International Journal of Pharmacognosy and Chemistry

Research Article

BLEND, PORTRAYAL AND NATURAL ASSESSMENT OF SOME EPIC PYRIDINE CONTAINING AZETIDINONE SUBORDINATES

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Abstract

Six epic Pyridine containing azetidinone subordinates (Azetidinone II A-F) have been blended from Schiff base by treating 2-aminopyridine with substituted sweet-smelling aldehydes each were taken equimolar fixation within the sight of frigid acidic corrosive as an impetus utilizing Grindstone method. Further Schiff base include triethanol amine, chloroacetyl chloride and 1, 4-dioxane experiences buildup pursued by end response result into novel pyridine containing azetidinone subsidiaries. The recently integrated subordinates were described by utilizing spectroscopic techniques (IR, 1H-NMR, MASS) and screened for chosen rheumatoid joint pain.Every one of the subordinates were screened for rheumatoid joint inflammation action by in-vitro examines (protein denaturation measure) utilizing Indomethacin as a standard. The consequences of rheumatoid joint pain action have show increasingly strong movement is compound II C when contrast with standard and shows less intense action is compound II A.

Keywords: Azetidinone, Pyridine, Rheumatoid arthritis, Schiff base.

Article Info

Received: 19-04-2020

Revised: 15-06-2020

Acepted: 22-06-2020

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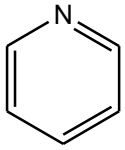
INTRODUCTION

PYRIDINE

Pyridine is a basic heterocyclic organic compound of the chemical formula C_5H_5N. It is structurally related to benzene with one methyne group (=CH-) replaced by a nitrogen atom. The pyridine ring occurs in many important compounds, including azines and the vitamins, niacin and pyridoxine.It was concluded that pyridine has been derived from benzene and its structure might be obtained by replacing a CH moiety with a nitrogen atom. In the year 1876, William Ramsay synthesized this compound by combining acetylene and hydrogen cyanide, a red-hot iron-tube furnace was used to carry out the reaction. It was the ever first synthesis of a hetero-aromatic compound. Pyridine became an interesting target in 1930 with the importance of niacin for the treatment of dermatitis and dementia [1,2].



pyridine

Figure 01: Pyridine

AZETIDINONE

2-Azetidinone is normally known as beta-lactams are notable heterocyclic mixes. Parent heterocyclic ring of azetidinones is azetidine. Azetidine is a 4 part heterocyclic ring framework with nitrogen as hetero particle. 2-Azetidinones comprises of a carbonyl gathering on second position. Azetidinone can be set up from Schiff's bases, which are the buildup results of aldehydes or ketones and amino acids mixes. Azetidinones are significant class of mixes having wide scope of organic exercises, for example, hostile to tumor, anticancer, calming, rheumatoid joint pain, pesticide chemical inhibitor and cholesterol assimilation inhibitor [3,4].

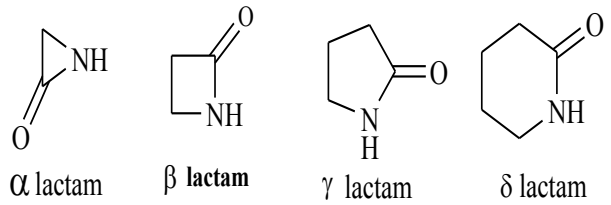


Figure 02: Structures of Lactams

SCHIFF BASES

The buildup of essential amines with carbonyl mixes was first detailed Schiff and the buildup item are regularly alluded to as Schiff bases. The general structure of these bases is given beneath. Where R, R1 and R2 are H, alkyl, cyclohexyl, aryl or heterocyclic radicals, who might be different substituted. General structure of Schiff base can be seen in Figure 3.

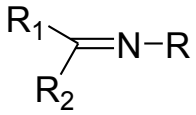


Figure 03: General structure of Schiff base

Schiff bases are also called as anils, imines or azo methines. Various studies have been shown that the >C=N group has considerable biological importance. Where R, indicates may be an alkyl or an aryl moiety. Schiff bases that contain aryl substituents are substantially more stable and more readily synthesized when compare to alkyl moieties and which are relatively unstable. The main mechanism of Schiff bases is Nucleophillic addition to the carbonyl moiety. General synthesis of Schiff base can be seen in Figure 4 [5-8].

