**General Remarks**

All the starting materials were purchased from commercial sources and were used without further purification. All the melting points were recorded using Kumar melting point apparatus. IR spectra were recorded using Perkin Elmer Spectrum -1 instrument. 1H and 13C spectra of compounds were recorded in CDCl3 / d6-DMSO using Bruker Avance AC-300 spectrometer.

**Experimental**

**Synthesis of (2-amino-4H-chromene) derivatives, 4 / 6 / 8 a-h:**

To a well stirred solution of salicylaldehyde (2 mmol) and ethyl cyanoacetate or malononitrile or phenylsulphonyl acetonitrile (4 mmol) in ethanol (3 mL) or dioxane – ethanol mixture (1 : 10, v / v, 3 mL) was added diethylamine (10 mol %) and stirring continued. Upon completion of the reaction (tlc), water (10 mL) was added and stirring was continued till a free flowing colourless solid was obtained. It was filtered and washed successively with water, n-hexane and dried.

All the synthesized chromene derivatives, **4 , 6** as well as **8,** were found to be almost pure for most of the practical purposes and they didn’t require any further purification.

**Spectral Data**

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| **Ethyl 2-amino-4-(1-cyano-2-ethoxy-2-oxoethyl)-4*H*-chromene-3-carboxylate, 4a** | |
| **dr = 100 %** | White solid; **IR (KBr)** = 3438, 3313, 2989, 2922, 2249, 1735, 1676, 1636, 1462, 1368, 1296, 1112 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 1.30 (t, 3H, *J* = 6.6 Hz), 1.34 (t, 3H *J* = 6.9 Hz), 3.92 (d, 1H*, J* = 3.6 Hz), 4.21- 4.29 (m, 4H), 4.69 (d, 1H, *J* = 3.6 Hz), 7.06-7.12 (m, 3H), 7.26-7.33 (m, 1H); **13C NMR (75.4 MHz, CDCl3):** δ = 13.98 (CH3), 14.60 (CH3), 36.83 (CH), 46.63 (CH), 59.75 (CH2), 62.39 (CH2), 73.41 (C=C-COOC2H5), 114.99 (CN), 116.56 (ArCH), 120.31 (ArC), 124.54 (ArCH), 128.19 (ArCH), 129.20 (ArCH), 150.53 (ArC), 162.42 (C), 164.93 (CO), 167.75 (CO) ppm. |
| **Ethyl 2-amino-6-chloro-4-(1-cyano-2-ethoxy-2-oxoethyl)-4*H*-chromene-3-carboxylate, 4b** | |
| **dr = 100 %** | White solid; **IR (KBr)** = 3392, 3310, 2985, 2923, 2248, 1687, 1466, 1287, 1225, 1078 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 1.33 (t, 3H, *J* = 7.2 Hz), 1.36 (t, 3H *J* = 7.2 Hz), 3.92 (d, 1H, *J* = 3.3 Hz), 4.23- 4.38 (m, 4H), 4.65 (d, 1H, *J* = 3.3 Hz), 7.03 (d, 1H, *J* = 8.7 Hz), 7.10 (brs, 1H), 7.28 (brs, 1H); **13C NMR (75.4 MHz, CDCl3):** δ = 14.09 (CH3), 14.61 (CH3), 36.81 (CH), 46.49 (CH), 59.91 (CH2), 62.78 (CH2), 72.90 (C=C-COOC2H5), 114.86 (CN), 117. 92 (ArCH), 121.80 (C),128.02 (ArCH), 129.30 (ArCH), 129.57 (ArC), 149.34 (ArC), 162.46 (C), 165.23 (CO), 167.76 (CO) ppm; **HRMS:** Mass Calcd for (C17H17O5N2Cl + Na): 387.0723; Obs. mass: 387.0729. |
