Synthesis of some new fused coumarin derivatives

EL-DEEN, Ibrahim Mohey[a] IBRAHIM, H.K.[b] MAHMOUD, F.F.[c]

[a] *Faculty of Education, Suez Canal University, Port-Said, Egypt*

[b] *Faculty of Science, Suez Canal University, Ismailia, Egypt*

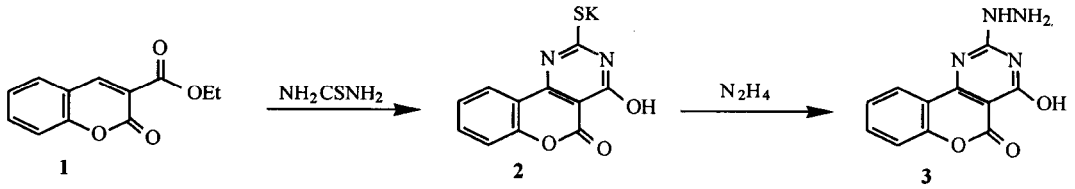
[c] *Faculty of Science (for Girls), Al-Azhar University, Nasr City, Egypt*

2-Hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (3) was prepared via condensation of 2 with hydrazine hydrate. Treatment of 3 with methylene chloride, ethyl chloroformate, ethyl chloroacetate and benzaldehyde yielded the corresponding 2-(substituted) hydrazino-4-hydro-xy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (4, 5, 6, and 10), followed by cyclization of 4, 5 and 6 with dimethyl formamide and fused sodium acetate under reflux, while compound 10 was cyclized with bromine and sodium acetate in acetic acid. Compound 3 reacted with β-(toloyl) acrylic acid, ethyl α-cyano-*p*-methoxycinnamate, diethyl malonate and acetyl chloride affording the corresponding 2-(substituted) hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (12, 13, 14, 15 and 16).

Keywords Synthesis, fused coumarin derivatives, cyclization

As an extension of our previous work,[1-6] this present work describes the synthesis of some new fused coumarin derivatives starting from salicylaldehyde. Condensation of salicylaldehyde with diethyl malonate in presence of piperidine afforded the corresponding 3-ethoxycarbonylcoumarin (**1**). Treatment of **1** with thiourea in the presence of anhydrous potassium carbonate in methanol under reflux to form the potassium salt of 2-mercapto-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**2**) in good yield. Heating of the potassium salt of **2** with hydrazine hydrate under fusion gave the corresponding 2-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**3**, Scheme 1).

