**Protocol synthesis of 3-Acetyl-4-hydroxycoumarin (1)**

To a solution of 4-hydroxy-2H-chromen-2-one (3 g, 1.86 mmol) in acetic acid (16 ml) was added phosphorus oxychloride (5.6 ml). The mixture was heated at reflux for 30 min. After cooling, the precipitate was collected and recrystallized from ethanol to give 3-acetyl-4-hydroxy-2H-chromen-2-one as white needles. Yield 2.7 g (90%); mp 135°C. IR spectrum cm-1: 3185 (OH); 1705 (CO); 1700 (O–CO lactone). 1H NMR spectrum (CDCl3). δ ppm: 2.72 (3H, s, CH3); 7.98 (1H, s, H5); 7.95 (1H, dd, H8); 7.1–7.4 (2H, m, H6 + H7); 17.69 (1H, s, OH). 13C NMR spectrum (CDCl3), δ ppm: 29.9 (CH3); 178.5 (CO); 159.8 (C4); 154.6 (C2); 101.26 (C3); 115.0–136.0 (Carom).

**General procedure for the synthesis of 4-aryl-1,2-dihydro-6-(4-hydroxy-2-oxo-2H-chromen-3-yl)-2-oxopyridin-3-carbonitriles 3**

A solution of 3-Acetyl-4-hydroxycoumarin (0,5g ; 2,5mmol) and the selected aromatic aldehydes (2,5mmol) namely : 4-dimethylaminobenzaldehyde, 4-nitrobezaldehyde, 3-hydroxybenzaldehyde, 3-bromobenzaldehyde and 3-methoxybenzaldehyde in the presence of ethyl cyanoacetate (0,26ml ; 2,5 mmol) and ammonium acetate (0,38g ; 5 mmol) was refluxed in 10 ml of DMC, the obtained solid was filtered off and recrystallized from methanol.

**4-(4-(dimethylamino) phenyl) -6-(4-hydroxy-2-oxo-2Hchromen-3-yl)-2-oxo-1,2-dihydropyridine-3-carbonitrile 3a**

Yield: 95%,0.88g, mp: 122°C. 1 H NMR spectrum (DMSO-d6) in ppm δ 3.07 (s, 6 Ha,b), 5.8(s,1H, H2’), 6.81-8.07 (m, 9H, Ar-H), 9.98(s,1H, NH), 12.02 (s, 1H, OH). 13C NMR spectrum (DMSO-d6) in ppm , δ 43.6(Ca,b), 61.9(C1’), 92.6-163.9(Carm), 96.1(C3), 118.0(CN),118.7(C5),120.8(C2’), 134.4(C4’),153.6(C2), 154.6 (C3’), 177.8 (C5’), 158.1 (C4). IR spectrum, ν cm-1: 3661 (O-H), 3550(NH),1457(C=C),1684(COlactone),1699(CO amide). Anal. Calcd for C23H17N3O4: C, 69.166%, H, 4.290%, N,10.521%. Found C, 69.3%; H, 4.1%; N,10.8%

**6-(4-hydroxy-2-oxo-2Hchromen-3-yl)-4-(4-nitrophenyl)-2-oxo-1,2-dihydropyridine-3-carbonitrile 3b**

Yield: 71%;0.71g, mp: 208°C. 1 H NMR spectrum (DMSO-d6) in ppm δ 6.00 (s,1H, H2’),7.21-8.40 (m, 8H, Ar-H), 9.97(s,1H, NH), 12.02 (s, 1H, OH). 13C NMR spectrum (DMSO-d6) in ppm , δ63.9(C1’), 95.7-162.9(Carm), 96.1(C3), 117.2(CN),118.7(C5),120.5(C2’), 135.1(C4’),153.2(C2), 154.2 (C3’), 178.6 (C5’), 152.5 (C4). IR spectrum, ν cm-1:3740 (O-H), 3638(NH), 1540(C=C), 1684(COlactone), 1697(CO amide). Anal. Calcd for C21H11N3O6: C, 62.847%; H, 2.763%, N, 10.470%. Found C, 62.5%; H, 2.9%, N, 10.7%.

**Synthesis of 6-(4-hydroxy-2-oxo-2Hchromen-3-yl)-4-(3-hydroxyphenyl)-2-oxo-1,2-dihydropyridine-3-carbonitrile 3c**

Yield: 82%; 0.76g, mp: 236°C. 1 H NMR spectrum (DMSO-d6) in ppm δ6.00 (s,1H, H2’), 7.21-8.40 (m, 8H, Ar-H), 9.97(s,1H, NH), 12.02 (s, 1H, OH). 13C NMR spectrum (DMSO-d6) in ppm 63.9(C1’), 95.7-162.9(Carm), 96.1(C3), 118.2(CN),118.7(C5),120.6(C2’), 134.3(C4’),153.5(C2), 154.2 (C3’), 178.6 (C5’), 152.3 (C4). IR spectrum, ν cm-1:3756 (O-H), 3637(NH), 1541(C=C), 1683(COlactone), 1698(CO amide). Anal. Calcd for C21H12N2O5: C, 67.742%; H, 3.249%, N, 7.524%. Found C, 67.3%; H, 3.8%; N, 7.8%

**4-(3-bromophenyl)-6-(4-hydroxy-2-oxo-2Hchromen-3-yl)-2-oxo-1,2-dihydropyridine-3-carbonitrile 3d**

Yield: 62%;0.45g, mp: 226°C. 1 H NMR spectrum (DMSO-d6) δ in ppm

6.00 (s,1H, H2’), 7.21-8.40 (m, 8H, Ar-H), 9.97(s,1H, NH), 12.02 (s, 1H, OH). 13C NMR spectrum (DMSO-d6) in ppm δ  63.9(C1’), 95.7-164.8(Carm), 96.2(C3), 117.5(CN),118.7(C5),122.5(C2’), 135.2(C4’),153.6(C2), 153.3 (C3’), 178.2 (C5’), 155.4 (C4). IR spectrum, ν cm-1:3756 (O-H), 3716 (NH), 1541(C=C), 1698(COlactone), 1716(COamide). Anal. Calcd for C21H11BrN2O4: C, 57.953%, H, 2.547%, N, 6.436%. Found C, 58.2%, H, 2.9%, N, 6.7%

**6-(4-hydroxy-2-oxo-2H-chromen-3-yl)-4-(4-methoxyphenyl)-2-oxo-1,2-dihydropyridine-3-carbonitrile 3e**

Yield: 70%; 0.67g, mp: 239°C. 1 H NMR spectrum (DMSO-d6) δ in ppm : 6.00 (s,1H, H2’), 7.21-8.40 (m, 8H, Ar-H), 9.97(s,1H, NH), 12.02 (s, 1H, OH). 13C NMR spectrum (DMSO-d6) in ppm 25.0 (Ca), 62.8(C1’), 96.1(C3), 116.7-164.8(Carm), 116.7 (C5,6), 120.8 (CN), 124.0 (C7,8), 126.2 (C8´,9´,11´,12´), 122.8(C2’), 134.4 (C9,10), 135.5(C4’), 153.6 (C2,5’), 155.7 (C3’), 153.8(C4). IR spectrum, ν cm-1:3756 (O-H), 3716 (NH), 1541(C=C); 1698(COlactone), 1716(CO amide). Anal. Calcd for C22H14N2O5: C, 68.392%; H, 3.652%, N, 7.251%. Found C, 68.8%, H, 4.5%, N, 7.8%