| **Ethyl 2-amino-6,8-dichloro-4-(1-cyano-2-ethoxy-2-oxoethyl)-4*H*-chromene-3-carboxylate, 4c** | |
| **dr= 100 %** | White solid**; IR (KBr)** = 3432, 3314, 2983, 2252, 1682, 1416, 1251, 1074 cm-1;  **1H NMR (300 MHz, CDCl3):** δ = 1.33 (t, 3H, *J* = 7.2 Hz), 1.36 (t, 3H *J* = 7.2 Hz), 3.91 (d, 1H, *J* = 3.6 Hz), 4.20-4.38 (m, 4H), 4.66 (d, 1H, *J* = 3.6 Hz), 7.04 (d, 1H, *J* = 2.4 Hz), 7.40 (d, 1H, *J* = 2.1 Hz); **13C NMR (75.4 MHz, CDCl3)**: δ = 14.09 (CH3), 14.57 (CH3), 37.00 (CH), 46.33 (CH), 60.10 (CH2), 62.94 (CH2), 72.88 (C=C-COOC2H5), 114.54 (CN), 122.80 (ArC), 123.23 (ArC), 126.53 (ArCH), 129.41 (ArC), 129.83 (ArCH), 145.33 (ArC), 161.70 (C), 164.58 (CO), 167.25 (CO) ppm; **HRMS:** Mass Calcd for (C17H16O5N2Cl2 + Na): 421.0332; Obs. mass: 423.0305. |
| **Ethyl 2-amino-6-bromo-4-(1-cyano-2-ethoxy-2-oxoethyl)-4*H*-chromene-3-carboxylate, 4d** | |
| **dr = 100 %** | Solid; **IR (KBr)** = 3422, 3112, 2982, 2353, 1735, 1687, 1621, 1478, 1294, 1197, 1080, 1041 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 1.33 (t, 3H, *J* = 5.4 Hz), 1.36 (t, 3H *J* = 6.6 Hz), 3.92 (d, 1H, *J* = 3.6 Hz), 4.23-4.36 (m, 4H), 4.65 (d, 1H, *J* = 3.6 Hz), 6.98 (d, 1H, *J* = 8.7 Hz), 7.22 (dd, 1H, *J* = 8.7 & 2.4 Hz), 7.26 (d, 1H, *J* = 2.4 Hz); **13C NMR (75.4 MHz, CDCl3)**: δ = 14.13 (CH3), 14.59 (CH3), 36.77 (CH), 46.53 (CH), 59.90 (CH2), 62.79 (CH2), 72.81 (C=C-COOC2H5), 114.80 (ArC), 116.92 (ArC), 117.81 (CN), 118.30 (ArCH), 122.27 (ArC), 130.95 (ArCH), 131.32 (ArC), 132.20 (ArCH), 149.59 (ArC), 162.15 (C), 164.75 (CO), 167.51 (CO) ppm; **HRMS**: Mass Calcd for (C17H17O5N2Br + Na): 431.0217; Obs. Mass: 431.0241. |
| **Ethyl 2-amino-6,8-dibromo-4-(1-cyano-2-ethoxy-2-oxoethyl)-4*H*-chromene-3-carboxylate, 4e** | |
| **dr = 100 %** | Solid; **IR (KBr)** = 3430, 3314, 2984, 2248, 1730, 1634, 1532, 1293, 1079 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 1.33 (t, 3H, *J* = 5.7 Hz), 1.36 (, t, 3H *J* = 5.4 Hz), 3.90 (d, 1H, *J* = 3.9 Hz), 4.23-4.35 (m, 4H), 4.66 (d, 1H, *J* = 3.6 Hz), 7.22 (d, 1H, *J* = 2.1 Hz), 7.68 (d, 1H, *J* = 2.1 Hz); **13C NMR (75.4 MHz, CDCl3):** δ = 14.13 (CH3), 14.57 (CH3), 37.11 (CH), 46.37 (CH), 60.08 (CH2), 62.92 (CH2), 72.98 (C=COOC2H5), 111.13 (ArC), 114.50 (CN), 116.88 (ArC), 123.58 (ArC), 130.18 (ArCH), 135.33 (ArCH),146.84 (ArC),161.79 (C), 164.56 (CO), 167.19 (CO) ppm; **HRMS**: Mass Calcd for (C17H17O5N2Br2 + Na): 508.9323; Obs. mass: 510.9420. |
