588, 1513, 1382, 1294, 1262, 1243, 1214, 1185, 1119, 1021, 839. UV spectrum (CH_3CN, λ_{max}, nm, log ε): 219 (4.68), 239 (4.52), 258 (4.38), 304 (4.34). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.52 (3H, s, Me-9), 3.75 (3H, s, OMe-3″), 3.84 (3H, s, OMe-4′), 6.29 (1H, s, H-6), 6.91 (1H, dd, J = 2.4, J = 8.4, H-4‴), 7.09 (4H, m, H-3′, H-5′, H-2″, H-5″), 7.37 (1H, m, H-6‴), 7.52 (2H, d, J = 8.4, H-2′, H-6′), 7.69 (1H, s, H-4), 8.44 (1H, s, H-2).

3-Benzo[*b*]furan-2-yl-5-(4-methoxyphenyl)-7*H*-furo[3,2-*g*]chromen-7-one (55). Yield 0.60 g (74%), $C_{26}H_{16}O_5$, mp 259-260°C. IR spectrum (KBr, cm^{-1}): 1720, 1608, 1512, 1453, 1376, 1346, 1296, 1259, 1177, 1157, 1136, 1070, 1027, 829. UV spectrum (dioxane, λ_{max}, nm, log ε): 212 (4.65), 221 (4.63), 245 (4.51), 267 (4.53), 274 (4.54), 314 (4.56), 322 (4.52). PMR

spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 3.91 (3H, s, OMe-4′), 6.39 (1H, s, H-6), 7.11 (1H, s, H-3″), 7.22 (2H, d, J = 8.4, H-3′, H-5′), 7.28 (1H, t, J = 8.0, H-5″), 7.35 (1H, t, J = 8.0, H-6″), 7.50 (1H, d, J = 8.0, H-7″), 7.64 (2H, d, J = 8.4, H-2′, H-6′), 7.69 (1H, d, J = 8.0, H-4″), 7.93 (1H, s, H-9), 8.15 (1H, s, H-4), 8.75 (1H, s, H-2).

3-Benzo[*b*]furan-2-yl-5-(4-methoxyphenyl)-9-methyl-7*H*-furo[3,2-*g*]chromen-7-one (56). Yield 0.68 g (81%), $C_{27}H_{18}O_5$, mp 261-262°C. IR spectrum (KBr, cm^{-1}): 1719, 1607, 1588, 1512, 1451, 1386, 1344, 1252, 1176, 1113, 1091, 1045, 840. UV spectrum (dioxane, λ_{max}, nm, log ε): 218 (4.21), 242 (4.11), 259 (4.13), 267 (4.13), 312 (4.13), 334 (3.95). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 2.61 (3H, s, Me-9), 3.92 (3H, s, OMe-4′), 6.30 (1H, s, H-6), 7.02 (1H, s, H-3″), 7.18 (2H, d, J = 8.4, H-3′, H-5′), 7.23 (1H, t, J = 8.0, H-5″), 7.30 (1H, t, J = 8.0, H-6″), 7.44 (1H, d, J = 8.0, H-7″), 7.57 (2H, d, J = 8.4, H-2′, H-6′), 7.62 (1H, d, J = 8.0, H-4″), 7.99 (1H, s, H-4), 8.62 (1H, s, H-2).

4-(4-Methoxyphenyl)-6,7,8,9-tetrahydro-2*H*-benzo[4,5]furo[3,2-*g*]chromen-2-one (57). Yield 0.58 g (84%), $C_{22}H_{18}O_4$, mp 190-191°C. IR spectrum (KBr, cm^{-1}): 2927, 1714, 1605, 1412, 1458, 1379, 1259, 1181, 1142, 1124, 1025, 837. UV spectrum (EtOH, λ_{max}, nm, log ε): 205 (4.68), 233 (4.53), 259 (4.59), 304 (4.37). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.79 (2H, m, CH_2-7), 1.90 (2H, m, CH_2-8), 2.53 (2H, m, CH_2-6), 2.74 (2H, m, CH_2-9), 3.95 (3H, s, OMe-4′), 6.19 (1H, s, H-3), 6.27 (1H, s, H-3), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.46 (2H, d, J = 8.4, H-2′, H-6′), 7.50 (1H, s, H-11), 7.55 (1H, s, H-5).

4-(4-Methoxyphenyl)-11-methyl-6,7,8,9-tetrahydro-2*H*-benzo[4,5]furo[3,2-*g*]chromen-2-one (58). Yield 0.62 g (86%), $C_{23}H_{20}O_4$, mp 222-223°C. IR spectrum (KBr, cm^{-1}): 2945, 1720, 1606, 1583, 1513, 1458, 1398, 1341, 1256, 1178, 1132, 1114, 1091, 1020, 835. UV spectrum (EtOH, λ_{max}, nm, log ε): 204 (4.64), 219 (4.54), 234 (4.44), 259 (4.43), 305 (4.21). PMR spectrum (400 MHz, DMSO-d_6, δ, ppm, J/Hz): 1.78 (2H, m, CH_2-7), 1.91 (2H, m, CH_2-8), 2.50 (2H, m, CH_2-6), 2.53 (3H, s, CH_3-11), 2.75 (2H, m, CH_2-9), 3.94 (3H, s, OMe-4′), 6.19 (1H, s, H-3), 7.11 (2H, d, J = 8.4, H-3′, H-5′), 7.21 (1H, s, H-5), 7.45 (2H, d, J = 8.4, H-2′, H-6′).

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