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A novel synthesis, characterization and antibacterial studies of quinoxaline derivative

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Abstract

A novel synthesis, Characterization and their antibacterial studies of benzoderivative of quinoxaline has been reported. 3-nitro anilines are reacted with chloroacetyl chloride in presence of acetone to give 2-chloro-*N*-(3-nitrophenyl)acetamide which when reacted with 2-amino-4-(4-chlorophenyl)-1,4-dihydrocinnolin-3(2*H*)-one in presence of dry pyridine to give the final target. The structures of synthesized compounds are confirmed by their IR and ¹H-NMR spectral data. Melting point of the compound has been determined by open capillary tube and hence uncorrected. TLC of the compound has been carried out by using *n*-hex:EA (1:1) solvent.

Keywords: Quinoxaline, IR, NMR TLC, Antibacterial activity

Introduction

The important class of paradiazine heterocyclic is quinoxaline derivatives. These are reported to possess a wide spectrum of biological properties such as antibacterial^[1], analgesic^[2], anti-inflammatory^[3], antifungal^[4], antimalarial^[5], antihypertensive^[6], CNS depressant^[7], anticonvulsant^[8], antihistaminic^[9], local anesthetic^[10], antiparkinsonism^[11], anti-viral^[12], antitubercular^[13], anti-cancer^[14] etc. activities.

In this paper a novel synthesis of quinoxaline derivative has been reported.

Synthesis of 2-chloro-*N*-(3-nitrophenyl)acetamide

Procedure

13.8 g (or 0.10 mol) of 3-nitroaniline was taken in a round bottom flask to which 50 ml of acetone was added and mixed thoroughly. The 11.2 g (or 0.10 mol) of chloroacetyl chloride was added drop wise to it with continuous shaking. After complete addition, the reaction mixture was refluxed for 3-4 h. The reaction was monitored by TLC. The reaction mixture was cooled and poured into ice-cold water with continuous stirring. Sodium bicarbonate was added to neutralize the hydrogen chloride liberated during the reaction. The product obtained was filtered, thoroughly washed with water, dried and recrystallised with ethanol.

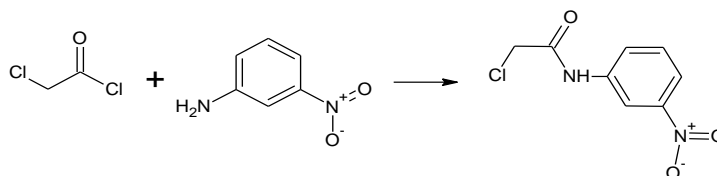


Table 1: physical properties of 2-chloro-*N*-(3-nitrophenyl)acetamide

Mol. formula	Mol. weight	M.P	Recrystallising solvent	% yield	TLC solvent	R _f value
C ₈ H ₇ O ₃ N ₂ Cl	214	115-120°C	Ethanol	36	<i>n</i> -hex:EA (1:1)	0.72

Synthesis of quinoxaline of *p*-diazenederivative

Procedure

The 0.86 g (0.0031 mol) of 1-amino-3-(4-chlorophenyl)quinoxalin-2(1*H*)-one was taken in a round bottom flask and dissolved in 20 ml of dry pyridine then 0.80 g (0.0037 mol) of 2-chloro-*N*-(3-nitrophenyl)acetamide was added and refluxed for 6 h.

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The reaction was monitored by TLC. After the completion of reaction, the contents were cooled and poured into ice-cold water with continuous stirring and kept aside for 10

min, the crystalline solid obtained was filtered at pump, thoroughly washed with water, dried and recrystallised with ethanol.

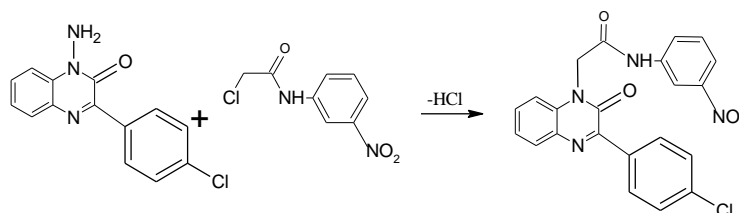


Table 2: physical properties of quinazoline of p-diazene derivative

Mol. formula	Mol. weight	M.P	Recrystallising solvent	% yield	TLC solvent	R _f value
C ₂₂ H ₁₆ O ₄ N ₅ Cl	449	193°C	Ethanol	40	n-hex:EA (1:1)	0.49

Antibacterial activity

The antibacterial activity of newly synthesized quinazoline derivative was evaluated by disc diffusion method against gram-positive *Bacillus subtilis* and *Staphylococcus aureus* and gram-negative *Pseudomonas aeruginosa* and *Escherichia coli*.

The main objectives of this present study to synthesize, characterize and evaluate biological activity of benzodiazene derivative are completed.

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