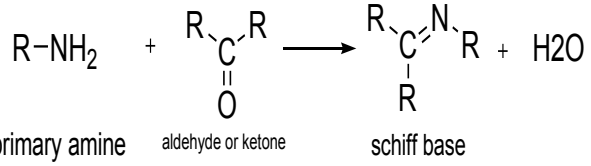


Figure 04: General synthesis of Schiff base

MATERIALS AND METHODS

All the chemicals and solvents used were of synthetic grade from finer chemicals Ltd., (Mumbai, India), E. Merck, SD Fine-Chemicals. Melting points were determined in open capillary tubes using melting point apparatus and are uncorrected. Purity of the compound was verified by single spot in TLC using F254, 0.25mm aluminum plates with mobile phase n-hexane and ethyl acetate (8:2, 7:3). The IR spectra were recorded on **SCHIMADZU FT-IR SPECTROPHOTOMETER** by using 1% potassium bromide discs.

EXPERIMENTAL METHODOLOGY

Step: 1 ***Synthesis of Schiff base by Grind stone method***

Take equimolar concentration of 2-amino pyridine (0.01 mol) and substituted aromatic aldehydes (0.01 mole) into a mortar, to this add 2-3 drops of Glacial acetic acid and 5 ml water. The reaction was grinded for 15-30 min. The reaction was monitored by TLC. After completion of reaction add 25 ml of water and stirred product for 5 min. separated out crude solid

product was filtered, washed with water and recrystrallized from ethanol to give the corresponding Schiff bases [9,13].

Step: 2 Synthesis *of pyridine containing Azetidinone derivative:*

To the Schiff base compound (0.01 mol), add triethylamine (2-3 drops) and chloroacetyl chloride (0.02 mol) and 1,4-dioxane were added drop by drop, stir the mixture for 1 hr, further the reaction mixture refluxed for 3- 6 hr the reaction was monitored by TLC. The reaction mixture was cooled and poured into ice. The solid mass obtained then it was filtered and recrystrallized by using ethanol. The scheme & subordinates for the synthesis of "some epic pyridine containing azetidinone subordinates" can be seen in Figure 5 and Table 01 [14-20].

SYNTHETIC SCHEME

SCHEME:

