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Efficient synthesis of 3-amino-5,6-diphenyl-1,2,4-triazine

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Summary. Efficient optimized method for the synthesis of 3-amino-5,6-diphenyl-1,2,4-triazine was developed.

Keywords: 3-amino-5,6-diphenyl-1,2,4-triazine, dibenzoyl, aminoguanidine bicaronate.

Introduction. The derivatives of 1,2,4-triazines are of interest as physiologically active compounds. In particular the 3-amino-5,6-diphenyl-1,2,4-triazine (**3**) shows antimalarial activity [1] and represents key intermediate for the synthesis of 2,3,6-tri-replaced imidazo[1,2-*b*]-1,2,4-triazines and replaced 6-hydroxy-8*H*-pyrimido[1,2-*b*]-1,2,4-triazin-8-ones possessing potential antineoplastic activity [2]. Besides, among the derivatives of imidazo — [1,2-*b*]-1,2,4-triazines obtained from triazine **3** compounds with an intensive luminescence are found out, which also are capable of generating in soutions and vapor the laser radiation in visible range of a spectrum.

The synthesis of 3-amino-5,6-diphenyl-1,2,4-triazine (**3**) by means of the condensation of dibenzoyl and semicarbazide at the further reaction of obtained 3-hydroxy-5,6-diphenyl-1,2,4-triazine with $POCl_3$ followed by the processing of 3-chloro-5,6-diphenyl-1,2,4-triazine with a solution of ammonia appears labour-consuming enough and demands severe conditions for realization of last stage, during which replacement of atom of chlorine on amino group in 6-th position was carried out under pressure at temperature of 140 ˚C.

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More simple and efficient method of the synthesis of 3-amino-5,6-diphenyl-1,2,4-triazine (**3**) appears as a condensation of dibenzoyl (**1**) with aminoguanidine bicaronate (**2**). We carried out the synthesis of triazine **3** (scheme 1) at refluxing of initial components in *n*-BuOH followed by a washing of a precipitate with a mix of Et_2O-hexane (1:1). The yield of product has reached 97 %.

It is necessary to note that in examples known from the literature sources for a case when the triazine **3** obtained at refluxing initial components in EtOH [5, 6] or benzene [1] techniques of the synthesis have not been optimized and the yield of the required product made up not more than 30-60 %.

The structure of obtained triazine **3** is proved by data of ^{1}H, ^{13}C NMR- and mass-spectroscopy.

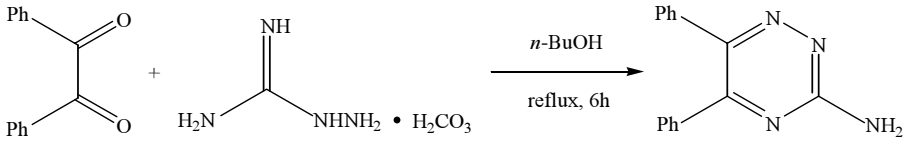
Experimental section. Melting point was measured on a device «Boetius». Spectra NMR were registered on a spectrometer «Bruker AM-300» (300 MHz). Mass-spectrum was registered on a mass-spectrometer «Kratos MS-30» (electron ionization, 70 *e*V, direct inlet, source temperature 200 ˚C).

3-Amino-5,6-diphenyl-1,2,4-triazine (3). Add 13.61 g (0.1 mol) aminoguanidine bicaronate (**2**) to a solution 21.02 g (0.1 mol) of dibenzoyl (**1**) in 50 ml of *n*-BuOH at intensive stirring.

Further a reaction mixture heat at refluxing for 6 hours, cool up to a room temperature and maintain within 24 hours at 5 ˚C before end of crystallization. An obtained precipitate dry up

Scheme 1

Synthesis of 3-amino-5,6-diphenyl-1,2,4-triazine



1 **2** **3**

and wash out by 100 ml of a mixture Et_2O-hexane (1:1). After drying in vacuum the yield of product **3** has made up 24.05 g (97 %).

M.p. 174.5-175.5 ˚C (lit.: 175 ˚C [5]).

^{1}H NMR spectrum (DMSO-d_6, δ): 7.23 (br s, 2H, NH_2), 7.31-7.37 (m, 7H, Arom), 7.39-7.44 (m, 3H, Arom).

^{13}C NMR spectrum (DMSO-d_6, δ): 127.7, 127.9, 128.9, 129.2, 129.8, 136.2, 136.5, 148.6, 156.1, 161.7.

Mass spectrum, m/z (I_{rel}, %): 248 ($M^{+\cdot}$, 26), 220 (0.5), 178 (100), 165 (5), 152 (6), 126 (2), 103 (10), 76 (23), 59 (11), 43 (18).

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Ефективний синтез 3-аміно-5,6-дифеніл-1,2,4-триазину

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Резюме. Розроблено ефективний та оптимальний підхід до синтезу 3-аміно-5,6-дифеніл-1,2,4-триазину.
Ключові слова: 3-аміно-5,6-дифеніл-1,2,4-триазин, дибензоїл, аміногуанідин бікарбонат.

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