Scheme 1



1 2 3

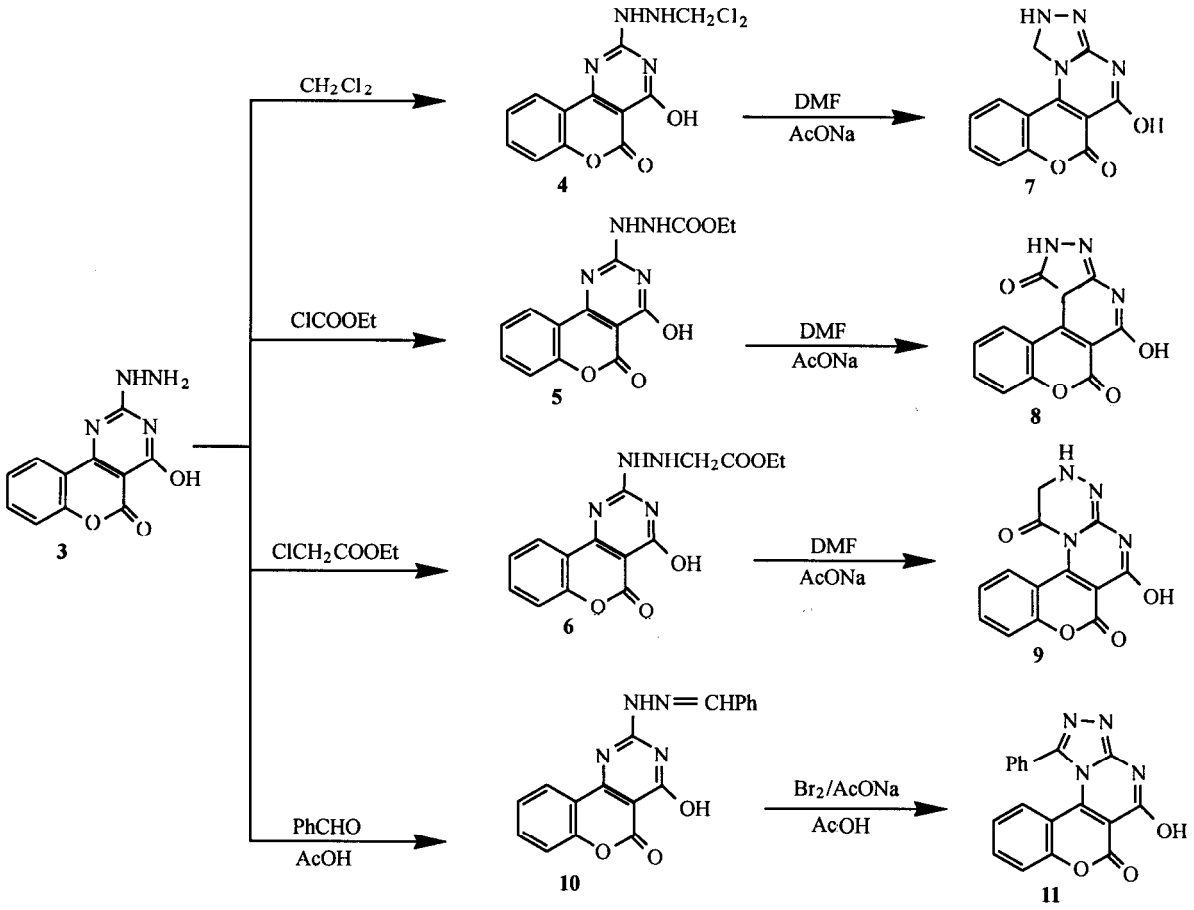
The reaction of 2-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**3**) with methylene chloride, ethyl chloroformate or ethyl chloroacetate in pyridine under reflux produced 2-(substituted) hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**4**, **5** and **6**, Scheme 2). 5-Hydro-1*H*,6*H*-[1]-benzopyrano-[4,3-d]-1,2,4-triazolo-[3,4-b]-pyrimidin-6-one (**7**), 5-hydroxy-1*H*,6*H*-[1]-benzopyrano-[4,3-d]-1,2,4-triazolo-[3,4-b]-pyrimidin-1,6-dione (**8**) and 1,2-dihydro-6-hydroxy-7*H*-[1]-benzopyrano-[4′,3′:4,5]-pyrimido-[2,3-c]-1,2,4-triazin-1,7-dione (**9**) were obtained by boiling of **4**, **5** and **6** in dimethyl formamide in presence of fused sodium acetate.

Subsequently, 2-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**3**) was transformed to 5-hydroxy-1-phenyl-6*H*-[1]-benzopyrano-[4,3-d]-1,2,4-triazolo-[3,4-b]-pyrimidin-6-one (**11**) via condensation of **3** with benzaldehyde to give 2-benzalhydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**10**), followed by cyclization of **10** with bromine in

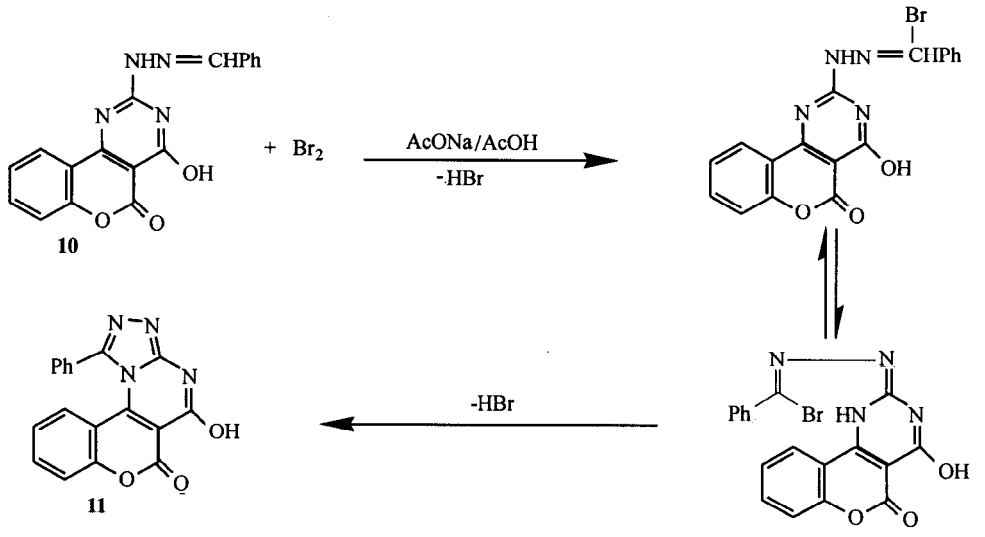
* Received September 13, 1999; accepted February 3, 2000.