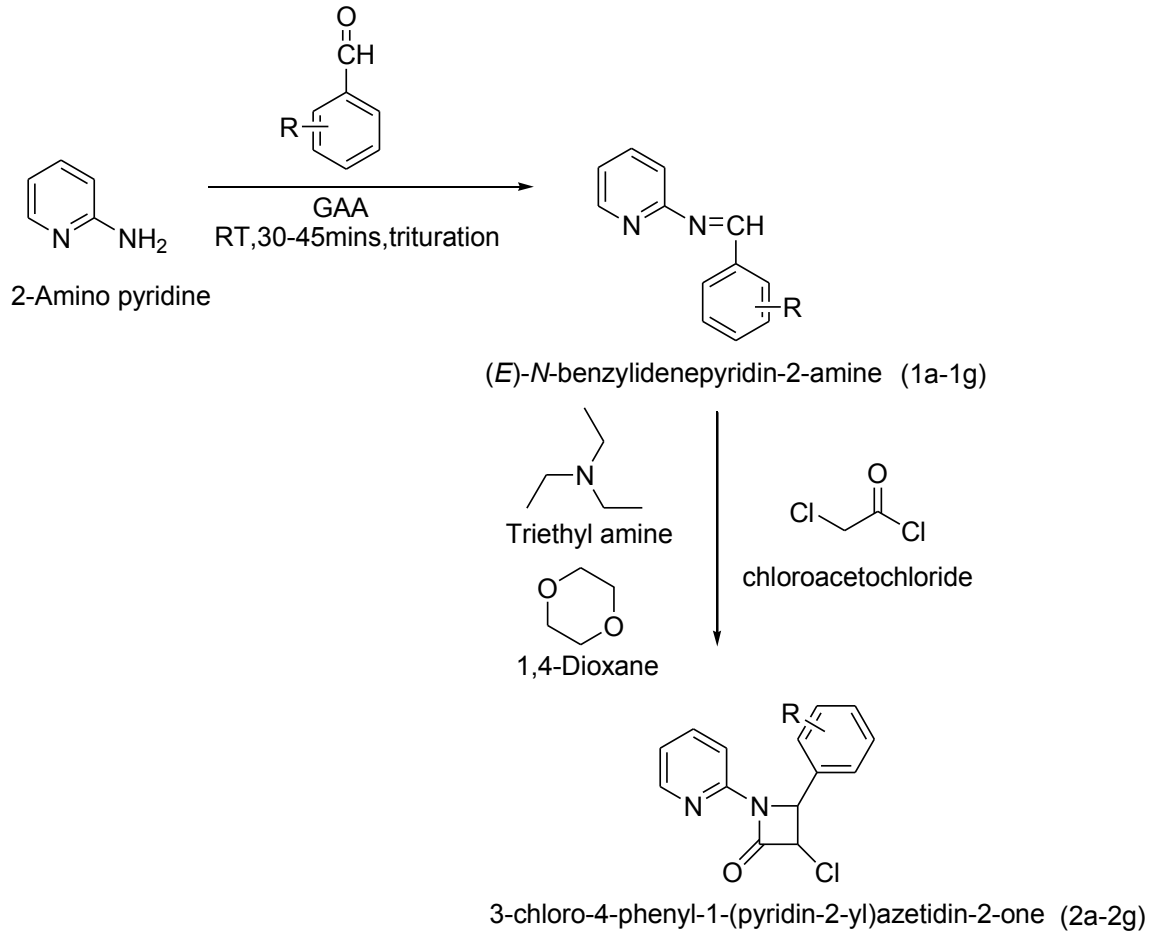


Figure 05: Scheme for Azetidinone derivatives

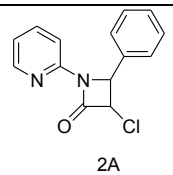
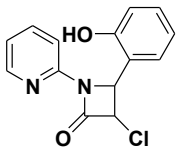
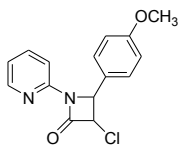
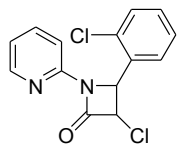
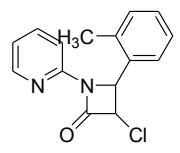
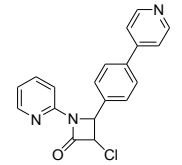
2A	2B	2C	2D	2E	2F
 2A					

Table 10: *Derivatives of Azetidinone*

CHARACTERIZATION

COMPOUND (2A)

IR (KBr in cm^{-1})

C=C Stretch1899.58, C-C Stretch 1175.01, C=N Stretch 1659.83, CH_2 Stretch 1343.16, O=C-NH_2 Stretch 1659.83.

^{1}H NMR Chemical shift (δ, ppm)

δ=2.0,81.8 (CH_2, 2H, doublet), δ=2.35 (Ar CH_3, 3H, S), δ=8 (S, secondary amide of pyrimidine ring), δ=3.9(triplet, CH_2 of pyrazole ring), δ=7.3–7.6(Ar-H, 5H, doublet), δ=7.14–7.3 (Ar-H, 5H, doublet).

Mass

Base peak 283.0001, Molecular ion peak 383.000.

COMPOUND (2B)

IR (KBr in cm^{-1})

OH Stretch 3342, Ar C=C Stretch 1514.25, Ar C-C Stretch 1251.70, Aromatic O=C-NH_2 Stretch 1636.83, CH3 Stretch 2930.22.

^{1}H NMR Chemical shift (δ, ppm)

δ=7.3–7.6 (Ar-H, 5H), δ=2.0 (CH_2, 2H, Methylene of pyrazole ring doublet), δ=2.35 (Ar-CH_3, 3H, singlet), δ=8 (1H, 20 amine of pyrimidine ring), δ=7.01–7.18 (Ar-H, 4H, Doublet), δ=6.68–6.95 (Ar-H, 5H, Doublet), δ=5.0 (Ar-C-OH).

Mass

Base peak 105.2000, Molecular ion peak 430.2000.

Compound (2C):

IR (KBr in cm^{-1})

Cl (halogen) Stretch 750.75, C=N Stretch 1438.14, Ar O=C-NH_2 Stretch 1612.17, C=O Stretch 1700.33, Aromatic –CH Stretch 3000.52, -NH- Stretch 3200.

^{1}H NMR Chemical shift (δ, ppm)

δ=2.0, 1.8 (CH_2, 2H, doublet), δ=8 (1H, 2^0 amide of pyrimidine ring), δ=7.06–7.22 (Ar-H, 4H, doublet), δ=5.0 (Ar-C-OH).

Mass

Base peak 227.10004, Molecular ion peak 450.5000.

Compound (2D)

IR (KBr in cm^{-1})

Cl (halogen) Stretch 780.97, C=N Stretch 1514.52, Aromatic O=C-NH_2 Stretch 1599.20, CH_3=O Stretch 1089.98, C-C Stretch 1251.84.

^{1}H NMR Chemical shift (δ, ppm)

δ=2.0 (CH_2, 2H, doublet), δ=8.0 (1H, 2^0 Amide), δ=6.72 (Ar-H, 1H, doublet), δ=3.9 (CH of pyrazoline), δ=3.73 (alpha CH_3).

Mass

Base peak 239.2000, Molecular ion peak 464.5000.

Compound (2E)

IR (KBr in cm^{-1})

Ar C=C Stretch 1661.59, Ar C-C Stretch 1515.58, CH_3=O Stretch 1309.90, C=N Stretch 1601.36.

