Georgian Scientists

ქართველი მეცნიერები

Vol. 5 Issue 1, 2023

https://doi.org/10.52340/gs.2023.05.01.21

Synthesis of some derivative Quinoxaline.

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Abstract

In order to create medicinal preparations of some pharmacological action we deemed topical to develop an convenient preparative method for the synthesis of new isomeric qunoxalines.

By condensation of 4-chlorophenylenediamine (1) with diphenylethanedione, 6-chloro-2,3-diphenylquinoxaline (2) was synthesized. Quinolinhydrazine (3) was obtained by interaction of the mentioned chlorine products with hydrazine hydrate, and the corresponding 2,3-diphenyl-6-quinoxalinehydrazone was obtained by the action of ethylester of pyruvic acid on the latter.

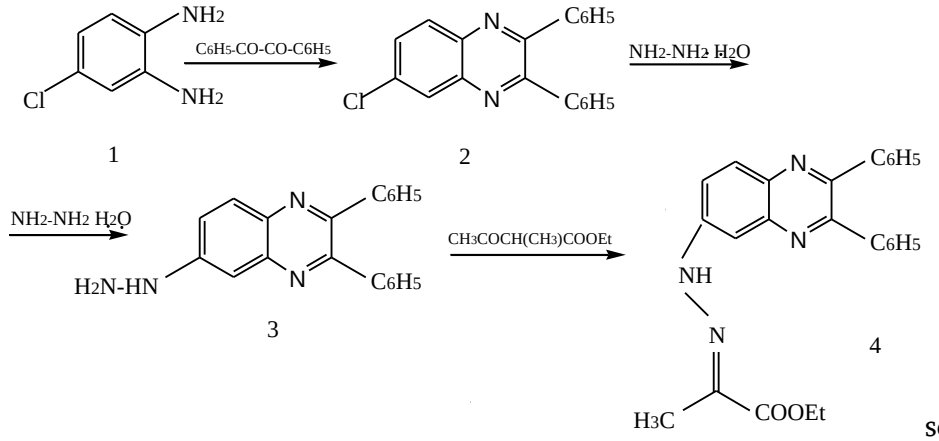
Composition and structure of synthesized compounds is determined by element analysis and physical methods of investigation.

Keywords: *quinoxaline hydrazone, diketones*

As of today a total quantity of medications exceeded hundred thousands and more than a half from here falls on the heterocyclic compounds. That's why it seems that heterocycles are the structural units predetermining biological activity of most important medicinal preparations (cardiac drugs, anticarcinogens, antibiotics, curative alkaloids, their antagonists etc.). According to requirements of practical medicine an increasingly attention is paid to the synthesis of new heterocyclic compounds, study of their properties and biological activity. The interest is getting higher toward such heterocyclic systems, that contain two or more heterocyclic fragment in the molecule[1-2]. Research of such polyheteroaromatic compounds turned to be important and fruitful not only from the viewpoint of development of heterocyclic compound chemistry, but also from practical point of view, since it promotes discovery of new effective medicinal preparations and their practical implementation.

There is relatively scarce information on biological activity of quinoxaline and other heterocycles containing two nitrogens, as well as on their use as medications. Antimalarial and sulfanylamide preparations prepared on the basis of quinoxaline due to their insufficient solubility or toxicity can't satisfy the requirements raised to chemotherapeutic preparations[3-4]. But it should be noted that modification of similar compounds through insertion of functional groups of different nature into their structure, creates definite basis for avoidance of these shortcomings and from the viewpoint of improvement of preparation properties[5-6].

Proceeding from the above mentioned, in order to create medicinal preparations of some pharmacological action we deemed topical to conduct synthesis and study of pyrroloquinoxalines of new condensed heterocyclic systems. These compounds are distinguished by the fact that indole fragment in them is annelated by heterocycle containing two heteroatoms that substantially extend the possibility of task-oriented synthesis of new, effective biologically active substances. Our objective was obtaining qunoxalhydrazone according to the following scheme 1



scheme 1

Experimental section

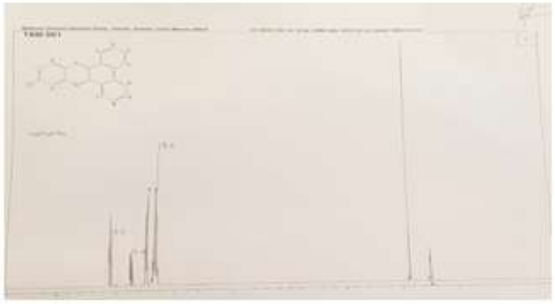
6-chloro-2.3-diphenylquinoxaline (2). A mixture of equimolar (0.1mol) of phenylendiamine and benzyl is heated for 2-3 hours with glasical acetic acid (300ml). The reaction mixture is cooled end poured into cold water (2000ml). A precipitate is formed from the resulting suspension, which is treated with 20% NaOH. The formed precipitate is recrystallized with ethanol. yield 70%. t_{melt}=121^0-123^{0}C.

2,3-diphenyl-6-quinoxaline hydrazine (3), to (0.05 mol.) quinoxaline(2) add (0.5mol.) hydrazine hydrate and heated to 118^{0}C for 35 hours. Then the reaction mixture is cooled to 60^{0}C. Add 25ml of hydrazine hydrate, 25 ml of benzene and heat for 4 hours.The contents of the flask are transferred to a separatory funnel. The lower layer is separated and the upper layer is washed with 25% NaOH solution, then washed twice with water. 1g of activated carbon is added to the benzene solution and boiled for 1 hour. Then filtered and 25 ml conc. HCl added. The crystals obtained are washed with ether. yield 21%.

