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METHOD OF PREPARATION OF 2,5-DISUBSTITUTED 2-THIAZOLINE

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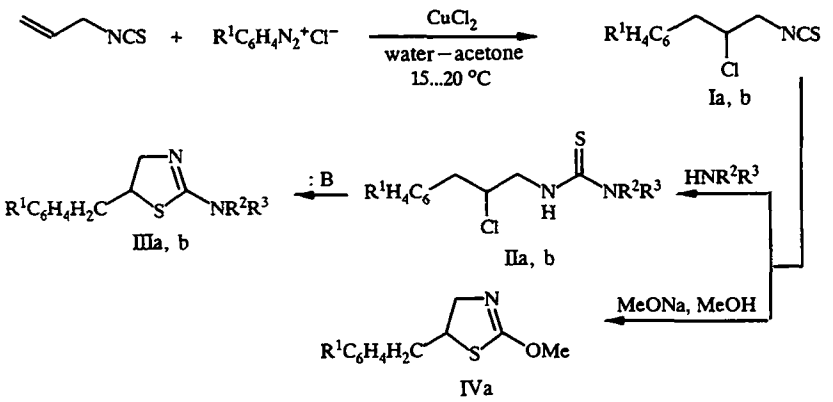
There are many methods of synthesis of thiazolines, but the possibilities for preparative preparation of 2,5-disubstituted 2-thiazolines are very limited [1]. We propose a new approach to synthesis of these compounds using products of chloroarylation of allyl isothiocyanate by arenediazonium salts. It was found that adducts (I) in the presence of bases undergo intramolecular cyclization. Using weakly basic amines as the bases, cyclic thioureas (IIa, b) can be isolated.



I a R^1 = 4-Me, b 2-Cl; IIa, IIIa $R^2 + R^3 = -(CH_2)_2O(CH_2)_2$; IIb, III b R^2 = H, R^3 = Ph

1-Isothiocyanato-2-chloro-3-arylpropanes (Ia, b) were prepared by the method described in [2].

2-Morpholino-5-(4-tolylmethyl)-2-thiazoline (IIa, $C_{15}H_{20}N_2OS$). Here 0.022 mole of morpholine was added to a solution of 0.01 mole of isothiocyanate (Ia) in 8 ml of acetone while stirring. After 10 min, 50 ml of water was added and the sediment of thiazoline (IIa) was filtered off. Yield of 2.37 g (86%), mp = 111-112°C (benzene–hexane). PMR spectrum (DMSO-D_6): 2.26 (3H, s, CH_3); 2.76 (1H, d.d, CH_2Ar); 2.89 (1H, d.d, CH_2Ar); 3.25 (4H, t, CH_2NCH_2); 3.57 (4H, t, CH_2OCH_2); 3.70 (1H, d.d, 4-CH_2); 3.87 (1H, d.d, 4-CH_2); 4.14 (1H, m, CH); 7.10 ppm (4H, s, C_6H_4).

2-Phenylamino-5-(2-chlorophenylmethyl)-2-thiazoline (IIIb, $C_{16}H_{15}ClN_2S$), in tautomeric equilibrium with the imino form, was obtained in treatment of thiourea (IIb) with NaOEt in ethanol. Yield of 78%, mp = 102-103°C (cyclohexane). PMR spectrum (DMSO-D_6): 2.99 (1H, d.d, CH_2Ar); 3.14 (1H, d.d, CH_2Ar); 3.79 (1H, d.d, 4-CH_2); 3.92 (1H, d.d, 4-CH_2); 4.19 (1H, m, CH); 7.20-7.46 (9H, m, arom. protons); 6.92 (t, 3-NH); 8.91 ppm (br. s, NHPh).

2-Methoxy-5-(4-tolyl)-2-thiazoline (IVa, $C_{12}H_{15}NOS$). Here 10 mmole of compound Ia and 10 mmole of MeONa in 30 ml of MeOH were boiled for 1 h. Then 50 ml of water was added, it was extracted with ether, and dried with $MgSO_4$. After evaporation of the solvent, the residue was vacuum distilled. Yield of 2.06 g (93%), bp = 148°C (1.5 mm Hg), n_D^{20} = 1.5700. PMR spectrum (acetone-D_6): 2.28 (3H, s, CH_3); 2.87 (1H, d.d, CH_2Ar); 2.98 (1H, d.d, CH_2Ar); 3.83 (3H, s, CH_3O); 3.75 (1H, d.d, 4-CH_2); 3.93 (1H, d.d, 4-CH_2); 4.28 (1H, m, CH); 7.12 ppm (4H, s, C_6H_4).

The data from elemental analysis corresponded to the calculated data.

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