International Journal for Pharmaceutical Research Scholars (IJPRS)

V-5, I-2, 2016 ISSN No: 2277 - 7873

RESEARCH ARTICLE

Synthesis of Urea based Chalcone Derivatives and Evaluate its Biological Activity

Arpita Desai*[1], K. B. Vyas[2], Rajarshi N. Patel[3], K. S. Nimavat[4]

[1]*Pacific Academy of Higher Education and Research University Udaipur, Rajasthan, India.*

[2]*Department of Chemistry, Sheth L. H. Science Collage– Mansa-382 845, Gujarat, India.*

[3]*Department of Chemistry, APMS, Anand -388001, Gujarat, India.*

[4]*Department of Chemistry, Government Science College– Gandhinagar, Gujarat, India.*

Manuscript No: IJPRS/V5/I2/00066, Received On: 22/04/2016, Accepted On: 26/04/2016

ABSTRACT

Chalcones have been the center of attraction for researchers from several decades due to nits innumerous therapeutic application, Efforts have been done in my research to synthesized chalcones and their derivatives that further reacts with various substituted aldehyde to give corresponding substituted chalcone derivatives. Now these derivatives on condensation with Guanidine nitrate gives the vast range of phenyl pyrimidine amine Derivatives. Structure elucidation of synthesized compound had been made on the basis of element analysis, 1H NMR Spectra studies. The microbial activity of the synthesized compounds has been studied against the species bacillus subtillis, staphylococcus aureus, Escherichia coli, and salmonella typhi.

KEYWORDS

Synthesis, heterocyclic substituted chalcone derivatives, Pyrimidine derivatives, Chalcones

INTRODUCTION

Chalcone[1] are the compounds were aromatic substitutes are introduced in to the terminal position of system C═C-C═, So chalcone are characterized by their position of a Ar(A)-CO-CH ═ CH-Ar(B) Structure in which two aromatic ring are linked by an aliphatic three carbon chain, thus chalcones are phenyl-styryl ketones containing reactive ketoethylenic group –C-CO═CH-[2-5] .

Pyrimidines have chemical and biological importance, as the pyrimidine ring system has associated with the valuable pharmacological activity[6-10]. The simple pyrimidine compounds were prepared by the cyclization of aliphatic raw materials, Polysubstituted Pyrimidines compound were synthesized from acyclic compounds in a similar manner to Chemistry of the benzenoid[11-15]. The NH_2CONH_2 group act as an antithyroid compound, with the same actions and uses as thiouracil. Numerous derivative of NH_2CONH_2 are valuable in the treatment of leprosy[16].

Mostly NH_2CONH_2 derivatives show cytotoxic activity along with antithyroid activity. NH_2CONH_2 also shows some anti-inflammatory, antimicrobial and antifungal activities[17].

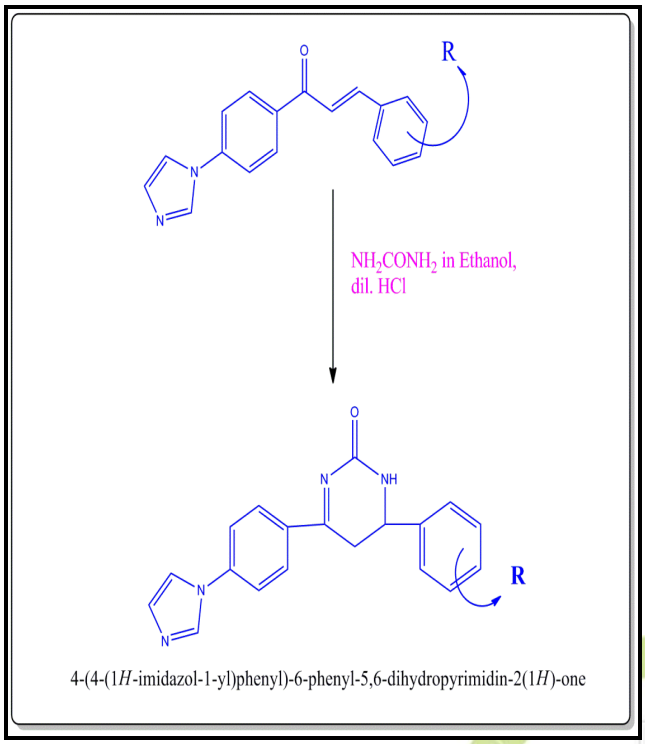
The diverse medicinal uses and biological activities of pyrimidine are reported earlier[18].