| **Ethyl 2-amino-4-(1-cyano-2-ethoxy-2-oxoethyl)-6-nitro-4*H*-chromene-3-carboxylate, 4f** | |
| **dr = 100 %** | White solid; **IR (KBr)** = 3430, 3327, 3080, 2993, 2254, 1739, 1689, 1519, 1478, 1247, 1082, 1038 cm-1; **1H NMR (300 MHz, CDCl3)**: δ = 1.34 (t, 3H, *J* = 7.2 Hz), 1.38 (, t, 3H *J* = 7.2 Hz), 3.99 (d, 1H, *J* = 3.3 Hz), 4.26-4.37 (m, 4H), 4.79 (d, 1H, *J* = 3.3 Hz), 7.25 (d, 1H, *J* = 9.0 Hz), 8.08 (d, 1H, *J* = 2.7 Hz), 8.24 (dd, 1H, *J* = 9.0 Hz and 2.7 Hz); **13C NMR (75.4 MHz, CDCl3):** δ = 14.00 (CH3), 14.62 (CH3), 36.63 (CH), 46.54 (CH), 60.23 (CH2), 63.20 (CH2), 72.84 (C=C-COOC2H5), 114.47 (CN), 117.46, 121.31, 124.81, 125.04, 144.30, 154.60, 161.27 (C), 164.40 (CO), 167.17 (CO) ppm. |
| **Ethyl 2-amino-4-(1-cyano-2-ethoxy-2-oxoethyl) 6-methoxy-4H -chromene-3-carboxylate, 4g** | |
| **dr = 100 %** | Solid; **IR (KBr)** = 3393, 3291, 2994, 2248, 1736, 1622, 1497, 1416, 1298, 1210, 1030 cm-1; **1H NMR (300 MHz, CDCl3)**: δ = 1.31 (t, 3H, *J* = 7.2 Hz), 1.35 (t, 3H *J* = 7.2 Hz), 3.75 (s, 3H), 3.94 (d, 1H, *J* = 3.2 Hz), 4.22-4.30 (m, 4H), 4.67 (d, 1H, *J* = 3.2 Hz), 6.61 (d, 1H, *J* = 2.7 Hz), 6.81-6.85 (m, 1H), 7.01 (d, 1H, *J* = 7.7 Hz); **13C NMR (75.4 MHz, CDCl3)**: δ = 14.02 (CH3), 14.60 (CH3), 37.16 (CH), 46.63 (CH), 55.47 (OCH3), 57.76 (CH2), 62.57 (CH2), 72.84 (C=C-COOC2H5), 112.49 (ArCH), 114.92 (ArCH), 115.20 (CN), 117.31 (ArCH), 120.89 (ArC), 144.86 (ArC), 156.19 (ArC), 162.22 (C), 165.11 (CO), 167.92 (CO) ppm. |
| **Ethyl 2-amino-4-(1-cyano-2-ethoxy-2-oxoethyl)8-methyl-4H-chr-omene-3-carboxylate, 4h** | |
| **dr = 100 %** | Solid; **IR (KBr)** = 3423, 3306, 2983, 2252, 1731, 1682, 1639, 1532, 1469, 1420, 1289, 1200, 1085, 1033 cm-1; **1H NMR (300 MHz, CDCl3)**: δ = 1.29 (t, 3H, *J* = 6.9 Hz), 1.36 (, t, 3H *J* = 7.2 Hz), 2.34 (s, 3H), 3.90 (d, 1H, *J* = 3.9 Hz), 4.20-4.29 (m, 4H), 4.66 (d, 1H, *J* = 3.9 Hz), 6.90-7.00 (m, 2H), 7.12 (d, 1H, *J* = 7.2 Hz); **13C NMR (75.4 MHz, CDCl3)**: δ 14.00 (CH3), 14.62 (CH3), 15.79 (CH3), 37.13 (CH), 46.68 (CH), 59.70 (CH2), 62.34 (CH2), 73.45 (C=C-COOC2H5), 115.11 (CN), 119.88 (ArC), 124.00 (ArCH). 125.67 (ArC), 125.73 (ArCH), 130.69(ArCH), 148.86 (ArC), 162.48 (C), 164.92 (CO), 167.79 (CO) ppm. |

