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2-(ADAMANTAN-1-YL)IMIDAZO-[1,2-*a*]PYRIDINE AND ITS TRANSFORMATIONS

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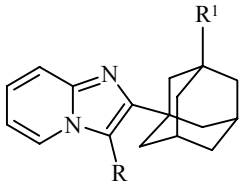
Imidazopyridines and many adamantane derivatives have appreciable physiologically active properties, an important role in which is played by the nature of the substituents in the molecule.

2-(Adamantan-1-yl)imidazo[1,2-*a*]pyridine (**1a**) was described earlier in [1], but no functional derivatives have been known up to now for it. In this report, we propose an improved method for obtaining compound **1a** and present the results of a study of some of its chemical transformations. By heating 2-aminopyridine with bromomethyl (adamantan-1-yl) ketone in ethylacetate, followed by boiling the alkylation product **2** in acetic acid, we synthesized compound **1a** in 84% yield (compare with [1]). We have established that compound **1a** exhibits the chemical properties that are typical for imidazo[1,2-*a*]pyridines [2]: when treated with elemental bromine under conditions described in [2], the monobromo derivative **1b** is formed, is nitrosated by sodium nitrite converting to compound **1c**.



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a R = H, **b,d** Br, **c** NO; **a-c** R^1 = H, **d** $NHCOCH_3$

Boiling compound **1a** in liquid bromine for 4 h also leads to formation of compound **1b**, but in higher yield. We were not able to add a bromine atom to the adamantane ring even when using catalysts (Lewis acids) conventionally used for difficult bromination reactions. Regardless of the reaction conditions, we could detect formation of only compound **1b**. By adding a bromine atom to the adamantane ring, we hoped to use the lability of the C–Br bond for further functionalization of the compounds obtained. But quite unexpectedly, we found that the presence of a bromine atom or other good leaving group on the adamantane ring was not necessary for this purpose. Thus we converted compound **1b** to the acetoamino derivative **1f** via the Ritter reaction.

The structure of the compounds obtained was confirmed by ^{1}H NMR spectra.

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1-(2-Adamantan-1-yl-2-oxoethyl)-2-aminopyridinium bromide (2). A solution of 2-aminopyridine (0.044 mol) in ethylacetate (10 ml) was added gradually with stirring to a solution of bromomethyl adamantyl ketone (0.044 mol) in ethylacetate (30 ml). The reaction mass was heated up to 80°C, held at this temperature while stirring was continued for 1.5 h, and the precipitate was separated. Yield 75%; mp 238-240°C (according to data in [1], mp 114-115°C).

2-(Adamantan-1-yl)imidazo[1,2-*a*]pyridine (1a). A solution of pyridinium bromide **2** (0.035 mol) in glacial acetic acid (50 ml) was boiled for 1 h. The next day, the precipitate formed was separated and boiled for 2 h in 1 N aqueous solution of sodium hydroxide. Yield 84%; mp 195-197°C (according to data in [1]: yield 25%; mp 189-191°C).

2-(Adamantan-1-yl)-3-bromoimidazo[1,2-*a*]pyridine (1b). A. Obtained as described in [2] from compound **1a** (0.0012 mol). Yield 25%; mp 168-170°C (aqueous alcohol). Found, %: Br 24.16. $C_{17}H_{19}BrN_2$. Calculated, %: Br 24.13.

B. Compound **1a** (0.0015 mol) was boiled in bromine (4 ml) for 4 h, and then the reaction mass was poured into a mixture of ice and sodium metabisulfite. The precipitate was separated, washed with water until neutral reaction. Yield 71%, identical to the material obtained by method A according to mp and spectral characteristics.

2-(Adamantan-1-yl)-3-nitrosoimidazo[1,2-*a*]pyridine (1f). A solution of sodium nitrite (0.002 mol) in water (1 ml) was added, with stirring and cooling down to 0-5°C, to a solution of compound **1a** (0.002 mol) in acetic acid (8 ml). After 1 h, the reaction mass was poured into water and allowed to stand until the next day. Yield 29%; mp 220-222°C (aqueous alcohol). Found, %: N 14.79. $C_{17}H_{19}N_3O$. Calculated, %: N 14.94.

2-(3-Acetaminoadamantan-1-yl)-3-bromoimidazo[1,2-*a*]pyridine (1d). Compound **1b** (0.002 mol) was gradually added to a mixture of concentrated sulfuric acid (10 ml) and fuming sulfuric acid (5 ml) at a temperature of 0-5°C, and then acetonitrile (3 ml) was added. The reaction mass was held at 45-50°C, continuing the stirring, for 9 h and then poured onto ice and neutralized with sodium bicarbonate. The precipitate was separated. Yield 65%; mp 159-160°C (dioxane–alcohol–water). Found, %: N 10.69. $C_{19}H_{22}BrN_3O$. Calculated, %: N 10.82.

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