Here a series of thioxo tetrahydro pyrimidine derivatives are synthesized to evaluate their antibacterial and antifungal activities

All effort are done in the research is to synthesized a novel compound that can be used for formulation of anticancer drugs.

***Address for Correspondence:**
Arpita Desai
Pacific Academy of Higher Education And Research University Udaipur, India.
E-Mail Id: apdesai64@gmail.com

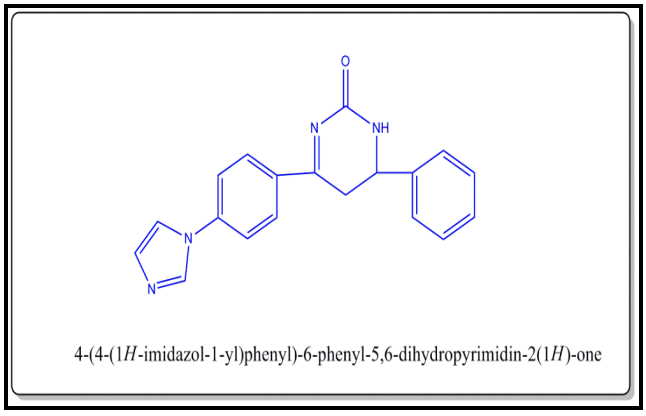
Reaction Scheme



Where R as : (5a) -H (5b) 4-OCH_3 (5c) 2-OCH_3 (5d) 2-OH (5e) 2-Cl (5f) 4-Cl (5g) 2-NO_2 (5h) 3-Br (5i) 3,4-$(OCH_3)_2$ (5j) 3,4,5-$(OCH_3)_2$

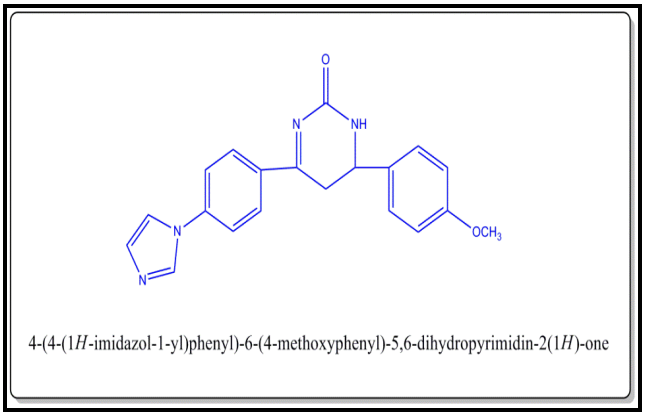
EXPERIMENTAL

(5a) Synthesis of 4-(4-(1H-imidazol-1-yl) phenyl)-6-phenyl-5, 6-dihydropyrimidin-2-(1H)-one



A mixture of (E)-1-(4-(1H-imidazol-1-yl) phenyl)-3-phenylprop-2-en-1-one (4.2 g) and NH_2CONH_2 (0.63 g) and HCl (22 ml) in ether (95%, 25ml), was refluxed for 2.5 hours on water-bath at 75°C. Furthermore, the crude was hot filtered to avoid traced of impurities and then allow it to cool at room temperature follow crystallization as a consequence.

(5b) 4-(4-(1H-imidazol-1-yl) phenyl) -6-(4-methoxyphenyl) -5,6-dihydropyrimidin-2(1H)-one



A mixture of (E)-1-(4-(1H-imidazol-1-yl) phenyl)-3-(4-methoxyphenyl)prop-2-en-1-one (0.44 g) and NH_2CONH_2 (0.63 g) and HCl (22 ml) in ether (95%,25ml),was refluxed for 2.5 hours on water-bath at 75°C. Furthermore, the crude was hot filtered to avoid traced of impurities and then allow it to cool at room temperature follow crystallization as a consequence.

