Synthesis and Biological Study of O-β-D-Glucosides of 7-Hydroxy-3-(Disubstituted Imidazol-2-yl)-4H-chromen-4-ones

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A series of 7-β-D-glucopyranosyloxy-3-(disubstituted imidazol-2-yl)-4H-chromen-4-ones was synthesized. The 7-hydroxy-3-formyl-4H-chromen-4-one reacted with various 1,2-dicarbonyl compounds in the presence of ammonium acetate to furnish 7-hydroxy-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones, which on glucosylation with α-acetobromoglucose affords 2,3,4,6-tetra-o-acetyl-7-β-D-glucopyranosyloxy-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones. 7-β-D-Glucopyranosyloxy-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones were prepared by deacetylation with anhydrous zinc acetate in absolute methanol. Elemental analysis, IR, 1H NMR, 13C NMR, EI-MS spectral data were obtained to determine the structure of the newly synthesized compounds.

Keywords: Chromone, imidazole, acetobromoglucose, glucosylation, glucosides.

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Синтез и биологические исследования O-β-D-гликозидов 7-гидрокси-4H-хромен-4-онов с 4',5'-дизамещенными 3-имидазол-2'-ильными фрагментами

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Была синтезирована серия O-β-D-глюкопиранозилкис-7-гидрокси-4H-хромен-4-онов с 4',5'-дизамещенными 3-имидазол-2'-ильными фрагментами. 7-Гидрокси-3-формил-4H-хромен-4-он взаимодействовал с 1,2-дикарбонил замеченными соединениями в присутствии ацетата аммония с образованием 7-гидрокси-4H-хромен-4-онов с 4',5'-дизамещенными 3-имидазол-2'-ильными фрагментами. O-β-D-глюкопиранозилкис-7-гидрокси-4H-хромен-4-он с 4',5'-дизамещенными 3-имидазол-2'-ильными фрагментами получены деметилированием с безводным ацетатом цинка в абсолютном метаноле. Новые соединения были охарактеризованы с помощью элементного анализа, ИК, 1H и 13C ЯМР спектроскопии и масс-спектрометрии (EI-MS).

Ключевые слова: Хромоны. имидазол, ацетобромоглюкоза, глюкозилирование, гликозиды.
Introduction

Carbohydrates are being considered as extremely useful stereo chemical building blocks for complex organic synthesis.[1] Apart from being an energy source in leaving systems, carbohydrates increasingly are being recognized as playing important roles in a variety of biological processes, such as signaling, cell-cell communications, molecular and cellular targeting.[2] α-β-δ-Glucosides possess higher degree of biological activities such as cell growth regulation, cell differentiation, immunological response, antitumour, antiparasitic, antifungal activities.[3-11] Several therapeutically interesting biological activities of certain flavonoids have been reported including anticancer,[12-17] anti-HIV,[18-20] and antiprotozoal, antifungal activities.[3-11] Several therapeutically interesting biological activities of certain flavonoids have been reported including anticancer,[12-17] anti-HIV,[18-20] and antiprotozoal, antifungal activities.[3-11] Several therapeutically interesting biological activities of certain flavonoids have been reported including anticancer,[12-17] anti-HIV,[18-20] and antiprotozoal, antifungal activities.[3-11]

Experimental

All melting points (mp) measured in open capillary tube were uncorrected. FT-IR spectra were recorded on Perkin-Elmer spectrophotometer. 1H and 13C NMR spectra were recorded on a Bruker II-400 NMR spectrometer (1H, 400 MHz and 13C, 100 MHz), using TMS as an internal standard in DMSO and CDCl3. Chemical shifts are reported (δ) relative to TMS. Mass spectra were obtained from Hitachi Perkin-Elmer RMU 6D mass spectrometer. Elemental analysis for C, H, and N were determined using a Perkin-Elmer 2400 CHN rapid analyzer. Chemicals were obtained from Merck and Fluka and used without further purification. Various 1,2-dicarbonyl compounds were prepared using methods described in literature.[27] A mixture of 7-hydroxy-3-formyl chromone (5 mmol), ammonium acetate (10 mmol) and glacial acetic acid (50 ml) was refluxed for 2-3 h (monitored by TLC). It was poured on to cold water (200 ml). The solid obtained was filtered, washed with water and crystallized from solvents.