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| ***Spectra data of the products resulted by condensation between salicylaldehydes and phenylsulphonyl acetonitrile*** | |
| **2-Amino-3-benzenesulphonyl-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6a** | |
| **dr = 100 %** | White solid; **IR (KBr)** = 3485, 3266, 2242, 1639, 1402, 1282, 1148, 1085, 852, 762, 629 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 4.77 (1H, d, J= 1.8 Hz, CH), 5.02 (1H, d, J= 1.8 Hz, CH), 6.12 (2H, br s, NH2), 7.06- 8.06 (14H, m, ArHs); **13C NMR (75.4 MHz, DMSO):** δ = 35.04 (CH), 64.10 (CH), 76.19 (= CH), 112.62, 116.37, 118.28, 124.78, 126.14, 128.62, 129.30, 129.88, 130.26, 132.99, 135.13, 138.04, 142.27, 150.49, 160.56 ppm. (ArCs). |
| **2-Amino-3-benzenesulphonyl-6-chloro-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6b** | |
| **dr = 100 %** | Red solid; **1H NMR (300 MHz, CDCl3):** δ = 4.70 (1H, s, CH), 5.00 (1H, d, J= 1.2 Hz, CH), 6.14 (2H, Br s, NH2), 7.01 (1H, d, J= 9.1 Hz, ArH), 7.29 – 7.79 (10H, m, ArHs), 7.95 (1H, d, J= 7.5 Hz, ArH), 8.04 (1H, d, J= 8.1 Hz, ArH); **13C NMR (75.4 MHz, DMSO):** δ = 34.56 (CH), 63.61 (CH), 78.04 (= CH), 112.34, 117.66, 119.64, 126.54, 128.88, 129.43, 129.82, 130.15, 130.22, 130.31, 133.33, 135.06, 137.79, 141.52, 148.84, 159.35 ppm. (ArCs) |
| **2-Amino-3-benzenesulphonyl-6, 8-dichloro-4H-chromen-4-yl–benzenesulphonyl acetonitrile,6c** | |
| **dr = 100 %** | Faint pink solid; **1H NMR (300 MHz, CDCl3):** δ = 4.71 (1H, d, J= 2.1Hz, CH), 5.00 (1H, d, J= 2.1Hz, CH), 6.22 (2H, Br s, NH2), 7.41-7.81 (8H, m, ArHs), 7.94 (2H, dd, J= 8.0 and 1.5 Hz, ArHs), 8.03 (2H, dd, J= 8.1 and 1.5 Hz, ArHs); **13C NMR (75.4 MHz, DMSO)**: δ = 35.17 (CH), 63.68 (CH), 75.78 (= CH), 112.32, 121.34, 122.43, 126.22, 128.58, 128.66, 129.44, 129.97, 130.31, 133.30, 135.39, 137.53, 141.81, 145.36, 159.93 ppm (ArCs) |
| **2-Amino-3-benzenesulphonyl-6-bromo-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6d** | |
| **dr = 100 %** | Pink solid; **1H NMR (300 MHz, CDCl3):** δ = 4.69 (1H, d, J= 1.8 Hz, CH), 5.01 (1H, d, 1.8 Hz, CH), 6.95 (2H, Br s, NH2), 7.42 (1H, d, J= 2.1 Hz, ArH), 7.53 (1H, dd, J= 9.1 and 2.1 Hz), 7.56- 7.80 (7H, m, ArHs), 7.95 (2H,d J= 7.8 Hz), 8.04 (2H, d, J= 7.8 Hz); **13C NMR (75.4 MHz, DMSO):** δ = 35.06 (CH), 63.95 (CH), 75.48 (= CH), 112.66, 116.73, 118.59, 120.69, 126.12, 128.75, 129.60, 130.24, 132.77, 133.02, 133.28, 135.63, 137.61, 142.52, 149.86, 160.44 ppm. (ArCs). |