RESULTS AND DISCUSSION

Melting Points

All melting points were determined in open capillaries in a liquid paraffin bath and are uncorrected. The IR spectra were recorded with KBr pellets on Perkin - Elmer - 783 spectrophotometer and 1H NMR spectra were recorded on a Varian Geminy 200 MHz spectrophotometer with CDC_{l3} / $DMSOd_6$ as a solvent using tetramethylsilane (T.M.S.) as an internal standard; the chemical shift values are in d ppm. The purity of the compounds was checked by thin layer chromatography (T.L.C.) on silica gel coated glass plates.

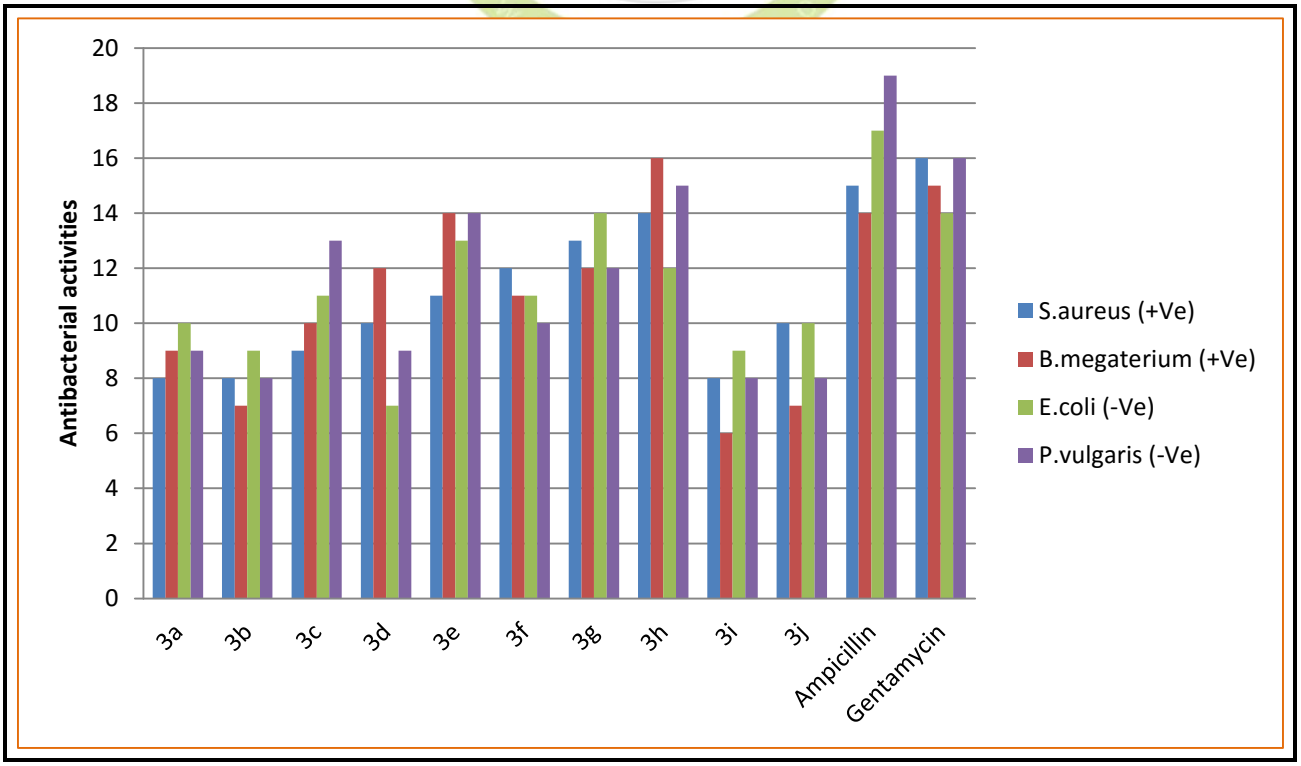
Antimicrobial Activity

Antimicrobial activity of newly synthesized compounds was studied against gram-positive bacteria *Staphylococcus aureus* and gram-negative bacteria *Escherichia coli* (for