7-Hydroxy-3-(imidazol-2-yl)-chromone 3a. Yield 81 %, mp 290 °C (ethanol). IR (KBr) ν cm⁻¹: 3412 (OH), 2995 (N-H), 1616 (C=O), 1456 (C=N), 1160 (C-O-C).

Yield 78 %, mp 282 °C (ethanol). IR (KBr) ν cm⁻¹: 3400 (OH), 2990 (N-H), 1622 (C=O), 1455 (C=N), 1171 (C-O-C). 1H NMR (DMSO-d₆) δ ppm: 12.7 (s, 1H, NH). 7.56 (s, 2H, CH), 7.05 (s, 2H, CH), 6.41-7.50 (m, 8H, Ar-H), 5.02 (s, 1H, -OH). 13C NMR (DMSO-d₆) δ ppm: 174.8 (s, C-4, C=O), 165.1 (s, C-7), 160.0 (s, C-2), 157.5 (s, C-9), 140.1 (s, C-3′), 135.5 (s, C-5′), 132.0 (s, C-2′), 125-133.5 (aromatic 6C-atom), 121.0 (s, C-2′), 117.6 (s, C-3), 115.9 (s, C-10), 110.1 (s, C-6), 104.8 (s, 4H, -CH₂). EI-MS m/z (%): 305 (M⁺, 100), 136 (10), 91 (21). Anal. Calcd for C₁₅H₁₀N₂O₃: C, 65.62; H, 4.72; N, 10.93. Found: C, 65.58; H, 4.72; N, 10.89(%).

7-Hydroxy-3-(4,5-diphenylimidazol-2-yl)-chromone 3d. Yield 90 %, mp 220 °C (chloroform + dioxane). IR (KBr) ν cm⁻¹: 3412 (OH), 2992 (N-H), 1631 (C=O). 1456 (C=N), 1160 (C-O-C).

Yield 78 %, mp 282 °C (chloroform + dioxane). IR (KBr) ν cm⁻¹: 3412 (OH), 2994 (N-H), 1622 (C=O), 1455 (C=N), 1171 (C-O-C). 1H NMR (DMSO-d₆) δ ppm: 12.9 (s, 1H, NH). 7.57 (s, 2H, CH), 6.43-7.50 (m, 13H, Ar-H), 5.02 (s, 1H, -OH). 13C NMR (DMSO-d₆) δ ppm: 176.1 (s, C-4, C=O), 164.5 (s, C-7), 158.9 (s, C-2′), 157.8 (s, C-9), 140.1 (s, C-3′), 135.5 (s, C-5′), 132.0 (s, C-2′), 125-133.5 (aromatic 12C-atom), 117.9 (s, C-3), 117.0 (s, C-10), 109.8 (s, C-6), 104.8 (s, 4H, -CH₂). EI-MS m/z (%): 380 (M⁺, 100), 136 (10), 91 (34). Anal. Calcd for C₁₅H₁₀N₂O₃: C, 75.78; H, 4.24; N, 7.36. Found: C, 75.75; H, 4.21; N, 7.35(%).

7-Hydroxy-3-[4-phenyl,5-(p-methoxyphenyl)imidazol-2-yl]-chromone 3e. Yield 89 %, mp 284 °C (chloroform + dioxane). IR (KBr) ν cm⁻¹: 3414 (OH), 2994 (N-H), 1620 (C=O), 1457 (C=N), 1154 (C-O-C). 1H NMR (DMSO-d₆) δ ppm: 12.6 (s, 1H, NH). 7.52 (s, 2H, CH), 6.38-7.49 (m, 12H, Ar-H), 4.93 (s, 1H, -OH). 13C NMR (DMSO-d₆) δ ppm: 176.1 (s, C=O), 165.2 (s, C-7), 159.0 (s, C-9), 158.9 (s, C-2′), 136.1 (s, C-5′), 131.6 (s, C-5′), 128.7 (s, C-2′), 119.2 (s, C-3), 117.1 (s, C-10), 115-135 (aromatic 12C-atom), 109.8 (s, C-6), 106.1 (s, 8H, -CH₂). EI-MS m/z (%): 305 (M⁺, 100), 136 (10), 91 (34). Anal. Calcd for C₁₅H₁₀N₂O₃: C, 75.78; H, 4.24; N, 7.36. Found: C, 75.75; H, 4.21; N, 7.35(%).