presence of fused sodium acetate in acetic acid. Compound **11** may be formed by bromination of **10** with ring cyclization via the removal of hydrogen bromide as shown in Scheme 3.

Scheme 2



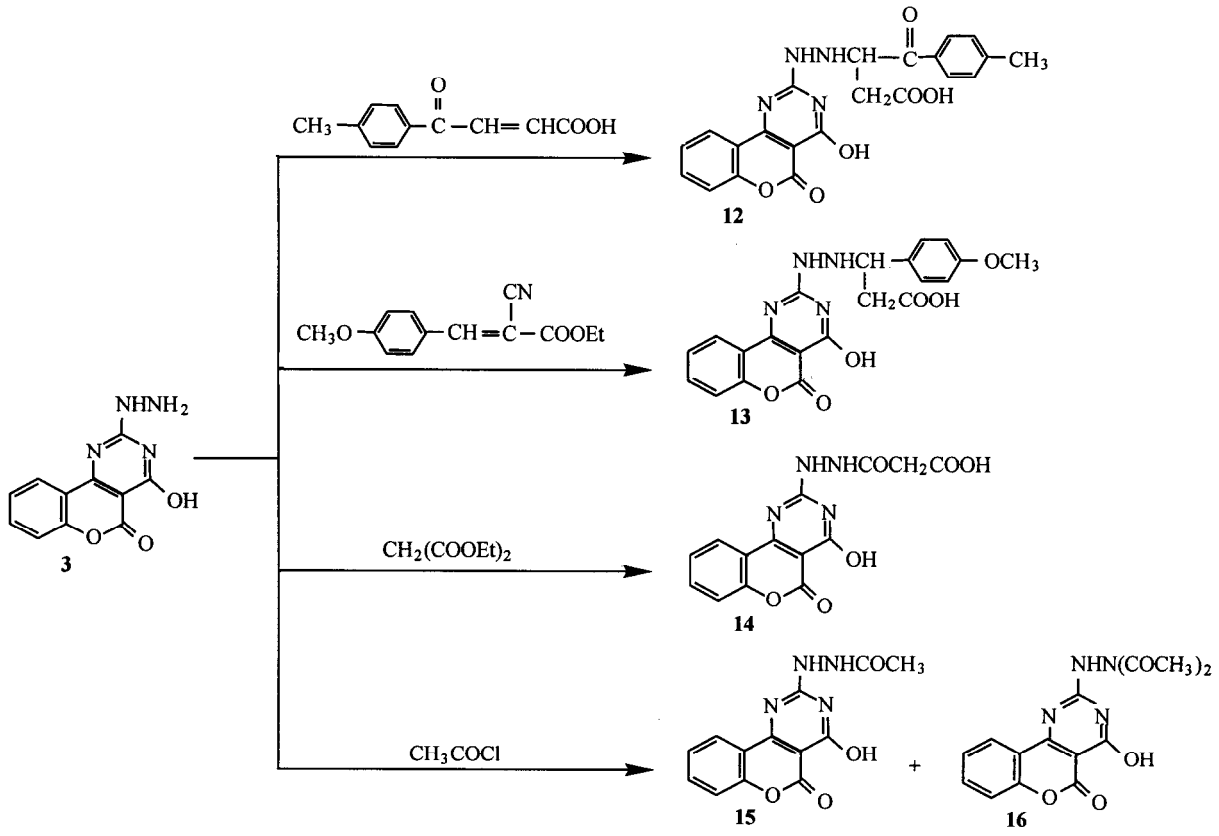
Scheme 3



In the detailed work[7] the reaction of **3** with activated olefinic compounds (namely, β-toloyl-acrylic acid and ethyl α-cyano-*p*-methoxycinnamate) in presence of triethyl amine led to the formation of 2-(substituted)hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**12** and **13**, Scheme 4). Condensation of **3** with diethyl malonate in presence of triethyl amine afforded the corresponding 2-malonyl-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**14**).