RESULTS AND DISCUSSION

Anti-Arthritic Activity

Anti-arthritic activity of the synthesized derivatives was performed by the evaluating of the joint diameter method and the results were tabulated Table 2 and Figure 6.

Table 02: *In-Vitro* Results Anti-arthritic Of Indomethacin (Standard)

Compound	Joint diameter in mm
2 A	1.6±0.06
2 B	2.2±1.96
2 C	2.5±0.03
2 D	2.1±0.91
2 E	2.0±0.14
2 F	1.8±0.03
Indomethacin	0.9±0.03

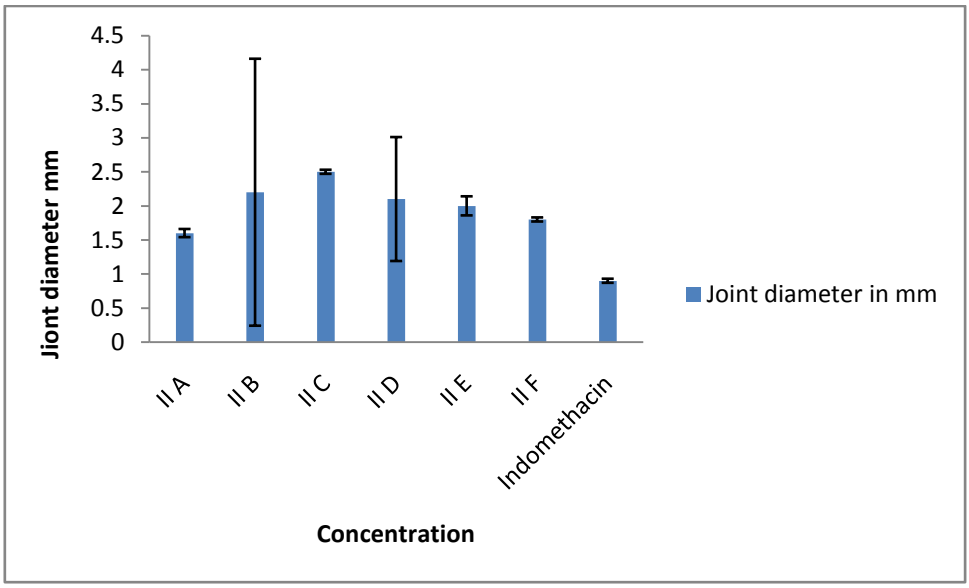


Figure 06: Joint Diameter Methods

DISCUSSION

In the present work six subsidiaries containing pyridine intertwined azetidinones were orchestrated by utilizing straight combination. The union includes predominantly two stages. In the initial step blend of the subordinates were performed by utilizing toil stone procedure, in this 2-amino pyridine with various sweet-smelling aldehyde, for example, Benzaldehyde, Anisaldehyde, salicyldehyde, 4-methyl Benzaldehyde, 2-chlorobenzaldehyde, 4-chlorobenzaldehyde, within the sight of icy acidic corrosive to get Schiff base subsidiaries they acquired yield was around 68%. The subsequent advance is Nucleophilic acylation response between different Schiff base subordinates

and chloroacetylchloride within the sight of triethylamine and 1, 4-dioxane to get pyridine containing azetidinone subsidiaries and the got yield was around 45-74%.

All the recently integrated mixes were assessed for hostile to joint. Hostile to ligament action of incorporated mixes was performed by the assessing of the joint distance across strategy. The reaction to the joint breadth technique gives a helpful trial model of joint distance across in mm which has been generally utilized for assessing in-vitro hostile to ligament drugs. Be that as it may, from the acquired outcomes by hostile to ligament action it was discovered that compound 2-A, 2-B, 2-C, 2-D, 2-E and 2-F showed great level of hindrance when contrasted with standard medication at grouping of 1µg of Indomethacin. The above outcome demonstrated that compound II-C indicated most elevated action among all the orchestrated mixes.

CONCLUSION

Six subsidiaries of 3-chloro-4-phenyl-1-(pyridine-2-yl) azetidine-2-one have been incorporated in high virtue and in great yields. The synthetic structures of the blended mixes were affirmed based on physical and IR, 1HNMR and Mass phantom information. Pyridine melded Azetidinone were gotten from stage 1 compound by response with Triethylamine, chloroacetylchloride and 1, 4-dioxan. The mixes were screened for hostile to ligament action by utilizing joint distance across technique; The mixes 2-A, 2-B, 2-C, 2-D, 2-E and 2-F in this 2-C displays critical joint distance across to contrast and the standard medication Indomethacin.

ACKNOWLEDGEMENT

The authors are thankful to the secretary Shri. C.Gangi Reddy garu through the Principal, Annamacharya College of Pharmacy, Rajampet, A.P for providing necessary facilities to carry out research work successfully.

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