7-Hydroxy-3-[4-phenyl,5-(p-methoxyphenyl)imidazol-2-yl]-chromone 3f. Yield 89 %, mp 284 °C (chloroform + dioxane). IR (KBr) ν cm⁻¹: 3414 (OH), 2994 (N-H), 1620 (C=O), 1457 (C=N), 1154 (C-O-C). 1H NMR (DMSO-d₆) δ ppm: 12.6 (s, 1H, NH). 7.52 (s, 2H, CH), 6.38-7.49 (m, 12H, Ar-H), 4.93 (s, 1H, -OH). 13C NMR (DMSO-d₆) δ ppm: 176.1 (s, C=O), 165.2 (s, C-7), 159.0 (s, C-9), 158.9 (s, C-2), 136.1 (s, C-5′), 131.6 (s, C-5′), 128.7 (s, C-2′), 119.2 (s, C-3), 117.1 (s, C-10), 115-135 (aromatic 12C-atom), 109.8 (s, C-6), 106.1 (s, 8H, -CH₂). EI-MS m/z (%): 305 (M⁺, 100), 136 (10), 91 (34). Anal. Calcd for C₁₅H₁₀N₂O₃: C, 75.78; H, 4.24; N, 7.36. Found: C, 75.75; H, 4.21; N, 7.35(%).
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6.41-7.45 (m, 11H, Ar-H), 4.96 (s, 1H, -OH). ¹³C NMR (DMSO-d₆) δ ppm: 176.1 (s, C-4, C=O), 164.7 (s, C-7), 159.9 (s, C-2), 159.1 (s, C-9), 136.7 (s, C-5), 132.0 (s, C-5), 129.9 (s, C-2′, C-3′), 125.0-135.1 (aromatic 12C-atom), 118.1 (s, C-3), 117.2 (s, C-10), 109.9 (s, C-6), 104.6 (s, C-8). EM-νs (%): 450 (M⁺, 100), 136 (25), 91 (26). Anal. Calcd for C₂₇H₂₅O₇N: C, 64.16; H, 3.14; N, 6.24. Found: C, 64.12; H, 3.11; N, 6.22(%).

7-Hydroxy-3-[4,5-diphenylimidazol-2-yl]-chromone 3g. Yield 83 %, mp 280 °C (ethanol). IR (KBr) cm⁻¹: 3449 (OH), 2994 (NH), 1629 (C=O). 1645 (C=N), 1054 (C-O-C).

1H NMR (DMSO-d₆) δ ppm: 11.2 (s, 1H, -NH), 7.43 (s, 2H, CH), 6.35-7.40 (m, 11H, Ar-H), 4.90 (s, 1H, -OH). ¹³C NMR (DMSO-d₆) δ ppm: 176.9 (s, C-4), 164.1 (s, C-7), 160.1 (s, C-2), 159.6 (s, C-9), 137.0 (s, C-5), 132.7 (s, C-5), 130.1 (s, C-2′, C-3′), 124.4-135.5 (aromatic 12C-atom), 118.6 (s, C-3), 117.8 (s, C-10), 109.1 (s, C-6), 104.9 (s, C-8). EM-νs (%): 450 (M⁺, 100), 136 (29), 91 (36). Anal. Calcd for C₂₇H₂₅O₇N: C, 64.16; H, 3.14; N, 6.24. Found: C, 64.10; H, 3.04; N, 6.16(%).

7-Hydroxy-3-[4,5-diphenyl-N,N-dimethylaminoimidazol-2-yl]-chromone 3b. Yield 73 %, mp 278 °C (chloroform + dioxide). IR (KBr) cm⁻¹: 3443 (OH), 2989 (NH), 1639 (C=O), 1445 (C-N), 1123 (C-O-C). ¹³C NMR (DMSO-d₆) δ ppm: 11.8 (s, 1H, -NH), 7.23 (s, 2H, CH), 6.51-7.40 (m, 11H, Ar-H), 4.96 (s, 1H, -OH), 2.88 (s, 6H, N(CH₃)₂), 2.79 (s, 6H, N(CH₃)₂). ¹³C NMR (DMSO-d₆) δ ppm: 176.2 (s, C-4, C=O), 164.5 (s, C-7), 160.7 (s, C-2), 160.1 (s, C-9), 173.5 (s, C-5), 132.1 (s, C-5), 130.7 (s, C-2′, C-3′), 124.0-136.1 (aromatic 12C-atom), 118.2 (s, C-3), 117.1 (s, C-10), 109.8 (s, C-6), 105.2 (s, C-8), 40.1 (s, N(CH₃)₂), 40.7 (s, N(CH₃)₂). Anal. Calcd for C₂₇H₂₅O₇N: C, 72.09; H, 5.02; N, 12.01. Found: C, 72.01; H, 4.96; N, 11.92(%).

