# NEW SYNTHESIS OF *N*-ALKOXYHYDANTOINS AND *N*-ALKOXY-IMIMAZOLIDIN-3-ONES

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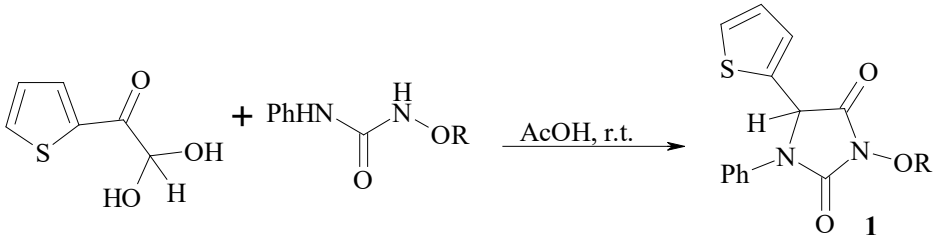
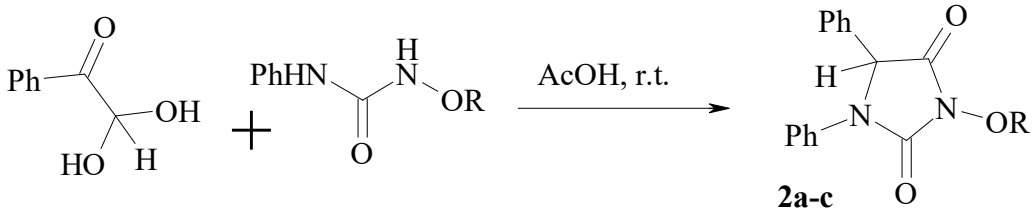
The relevance of the products which can be obtained by the *N*-alkoxy-*N*'-arylureas interaction with the arylglyoxals and ninhydrin is significant because of the importance of imidazolidin-2-ones and hydantoins among pharmaceutical materials. Arylglyoxals and ninhydrin are widely used in synthesis of these biologically active nitrogen-containing heterocycles. It is therefore important to create the reaction strategies that give access to such new biological relevant scaffolds.

We had found that 2-thienylglyoxal selectively reacted with *N*-alkoxy-*N*'-phenylureas in acetic acid at room temperature yielding only the unknown 3-alkoxy-1-phenyl-5-(2-thienyl)hydantoins**1**.



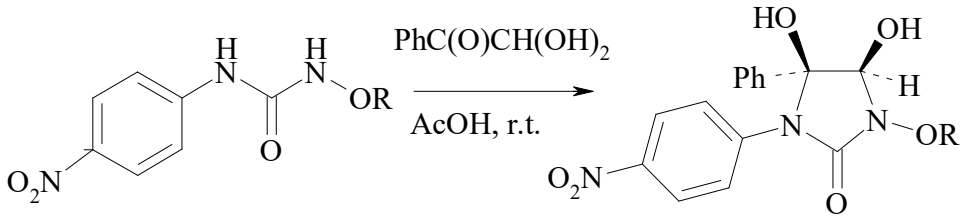

R=Me,Et,Pr,i-Pr,n-Bu

Phenylglyoxal reacts with *N*-alkoxy-*N*'-phenylureas in acetic acid at room temperature in most cases giving only 3-alkoxy-1,5-bis(phenyl)hydantoins **2**.



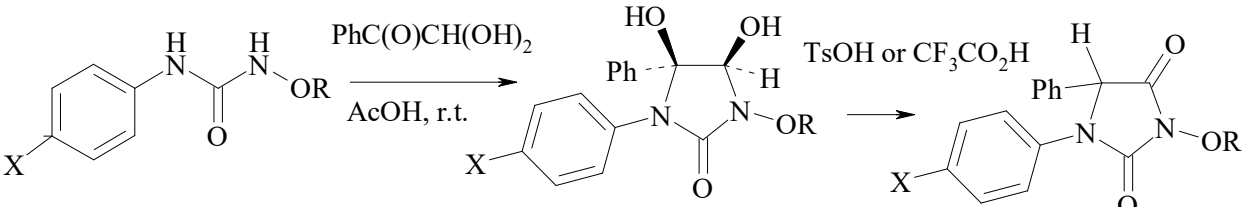

R=Et (a),n-Bu (b), n-$C_8H_{17}$(c)

