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SYNTHESIS OF THE NOVEL HETEROCYCLIC SYSTEM 7,8-DIHYDROIMIDAZO[1,2-*c*]-[1,3]OXAZOLO[4,5-*e*][1,2,3]TRIAZINE

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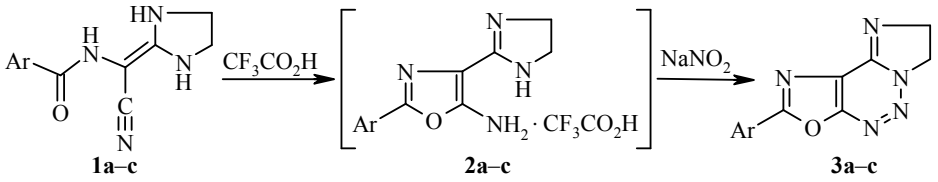
The novel heterocyclic systems 7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*]pyrimidine [1], 7,8-dihydroimidazo[1,2-c][1,3]thiazolo[4,5-*e*]pyrimidine [2], and 4,5,7,8-tetrahydroimidazol[1,2-*c*][1,3]thiazolo[4,5-*e*][1,3,2]-diazaphosphinine [3] have been prepared from the 2-(aroylaminocyanomethylene)imidazolidines **1a-c** [1].

We propose to use compounds **1a-c** in the synthesis of another novel condensed heterocyclic system, in which oxazole and imidazoline rings are annelated to a 1,2,3-triazine ring. The 2-(aroylaminocyanomethylene)imidazolidines **1a-c** were initially maintained for 1 h in trifluoroacetic acid, and the reaction mixture was then treated with excess $NaNO_2$ to give the 2-aryl-7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*]-[1,2,3]triazines **3a-c** in 54-61% yields. Formation of compounds **3a-c** evidently occurs via the intermediate 5-amino-1,3-oxazoles **2a-c**, which take part in a diazotation reaction.

The composition and structure of the compounds **3a-c** obtained were confirmed by elemental analysis, chromato-mass spectrometry, and also by IR, ^{1}H NMR, and ^{13}C NMR spectroscopy.



1a–c **2a–c** **3a–c**

a Ar = Ph, **b** Ar = 4-MeC_6H_4, **c** Ar = 4-ClC_6H_4

Hence, successive treatments of 2-(aroylaminocyanomethylene)imidazolidines with trifluoroacetic acid and sodium nitrite gave representatives of the novel 7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*]-[1,2,3]triazine system.

IR spectra were recorded on a Vertex 70 spectrometer for KBr pellets. ^{1}H and ^{13}C NMR spectra were recorded on a Bruker Avance DRX-500 instrument (500 and 125 MHz, respectively) with TMS as internal standard. Chromato-mass spectra were recorded on an Agilent 1100 high performance liquid chromatograph.

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The chromato-mass spectroscopy analysis parameters were: Zorbax SB-C18 column, 1.8 microns, 4.6×15 mm with solvents A) MeCN–H_2O 95:5, 0.1% CF_3COOH or B) 0.1% aqueous CF_3COOH; eluent flow 3 ml/min; injection volume 1 μl; UV detectors 215, 254, 285 nm; CI at atmospheric pressure. Elemental analysis was performed in the analytical laboratory of the [1]Institute of Bioorganic and Petrochemistry, Ukraine National Academy of Sciences. Melting points were performed on Fisher-Johns equipment.

Synthesis of Compounds 3a-c (General Method). One of the compounds **1a-c** (1 mmol) was dissolved in trifluoroacetic acid (10 ml). The mixture was stirred for 1 h at 15°C, $NaNO_2$ (0.35 g, 5 mmol) was then added, and stirring was continued for 20 min at 15°C. The trifluoroacetic acid was evaporated *in vacuo* and the residue was dissolved in methanol (3 ml), diluted with water (50 ml), and basified with 10% aqueous NaOH solution to pH ~ 8. The precipitate was filtered off, and compounds **3a-c** were purified by reprecipitation from a mixture of DMF and water (1:2).

2-Phenyl-7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*][1,2,3]triazine (3a). Yield 0.15 g (61%). Yellow powder, mp 211-212°C. IR spectrum, ν, cm^{-1}: 1709, 1602, 1549, 1481, 1431, 1299, 1251, 1198. ^1H NMR spectrum (DMSO-d_6), δ, ppm (*J*, Hz): 4.03 (2H, t, *J* = 8.7, CH_2); 4.49 (2H, t, *J* = 8.7, CH_2); 7.56-7.74 (3H, m, H-3,4,5 Ph); 8.06-8.24 (2H, m, H-2,6 Ph). ^{13}C NMR spectrum (DMSO-d_6), δ, ppm: 49.5; 52.5; 121.1; 125.5; 127.7; 130.0; 133.1; 146.9; 157.0; 161.8. Mass spectrum, *m/z*: 240.2 $[M+H]^+$. Found, %: C 60.18; H 3.78; N 29.31. $C_{12}H_9N_5O$. Calculated, %: C 60.25; H 3.79; N 29.27.

2-(4-Methylphenyl)-7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*][1,2,3]triazine (3b). Yield 0.14 g (55%). Yellow powder, mp 250-251°C. IR spectrum, ν, cm^{-1}: 1704, 1609, 1552, 1496, 1431, 1296, 1249, 1206. ^1H NMR spectrum (DMSO-d_6), δ, ppm (*J*, Hz): 2.43 (3H, s, CH_3); 4.02 (2H, t, *J* = 9.6, CH_2); 4.50 (2H, t, *J* = 9.6, CH_2); 7.45 (2H, d, *J* = 7.5, H Ar); 8.04 (2H, d, *J* = 7.5, H Ar). ^{13}C NMR spectrum (DMSO-d_6), δ, ppm: 21.7; 49.5; 52.5; 121.1; 122.8; 127.7; 130.6; 143.6; 146.9; 160.0; 161.8. Mass spectrum, *m/z*: 254.3 $[M+H]^+$. Found, %: C 61.54; H 4.41; N 27.59. $C_{13}H_{11}N_5O$. Calculated, %: C 61.65; H 4.38; N 27.65.

2-(4-Chlorophenyl)-7,8-dihydroimidazo[1,2-*c*][1,3]oxazolo[4,5-*e*][1,2,3]triazine (3c). Yield 0.15 g (54%). Yellow powder, mp 280-281°C (decomp.). IR spectrum, ν, cm^{-1}: 1706, 1597, 1546, 1482, 1432, 1297, 1242, 1207. ^1H NMR spectrum (DMSO-d_6), δ, ppm (*J*, Hz): 4.03 (2H, t, *J* = 8.9, CH_2); 4.51 (2H, t, *J* = 8.9, CH_2); 7.71 (2H, d, *J* = 7.6, H Ar); 8.15 (2H, d, *J* = 7.6, H Ar). ^{13}C NMR spectrum (CF_3COOD), δ, ppm: 44.1; 51.7; 119.2; 120.5; 130.0; 130.1; 143.5; 149.9; 160.8; 168.6. Mass spectrum, *m/z*: 274.7 $[M+H]^+$. Found, %: C 52.48; H 2.99; Cl 12.90; N 25.51. $C_{12}H_8ClN_5O$. Calculated, %: C 52.66; H 2.95; Cl 12.75; N 25.59.

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