



Synthesis and Characterization of Schiff Bases, N-(4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl)pyrimidin-2-yl)-1-(aryl) methanimine from 4-(5-bromothiophene-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine.

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Abstract-

In the present study a series of new Schiff bases were synthesized by the condensation of 4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine with various aromatic aldehydes in presence of glacial acetic acid in ethanol. The 4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine was prepared by refluxing 1-(5-bromothiophen-2-yl)-3-(4-methoxyphenyl) prop-2-en-1-one, guanidine hydrochloride and alkali in ethanol. The 1-(5-bromothiophen-2-yl)-3-(4-methoxyphenyl) prop-2-en-1-one was prepared by reacting equimolar quantity of 4-methoxybenzaldehyde and 2-acetyl-5-bromothiophene in presence of alkali in ethanol. All newly synthesized compounds were characterized by spectroscopic data.

Key wards - Pyrimidine, Schiff Bases, Spectral analysis

I. INTRODUCTION

Antibacterial drugs prevent microbial growth and survival without seriously harming the host. Around the world, the number of infectious diseases that can be fatal and are brought on by germs that are resistant to many drugs is rising daily. The management of infectious diseases is now severely hampered by the rise of antibiotic resistance. However, resistance to at least one bacterial infection was identified for the majority of antibacterial drugs used in clinical practice. But during a 5-year period, their therapeutic relevance was drastically reduced from the market due to the organism's development of resistance to particular bacteria-antibiotic combinations [1]. To combat the issues caused by microbial resistance, it is vitally necessary to develop novel, efficient, and safe antimicrobial agents.

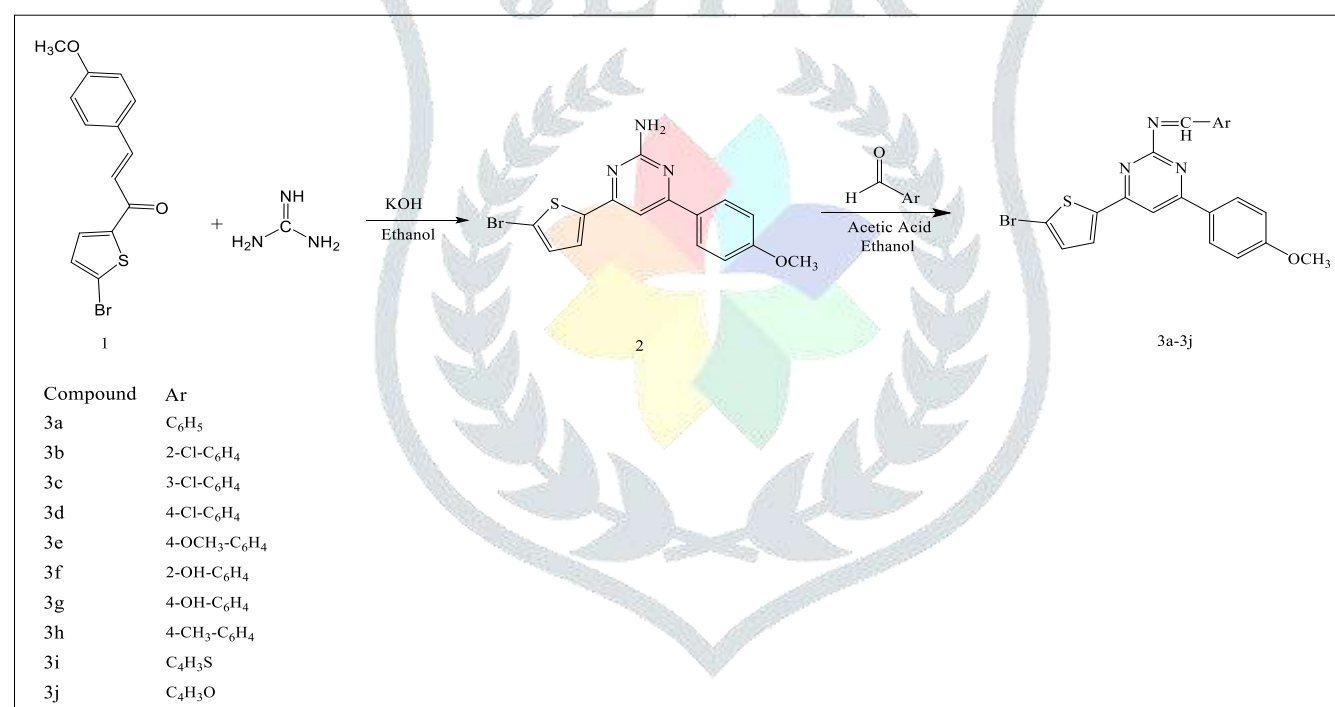
Pyrimidines are the important heterocyclic compounds containing two nitrogen atoms at positions 1 and 3 in the six-membered rings. Cytosine, thymine, and uracil, the pyrimidine bases have long been recognized as being crucial components of nucleic acid. Additionally, pyrimidine rings are also present in a