Phenylglyoxal interacts with *N*-alkoxy-*N*'-(4-nitrophenyl)ureas, *N*-alkoxy-*N*'-(4-bromophenyl)ureas, *N*-alkoxy-*N*'-(4-tolyl)ureas in the similar conditions yielding only 3-alkoxy-*cis*-4,5-dihydroxy-1-(4-nitrophenyl)-5-phenylimidazolidin-2-ones **3**, 3-alkoxy-*cis*-4,5-dihydroxy-1-(4-bromophenyl)-5-phenylimidazolidin-2-ones **4** and3-alkoxy-*cis*-4,5-dihydroxy-1-(4-tolyl)-5-phenylimidazolidin-2-ones **5**, respectively. Compounds **4**,**5** give hydantoins **6**,**7** by the TsOH or $CF_3COO_2H$ action.




R= i-Am,Bn

**3**



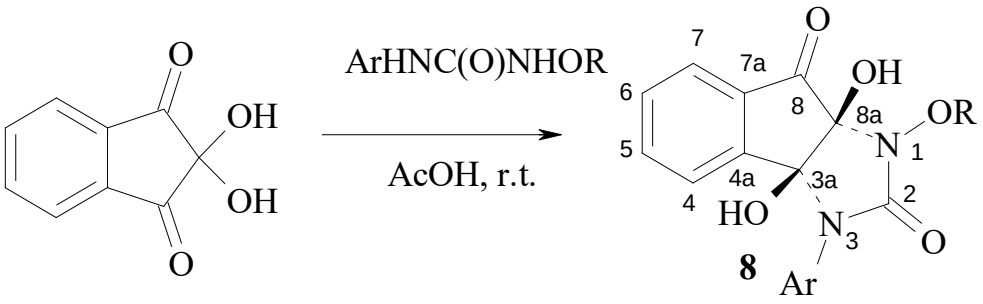

R=Et,Pr,Bn

X=Br(**4**,**6**),Me(**5**,**7**)

**4,5**

**6,7**

We had found that ninhydrin reacted with *N*-alkoxy-*N'*-arylureas in acetic acid at room temperature selectively forming the 1-alkoxy-3-aryl-3a,8a-dihydroxy-1,3,3a,8a-tetrahydroindeno[1,2-*d*]imidazole-2,8-diones **8**. The XRD study of the synthesized compounds **8** has revealed that there is the mutual *cis*-orientation of the C(3a)–OH and C(8a)–OH hydroxyl groups towards to each other. It has also found that the C(3a)–C(8a) and C(8)–C(8a) bonds are some elongated.




Ar=$C_6H_4$Me-p, R=Bu,Me
Ar=$C_6H_4$Br-p,R=Pr , Bu, Bn
Ar=Ph, R=Bn

**References:**

1. Shtamburg V. G.; Shtamburg V. V.; Anishchenko A. A.; Mazepa A.V.; Rusanov E.B. Interaction of Ninhydrin with *N*-alkoxy-*N'*-arylureas and *N*-alkoxy-*N'*-alkylureas. 1-Alkoxy-3-aryl(alkyl)-3a,8a-dihydroxy-1,3,3a,8a-tetrahydroindeno [1,2-d]imidazole-2,8-diones: Synthesis and Structure. // J. Mol. Structure. – 2022. – 1248.
2. Shtamburg V. G.; Shtamburg V. V.; Anishchenko A. A.; Rusanov E.B.; Kravchenko S.V. The structure of 1-Ethoxy-3A,8A-Dihydroxy-3-(1-Naphthyl)methyl-1,3,3A,8A-Tetrahydroindenol[1,2-d]imidazole-2,8-dione // J.of Chemistry and Technologies. – 2021. – 29(2), 232-239.