General procedure for the synthesis of compounds 3a-i. In a 250 ml round-bottomed flask, anhydrous K₂CO₃ (6.3 mmol) was added to the mixture of dry DMF (9 ml) and acetonitrile (6 ml), then 7-hydroxy-3-(4,5-disubstituted imidazol-2-yl)-chromones 3a-i (0.30 mmol), DMATAB (10 mg) and α-acetobromoglucose (0.6 mmol) were added under stirring, the reaction mixture was refluxed for 5-6 h (monitored by TLC). The mixture was cooled and poured into dry ice with water. After freeze-drying, the residue was purified by column chromatography (silica gel) to give a brown coloured semisolids.

7-(2,3,4,6-Tetra-acetyl-α-L-β-D-glucopyranosyl)-3-(4-R,5-R′-imidazol-2-yl)-chromone 3b. Yield 86 %, [α]₂⁰ = - 1.9 (c 0.1, CH₂OH). IR (KBr) cm⁻¹: 3405 (OH), 2958 (NH), 1650 (C=O), 1590 (C-N), 1055 (C-O-C). ¹³C NMR (DMSO-d₆) δ ppm: 12.8 (s, 1H, -NH), 7.61 (s, 2H, CH), 6.83-7.50 (m, 13H, Ar-H), 4.99 (s, 1H, 1″-H, aromatic proton), 4.76 (d, 1H, 2″, 3″, 4″-H), 4.47 (d, 1H, 5″-H, aromatic proton), 4.41 (dd, 1H, 5″-H, 3″-H). EM-νs (%): 711 (M⁺, 14), 379 (51), 242 (29). ¹³C NMR (DMSO-d₆) δ ppm: 175.8 (s, C-4, C=O), 171.0 (s, C-atoms of acetyl C-O), 164.4 (C-7), 160.4 (C-2′, C-3′), 159.1 (C-9), 136.5 (C-5′), 135.4 (C-3′), 129.9 (C-2′, C-3′), 128.3-129.4 (aromatic 6C-atom), 118.3 (C-5), 116.0 (C-8), 110.8 (C-2′, C-3′), 109.8 (C-10), 101.9 (s, C-6). Anal. Calcd for C₃₅H₂₅O₁₇N: C, 64.19; H, 4.80; N, 3.90(%).

7-(2,3,4,6-Tetra-acetyl-α-L-β-D-glucopyranosyl)-3-(4-R,5-R′-imidazol-2-yl)-chromone 4b. Yield 80 %, [α]₂⁰ = - 1.5 (c 0.1, CH₂OH). IR (KBr) cm⁻¹: 3405 (OH), 2958 (NH), 1650 (C=O). ¹³C NMR (DMSO-d₆) δ ppm: 12.7 (s, 1H, -NH), 7.49 (s, 2H, CH), 6.73-7.48 (m, 12H, Ar-H), 4.84-5.05 (m, 3H, 2″, 3″, 4″-H). 4.82 (d, 1H, 1″-H, aromatic proton), 4.41 (dd, 1H, 5″-H, 3″-H). 194 Mикроцентрифуга / Microcentrifuge 2013 (6) 192-198
OCH₃), 2.01, 2.00, 1.97, 2.01 (s, 3H, OAc). ¹³C NMR (DMSO-d₆) δ ppm: 174.8 (C-4, C=O), 170.0 (C-atoms of acetyl C=O), 164.1 (C-7), 158.7 (C-2), 157.5 (C-9), 135.4 (C-5'), 131.0 (C-5), 128.9 (C-2', C-3'), 118.9 (C-3), 115.9 (C-10), 114.5-164.5 (aromatic 12C-atom), 109.7 (C-6), 103.1 (C-8), 101.9 (C-1″, anomic C-atom), 75.1 (C-5″), 71.9 (C-2″), 71.3 (C-3″), 71.1 (C-4″), 66.1 (C-6″), 56.1 (C-atom of OCH₃), 21.4 (C-atom, CH of acetyl group). EI-MS m/z (%): 741 (M⁺, 21), 410 (100), 136 (11), 91 (29). Anal. Calc’d for C₃₈H₃₄N₂O₁₂Cl₂: C, 60.17; H, 4.14; N, 3.59. Found: C, 60.71; H, 4.20; N, 3.62.