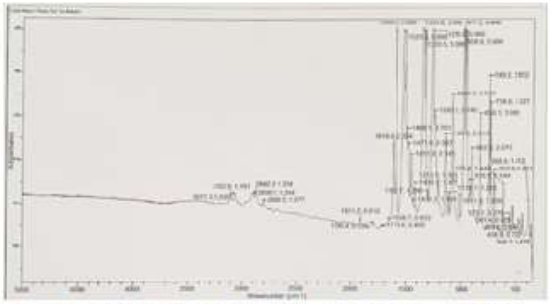
2,3-diphenyl-6-quinoxaline hydrazone (4), 2,3-diphenyl-6-quinoxaline hydrazine (3) is dissolved in 50ml of benzene, 3.5ml of pyruvic acid ethyl ester are added and heated for 1.5hours. Precipitate is filtered and dried, crystallized from alcohol. m.p.181-183^{0}C, yield 11%.

Standard chromatographic (paper and column) methods were used to separate and determine the individuality of the obtained compounds.

Infrared spectra will be captured on a spectrophotometer Thermo Nicolet AVATOR 370 FT-IR. NMR spectra will be taken on the instrument (^{1}H, ^{13}C)Varian Merkury-300 VX Bruker AMX-400



The **NMR** spectra 6-chloro-2,3-diphenylquinoxaline



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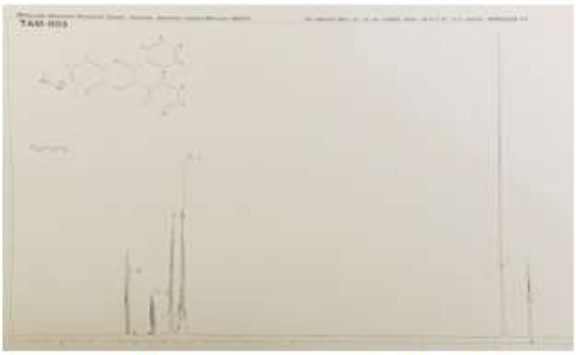
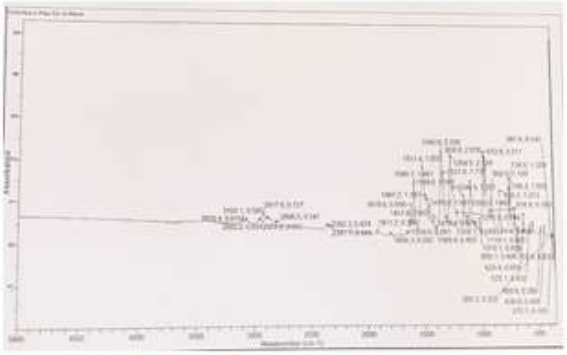


The **NMR** spectra 2,3-diphenyl-6-quinoxalinehydrazine



The IR spectra 2,3-diphenyl-6-quinoxalinehydrazine

References

[1]S.P Singh., D.Kumar. Heterocycles 31 (1990), 31, 855.

[2] S.P Singh., Savita., D.Kumar. Bull. Chem. Soc. Jpn. (1993), 66, 1703

[3]A. Gil., A. Pabon., S.Galiano., A.Burguete., S.Perez-Silanes., E. Deharo., A. Monge and I.Aldana. Molecules 19 (2014), 2166-2180.

[4] D.P. Singh., S.K. Deivedi, and R.G.Singhal. Pharmaceuticals (Basel). 2(2010) 8, 2416-2425.

[5]J.Guillon., S. Moreau., M.Elisabeth and V. Sinou. Bioorganic & medicinal chemistry 16 (2008) 20, 9133-44.

[6] R.Aggarwal., G.Sumran., R. Kumar, and S.P. Singh. General Papers Akivoc XV(2007), 292-302.

ზოგიერთი ქინოქსალინის წარმოებულის სინთეზი

ი.ჯინიყაშვილი, ბ.არზიანი

თბილისის სახელმწიფო სამედიცინო უნივერსიტეტი, სამედიცინო ქიმიის დეპარტამენტი

რეზიუმე

გარკვეული ფარმაკოლოგიური მოქმედების სამკურნალო პრეპარატების შექმნის მიზნით, აქტუალურად ჩავთვალეთ ახალი იზომერული ქინოქსალინების სინთეზის მოხერხებული პრეპარატული მეთოდის დამუშავება.

4-ქლორფენილენდიამინის(1) დიფენილეთანდიონთან ურთიერთქმედებით დასინთეზებულ იქნა 6-ქლორ-2,3-დიფენილქინოქსალინი(2). აღნიშნული ქლორნაწარმის ჰიდრაზინჰიდრატთან ურთიერთქმედებით მიიღებულ იქნა ქინოლინჰიდრაზინი (3), ხოლო ამ უკანასკნელზე პიროყურძენმჟავას ეთილესტერის მოქმედებით შესაბამისი 2,3-დიფენილ-6-ქინოქსალინჰიდრაზონი. ნაერთების სტრუქტურისა და აგებულების დასადგენად გამოყენებულ იქნა კვლევის თანამედროვე ფიზიკურ-ქიმიური მეთოდები,

საკვანძო სიტყვები: ქინოქსალინჰიდრაზონი, დიკეტონები