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SYNTHESIS AND CHARACTERIZATION OF 3-[(5-(2-NITROPHENYL)-1, 3, 4-OXADIAZOL-2-YL) METHYL AMINO]-2-METHYL QUINAZOLIN-4(3H)-ONE

Ramesh Dhani

Department of Pharmaceutical Chemistry, Oil Technological Research Institute, Jawaharlal Nehru Technological University Anantapur, Andhra Pradesh, India

Keywords:
Quinazolinone, Anthranilic acid, 2-methyl 3-amino quinazoline 4(3H) one, Acetyl chloride, Chloro ethyl acetate, Ethanol

Correspondence to Author:

Ramesh Dhani

Department of Pharmaceutical Chemistry, Oil Technological Research Institute, Jawaharlal Nehru Technological University Anantapur, Andhra Pradesh, India

E-mail: dhaniramesh1@gmail.com

ABSTRACT

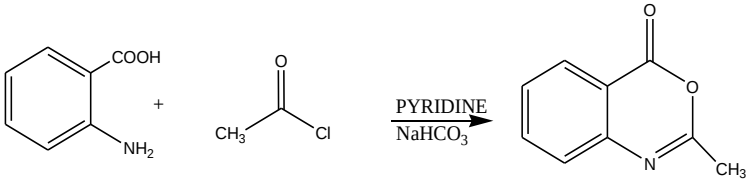
Quinazolinone is a heterocyclic chemical compound. There are two structural isomers, 2-quinazolinone and 4-quinazolinone, with the 4-isomer being the more common. The present survey aims to achieve the synthesis of quinazolinones and their derivatives of specific pharmacological properties. Various novel classes of structurally different quinazolinones have been designed and synthesized depicting potential interventions such as antibacterial, antifungal, antiviral, anticonvulsant, CNS depressant, anti-inflammatory, antihistaminic, anticancer and so on. At present some novel quinazolinone derivatives are synthesized and characterized by IR, H^1 NMR, MASS Spectral studies.

INTRODUCTION: Quinazoline is a bicyclic compound earlier known as benzo- 1, 3-diazine was prepared in the laboratory by Gabriel in 1903. Quinazolinone has been considered as a magic moiety possessing myriad spectrum of medicinal activities. Diversity of biological response profile has attracted considerable interest of several researchers across the globe to explore this skeleton for its assorted therapeutic significance. Various novel classes of structurally different quinazolinones have been designed and synthesized depicting potential interventions such as antibacterial, antifungal, antiviral, anticonvulsant, CNS depressant, anti-inflammatory, antihistaminic, anticancer and so on. Moreover, the nucleus constitutes an integral structural component in a number of drugs currently employed in several clinical therapies [1, 2].

MATERIALS AND METHODS:

1. Preparation of 2-methyl 3amino quinqzolin-4(3H) one IV

Step 1: To a solution of anthranilic acid (0.1mol) is taken in a beaker and pyridine, acetyl chloride (0.2mol) was added. The reaction mixture is stirred continuously at 60°–90°C further followed by 5% of sodium bicarbonate. The solid obtained is recrystalized from ethanol and dried [5, 6].



