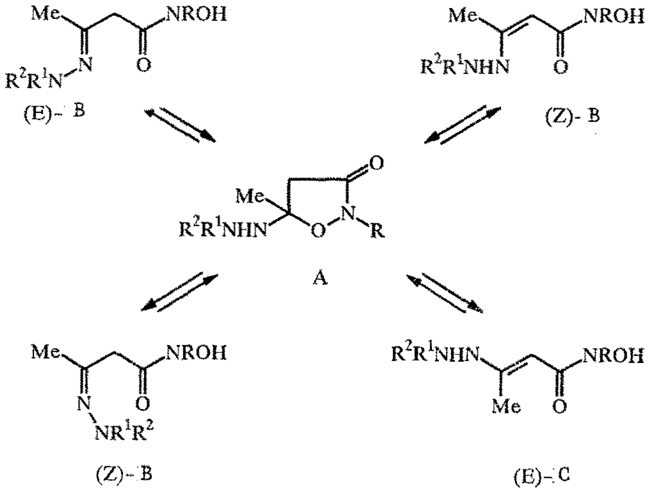
5-HYDRAZINOISOXAZOLIDIN-3-ONES AND THEIR TAUTOMERS

K. N. Zelenin, I P. Bezhan, and I. V. Lagoda

Hydrazones of N-hydroxyacetoacetamides, which are of interest as synthones, have been regarded as inaccessible [1], but we have readily prepared their first representatives Ia-c by the reaction of the corresponding hydrazones with N-hydroxyacetoacetamides [2, 3] at room temperature in benzene with yields of 70-90%.

In $CDCl_3$ compounds Ia-c are in the form of 5-hydrazinoisoxazolin-3-ones (A), and in their polar media (DMSO, DMF) there is a tendency to tautomeric conversion (A ⇄ B ⇄ C) the position of the equilibrium depending in a complex way on the nature of the substituents. Thus, compound Ic in DMSO is largely a mixture of E- and Z-hydrazones (B), and compounds Ia and Ib exist in the form of all five tautomers.



I a $R=Ph$, $R^1=R^2=CH_3$; b $R=Ph$, $R^1=R^2=CH_2Ph$; c $R=CH_2Ph$, $R^1=H$, $R^2=COCH_2Ph$

5-N,N-Dimethylhydrazino-5-methyl-2-phenylisoxazolidin-3-one (Ia). Mp 88°C (from benzene). PMR spectrum (in $CDCl_3$, δ, ppm): 1.46 (3H, s, 5-CH_3), 2.33 [6H, s, $N(CH_3)_2$], 2.78 and 3.16 (2H, AB system, J_{AB} = 17 Hz, CH_2); 3.14 (1H br.s., NH); 6.95-7.82 ppm (5H, m, H_{arom}). PMR spectrum in DMSO-D_6: form A (44%) — 1.43 (3H, s, 5-CH_3); 2.26 [6H, s, $N(CH_3)_2$]; 2.90 (2H, s, CH_2); form E—B (10%) 1.90 (3H, s, CH_3), 3.42 (2H, s, CH_2); form Z—B (6%) 1.85 (3H, s, CH_3), 3.76 (2H, s, CH_2); form Z—C (18%) 1.93 (3H, s, CH_3), 4.80 (1H, s, CH); form E—C (22%) 1.93 (3H, s, CH_3), 5.02 (1H, s, CH); 2.22, 2.24, 2.36, and 2.38 [6H, $N(CH_3)_2$] of forms E- and Z—B and E— and Z—C; 4.18 (br.s, general NH signal of forms A, E— and Z—C); 9.66, 9.87, 10.04, and 10.58 (4OH of forms E— and Z—B and E— and Z—C); 6.93-7.68 (5H, m, H_{arom} of all 5 tautomeric forms). Carbon-13 NMR spectrum (in $CDCl_3$, δ, ppm): 23.0 (5-CH_3), 42.5 ($C_{(4)}$), 49.7 [$N(CH_3)_2$], 96.5 ($C_{(5)}$), 116.2, 123.9, 128.4, and 131.7 (C_{arom}), 165.9 (C=O). Carbon-13 NMR spectrum (in DMSO-D_6, δ, ppm): form A 23.2 (5-CH_3), 42.3 ($C_{(4)}$), 49.6 [$N(CH_3)_2$], 97.0 ($C_{(5)}$), 166.0 (C=O); form E—B 17.7 (CH_3), 46.2 (CH_2), 46.9 [$N(CH_3)_2$], 161.8 (C=N); form Z—B 17.3 (CH_3), 43.9 (CH_2), 47.1[$N(CH_3)_2$], 163.1 (C=N); form Z—C 19.4 (CH_3), 48.4 [$N(CH_3)_2$], 83.3 (CH), 156.8 (C=O); form E—C 19.4 (CH_3), 48.4 [$N(CH_3)_2$], 81.3 (CH), 160.9 (C=O), group of signals in the range 121-124 (C_{arom} and N—C=C of forms E— and Z—C).

5-N,N-Dibenzylhydrazino-5-methyl-2-phenylisoxazolidin-3-one (Ib). Mp 93-94°C (from benzene). In DMSO-D_6, the following forms were present (%): 16 (A), 8 (E—B), 3 (Z—B), 60 (Z—C), 7 (E—C).

2-Benzyl-5-phenacetylhydrazino-5-methylisoxazolidin-3-one (Ic). Mp 98-99°C (from benzene). In DMSO-D_6 the composition was 5% form A, 55% tautomer E—B, 40% from Z—B.

S. M. Kirov Academy of Military Medicine, Saint Petersburg, 194175. Translated from Khimiya Geterotsiklicheskikh Soedinenii, No. 3, pp. 425-426, March, 1992. Original article submitted June 25, 1991.

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