7-(2,3,4,6-Tetra-β-glucopyranosyloxy)-3-[4,5-di-(p-methylphenyl)imidazol-2-yl]-chromone 4f. Yield 75%, [α]₂⁰ = -0.1 (c 0.1, CH₃OH). IR (KBr) ν cm⁻¹: 3446 (br, OH peak of carbohydrate residue), 2958 (N-H), 1759 (C=O), 1445 (C=O), 1089 (C=O). ¹³C NMR (DMSO-d₆) δ ppm: 12.7 (s, 1″-H, N-H), 7.51 (s, 2-H, CH), 7.06 (d, 2″-H, 3″-H), 6.37-7.55 (m, 3H, Ar-H), 5.69 (d, 1″-H, anomeric proton), 3.45-4.70 (m, 6H, 6″-H, 6″-b-OH). EM-MS m/z (%): 780 (M⁺, 18), 449 (100), 136 (33), 91 (25). Anal. Calc’d for C₃₇H₃₆N₂O₁₂: C, 69.65; H, 6.19; N, 4.36.

7-(2,3,4,6-Tetra-β-glucopyranosyloxy)-3-[4,5-di-(p-methoxyphenyl)imidazol-2-yl]-chromone 4g. Yield 83%, [α]₂⁰ = -4.7 (c 0.1, CH₃OH). IR (KBr) ν cm⁻¹: 3297 (N-H), 2958 (N-H), 1759 (C=O). ¹³C NMR (DMSO-d₆) δ ppm: 11.8 (s, 1″-H, N-H), 7.41 (s, 2-H, CH), 6.44-7.41 (m, 11H, Ar-H), 4.81-4.99 (m, 3H, 2″, 3″, 4″-H), 4.77 (d, 1H, 1″-H, anomeric proton), 4.41 (dd, 1H, 5″-H), 3.84-4.20 (m, 2H, 6″-H), 2.00, 2.01, 1.98, 2.04 (s, 3H, OAc). ¹³C NMR (DMSO-d₆) δ ppm: 175.1 (C-4, C=O), 171.0 (C-atoms of acetyl C=O), 163.7 (C-9), 159.0 (C-2), 153.5 (C-5′), 131.6 (C-5), 128.9 (C-2′, C-3′), 125.0 (aromatic 12C-atom), 119.0 (C-3), 115.8 (C-10), 109.8-106.0 (C-6, C-7, C-8), 101.7 (C-1″, anomic C-atom), 74.9 (C-5″), 71.3 (C-2″), 71.4 (C-3″), 71.1 (C-4″), 66.0 (C-6″), 21.4 (C-atom, CH of acetyl group). EI-MS m/z (%): 780 (M⁺, 18), 449 (100), 136 (33), 91 (25). Anal. Calc’d for C₃₇H₃₆N₂O₁₂Cl₂: C, 65.03; H, 5.18; N, 3.79. Found: C, 64.91; H, 5.11; N, 3.71.

General procedure for the preparation of compounds 5a-i.