On the other hand, the acylation of **3** with acetyl chloride in acetic acid led to the formation of 2-acetyl-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4, 3-d]-pyrimidin-5-one (**15**) and 2-diacetyl-hydrazino-4-hydroxy-5*H*-[1]-benzopyrano-[4, 3-d]-pyrimidin-5-one (**16**).

Scheme 4



Experimental

NMR spectra were recorded on a General Electric QE 300 instrument and chemical shifts were given with respect to TMS. IR spectra were recorded on a Perkin-Elmer 1420 spectrometer and a Biorad FTS7 (KBr). Mass spactra were obtained on a VG Autospec (EI and FAB +) and a Hewlett packard MS-Engine Thermospray. Microanalyses were conducted using an elemental analyzer 1106. Melting points were determined on a Reichert Hot stage and uncorrected.

Potassium salt of 2-mercapto-4-hydroxy-5H-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**2**)

A mixture of **1** (0.01 mol), thiourea (0.01 mol) and anhydrous potassium carbonate (0.03 mol) in methanol (60 mL) was heated under reflux for 2 h. The solid formed was filtered off, washed with methanol and dried to give **2** as pale yellow powder, yield 54%, mp: > 500℃.

2-Hydrazino-4-hydroxy-5H-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**3**)

A mixture of **2** (0.01 mol) and hydrazine hydrate (0.02 mol) was fused on a hot plate for 10—15 min. The reaction mixture was added to boiling methanol (70 mL) and heated under reflux for 2 h, then cooled. The solid fromed was filtered off, washed with methanol, dried and purified by recrystallization with dimethyl formamide to give **3** as orange crystals, yield 73%, mp: > 470℃. ν_{max}(KBr): 3430—2560(br. OH), 3336, 3175(NH_2), 3251(NH), 1712(C = O), 1616(C = N), 1125, 1045(C-O) cm^{-1}. δ_H(DMSO-d_6): 4.36 (s, 2H, NH_2), 7.29—7.78(m, 4H, ArH), 8.83 (br. s, 1H, OH), 9.35(s, 1H, NH). *m/z*(%): 245(M^+ + 1, 67.31), 244(M^+, 100), 229(25.80), 213 (17.10), 188(26.41), 170(2.61), 145(4.8), 102(24.0), 91(26.60), 88(20.91), 76(24.30), Anal $C_{11}H_8N_4O_3$. Calcd: C, 54.10 ; H, 3.30; N, 22.93. Found: C, 53.97; H, 3.19; N, 22.71.

2-(Substituted) hydrazino-4-hydroxy-5H-[1]-benzopyrano-[4,3-d]-pyrimidin-5-one (**4**, **5** *and* **6**)

A mixture of **3** (0.01 mol) and methylene chloride, ethyl chloroformate or ethyl chloroacetate (0.01 mol) in pyridine (50 mL) was heated under reflux for 2 h, then cooled and acidified with hydrochloric acid (6 mol/L). The deposited solid was filtered off, washed with water, dried and purified by recrystallization with dimethyl formamide to give **4**, **5** and **6**.

Compound **4** as pale yellow crystals, yield 57%, mp: 342℃. ν_{max}(KBr): 3390—2596(br. OH), 3175 (NH), 1710(C = O), 1615(C = N), 1095, 1035 (C—O) cm^{-1}. δ_H(DMSO-d_6): 3.81(s, 2H, CH_2), 4.35(s,1H, NH), 7.30—7.77(m, 4H, ArH), 8.84 (br. s, 1H, OH), 9.87(s, 1H, NH). *m/z*(%): 294(M^+ + 2, 6), 292(M^+, 17), 256(100), 242 (13), 229(7.2), 187(22.1), 144(15.20), 102 (23), 91(23), 87(53), 77(13.1), 63(23). Anal. $C_{12}H_9ClN_4O_3$. Calcd: C, 49.25; H, 3.10; N, 19.14; Cl, 12.11. Found: C, 49.01; H, 2.97; N, 19.02; Cl, 11.98.

