

REDUCTION REACTIONS OF DINITROIMIDAZOLE DERIVATIVES

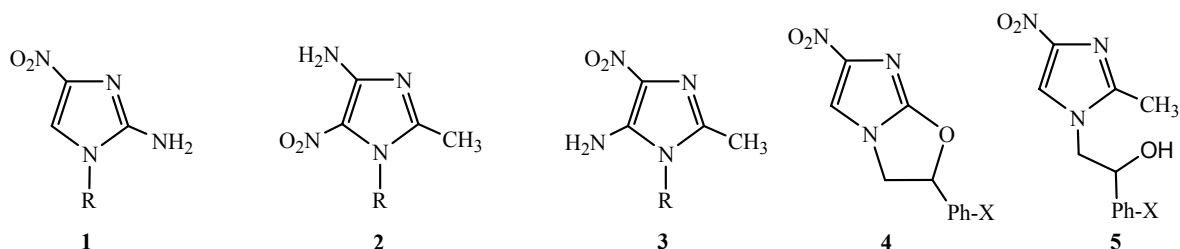
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Nitroimidazole derivatives play a significant role in some of the therapies. Many of their analogues are used in the treatment of various infections, particularly as antifungal substances and radiosensitizers, as well as recently as antivirals.

Our earlier works presented syntheses of many N-substituted derivatives of 4,5-dinitroimidazoles and 4-(substituted amino)-5-nitroimidazoles [1]. Some of them were tested as to their pharmacological activity. Recent research shows that a few new compounds show high antioxidant activity.

Now, we describe some reduction reactions of 2,4-dinitro- and 2-methyl-4,5-dinitroimidazole derivatives, where the N-1 positions are substituted with one, two or three-carbon aliphatic chain or with phenacyl group. These starting nitroimidazole derivatives had been prepared according to methods described in the literature [2] and they were reduced with the excess of iron dust in glacial acetic acid, at room temperature or with sodium borohydride in boiling methanol. The reactions with iron led unexpectedly to products in which only one nitro group was reduced to amino function, but the second remained intact. N-Substituted 2,4-dinitroimidazole derivatives were reduced to respective 2-amino-4-nitroimidazoles (**1**). Reduction of appropriate 4,5-dinitroimidazoles led to two isomers 4-amino-5-nitro- (**2**) and 5-amino-4-nitro- (**3**), with predomination of the latter mentioned. Identification of these products was based on full spectral analysis and in some cases on X-ray crystallography. The borohydride reduction was performed for N-phenacyl derivatives only. In the case of 2,4-dinitroimidazole, a part from the reduction of carbonyl group we observed also substitution of nitro group at the C-2 position with newly formed hydroxyl group. Compounds with imidazooxazole structure (**4**) are the only products of this reaction. Use of appropriate 4,5-dinitroimidazoles led to obtaining the respective alcohol derivatives (**5**) with the lack of 5-nitro group. Structures of these compounds were confirmed by Jones oxidation reaction and comparison of products with the original ones, which were described earlier [3].



where: X=H, p-Cl; R=CH₃, C₂H₅, CH₂CH(OH)CH₂Cl, CH₂CH(OH)CH₂Br, phenacyl or (p-Cl)-phenacyl

[1] L. Zaprutko et al., *Monatsch. Chem.*, **134**, 1145-1150 (2003); [2] L. Zaprutko et al., *Pharmazie*, **44**, 81-84 (1989); [3] D. Skwarski et al., *Pol. J. Chem*, **57**, 551-553 (1983).

Acknowledgements: This work is partially financed by Grant No. 2 PO5F 039 27 from the KBN.