Anthranilic acid: Acetyl Chloride 2-methyl-4H-benzo [d][1, 3]oxazin-4-one

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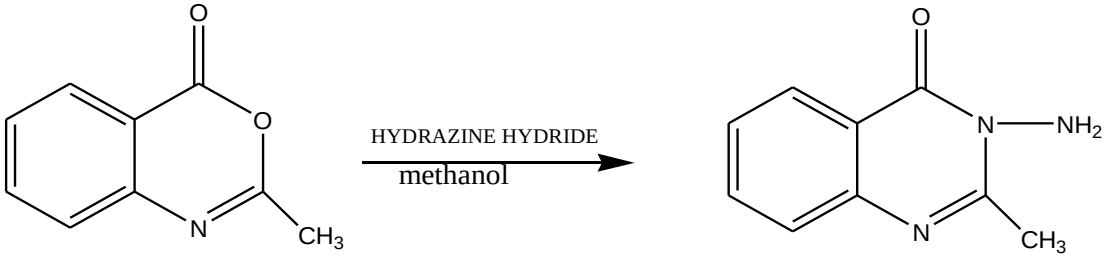
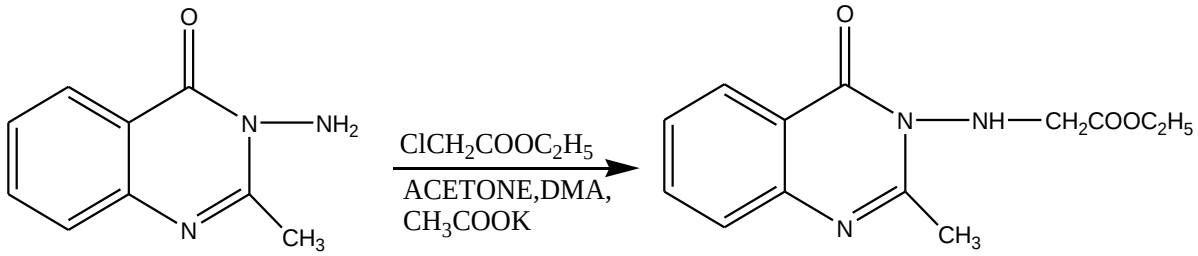
Step 2: A mixture of 2-methyl-4H-benzo[d][1, 3]oxazin-4-one (0.01mole) compound was taken in round bottom flask and treated with hydrazine hydrate in ethanol was refluxed for 3hrs at 60°–90° and the resulting solution was poured in to the crushed ice. A white precipitated was obtained and recrystalized with ethanol and dried [6].



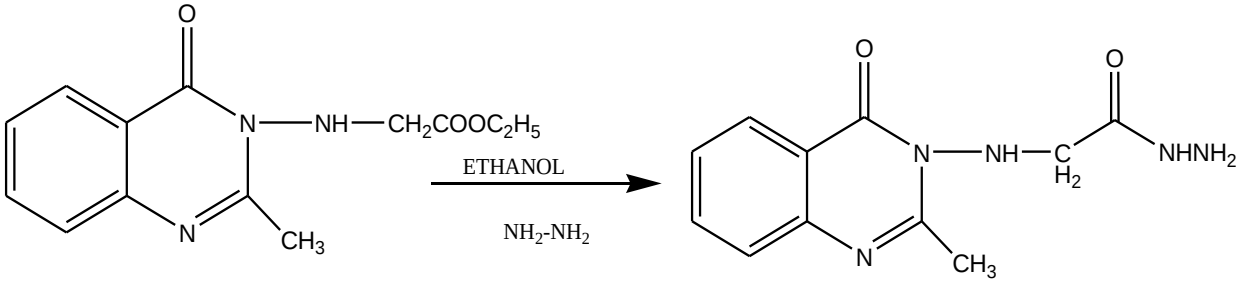
2-methyl-4H-benzo[d][1,3]oxazin-4-one 2-methyl3amino quinqzolin4(3H)one

2. **Preparation of ethyl 2-(4-oxo-2-methyl quinazolin-3(4H)-yl amino) acetate II:** A mixture of 2-methyl 3amino quinqzolin-4(3H)-one compound (0.01mole) was taken in round bottom flask and treated with chloro ethyl acetate (0.01mole), DMA, acetone, potassium acetate, and refluxed for 6hrs and the resulting solution was poured in to crushed ice, precipitated was obtain, filtered and recrystalized with ethanol for two times and dried [7, 8].