Compound **5** as yellow crystals, yield 62%, mp: 275℃. ν_{max} (KBr): 3350—2540 (br. OH), 3253 (NH), 1740—1712(C = O of ester and pyrane), 1617 (C = N), 1226, 1062, 1039(C—O) cm^{-1}. δ_H(DMSO-d_6): 1.24(t, J = 1.2 Hz, 3H, CH_3), 4.14(q, J = 1.0 Hz, 2H, OCH_2), 7.31—7.75(m, 4H, ArH), 8.83(br. s, 1H, OH), 9.50(br. s, 1H, NH), 10.30(br. s, 1H, NHCO). *m/z*(%): 317 (M^+ + 1, 15.9), 316(M^+, 16.8), 270(33.8), 244 (14.1), 229(17.4), 214(100), 197(10.9), 186 (25.6), 145(10.2), 125(23.9), 114 (10.0), 102 (13.9),91(11.4),76(9.4),69(15.1),63(16.2). Anal. $C_{14}H_{12}N_4O_5$. Calcd: C, 53.17; H, 3.82; N, 17.71. Found: C, 53.02; H, 3.46; N, 17.52.

Compound **6** as pale yellow crystals, yield 63%, mp: 285℃. ν_{max}(KBr): 3390—2570(br. OH), 3251 (NH), 1745(C = O of ester), 1713(C = O), 1625(C = N), 1178, 1037, 1010(C—O) cm^{-1}. δ_H(DMSO-d_6): 1.22(t, J = 1.2 Hz, 3H, CH_3), 2.51(s, 2H, CH_2), 4.21(q, J = 1.0, 2H, OCH_2), 7.31—7.77 (m, 4H, ArH), 8.83(br. s, 1H, OH), 4.31(s, 1H, NH), 10.09(s, 1H, NH). *m/z*(%): 331(M^+ + 1, 12), 330(M^+, 21), 302(57.12), 284(23), 242(100), 229(13.1), 215(57.3), 188(15.0), 144 (2.9), 102(10.1), 92(4.1), 76(7.5), 63(10.2). Anal. $C_{15}H_{14}N_4O_5$. Calcd: C, 54.55; H, 4.27; N, 16.96. Found: C, 54.31; H, 4.09; N, 16.71.

5-Hydro-1H,6H-[1]-benzopyrano-[4,3-d]-1,2,4-triazolo-[3,4-b]-pyrimidin-6-one (**7**) *5-hydroxy-1H,6H-[1]-benzopyrano-[4,3-d]-1,2,4-triazolo-[3,4-b]-pyrimidin-1,6-dione* (**8**) *and 1,2-dihydro-6-hydroxy-7H-[1]-benzopyrano-[4′,3′:4,5]-pyrimido-[2,3-c]-1,2,4-triazin-1,7-dione* (**9**)

To a solution of **4**, **5** or **6** (0.01 mol) in dimethyl formamide (60 mL) was added fused sodium acetate (0.03 mol). The mixture was heated under reflux for 15 h, then cooled and poured into water. The deposited solid was filtered off, washed with water, dried and purified by recrystallization with dimethyl formamide to give **7**, **8** or **9**.

Compound **7** as yellow crystals, yield 78%, mp: 376℃. ν_{max} (KBr): 3381—2530 (br. OH), 3210 (NH), 1710(C = O), 1630(C = N), 1075, 1031 (C—O) cm^{-1}. δ_H(DMSO-d_6): 4.01(s, 2H, CH_2), 7.30—7.76(m, 4H, ArH), 8.84(br. s, 1H, OH), 9.86(s,1H,NH). *m/z*(%):257(M^+ + 1,7.13), 256(43.3), 228(100), 186(13.5), 145(9.7), 117 (5.5), 92(14.5), 63(20.6). Anal. $C_{12}H_8N_4O_3$. Calcd: C, 56.26; H, 3.15; N, 21.86. Found: C,

56.00; H, 2.96; N, 21.48.

