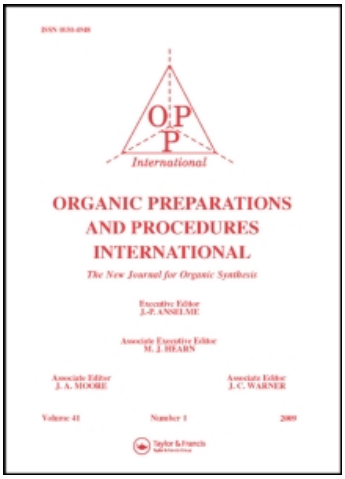

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A NOVEL SYNTHESIS OF 4-CYANO-2-(2-HYDROXYBENZOYL)PYRIDO[1,2-α]-BENZIMIDAZOLES FROM 3-FORMYLCHROMONE

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A NOVEL SYNTHESIS OF 4-CYANO-2-(2-HYDROXYBENZOYL)PYRIDO[1,2-*a*]-BENZIMIDAZOLES FROM 3-FORMYLCHROMONE

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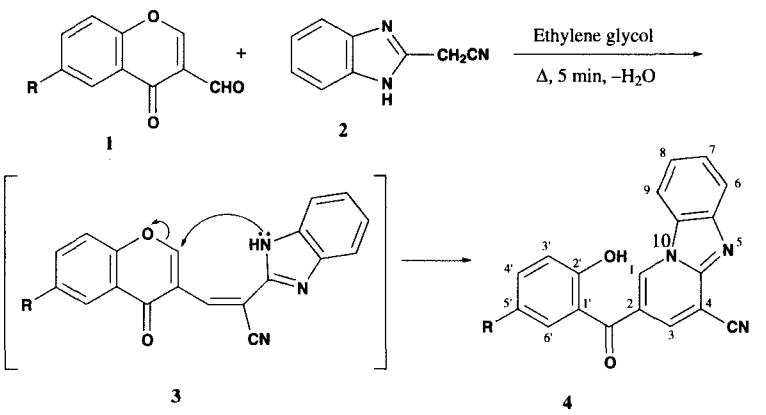
A number of pyrido[1,2-*a*] benzimidazole derivatives have been reported to have interesting biological properties like analgesic and antiinflammatory[1], antiviral[2], antimicrobial[3] and antineoplastic[4] activities. Other pyrido [1,2-*a*] benzimidazole derivatives possess the fluorescent properties and are used in synthetic fibers[5]. In continuation of our work of elaborating 3-formylchromones (**1**)[6] into a variety of fused heterocyclic systems[7] of biological interest, we herein report a novel, single step synthesis of pyrido [1,2-*a*]benzimidazoles starting from the readily available synthon **1**.

Thermal condensation of **1** with 1H-benzimidazole-2-acetonitrile **2**[8] in ethylene glycol at 200-210° gave a compound, homogeneous by TLC mp. 250-252°, in 70% yield. Its IR spectrum shows the presence of -OH(3065cm^{-1}), -CN(2235cm^{-1}) and -CO(1645cm^{-1}). Based on the above data, its ^{1}H NMR and MS (m/e 313), the structure of this compound was readily assigned as 4-cyano-2-(2-hydroxybenzoyl)pyrido[1,2-*a*]benzimidazole **4** as shown below.



a) R = H b) R = CH_3 C) R = Cl d) R = Br e) R = CH_2CH_3

TABLE 1. Yields, Mps and Elemental Analyses of Compounds **4a-e**.

Cmpd	R	Yield (%)	mp. (°C)	Elemental Analysis Calcd (Found) C	H	N
4a	H	70	250-252	72.84 (72.73)	3.54 (3.62)	13.41 (13.34)
4b	CH_3	73	276-278	73.39 (73.46)	4.00 (3.92)	12.84 (12.90)
4c	Cl	78	279-280	65.62 (65.54)	2.90 (3.02)	12.08 (11.98)
4d	Br	80	284-286	58.19 (58.21)	2.57 (2.46)	10.71 (10.76)
4e	Et	65	220-222	73.89 (73.91)	4.43 (4.49)	12.31 (12.26)

TABLE 2. Spectroscopic Data of Compounds **4a-e**.

Cmpd	^{1}H NMR ($CDCl_3$, DMSO-d_6), δ, *J* (Hz)
4a	6.48-6.65 (m, 2H), 6.95-7.23 (m, 4H), 7.48-7.58 (d, 1H, *J* = 8.0), 7.68-7.75 (d,1H, *J* = 8.0), 7.82 (s, 1H), 9.0 (s, 1H), 10.45 (bs, 1H).
4b	2.35 (s, 3H), 6.95-7.02 (d, 1H, J = 8.0), 7.28-8.05 (m, 6H), 8.32-8.4 (d, 1H, *J* = 8.0), 9.60 (s, 1H), 10.38 (s, 1H).
4c	7.02-7.08 (d, 1H, *J* = 8.0), 7.4-7.6 (m, 4H), 7.95-8.02 (d, 1H, *J* = 8.0), 8.38 (s, 1H), 8.48-8.55 (d, 1H, *J* = 8.0), 9.78 (s, 1H), 10.5 (bs, 1H).
4d	7.02-7.08 (d, 1H, *J* = 8.0), 7.48-7.72 (m, 4H), 7.98-8.05 (d, 1H, *J* = 8.0), 8.22-8.28 (d, 1H, *J* = 8.0), 8.92 (s, 1H), 9.5 (s, 1H), 10.5 (bs, 1H).
4e	1.25 (t, 3H), 2.65 (q, 2H), 7.02-7.08 (s, 1H), 7.38-7.74 (m, 4H), 8.04-8.08 (d, 1H, *J* = 8.0), 8.15-8.19 (d, 1H, *J* = 8.0), 8.32 (s,1H), 9.45 (s, 1H), 10.5 (bs, 1H).

EXPERIMENTAL SECTION

Melting points are uncorrected. ^{1}H NMR spectra were determined on Varian Gemini 200 MHz spectrometer (Internal Me_4Si). Mass spectra were recorded on a VG Micromass 70-70H instrument. IR spectra were recorded on a Perkin-Elmer 1605 instrument. Thin layer chromatography (TLC) was performed on Merck silica gel 60F250 precoated plates (0.2mm).

4-Cyano-2-(2-hydroxybenzoyl)pyrido[1,2-*a*] benzimidazoles (4a-e). General Procedure.- A mixture of 3-formylchromone (287 mmol) and 1H-benimidazole-2-acetonitrile[8] (287 mmol) in ethylene glycol (10 mL) was heated at 200-210° for 5 min. The cooled reaction mass was poured into water (150 mL) and the resulting solid was then recrystallized from DMF-MeOH to give **4** as yellow crystalline compounds in 65-80% yields (Table).

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