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NOVEL METHOD FOR SYNTHESIS OF 2-ARYL-2,3,7,8-TETRAHYDRO-4H,6H-PYRIMIDO[2,1-*b*]-1,3-THIAZIN-4-ONES HYDROCHLORIDES

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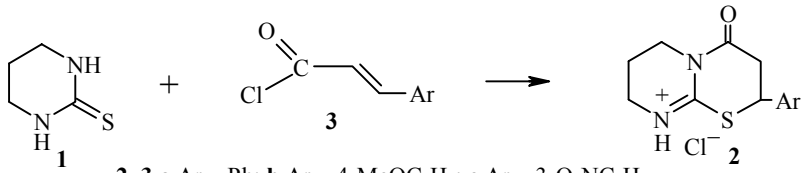
2-Mercapto-3,4,5,6-tetrahydropyrimidine (**1**) is the starting reagent for synthesis of condensed nitrogen- and sulfur-containing heterosystems which exhibit various types of physiological activity, such as bactericidal [1], fungicidal [2], and antitumor [3] activity.

We propose a novel method for synthesis of a difficultly accessible heterocyclic system that has been little studied, 2-aryl-2,3,7,8-tetrahydro-4H,6H-pyrimido[2,1-*b*]-1,3-thiazin-4-one (**2a-c**), by reaction of 2-mercapto-3,4,5,6-tetrahydropyrimidine **1** with cinnamoyl chloride (**3a**) and its substituted **3b** and **3c**. In this case, the reaction products are obtained as the hydrochlorides.



2, **3** **a** Ar = Ph; **b** Ar = 4-$MeOC_6H_4$; **c** Ar = 3-$O_2NC_6H_4$

The method is distinguished by convenience and accessibility of the starting reagents. The reaction proceeds with 58% to 72% yields under mild conditions (boiling the starting components in a benzene–pyridine mixture for 1 h).

The most informative proof for the structure of compounds **2** is ^{1}H NMR spectroscopy, since the double bond of the starting 3-(aryl)acryloyl chloride **3** (two doublets in the 6.80 ppm and 7.50 ppm region) after heterocyclization is converted to a single bond (the 3.30-5.40 ppm region), and an ABX system is formed. The structure of the synthesized compounds **2a-c** is also supported by the IR spectra, and the composition is confirmed by elemental analysis data.

2-Phenyl-2,3,7,8-tetrahydro-4H,6H-pyrimido[2,1-*b*]-1,3-thiazin-4-one Hydrochloride (2a). A solution of cinnamoyl chloride **3a** (1.67 g, 10 mmol) in benzene (4 ml) was added to a solution of compound **1** (1.16 g, 10 mmol) in pyridine (4 ml) at 20°C; this was boiled for 1 h under a reflux condenser and cooled. The precipitated product was filtered off and dried. Yield 1.83 g (65%); mp 163-165°C (ethanol). ^{1}H NMR spectrum

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(DMSO-d_6, 300 MHz), δ, ppm: 2.06 (2H, m, CH_2); 3.15 (2H, m, CH_2); 3.78 (1H, m, CH); 3.98 (1H, m, CH); 5.21 (1H, m, CH); 7.44 (5H, m, Ph); 13.04 (1H, br. s, N·HCl). IR spectrum (KBr), ν, cm^{-1}: 3200-2500 (>N·HCl), 1730 (C=O), 1600 (C=N). Found, %: C 54.85; H 5.37; N 9.99. $C_{13}H_{15}ClN_2OS$. Calculated, %: C 55.22; H 5.31; N 9.91.

2-(4-Methoxyphenyl)-2,3,7,8-tetrahydro-4H,6H-pyrimido[2,1-*b*]-1,3-thiazin-4-one Hydrochloride (2b). Obtained similarly to compound **2a**. Yield 72%; mp 200-203°C (ethanol). ^{1}H NMR spectrum (DMSO-d_6, 300 MHz), δ, ppm: 2.05 (2H, m, CH_2); 3.23 (2H, m, CH_2); 3.66 (1H, m, CH); 3.98 (1H, m, CH); 5.16 (1H, m, CH); 7.02 (2H, d, Ar); 7.38 (2H, d, Ar); 12.91 (1H, br. s, N·HCl). IR spectrum (KBr), ν, cm^{-1}: 3500-2500 (>N·HCl), 1720 (C=O), 1620 (C=N). Found, %: C 53.29; H 5.48; N 9.01. $C_{14}H_{17}ClN_2O_2S$. Calculated, %: C 53.76; H 5.44; N 8.96.

2-(3-Nitrophenyl)-2,3,7,8-tetrahydro-4H,6H-pyrimido[2,1-*b*]-1,3-thiazin-4-one Hydrochloride (2c). Yield 58%; mp 200-203°C. ^{1}H NMR spectrum (DMSO-d_6, 300 MHz), δ, ppm: 2.07 (2H, m, CH_2); 3.33 (2H, m, CH_2); 3.80 (1H, m, CH); 3.97 (1H, m, CH); 5.42 (1H, m, CH); 7.77 (1H, t, Ar); 7.94 (1H, d, Ar); 8.41 (1H, d, Ar); 8.33 (1H, s, Ar); 13.05 (1H, br. s, N·HCl). IR spectrum (KBr), ν, cm^{-1}: 3000-2200 (>N·HCl), 1710 (C=O), 1620 (C=N), 1540. Found, %: C 47.80; H 4.27; N 12.51. $C_{13}H_{14}ClN_3O_3S$. Calculated, %: C 47.63; H 4.27; N 12.82.

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