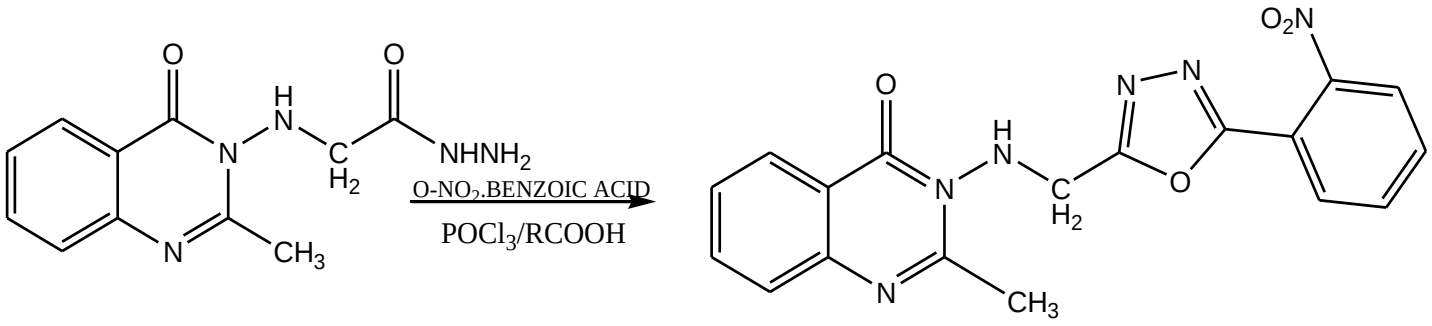
I II

3. **Preparation of 2-(4-oxo-2-methylquinazolin-3(4H)-yl-amino)aceto hydrazide III:** A Mixture of ethyl 2-(4- 0xo- 2-methyl quinazolin-3(4H)-yl-amino) acetate (0.01mole) was taken in round bottom flask and treated with hydrazine hydrate (0.01mole), in ethanol refluxed for 3hrs at 60°–90°C and the resulting solution was poured in to crushed ice, precipitated was obtain, filtered and recrystalized with ethanol for two times and dried [9].



II III

4. **Preparation of 3-((5-*(2-nitrophenyl)*-1, 3, 4-oxadiazol-2-yl)methylamino)-2-methylQuinazolin-4(3H)-one IV:** A mixture of *2-(4-oxo-2-methylquinazolin-3(4H)-yl-amino) aceto hydrazide* compound (0.1mol) treated with o-nitro benzoic acid in $POCl_3$ was refluxed for 5hrs at 60°–90° and the contents were cooled and poured in to crushed ice.then it was neutralized with $NaHCO_3$ solution and resulting solid was filtered and recrystalized with ethanol and dried.



III **IV**

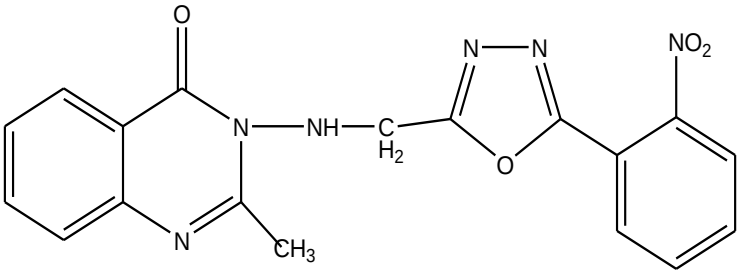
Observations:

TABLE 1: PHYSICAL AND ANALYTICAL DATA OF SYNTHESIZED COMPOUNDS

S. no.	Compound	M.P	Yield	TLC	R_f Value
1.	I	220°c	65%	hexane: ethyl acetate (1:1)	0.33
2.	II	477°c	59%	hexane: ethyl acetate (1:1)	0.62
3.	III	501°c	58%	hexane: ethyl acetate (1:1)	0.30
4.	IV	654°c	65%	hexane: ethyl acetate (1:1)	0.68

RESULTS AND DISCUSSION: The synthesized quinqzoline derivatives further studied for characterization of UV, IR, NMR and Mass. To study the structure-activity relationship and to optimize the structure.

3-((5-(2-nitrophenyl)-1, 3, 4-oxadiazol-2-yl) methylamino)-2-methylquinazolin-4(3H)-one



1. **IR spectrum:** The IR spectrum of the compound IV was recorded on FTIR spectrometer by KBr method. The FTIR spectra from the figure.1 and the **table 2** shows bands at 3413.70cm^{-1}, 3154.50cm^{-1}, 1601.50cm^{-1}, 1116.20 cm^{-1} , 912.50 cm^{-1} and 1681.20 cm^{-1} corresponds to 2° amine, aromatic C-H (stretch), Imine (C=N), C-O-C, C-NO_2 and quinazolinone (C=O) respectively.