variety of organic compounds. Moreover Pyrimidine bearing heterocyclic compounds are associated with wide range of biological activities, such as antibacterial [2, 3], anticancer [4, 5, 6, 7], antiinflammatory [8], and antitubercular [9]. Schiff bases containing various heterocyclic scaffolds covers a wide range of biological activities such as antimicrobial [10, 11], antifungal [12, 13], antiinflammatory [14], anticancer [15], antioxidant [16] and antiviral [17]. Moreover Schiff bases have the potential to form stable complexes with metal ions, Schiff base ligands are crucial to the development of Schiff base complexes. Many Schiff base complexes exhibit excellent catalytic activity in a variety of reactions. Therefore it seems interesting to synthesize the Schiff bases containing pyrimidine moiety. In present work we describe the synthesis and characterization of Schiff bases derived from pyrimidine.

II. MATERIALS AND METHODS

All the chemicals were procured from Sigma Aldrich and SDFINE chemicals and used without further purification. Melting points were determined in open capillary tube and are uncorrected. The progress of the reactions as well as purity of the compounds was monitored by thin layer chromatography with F-252 silica gel pre-coated aluminium sheets using petroleum ether-ethyl acetate (9:1) as a developing solvent and spots were visualized with near UV light and Iodine. The IR spectra were recorded on SHIMADZU spectrophotometer using KBr pellets and expressed in cm^{-1} . The NMR spectra were recorded on BRUKER ADVANCE (400 FT-NMR) spectrophotometer in DMSO using tetramethylsilane as an internal standard. Chemical shift values are expressed in δ ppm.

Scheme



i) Synthesis of 4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine-

Compound 4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine was prepared from 1-(5-bromothiophen-2-yl)-3-(4-methoxyphenyl)prop-2-en-1-one by the reported method [18].

ii) Synthesis of Schiff bases (3a-3j)-

0.01 mol of 4-(5-bromothiophen-2-yl)-6-(4-methoxyphenyl)pyrimidin-2-amine (2) and 0.01 mol of aromatic aldehydes were dissolved in 20 ml of ethanol followed by addition of 2-3 drops of glacial acetic acid. The reaction mixture was refluxed for about 3-8 hours and then cooled at room temperature. The solid thus obtained separated by filtration, washed with ethanol, dried and purified by recrystallization from ethanol.

Table - Analytical data of the Schiff Bases (3a-3j)

Sr. No.	Compound	Ar	Molecular Formula	Colour	Melting Point in °C	% Yield
1	3a	C ₆ H ₅	C ₂₂ H ₁₆ BrN ₃ OS	Yellow brown	128	57
2	3b	2-Cl-C ₆ H ₄	C ₂₂ H ₁₅ BrClN ₃ OS	Brown	134	64
3	3c	3-Cl-C ₆ H ₄	C ₂₂ H ₁₅ BrClN ₃ OS	Brown	132	60
4	3d	4-Cl-C ₆ H ₄	C ₂₂ H ₁₅ BrClN ₃ OS	Pale brown	140	58
5	3e	4-OCH ₃ -C ₆ H ₄	C ₂₃ H ₁₈ BrN ₃ O ₂ S	Yellow	124	66
6	3f	2-OH-C ₆ H ₄	C ₂₂ H ₁₆ BrN ₃ O ₂ S	Yellow	142	50
7	3g	4-OH-C ₆ H ₄	C ₂₂ H ₁₆ BrN ₃ O ₂ S	Yellow	148	67
8	3h	4-CH ₃ -C ₆ H ₄	C ₂₃ H ₁₈ BrN ₃ OS	Yellow	136	65
9	3i	C ₄ H ₃ S	C ₂₀ H ₁₄ BrN ₃ OS ₂	Brown	129	68
10	3j	C ₄ H ₃ O	C ₂₀ H ₁₄ BrN ₃ O ₂ S	Brown	135	63

III. RESULTS AND DISCUSSION

The series of Schiff bases was prepared from 4-(5-bromothiophene-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine (2) according to synthetic route as shown in the scheme. The compound 4-(5-bromothiophene-2-yl)-6-(4-methoxyphenyl) pyrimidin-2-amine (2) was prepared from the corresponding chalcone (1) by the reported method. Structures of all the newly prepared Schiff bases were confirmed by the presence of strong signal at around 1643 cm⁻¹ for HC=N group in the IR spectrum. And ¹H-NMR spectrum which, shows the sharp singlet's at δ 10 ppm for proton of HC=N group of Schiff bases, singlet at 4.2 ppm for -OCH₃ and multiples for aromatic protons were observed in the range of 6.7-7.9 ppm.

IV. CONCLUSION

A series of new Schiff bases (3a-3j) was prepared from the corresponding pyrimidines (2) in good yield. The newly synthesized compounds were characterized on the basis of IR and ¹H-NMR spectral data. This series of Schiff bases may be of great interest with respect to biological activity.

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