The mixture of 2,3,4,6-tetra-β-glucopyranosyloxy-3-(4,5-disubstituted imidazol-2-yl)-chromones 4a-i (0.10 mmol), dry methanol (2 ml) and anhydrous zinc acetate (0.126 mmol) was refluxed for 7-9 h (monitored by TLC). After cooled down at room temperature, it was filtered through cation exchanged resin; the solvent was removed under vacuum. The residue was purified by silica gel chromatography (CHCl₃, MeOH, 12:1 v/v) to get titled compound.
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7-α-β-d-Glucopyranosylxylo-3-[4,5-diphenylimidazol-2-yl]-chromone 5d. Yield 92 %. Yield 92 %, [α]25d = −11.9 (c 0.1, DMSO). IR (KBr) ν cm⁻¹: 3450 (br, OH peak of carbohydrate residue), 2944 (N-H), 2856 (glucosidic-CH), 1593 (C=O), 1415 (C-H), 1099 (C-O-C); 1H NMR (DMSO-d₆) δ ppm: 11.8 (1-H, N-H), 7.59 (2-H, CH), 6.50-7.75 (m, 13H, Ar-H), 5.80 (d, 1H, alpha anomeric proton), 3.43-4.78 (m, 6H, beta-glycosyloxy ring). 13C NMR (DMSO-d₆) δ ppm: 176.1 (C-4, C=O), 164.5 (C-7), 160.2 (C-2), 157.1 (C-9), 136.5 (C-5), 130.9 (C-5), 129.6 (C-2′), 123.7 (1,2,3-acidic 6C atom), 118.9 (C-3), 115.1 (C-10), 109.5 (C-6), 106.2 (1′-C, anomeric C-atom), 104.1 (C-18), 81.4 (C-5′), 77.2 (C-2′), 75.2 (C-2″), 73.9 (C-4″), 64.9 (C-6″). 13C NMR of 5d was prepared by Vilsmeier-Haack reaction from resacetophenone.[25,27] The condensation of I with various 1,2-dicarbonyl compounds 2 in the presence of anhydrous CH₂COONH₄ in glacial acetic acid undergoes cyclisation reactions in the formation of 7-hydroxy-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones[30] (3a-4). The IR spectrum of 3a showed a broad peak at 3400 cm⁻¹ due to the OH stretch; the peak at 3064 cm⁻¹ was attributed due to N-H stretch; a strong absorption at 1621 cm⁻¹ was assigned to the C=N and C-O-C stretches respectively. The 1H NMR spectrum showed three singlets at δ 5.12, 7.26, and 12.9 which readily recognised as arising from OH, C-H, and N-H respectively. The characteristic multiplets for the aromatic protons are located at δ = 6.40-7.49. The 13C NMR spectrum of 3a showed 12 distinctive resonances in agreement with the proposed structure. The potassium salts of 3a-i for α-glucoosidation were prepared by the action of anhydrous K₂CO₃ in the mixture of DMF and acetonitrile (3:2 v/v) as a solvent. An interaction between the potassium salt and α-acetobromoglucose as glucosyl donor in the presence of dodecyltrimethylammonium bromide (DMTAB) as a phase transfer catalyst. This gives rise to 2,3,4,6-tetra-o-acetyl-β-d-glucopyranosylxylo-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones 4a-i. The absence of IR band in 4a due to OH stretch at 3400 cm⁻¹ is indicating the formation of product. Further, the peaks at 3056 and 2924 cm⁻¹ were due to the C-H and N-H stretches respectively. The C-O stretch peak was found to be shifted to 1729 cm⁻¹. A strong absorption at 1757 cm⁻¹ was assigned to C=O stretch of o-acetyl groups of glucosy moieties. The peaks at 1621 and 1037 cm⁻¹ were attributed to the C=O and C-O-C stretches respectively. A sharp peak at 2853 cm⁻¹ was assigned to glucosidic C-H stretch. The 1H NMR spectrum exhibited.
signals at δ 12.5 (s, 1’-H, N-H), 7.46 (s, 2-H, CH), 7.15 (d, 2’, 3’-H, 3’-H) (CH), 6.44-7.43 (m, 3H, Ar-H), 4.87-5.00 (m, 3H, 2”, 3”, 4”-H), 4.76 (d, 1H, 1”-H, anomeric proton), 4.39 (dd, 2’-H, 3’-H) (CH), 6.44-7.43 (m, 3H, Ar-H), 4.87-5.00 (m, 3H, OAc). Similarly, 13C NMR data showed the presence of carbohydrate moiety. The chemical shift of the anomeric proton shows β-linkage indicating the linkage of carbohydrate unit to C-7 position of the aglycone. The compounds gave signals at δ 5.74 (C-H) indicating the linkage of carbohydrate moiety.

Conclusions

In conclusion we have synthesized the newly synthesized glucosides of 7-hydroxy-3-(4,5-disubstituted imidazol-2-yl)-4H-chromen-4-ones with promising yield.

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References

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