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LETTERS TO THE EDITOR

Reaction of 2-Acetylspiro[3.3]heptane with Dialkyl Phosphites

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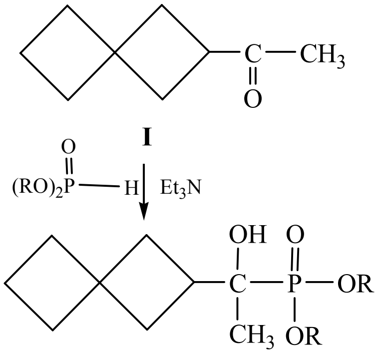
We have previously shown that the reaction of 7-acetylbicyclo[4.1.0]heptane with dialkylphosphites in the presence of bases occur without opening of small carbocycles [1]. In continuation of this research a heightened interest consists in studying the behavior of carbonyl compounds of spiroheptane series under the Abramov reaction conditions [2]. Given the strain energy of these spiranes, a non-trivial reaction course is expectable to give new types of organophosphorus compounds.

We found that the interaction of 2-acetylspiro[3.3] heptane **I** with dialkyl phosphites in the presence of catalytic amounts of saturated alcoholic solutions of sodium alkoxide or triethylamine proceeds by the classical scheme of the Abramov reaction with the retention of spirane structure to form dialkyl {1-hydroxy-1-(spiro[3.3]hept-2-yl)ethyl}phosphonates **IIa**–**IIc**.



IIa–**IIc**

R = CH_3 (**a**), C_2H_5 (**b**), C_3H_7 (**c**)

The structure of compounds **IIa**–**IIc** purified by column chromatography was confirmed by the IR and ^{1}H NMR spectroscopy, and the composition, by the elemental analysis data. The IR spectra contain the absorption bands at 3300 (O–H), 995–1050 (P–O–C), 1250–1255 cm^{-1} (P=O). In the ^{1}H NMR spectra of phosphonates **IIa**–**IIc** there are doublets of methyl [δ 1.30 ppm (3H, CCH_3, $^3J_{HP}$ 17.60 Hz)] and methylene protons in the positions 1 and 3 of the ring [δ 2.16 ppm (4H, $2CH_2$, $^3J_{HH}$ 7.75 Hz)], and also multiplets of methine (δ 2.65 ppm) and methylene groups of the second ring [δ 1.73 (C^5, C^7) and 1.84 ppm (C^6), respectively]. The hydroxyl proton was observed as a broadened signal at δ 4.20 ppm. The protons of alkoxy groups are in the typical areas.

Compound IIa. Yield 74%, d_4^{20} 1.1795, n_D^{20} 1.4876.

Compound IIb. Yield 72%, d_4^{20} 1.1296, n_D^{20} 1.4866.

Compound IIc. Yield 69%, d_4^{20} 1.1054, n_D^{20} 1.4857.

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