| **2-Amino-3-benzenesulphonyl-6,8-dibromo-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6e** | |
| **dr = 100 %** | Faint pink solid; **1H NMR (300 MHz, CDCl3):** δ = 4.70 (1H, d, J= 2.1 Hz), 4.99 (1H, d, J= 2.1 Hz), 6.25 (2H, Br s, NH2), 7.56- 7.95 (8H, m, ArCH), 8.01 (2H, d, J= 7.8 Hz), 8.05 (2H, d, J= 7.5 Hz); **13C NMR (75.4 MHz, DMSO):** δ = 35.42 (CH), 63.79 (CH), 75.88 (= CH), 111.21, 112.51, 116.77, 122.14, 126.28, 128.83, 129.63, 130.25, 132.24, 133.34, 135.64, 135.77, 137.57, 142.42, 147.11, 160.07 ppm. (ArCs) |
| **2-Amino-3-benzenesulphonyl-6,8-dibromo-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6f** | |
| **dr = 100 %** | Faint yellow solid; **IR (KBr)** = 3445, 3329, 2242, 1641, 1529, 1402, 1349, 1258, 1154, 1087 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 4.69 (1H, s, CH), 4.90 (1H, s, CH), 7.23 (1H, d, J= 9.0 Hz, ArH), 7.43 – 7.93 (12H, m, ArH and NH2), 8.17 (1H, d, J= 9.0 Hz, ArH), 8.38 (1H, d, J= 1.8 Hz, ArH); **13C NMR (75.4 MHz, DMSO):** δ = 34.98 (CH), 63.61 (CH), 75.56 (= CH), 112.34, 117.75, 119.53, 125.62, 126.23, 126.50, 128.74, 129.49 , 130.06, 133.32, 135.50, 137.44, 142.00, 143.90, 154.77, 159.75 ppm. (ArCs) |
| **2-Amino-3-benzenesulphonyl-5-methoxy-4H-chromen-4-yl–benzenesulphonyl acetonitrile, 6g** | |
| **dr = 100 %** | Yellow solid; **IR (KBr)** = 3610, 3440, 2324, 1638, 1507,1394, 1134, 1081, 842, 609 cm-1; **1H NMR (300 MHz, CDCl3):** δ = 3.80 (3H, s, OCH3), 4.69 (1H, d, J = 1.8 Hz), 4.99 (1H, d, J = 1.8 Hz), 6.15 (2H, br s, NH2), 6.58 (1H,d, J = 2.1 Hz, ArH), 6.75 (1H, dd, J = 8.1 and 2.4 Hz, ArH), 7.49 – 8.03 (12H, m, ArHs); **13C NMR (75.4 MHz, DMSO):** δ = 34.33 (CH), 55.40 (OCH3), 64.00 (CH), 78.43 (= CH), 101. 76, 109.95, 111.34, 112.57, 126.48, 128. 82, 129.29, 129.74, 131.05, 133.05, 134.83, 138.20, 141.86, 151.09, 159.61, 160.76 ppm. (ArCs). |

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| ***Spectra data of the products resulted by condensation between salicylaldehydes and malononitrile*** | |
| **2-(2-Amino-3-cyano-4H-chromen-4-yl) malononitrile, 8a** | |
