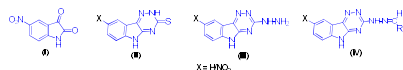


Abstract

1,2,4-triazino[5,6-b]indole derivatives have variety of pharmacological activities and extensively used for the treatment of different diseases. This project's purpose is to develop biologically active 1,2,4-triazino[5,6-b]indole derivatives. 3H-1,2,4-triazino [5,6-b] indole-3-thione variants (**I**) were made by fusing equimolar concentrations of isatin-analogues and thiosemicarbazides in the presence of K_2CO_3 , while 3-Hydrazino-1,2,4-triazino [5,6-b] indole derivatives (**III**) were prepared using an equimolar mixture of (**II**) and hydrazine hydrate. A series of hydrazones were prepared by condensation of different aromatic aldehydes with (**III**) by refluxing in ethanol. The synthesized compounds were characterized by different analytical techniques.



Keywords: 1,2,4-triazino[5,6-b]indole, Isatin, 5-Arylfuran-2-aldehydes, Condensation reaction

Introduction

It is a heterocyclic-aromatic compound and used in the synthesis of many organic compounds having many pharmaceutical effects and has much importance in history of Chemistry as well as in life. Because they are purine analogues, they are assumed to have pharmaceutical impact by interfering with DNA metabolism. Each atom is sp^2 -hybridized and planar in symmetry. Its structure is composed by fusing two heterocyclic rings such as 1,2,4-triazine ring and indole ring. These geometries are organic cyclic frameworks with one or more hetero-atoms in the ring other than C and H atoms.

Background of Study

Metwally & Bondock reported the formation of 3-Hydrazino-1,2,4-triazino[5,6-b]indole. 1,2,4-triazino[5,6-b]indole-3-thione was prepared by condensing isatin with thiosemicarbazide in the presence of K_2CO_3 . Reaction of resulting compound with hydrazine hydrate created the objective compound in good yield (Metwally & Bondock, 2011).

In 1925, Calvey reported the nitration of isatin at the C-3 position using fuming nitric acid in concentrated sulfuric acid. However, a more convenient method to synthesize 5-nitroisatin involves the dropwise addition of a solution of isatin in sulfuric acid to a solution of potassium nitrate dissolved in concentrated sulfuric acid at $0-4^\circ C$ (Clay 2014).

Rashed et al., reported the preparation of hydrazone. A solution of (5-Methyl-1,2,4-triazino[5,6-b]indole-3-yl)hydrazine in EtOH was mixed with a solution of aldehyde in EtOH and a few drops of AcOH. After 1 hour of reflux heating, red crystals of hydrazone were isolated out in 60% yield (Rashed et al., 1998; Hamid⁺, 2013; Mohammed A E Shaban et al., 2000).

Objectives

- Cost-effective and efficient synthesis of 5-Nitroisatin and 3-Hydrazino-1,2,4-Triazino-[5,6-b] Indole derivatives with high yield
- Synthesis of pharmaceutical products for healthy life

Significance of the Study

- 1,2,4-triazino[5,6-b]indole derivatives have variety of pharmacological activities
- Extensively used for the treatment of various disease



Synthesis, Characterization and Medicinal Applications of 3-Hydrazino-1,2,4-Triazino-[5,6-b] Indole Derivatives

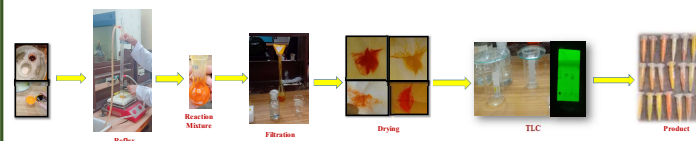
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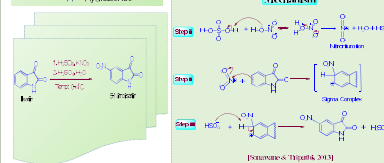
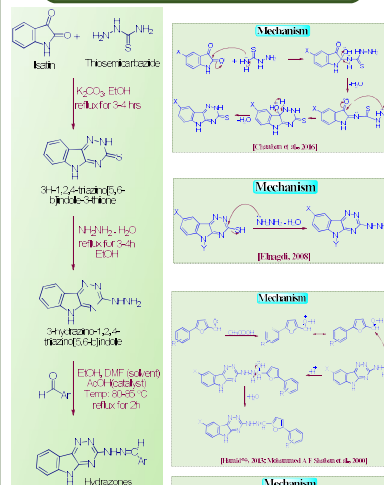
4-6 October 2022

Methodology

Reflux apparatus was used for the synthesis of target products. Then the product is filtered, recrystallized, dried and characterized



Synthesis and mechanism of 3-Hydrazino-1,2,4-Triazino-[5,6-b] Indole Derivatives



Results and Discussion

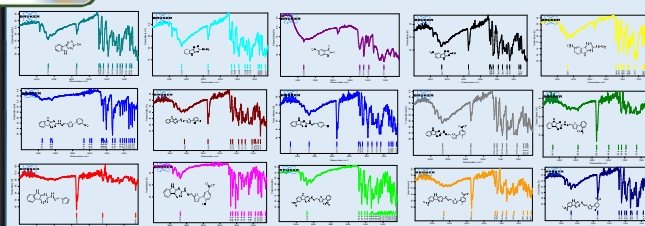
Fifteen compounds have been synthesized. Their structural formulas, yields, colors, and FTIR spectra have been given below:

Compound No.	Synthesized Compounds	Yield	Color
I	Isatin-3-thiosemicarbazide	51%	Orange
II	3-H-1,2,4-triazino[5,6-b]indole-3-thione	95%	Orange
III	3-Hydrazino-1,2,4-triazino[5,6-b]indole	76%	Yellow
IV	3-H-1,2,4-triazino[5,6-b]indole-3-thione	66%	Yellow
V	3-Hydrazino-1,2,4-triazino[5,6-b]indole	75%	Yellow

Compound No.	Synthesized Compounds	Yield	Color
VI	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	39%	Brown
VII	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	87%	Ginger Orange
VIII	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	62%	Yellow
IX	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	69%	Orange
X	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	26%	Orange

Compound No.	Synthesized Compounds	Yield	Color
XI	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	70%	Yellow
XII	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	96%	Candlelight Orange
XIII	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	60.5%	Yellow
XIV	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	74%	Yellow
XV	(E)-3-Hydrazino-1,2,4-triazino[5,6-b]indole-3-thione	82%	Yellow

FTIR Spectra



Conclusion

☐ Syntheses of fifteen compounds with high purity and excellent yield

Future Plans



- ☐ DFT Study
- ☐ Biological Evaluation
- ☐ Creation of new hetero systems with reliable biological applications

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