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SYNTHESIS OF 3-AMINO-5-CYCLOHEXYLIMINOTHIOPHENES

I. V. Paramonov, N. P. Bel'skaya, and V. A. Bakulev

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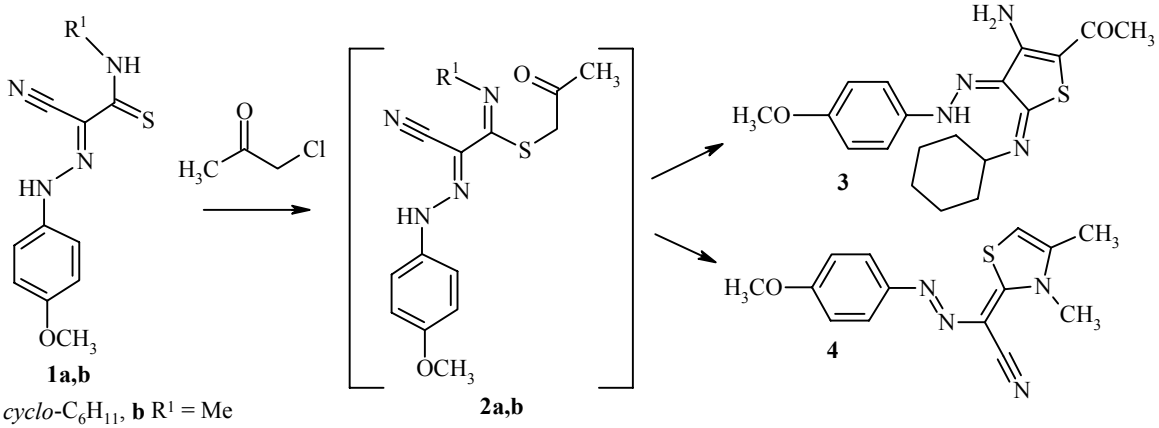
The reaction of thioamides with halo ketones proceeds with the involvement of the sulfur and nitrogen atoms and forms the basis of the well-known Hantsch thiazole synthesis [1].

We have found that the introduction of a cyclohexyl group at the nitrogen atom of thioamide group alters the direction of the reaction and leads to the formation of 3-amino-5-cyclohexylthioamide. Thus, the reaction of 2-arylhydrazono-2-cyano-N-cyclohexylthioamide **1a** with chloro acetone proceeds selectively with involvement of the sulfur atom and cyano group in intermediate **2a** to give thiophene **3** in 92% yield. The analogous reaction of 2-arylhydrazono-2-cyano-N-methylthioacetamide **1b** leads to the formation of another cyclic compound, namely, N-methyl-2-thiazolylideneacetonitrile **4**. The cyclohexyl group probably shields the nitrogen atom, prevents its reaction with chloro acetone, and, thereby, leads to cyclization involving the other reactive sites, namely, the cyano and mercaptomethylene groups.



1a,b

a R^1 = *cyclo*-C_6H_{11}, **b** R^1 = Me

2a,b

3

4

1-(3-Amino-4-[(4-methoxyphenyl)hydrazono]-5-cyclohexylimino-4,5-dihydrothiophen-2-yl)ethanone (3). Equimolar amounts of chloro acetone and triethylamine were added to a solution of 2-cyano-2-(4-methoxyphenyl)hydrazono-N-cyclohexylthioacetamide (0.327 g, $8.79 \cdot 10^{-4}$ mol) in DMF (10 ml). The resultant mixture was maintained at 80°C. At the end of the reaction, the mixture was poured over ice and the precipitate was filtered off to give **3** in 92% yield; mp 120-122°C (ethanol). Mass spectrum, *m/z*: 372 [M^+]. ^{1}H NMR spectrum (DMSO-d_6), δ, ppm, *J*, Hz: 1.31-1.83 (9H, m, CH_{ch}); 1.94-2.04 (1H, m, CH_{ch}); 2.09 (3H, s, $COCH_3$); 3.25-3.34 (1H, m, CH_{ch}); 3.84 (3H, s, OCH_3); 6.95 and 7.73 (4H, AA'BB', *J* = 8.9, CH_{Ar}); 7.50 (2H, br. s, NH_2); 10.33 (1H, br. s, NH–N). Found, %: N 15.30; S 8.63. $C_{19}H_{24}N_4O_2S$. Calculated, %: N 15.04; S 8.61.

Urals State Technical University, 620002, Russia; e-mail: belska@htf.ustu.ru. Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 10, pp. 1416-1417, October, 2001. Original article submitted June 20, 2001.

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3,4-Dimethyl-4-methoxyphenylazo-3H-thiazol-2-ylideneacetonitrile (4) was obtained in 80% yield analogously to **3**; mp 170-172°C (ethanol). Mass spectrum, *m/z*: 286 [M^+]. ^{1}H NMR spectrum (DMSO-d_6), δ, ppm, *J*, Hz: 2.30 (3H, s, CCH_3); 3.79 (3H, s, NCH_3); 3.88 (3H, s, OCH_3); 6.83 (1H, s, CH_{thiaz}); 6.96 and 7.46 (4H, AA'BB', *J* = 8.6, CH_{Ar}). Found, %: N 19.36; S 11.02. $C_{14}H_{14}N_4OS$. Calculated, %: N 19.58; S 11.19.

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REFERENCES

1. V. P. Litvinov, *Usp. Khim.*, **68**, No. 9, 817 (1999).