SHORT COMMUNICATIONS

Recyclization of 4,5-Di(methoxycarbonyl)-1*H*-pyrrole-2,3-dione Effected by Monosubstituted Hydrazines

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Reactions of 4,5-di(alkoxycarbonyl)-1*H*-pyrrole-2,3diones with hydrazine derivatives were not described.

By boiling for 20–30 min (TLC monitoring) in a mixture of anhydrous benzene and 1,4-dioxane, 2 : 1, 1-(4-methylphenyl)-4,5-bis(methoxycarbonyl)-1*H*pyrrole-2,3-dione (I) with benzyl- and phenylhydrazines (IIa, IIb) in 1 : 1 ration we obtained in good yields dimethyl 1-benzyl- and 1-phenyl-5-(4-methylphenylcarbamoyl)-1*H*-pyrazole-3,4-dicarboxylates IIIa, IIIb.

The formation of compounds **IIIa**, **IIIb** occurs evidently due to the addition of the primary amino group of monosubstituted hydrazine to the atom C^5 of pyrroledione **I**, the opening of the pyrroledione ring at the N¹–C⁵ bond followed by the nucleophilic attack by the secondary amino group of the monosubstituted hydrazine on the

keto carbonyl group of the arylcarbamoyl fragment with water liberation.

The described reaction is an example of the recyclization of pyrrolediones under the action of hydrazines, i.e., the opening of the pyrroledione ring followed by the closure of the pyrazole ring.

Dimethyl 1-benzyl-5-[(4-methylphenyl) carbamoyl]-1H-pyrazole-3,4-dicarboxylate (IIIa). To a solution of 1.0 mmol of pyrroledione I in 10 ml of anhydrous benzene was added a solution of 1.0 mmol of benzylhydrazine (IIa) in 10 ml of anhydrous benzene, 10 ml of 1,4-dioxane was added, and the mixture was boiled for 20 min. The solvent was removed, the residue was dissolved in boiling ethanol, cooled, the separated precipitate was filtered off and recrystallized



 $\mathbf{R} = \mathbf{Bz}(\mathbf{a}), \mathbf{Ph}(\mathbf{b}).$

from ethanol. Yield 76%, mp 140–141°C. IR spectrum, v, cm⁻¹: 3310 (NH), 1748 (COOMe), 1701 (COOMe), 1655 (CONH). ¹H NMR spectrum, δ , ppm: 2.28 s (3H, Me), 3.70 s (3H, COOMe), 3.85 s (3H, COOMe), 5.49 s (2H, CH₂), 7.18 d (2H, C₆H₄, *J* 8.3 Hz), 7.27–7.36 m (5H, Ph), 7.51 d (2H, C₆H₄, *J* 8.3 Hz), 10.80 s (1H, NH). Found, %: C 64.81; H 5.22; N 10.24. C₂₂H₂₁N₃O₅. Calculated, %: C 64.86; H 5.20; N 10.31.

Dimethyl 5-[(4-methylphenyl)carbamoyl]-1phenyl-1*H***-pyrazole-3,4-dicarboxylate (IIIb)** was obtained similarly. Yield 72%, mp 219–220°C (ethanol). IR spectrum, v, cm⁻¹: 3300 (NH), 1736 (COOMe), 1698 (COOMe), 1676 (CONH). ¹H NMR spectrum, δ , ppm: 2.26 s (3H, Me), 3.75 s (3H, MeO), 3.91 s (3H, MeO), 7.15 d (2H, C₆H₄, *J* 8.4 Hz), 7.41 d (2H, C₆H₄, *J* 8.4 Hz), 7.50–7.61 m (5H, Ph), 10.94 s (1H, NH). ¹³C NMR spectrum, δ , ppm: 20.37 (Me), 52.15 (OMe), 52.64 (OMe), 119.71–141.17 (C_{arom}, C⁴, C⁵), 143.41 (C³), 156.30 (<u>C</u>OOMe), 160.92 (CONH), 161.79 (<u>C</u>OOMe). Found, %: C 64.17; H 4.79; N 10.62. C₂₁H₁₉N₃O₅. Calculated, %: C 64.12; H 4.87; N 10.68.

IR spectra of compounds obtained were recorded on a spectrophotometer FSM -1201 from mulls in mineral oil. ¹H and ¹³C NMR spectra were registered on a spectrometer Bruker AM-400 [400 (¹H) and 100 (¹³C) MHz] in DMSO- d_6 , internal reference TMS.

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