Compound **8** as yellow crystals, yield 79%, mp: 256℃. ν_{max}(KBr): 3375—2592(br. OH), 3179 (NH), 1715(C=O), 1685(C=O), 1627(C=N), 1059, 1030, 1010(C—O) cm^{-1}. δ_H(DMSO-d_6): 7.31—7.76(m, 4H, ArH), 8.85(br.s, 1H, OH), 10.4(s, 1H, NH). *m/z*(%): 271(M^+ + 1, 31), 270(M^+, 34.8), 242(14.1), 228(6.8), 214(100), 186(27.6), 145(13.2), 117(6.51), 91(14.10), 63 (17.2). Anal. $C_{12}H_6N_4O_4$. Calcd: C, 53.34; H, 2.24; N, 20.73. Found: C, 53.14; H, 2.03; N, 20.46.

Compound **9** as yellow crystals, yield 73%, mp: > 390℃. ν_{max}(KBr): 3380—2560(br. OH), 3224 (NH), 1710(C=O), 1687(C=O), 1627(C=N), 1120, 1096, 1041(C-O) cm^{-1}. δ_H(DMSO-d_6): 3.79 (s, 2H, CH_2), 7.31—7.78(m, 4H, ArH), 8.83 (br.s, 1H, OH), 10.41(s, 1H, NH). *m/z*(%): 285(M^+ + 1, 13.1), 284(M^+, 27.3), 242(37.6), 214(100), 188(11.2), 145(13.0), 91(21.0), 63 (9.51). Anal. $C_{13}H_8N_4O_4$. Calcd: C, 54.94; H, 2.84; N, 19.70. Found: C, 54.63; H, 2.58; N, 19.47.

2-*Benzalhydrazino*-4-*hydroxy*-5*H*-[1]-*benzopyrano*-[4, 3-d]-*pyrimidin*-5-*one* (**10**)

A mixture of **3** (0.01 mol) and benzaldehyde (0.01 mol) in acetic acid (70 mL) was heated under reflux for 6 h, then cooled. The solid obtained was filtered off, washed with water, dried and purified by recrystallizationwith dimethyl formamide to give **10** as colourless crystals, yield 72%, mp: 360℃. ν_{max} (KBr): 3420—2779(br. OH), 3203(NH), 1720(C=O), 1630(C=N), 1124, 1051, 1031(C—O) cm^{-1}. δ_H(DMSO-d_6): 6.81—7.79(m, 10H, ArH and olefinic proton), 8.84(br. s, 1H, OH), 10.51 (s, 1H, NH). *m/z*(%): 333(M^+ + 1, 4.4), 332 (M^+, 7.1), 331(M^+ - 1, 2.6), 230(79.6), 229 (100), 188(30.4), 173(1.6), 144(7.7), 120(5.2), 119(15.5), 103(15.4), 90(11.6), 77(22.1), 63 (9.8). Anal. $C_{18}H_{12}N_4O_3$. Calcd: C, 65.06; H, 3.64; N, 16.85. Found: C, 64.83; H, 3.52; N, 16.66.

5-*Hydroxy*-1-*phenyl*-6*H*-[1]-*benzopyrano*-[4, 3-d]-1, 2, 4-*triazolo*-[3, 4-b]-*pyrimidin*-6-*one* (**11**)

A mixture of **10** (0.01 mol), bromine (0.01 mol) and fused sodium acetate (0.03 mol) in acetic acid (70 mL) was heated under reflux for 3—4 h, then cooled and poured onto water. The resulting product was filtered, washedwith water, dried and purified by recrystallization with acetic acid to give **11** as yellow crystals, yield 74%, mp: 395℃. ν_{max}(KBr): 3345—2651(br. OH), 1719(C=O), 1632(C=N), 1095, 1057, 1029(C-O) cm^{-1}. δ_H(DMSO-d_6): 7.10—7.81(m, 9H, ArH), 8.83(br.s, 1H, OH). *m/z*(%): 331 (M^+ + 1, 1.2), 330(M^+, 58.2), 253(34.1), 227 (100), 185(13.7), 145(16.2), 144(6.3), 120 (3.2), 119(11.2), 103(221), 91(10.2), 77(18.1). Anal. $C_{18}H_{10}N_4O_3$. Calcd: C, 65.46; H, 3.05; N, 16.96. Found: C, 65.33; H, 2.88; N, 16.58.