Analysis Data

No.	Code No.	R	Molecular Formula	Molecular Weight (g/m)	Yield (%)	M.P. ºC	C %	H %	N %
							Found		
1	5a	-H	$C_{19}H_{16}N_4O$	316.13	73	156	72.13	5.10	17.74
2	5b	4-OCH_3	$C_{20}H_{18}N_4O_2$	346.14	72	108	69.35	5.29	16.17
3	5c	2-OCH_3	$C_{20}H_{18}N_4O_2$	346.14	72	108	69.35	5.29	16.17
4	5d	2-OH	$C_{19}H_{16}N_4O_2$	332.13	72	164	68.66	4.80	16.85
5	5e	2-Cl	$C_{19}H_{215}ClN_4O$	350.09	75	152	65.02	4.31	15..92
6	5f	4-Cl	$C_{19}H_{215}ClN_4O$	350.09	75	152	65.02	4.31	15..92
7	5g	2-NO_2	$C_{19}H_{15}N_5O_3$	361.12	85	130	63.14	4.12	19.37
8	5h	3-Br	$C_{19}H_{15}BrN_4O$	394.04	95	160	57.76	3.83	14.18
9	5i	3,4-$(OCH_3)_2$	$C_{21}H_{20}N_4O_3$	376.15	67	169	67.01	5.36	14.81
10	5j	3,4,5-$(OCH_3)_2$	$C_{22}H_{22}N_4O_4$	406.16	73	116	65.01	5.42	13.85

Antibacterial Activity

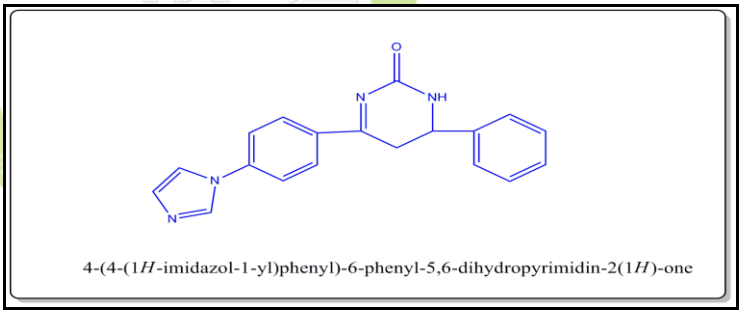


antibacterial activity) and against the culture "Candela albicans" (for antifungal activity). The antimicrobial screening was carried out by cup - plate method10 at a concentration of 50 mg.mL^{-1} in solvent D.M.F.

The zone of inhibition was measured in mm. The antimicrobial activity of the synthesized compounds was compared with standard drugs Ampicillin, Penicillin and Tetracycline at the same concentration.

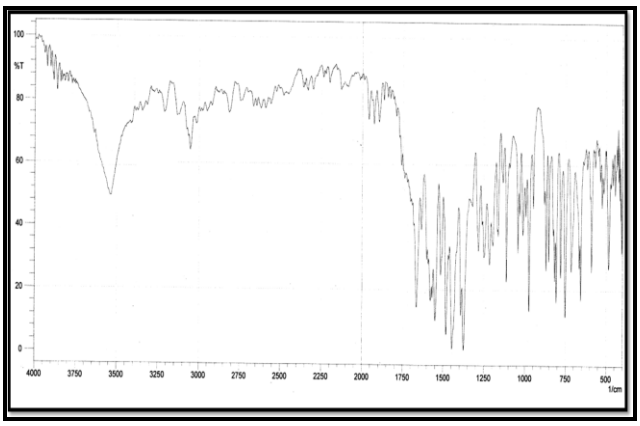
Results: (Comparison of Thioxo Tetrahydro Pyrimidine Derivatives against standard Drugs)

Organisms	Compounds	Ampicillin	Gentamycin
S.aureus	3-Br	✓	-
B. megaterium	4-Cl and 2-Cl	✓	✓
E.coli	2-OH	-	✓
P. vulgaris	3-Br	-	✓

