ALKYLATION OF 2-AMINOSELENAZOLIDIN-4-ONES

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2-Aminoselenazolidin-4-one and its 5-arylidene derivatives include an ambident system [1], the anion of which is capable of adding an alkyl group at both the exocyclic and endocyclic nitrogen atoms, as in the case of the isoelectronic analog 2-aminothiazolidin-4-one [2]. Products of alkylation at the exocyclic oxygen atom in the 4 position of the heterocyclic ring are usually not found in the reaction mixture; this is associated with thermodynamic control of the reaction at this center [3].

It seemed of interest to investigate the alkylation of 2-aminoselenazolidin-4-one. Despite our expectations, 3-methylselenazolidine-2,4-diones (III, IV) were isolated in polar hydroxy-containing solvents (alcohols and water) in the alkylation of salts (sodium, potassium, and triethylammonium) of 2-aminoselenazolidin-4-one (I) and its 5-benzylidene derivative (II) with alkylating agents with different strengths (methyl iodide and dimethyl sulfate). Products of methylation at the exocyclic nitrogen atom were not detected in the reaction mixture. Replacement of the imino group by an oxygen atom is evidently associated with solvolysis of the product of methylation of the exocyclic nitrogen atom.

I, II III, IV

I, III X=CH_2; II, IV X=C_6H_5CH

3-Methylselenazolidine-2,4-dione (III) [4] was obtained in 50% yield and had R_f 0.64 [Silufol UV-254, acetone–hexane (2:1)] and mp 33°C (from alcohol). IR spectrum (mineral oil): 1729 and 1670 cm^{-1} (C=O). Mass spectrum: M^+ 179. 3-Methyl-5-benzylideneselenazolidine-2,4-dione (IV) [5] was obtained in 75% yield and had R_f 0.68 [Silufol UV-254, acetone–hexane (2:1)] and mp 138-139°C (from alcohol). IR spectrum (mineral oil): 1725, 1679 (C=O); 1600 cm^{-1} (C=C). Mass spectrum: M^+ 266.

The structures of the compounds obtained were confirmed by data from the IR and mass spectra and also by a comparison with genuine samples.

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