2-(*Substituted*) *hydrazino*-4-*hydroxy*-5*H*-[1]-*benzopyrano*-[4, 3-d]-*pyrimidin*-5-*one* (**12** *and* **13**)

A mixture of **3** (0.01 mol), activated olefinic compound (such as β-toloyl-acrylic acid or ethyl α-cyano-*p*-methoxycinnamate) (0.01 mol) and triethyl amine (0.03 mol) was fused on a hot plate for 5—10 min. The mixture was added to boiling acetic acid (60 mL) and heated under reflux for 2—3 h, then cooled. The solid formed was filtered off, washed with water, dried and purified by crystallization with dimethyl formamide to give **12** or **13**.

Compound **12** as pale yellow crystals, yield 67%, mp: > 450℃. ν_{max}(KBr): 3420—2268(br. OH), 3251(NH), 1724(C=O), 1702(C=O of carboxylic acid), 1687(C=O), 1621(C=N), 1062, 1010(C—O) cm^{-1}. δ_H(DMSO-d_6): 2.41(s, 3H, CH_3), 2.67 (d, J = 1.4 Hz, 2H, CH_2), 3.69(t, J = 1.2 Hz, 1H, CH), 4.38(s, 1H, NHCH), 7.11—7.78(m, 8H, ArH), 8.83(br. s, 1H, OH), 10.30(s, 1H, NH), 12.01(br. s, 1H, OH). *m/z*(%): 434(M^+, 105), 314(17.4), 268(100), 241(1.1), 213(6.5), 172(5.6), 144(3.5), 120(0.6), 104(18.8), 103 (10.3), 92(2.8), 88(8.7), 89(2.9), 77(8.9), 76 (15.5), 63(10.9). Anal. $C_{22}H_{18}N_4O_6$. Calcd: C, 60.83; H, 4.18; N, 12.89. Found: C, 60.65; H, 3.88; N, 12.58.

Compound **13** as yellow crystals, yield 66%, mp: 374℃. ν_{max}(KBr): 3410—2225(br. OH), 1720(C=

O), 1695(C = O of acid), 1625(C = N), 1095, 1057, 1025(C—O) cm^{-1}. δ_H(DMSO-d_6): 2.81(d, J = 1.4 Hz, 2H, CH_2), 3.75(t, J = 1.2 Hz, 1H, CH), 3.86(s, 3H, OCH_3), 4.32(s, 1H, NHCH), 7.02—8.1(m, 8H, ArH), 8.84(br.s, 1H, OH), 10.21(s, 1H, NH), 11.83(br.s, 1H, OH). *m/z* (%): 423(M^+ + 1, 3.6), 422(M+, 13.4), 362 (4.7), 229(100), 188(30.1), 173(1.2), 145(4.1), 144(6.0), 133(8.2), 134(6.1), 116(3.4), 117 (2.1), 91(13.4), 92(7.0), 89(5.3), 88(2.9), 63(10.0), 60(1.5). Anal. $C_{21}H_{18}N_4O_6$. Calcd: C, 59.72; H, 4.30; N, 13.26. Found: C, 59.49; H, 4.03; N, 13.06.

2-*Malonyl-hydrazino*-4-*hydroxy*-5*H*-[1]-*benzopyrano*-[4,3-d]-*pyrimidin*-5-*one* (**14**)

A mixture of **3** (0.01 mol), diethyl malonate (0.01 mol) and triethyl amine (0.03 mol) was fused on a hot plate for 5—10 min. The mixture was added to boiling acetic acid (50 mL) and heated under reflux for 2—3 h, then cooled. The resulting solid was filtered off, washed with water, dried and purified by crystallization with dimethyl formamide to give **14** as pale yellow crystals, yield 64%, mp: > 450℃. ν_{max}(KBr): 3430—2231(br. OH), 3225(NH), 1730—1702(C = O of pyrane and acid), 1685(C = O), 1623(C = N), 1147, 1105, 1035, 1004(C-O) cm^{-1}. δ_H(DMSO-d_6): 3.53(s, 2H, CH_2), 7.31—7.78(m, 4H, ArH), 8.85(br.s, 1H, OH), 10.08(s, 1H, NH), 10.25 (s, 1H, NH) 12.01(br. s, 1H, OH). *m/z*(%): 331(M^+ + 1; 1.10), 330(M^+, 7.0), 286(19.6), 244(100), 224(8.4), 214(7.0), 213(11.0), 188 (15.8), 187(2.7), 186(6.7), 145(7.0), 144(2.6), 116(9.8), 115(5.4), 102(15.7), 91(13.4), 89 (7.3), 76(12.7), 75(10.3), 63(15.8). Anal. $C_{14}H_{10}N_4O_6$. Calcd: C, 50.92; H, 3.05; N, 16.96. Found. C, 50.62; H, 3.12; N, 16.59.