|  | Faint yellow solid**; IR (KBr)** = 3458, 3336, 2938, 2195, 1639, 1576, 1421, 1271, 1228, 1050 cm-1; **1H NMR (300 MHz, d6-acetone):** δ = 4.53 (brs, 1H), 4.71 (br s, 1H), 6.73 (brs, 2H, NH2), 7.13 (d, 1H, *J* = 8.1 Hz), 7.28 (t, 1H, *J* = 7.5 Hz), 7.44 (t, 1H, *J* = 8.1 Hz), 7.57 (d, 1H, *J* = 7.5 Hz); **13C NMR (75.4 MHz, d6-acetone):** δ = 32.49 (CH), 38.31(CH), 49.66 (C=C-CN), 112.51, 112.73, 116.75, 117.85, 119.47, 125.11, 128.92, 130.09, 150.21, 163.75 ppm, (ArCs) |
| 2**-(2-Amino-6-bromo-3-cyano-4H-chromen-4-yl) malononitrile, 8c** | |
|  | Faint yellow solid; **IR (KBr)** = 3461, 3347, 2880, 2190, 1640, 1594, 1480, 1427, 1268, 1229, 1037, 817, 470 cm-1; **1H NMR (300 MHz,DMSO-d6)**: δ = 4.36 (d, 1H, *J* = 3.3 Hz), 4.84 (d, 1H, *J* = 3.9 Hz), 7.04 (d, 1H, *J* = 8.7 Hz), 7.23 (br s, 2H), 7.42 (dd, 1H, *J* = 8.7 and 2.1 Hz), 7.61 (br s, 1H); **13C NMR (75.4 MHz, DMSO-d6):** δ = 32.36 (CH), 38.00 (CH), 49.05 (C=C-CN), 118.76, 131.45, 132.96, 149.28, 163.49 ppm. (ArCs) |
| **2-(2-Amino-3-cyano-6-nitro-4H-chromen-4yl) malononitrile, 8d** | |
|  | Faint yellow solid; **IR (KBr)** = 3395, 3318, 2903, 2329, 2200, 1729, 1639, 1520, 1419, 1345, 1256, 1093, 834, 745 cm-1; **1H NMR (300 MHz, DMSO-d6)**: δ = 4.56 (s, 1H), 4.96 (s, 1H), 7.27 (d, 1H, *J* = 9.0 Hz), 7.42 (brs, 2H, NH2), 7.82-7.86 (br s, 2H), 8.00 (dd, 1H, *J* = 9.0 and 2.4 Hz), 8.50 (d, 1H, *J* = 2.4 Hz); **13C NMR (75.4 MHz, DMSO-d6)**: δ = 32.50 (CH), 37.78 (CH), 49.31 (C=C-CN), 112.17, 112.33, 118.04, 118.78, 119.31, 125.46, 125.65, 144.31, 154.52, 163.00 ppm. (ArCs) |
| **2-(2-Amino-3-cyano-6-methoxy-4H-chromen-4yl)malononitrile, 8e** | |
|  | Colorless Solid; **IR (KBr)** = 3404, 3342, 3219, 2910, 2256, 2186, 1660, 1610, 1587, 1504, 1447, 1285, 1254, 1218 cm-1; **1H NMR (300 MHz, DMSO-d6)**: δ = 3.77 (s, 3H), 4.37 (d, 1H, *J* = 4.5 Hz), 4.52 (d, 1H, *J* = 5.4 Hz), 6.33 (br s, 2H), 6.88 (dd, 1H, *J* = 9.0 and 2.4 Hz), 6.97 (d, 1H, *J* = 9.0 Hz), 7.02 (d, 1H, *J* = 2.4 Hz); **13C NMR (75.4 MHz, CDCl3) :** δ = 31.90 (CH), 38.93 (CH), 50.75 (C=C-CN), 55.37 (OCH3), 111.59, 112.25, 116.45, 117.66, 118.27, 143.90, 156.65, 163.52 ppm. (ArCs) |
| **2-(2-Amino-3-cyano-8-methyl-4H-chromen-4yl)malononitrile, 8f** | |
|  | Faint yellow solid; **IR (KBr)** = 3399, 3353, 3218, 2911, 2252, 2187, 1659, 1587, 1503, 1254, 1217, 1036, 821, 755, 529 cm-1; **1H NMR (300 MHz, DMSO-d6)**: δ = 2.90 (s, 3H), 4.28 (d, 1H, *J* = 3.6 Hz), 4.73 (br s, 1H), 7.01-7.34 (m, 5H); **13C NMR (75.4 MHz, DMSO-d6)**: δ = 15. 62 (CH3), 32.48 (CH), 38.57 (CH), 49.67 (C=C-CN), 112.60, 117.62, 124.52, 125.95, 126.33, 131.36, 148.51, 163.90 ppm. (ArCs) |