IR frequencies:

TABLE 2: IR VALUES OF COMPOUND IV

Compound	Types of vibration	Wave number [cm^{-1}]	
		Observed value	Standard value
IV	N-H stretch	3413	3450
	C-HStretch (aromatic)	3154	3090
	C=O(quinazolinone)	1681	1665
	C-O-C	1116	1580
	C=N stretch	1601	1163
	C-NO_2	912	901

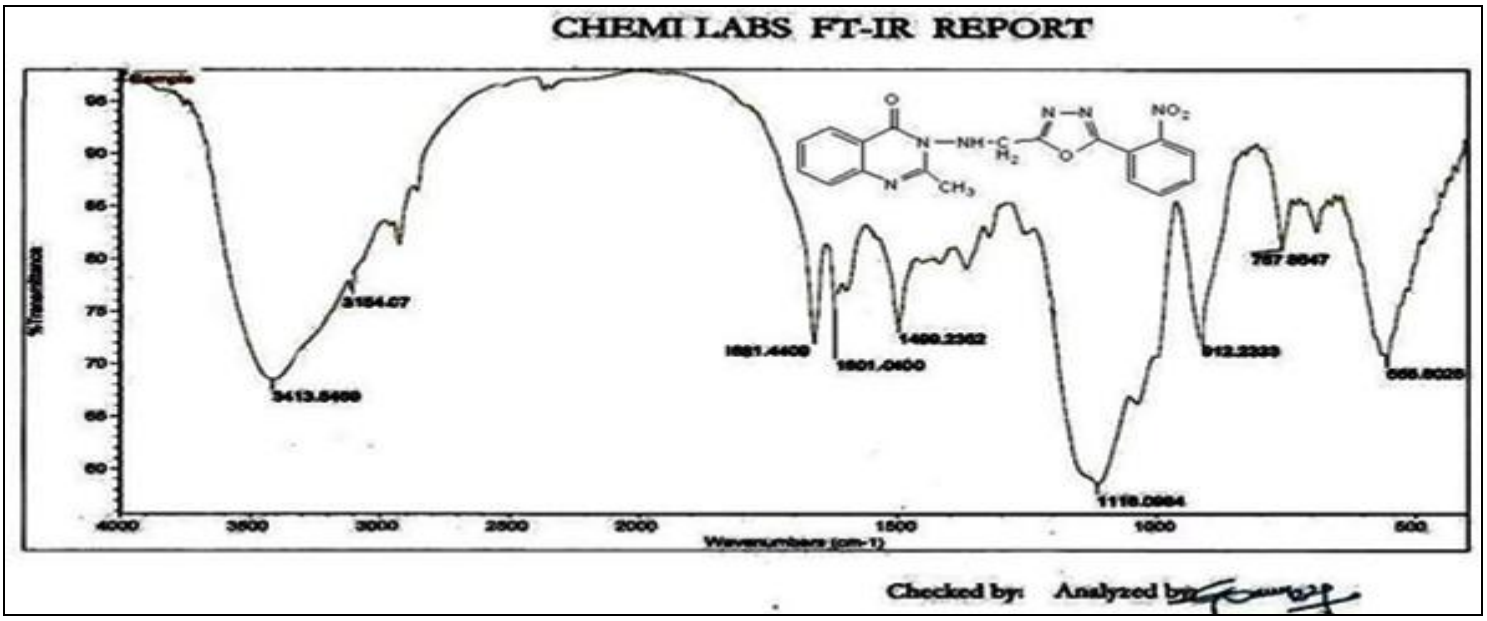


FIGURE 1: IR FOR COMPOUND 3-((5-(2-NITROPHENYL)-1,3,4-OXADIAZOL-2-YL) METHYL AMINO)-2-METHYL QUINAZOLIN-4(3H)-ONE IV

2. **Proton Magnetic Resonance Spectrum:** The ^1H NMR spectrum was recorded on JMR spectrometer using TMS as internal standard and DMSO as solvent. The ^1H NMR spectrum of compound IV shown in **figure 2** and **table 3** showed singlets at δ 2.85 (3H, S, CH_3) which represent the methyl group, singlets at δ 4.85 (2H, S, CH_3) which represent the methylene group and at δ 6.7 (1H, S, N-H) which represent the N-H group. It showed multiplets at δ 7.1-7.9(8H, M, Ar-H) which represent the aromatic protons.

