2-Selenoxoquinazolone-4 (II). Yield 59%, R_f 0.65 (silufol, 4:1 benzene–acetone), mp 245-247° (from alcohol), M^+ 224/226. UV spectrum: 224, 318 (C_2H_5OH), 235, 292 nm (C_2H_5OH + KOH).

2-Methylselenoquinazolone-4. (IV). Yield 62%, R_f 0.82, mp 208-210° (from alcohol), M^+ 238/240. PMR spectrum ($CDCl_3$): 2.55 ($SeCH_3$, s), 7.25-7.80 (6-, 7-, 8-H, m), 8.28 ppm (5-H,d). UV spectrum: 225, 237, 279 nm (C_2H_5OH).

3-Methyl-2-methylselenoquinazolone-4 (V). Yield 16%. R_f 0.90, mp 78° (from hexane), M^+ 254/256. PMR spectrum ($CDCl_3$): 2.55 ($SeCH_3$, s), 3.55 ($3-CH_3$, s), 7.37-7.70 (6-, 7-, 8-H, m), 8.15-8.40 ppm (5-H, d). UV spectrum: 224, 237, 238 nm (C_2H_5OH).

2,3-Dihydroselenazo[2,1-b]quinazolone-4 (VI). Yield 52%, R_f 0.52, mp 141-142° (from 3:2 alcohol–water), M^+ 250/252. UV spectrum: 226, 286, 242 nm (C_2H_5OH).

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ALKYLATION OF 6-SUBSTITUTED PURINES IN CONDITIONS OF INTERPHASE CATALYSIS

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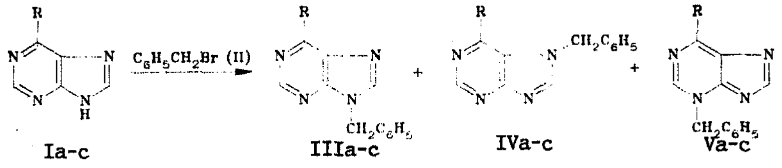
Alkylation of the 6-substituted purines (Ia-c) in the presence of bases is usually performed in dry bipolar aprotic solvents at 25-100°C in the course of 3-85 h; this leads to the mixture of the N-9-, N-7-, and N-3-alkylation products [1-3]. It was recently shown for adenine that the alkylation proceeds by 75-92% at 20-80°C in 8-12 h in the biphasic system of the organic solvent and a 10-20% aqueous solution of NaOH (or without the solvent with solid alkali) in the presence of an interphase catalyst [4-6].

We established that the application of a biphasic system of the liquid–liquid or liquid–solid type using 50% aqueous alkali or solid alkali is significantly more effective for the alkylation of the purines Ia-c. Such conditions increase the yield of the alkylpurines substantially with low duration of the reaction; the control of the course of the reaction is also additionally greatly simplified by using the liquid–liquid systems. The alkylation can be considered as completed right after the disappearance of the suspension of the sodium salt of the initial purine which is formed by its deprotonation at the interphase boundary, and is solubilized in the organic phase with the aid of the interphase catalyst, and is therefore gradually drawn into the alkylation reaction.



I,III-V a $R=NHCH_2C_6H_5$; b $R=Cl$; c $R=SCH_3$

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Thus, the purine Ia is alkylated with benzyl bromide II in the system CH_2Cl_2–50% NaOH (system A) in the presence of Bu_4NBr (10 mole %) at 40°C in 5 min; the mixture of the alkylpurines IIIa and IVa, ∿2:1 is formed in quantitative yield. On utilizing the more lipophilic catalyst — tetraoctylammmonium bromide, the reaction proceeds in 5 min at ∿20°C. On the alkylation of the purine Ia by the alkyl halogenide II in the system of benzene–solid KOH (18-crown-6, 60°C, 1 h), the 1:1 mixture of the isomers IIIa and IVa is formed in quantitative yield. On the alkylation of the purine (Ia) in the system of benzene–50% NaOH (system B) using the interphase catalyst immobilized on an insoluble carrier — the polymerically bound hexyltributylphosphonium bromide — the 5:4mixture of the isomers IIIa and Va is obtained after 10 min at 40°C in a quantitative yield. This is the first example of the alkylation of purines in the triphasic system of liquid–solid–liquid.

The alkylation of the purines Ib and Ic in the systems A and B leads to the mixture of three isomers — IIIb,c, IVb,c, and Vc — with a total yield greater than 95%. The purine Ib with the system A, the catalyst Bu_4NBr, the reaction temperature of 40°C, and the time of 60 min gave the 3:1 mixture of III and IV. The purine Ib with the system B, the catalyst $(C_8H_{17})_4NBr$, the reaction temperature of 40°C, and the time of 10 min gave the 3:2 mixture of III and IV. The purine Ic with the system B, the catalyst $(C_8H_{17})_4NBr$, the reaction temperature of 60°C, and the time of 5 min gave the 4:4:1 mixture of III, IV, and V.

The alkylation of the purines Ia-c does not proceed in the absence of a catalyst under the conditions studied. The isomeric alkylpurines which are formed are separated by the method of preparative TLC in the 1:1 system of chloroform–ethyl acetate, and are identified from the mps and the UV spectra, agreeing with the literature data. When the purine Ia is subjected to prolonged stirring in the system A (40°C, 15 h) in the absence of the alkylating agent, the solvent serves as the latter. Bis(6-benzylaminopurin-9-yl)methane is isolated from the reaction mixture. The yield of the product is 30%; mp 228-230°C, M^+ 462. The PMR spectrum (DMSO-D_6) was as follows: 4.73 (broad singlet, 4H, CH_2Ph), 6.55 (singlet, 2H, NCH_2N), 7.33 (multiplet, 10H, C_6H_5), 8.17 (singlet, 2H, 8-, 8'-H), and 8.22 ppm (singlet, 2-, 2'-H).

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