2-(*Monoacetyl or diacetyl*) *hydrazino*-4-*hydroxy*-5*H*-[1]-*benzopyrano*-[4,3-d]-*pyrimi*-din-5-*one* (**15** or **16**)

A mixture of **3** (0.01 mol) and acetyl chloride (0.02 mol) in acetic acid (60 mL) was heated under reflux for 2—3 h. The solid formed on hot was filtered off, dried and purified by crystallization with dimethyl formamide to give **15** as colourless crystals, yield 32%, mp: 301℃. ν_{max}(KBr): 3380—2513(br. OH), 3225 (NH), 1720, 1687(C = O), 1621(C = N), 1034, 1012(C—O) cm^{-1}. δ_H(DMSO-d_6): 2.10(s, 3H, CH_3), 7.30—7.78(m, 4H, ArH), 8.84(br. s, 1H, OH), 10.02(s, 1H, NH), 10.24(s, 1H, NH). *m/z* (%): 287(M^+ + 1, 12.6), 286(M^+, 14.4), 271 (1.6), 244(100), 229(12.7), 215(60.0), 214 (11.6), 188(16.3), 187(3.2), 186(7.3), 158(5.7), 145(7.4), 144(3.6), 120(18.6), 119(11.4), 103 (11.7), 102(12.5), 91(11.3), 77(9.9), 76(9.6), 63(14.0). Anal. $C_{13}H_{10}N_4O_4$. Calcd: C, 54.55; H, 3.52; N, 19.57. Found: C, 54.31; H, 3.27; N, 19.41.

Pouring the filtrate into water yielded the crude product, which was filtered and washed with water, dried and purified by recrystallization with ethanol to give **16** as colourless crystals, yield 51%, mp: 232℃. ν_{max}(KBr): 3370—2515(br. OH), 3174(NH), 1732, 1718, 1683(C = O), 1624(C = N), 1132, 1116, 1020(C—O) cm^{-1}. δ_H(DMSO-d_6): 2.13(s, 6H, 2× $COCH_3$), 7.31—7.79(m, 4H, ArH), 8.83(br. s, 1H, OH), 10.12(s, 1H, NH). *m/z*(%): 329(M^+ + 1, 1.1), 328(M^+, 1.2), 313(1.9), 286 (27.0), 229(100), 215(27.3), 213(4.0), 188(6.5), 187(1.1), 186(4.9), 145(3.8), 144(1.1), 120 (6.9), 119(4.7), 114(3.5), 103(5.3), 102(4.7), 91(5.0), 63(4.9). Anal. $C_{15}H_{12}N_4O_5$. Calcd: C, 54.88; H, 3.68; N, 17.06. Found: C, 54.61; H, 3.37; N, 16.79.

References

1. El-Deen, I. M., *J. Serb. Chem. Soc.*, **63**, 367(1998) [*Chem. Abstr.*, 129, 81701m(1998)].
2. El-Deen, I. M., *Chinese J. Chem.*, **16**, 528(1998).
3. El-Deen, I. M., *Chinese J. Chem.*, **16**, 533(1998).
4. El-Deen, I. M., *Chinese J. Chem.*, **17**, 391(1999).
5. El-Deen, I. M., *J. Indian Chem. Soc.*, **69**, 601(1992) [*Chem. Abstr.*, **119**, 95435h(1993)].
6. Eltamany, S. H.; El-Deen, I. M.; Abd El-Fattah, M. E., *J. Indian Chem. Soc.*, **73**, 367(1996)[*Chem. Abstr.*, **125**, 221729w(1996)].
7. El-Farargy, A.; Yassin, F.; AbdelChani, E.; El-Said, N.; Saleh, R., *Heterocycles*, **34**, 25(1992).

(E990117 JIANG, X.H.; DONG, L.J.)