TABLE 3: ^1H NMR VALUES OF COMPOUND IV

Compound	Types of proton	Nature of signal	Δ value (ppm)		No.of ^1H
			Observed value	Standard value	
IV	Aromatic	Multiplet	7.1-7.9	6.5-7.7	8
	NH-	Singlet	6.7	5.0-6.0	1
	CH_2	Singlet	4.8	4.22	2
	CH_3	Singlet	2.8	2.6	3

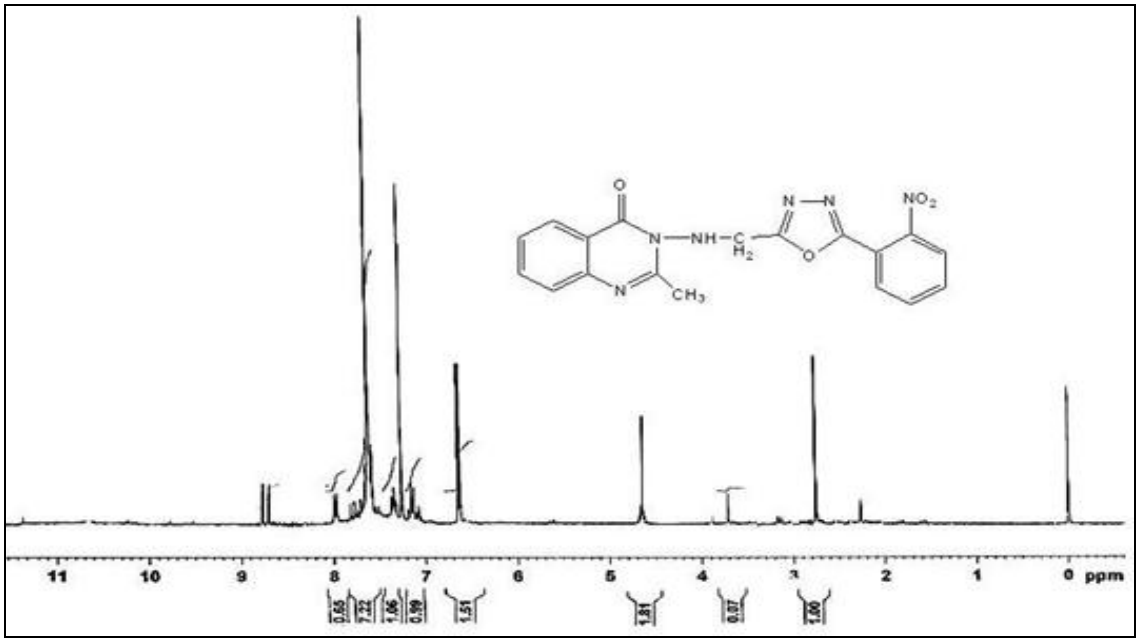


FIGURE 2: ^1H NMR FOR COMPOUND 3-((5-(2-NITROPHENYL)-1, 3, 4-OXADIAZOL-2-YL) METHYL AMINO)-2-METHYL QUINAZOLIN-4(3H)-ONE IV

CONCLUSION: The synthesized quinqzolinone derivatives characterized by IR, NMR and Mass spectral studies. By this studies find the structure-activity relationship and to optimize the structure.The synthesized quinazolinone derivative i.e., 3-((5-(2-nitrophenyl)-1, 3, 4-oxadiazol-2-yl) methyl amino)-2-methylquinazolin-4-(3H)-one was confirmed by physicochemical and spectral analysis.

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