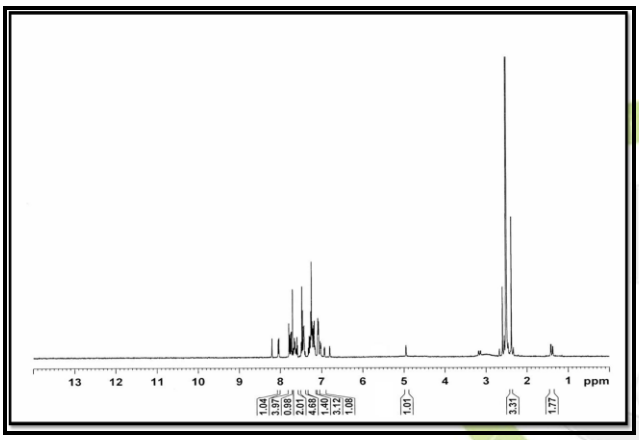
Compound code: 5a	 4-(4-(1*H*-imidazol-1-yl)phenyl)-6-phenyl-5,6-dihydropyrimidin-2(1*H*)-one
Molecular formula: $C_{19}H_{16}N_4O$	
^{1}H NMR (400 MHz, $CDCl_3$) δ ppm:	1.66-1.91 (2H, dd), 2.34 (3H, s), 4.9 (1H, s), 6.86-7.40 (17H, Ar-H, m), 8 (1H, s).
^{13}C NMR (100 MHz, $CDCl_3$) δ ppm:	20.5, 39.2, 52.6, 117.5, 118.8, 120.9, 121.2, 127.5, 128.1, 129.3, 130.1, 131.4, 131.9, 143.6, 151.8, 153.6, 155.1, 151.8, 162.6
IR cm-1 (KBr):	3545, 3049, 1644, 1614, 1592, 1569, 744
Mass (M+1):	316.13

IR Spectral Studies

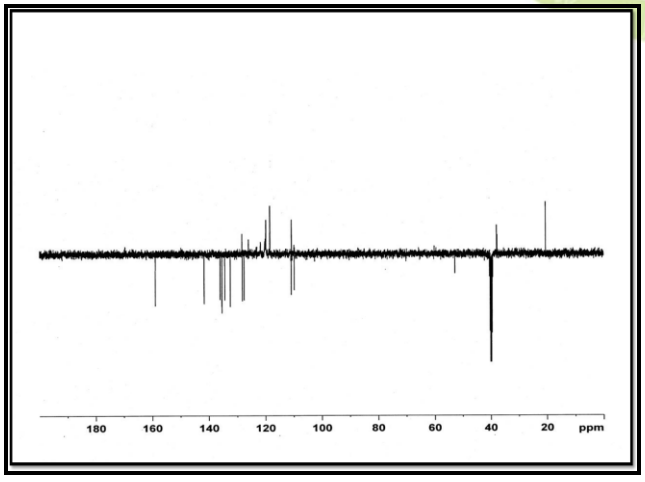
I.R. (cm^{-1}) (KBr) spectral data of compound



1H N.M.R. Spectral Studies



^{13}C NMR of compound 5a



CONCLUSION

The screening results revealed that the compounds (i) showed significant antimicrobial activity. In particular compounds (h) and (j) showed moderate to considerable antibacterial and antifungal activities against all the organisms employed at a conc. of 1000 g/mL (0.1ml dose level) Comparable to that of standard drugs Ampicillin and Gentamycin.

ACKNOWLEDGEMENTS

The authors are thankful to Dr. Rajarshi N. Patel for providing research facilities. They are also grateful to and the Department of Biosciences, Sardar Patel University, Vallabh Vidyanagar, for screening the newly synthesized compounds for their antimicrobial activities, for scanning the IR spectra and 1H NMR spectra of newly synthesized compounds.

REFERENCES

1. Patel, R. N. (2013). Study on synthesis of chalcone and pyrimidine heterocyclic compound and their antimicrobial activity, *Asian Journal of Biochemical and Pharmaceutical Research,* 4(1).
2. Patel, R. N., Nimavat, K. S., Vyas, K. B., and Patel, P. V. (2011). Synthesis on Study of 2-Methyl-5-Nitro-N-(4-(3-(2-Aryl-2,3-Dihydrobenzo[B][1,4]Thiazepin-4-Yl)Phenoxy)Phenyl) Benzenesulfonamide and their Antimicrobial Activity, *Journal of Chemical and Pharmaceutical Research*, 3(6), 409-415.
3. Patel, R. N., Nimavat, K. S., Vyas, K. B., & Patel, P. V. (2011). Synthesis on study of 2-methyl-5-nitro-n-(4-(3-(5-substituted-4, 5-dihydroisoxazol-3-yl) phenoxy) phenyl) benzenesulfonamide and their antimicobial activity. *Der Pharma Chemica*, 3(6), 334-340.
4. Patel, R. N., Patel, P. V., Desai, K. R., Purohit, P. Y., Nimavat, K. S., & Vyas, K. B. (2012). Synthesis of new heterocyclic schiff base, thiazolidinone and azetidinone compounds and their antibacterial activity and anti-hiv activities. *Heterocyclic Letters*, *2*(1), 99-105.
5. Patel, R. N., Patel, P. V., Desai, K. R., Nimavat, K. S., & Vyas, K. B. Study and synthesis of some organic spiro derivatives

using schiff base reaction. *Heteroletters*, 2(3), 327-332.

6. Patel, R. N., Nimavat, K. S., Vyas, K. B., & Patel, P. V. (2012). Synthesis on Study of 2-Methyl-5-Nitro-N-(4-(3-(2-Oxo-6-Phenyl-1,2,5,6- Tetrahydro -pyrimidin-4-Yl)Phenoxy)Phenyl)Benzene -sulfonamide And Their Antimicrobial Activity, *Elixir org. Chem.* 53, 11718-11721.
7. Patel, R. N., Patel, P. V. (2012). Synthesis on study of novel chalcone derivatives and their antimicrobial activity, *European Journal of Experimental Biology*, 2(5), 1492-1496.
8. Patel, K. S., Patel, R. B., & Patel, R. N. (2013). Biological activity of newly synthesized (ii) heterochelates of coumarin derivative and enrofloxacin, *Heteroletters*, 3(4), A novel and industrial approach for the synthesis of Valsartan, *Heteroletters*, 3(4), 493-504.
9. Patel, R. N., Patel, D. S., Patel, R. B., & Patel, K. S. (2013). A Novel and Industrial Approach for the Synthesis of Valsartan, *Heteroletters*, 3(4), 513-518.
10. Patel, R. N., Vyas, K. B. (2013). Synthesis on study Pyrazol derivatives and their antimicrobial activity, *World Journal of Science*, 1(1), 1-7.
11. Patel, R. N., Vyas, K., Patel, P. V., & Patel, D. S. (2013). Synthesis of 2-methyl-5-nitro-n-(4-(3-((3-phenylquinoxalin-2-yl) methyl) phenoxy) phenyl) benzenesulfonamide and their antimicrobial activity, *Heteroletters*, 3(3), 341-347.
12. Patel, R. N., Vyas, K. B. (2013). Synthesis on study Pyrazol derivatives and their antimicrobial activity, *World Journal of Science*, 1(1), 1-7.
13. Patel, R. B., Patel, K. S., Patel, R. N. (2013). Thermal and mechanical properties of Adipic Acid modified unsaturated polyester resin and jute composite, *International Journal for Pharmaceutical Research Scholars (IJPRS)*, 2(4).
14. Patel, R. N., Dave, H., Nimavat, K. S., Vyas K. B., and Patel, P. V. (2013). Study on synthesis of 6-phenyl-4-(4-(4-(p-tolyloxy) phenoxy) phenyl)-5, 6-dihydro -pyrimidin -2(1H)-one and their antimicrobial activity, *Archives of Applied Science Research, 5*(1), 40-44.
15. Patel, R. B., Patel, K. S., Patel, R. N., Patel, K. D. (2014). Thermal and mechanical properties of modified polyester resin and jute composite, *Der Chemica Sinica*, 5(1), 47-54.
16. Patel, K. S., Patel, R. N., Boricha, N. C., & Pandya, D. M. (2014). Synthesis, thermal behavior and biological evaluation of dicoumarol cu (ii) complexes based on ciprofloxacin. *Heteroletters*, 4(1), 23-33.
17. Patel, K. S., Patel, R. N., Boricha, N. C., & Pandya, D. M. (2014). Synthesis of some novel pyrimidinone and pyrimidine derivatives and their antimicrobial activity. *Heteroletters*, 4(1), 119-124.
18. Patel, K. S., Patel, R. N., Chhasatiya, M. R., Baser, Patel, D. S. (2015). Study on synthesis of novel chalcone their antimicrobial activity, *Journal Club for Pharmaceutical Sciences* (JCPS), 2(1).

