SYNTHESIS OF HETEROCYCLIC COMPOUNDS DERIVED FROM CHALCONES

Dissertation submitted to GOA UNIVERSITY in partial fulfillment of the requirement for the degree of

Master of Science in Chemistry

By

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April 2020

DECLARATION

I hereby declare that the matter embodied in the dissertation titled **"Synthesis of Heterocyclic compounds derived from Chalcones"** is the result of experiment carried out by me at the School of Chemical Science, Goa University, Goa, India, under the guidance of Miss. Siddhali V.Girkar and the same has not been submitted elsewhere for the award of a degree or diploma.

Dipti Dasharath Naik

CH-18-015

M.Sc. Part II

Organic Chemistry

School of Chemical Science

Goa university

Date:

Place: Goa University

Goa 403206

CERTIFICATE

This is to certify that the dissertation titled **"Synthesis of Heterocyclic compounds derived from Chalcones"** is a bonafied work carried out by **'Dipti D. Naik'** under my supervision in partial fulfillment of the requirement for the award of the degree of Master of Science in Chemistry at the School of Chemical Science, Goa University.

Ms. Siddhali V. Girkar

Project Supervisor

School of Chemical Science

Goa University

CERTIFICATE

This is to certify that the dissertation titled **"Synthesis of Heterocyclic compounds derived from Chalcones"** is a bonafied work carried out by **'Dipti D. Naik'** under the supervision of '**Ms. Siddhali V.Girkar'** for the award of the degree of Master of Science in Chemistry at the School of Chemical Science, Goa University.

Dean,

School of Chemical Science,

Goa University

ACKNOWLEDGEMENT

It gives us an immense pleasure to present this project report entitled "Synthesis of Heterocyclic compounds derived from Chalcones".

The success and final outcome of this poject required a lot of guidance and assistance from many people and I am extremely privileged to have got this all along the completion of my project. All that I have done is only due to such supervision and assistance and I would not forget to thank them.

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I gratefully acknowledge the help rendered by other teaching and non-teaching staff in laboratory fo their timely support.

I would like to thanks Dr. Vidyadatta Verenkar for allowing me to use furnace room and also like to thanks research student Mr. Pratik for helping me to operate the furnace.

I am grateful towards Mr. Prajot Prabhakar Chari for helping us record IR spectra of my compounds.

My deep sense of gratitude goes to all my friends and classmates for helping me and sharing ideas throughout my dissertation.

Last but not the least I wish to thank my parents for their moral support and financial assistance, without whom, I would have not been able to to completion.persue my studies. Their encouragement has given me a lot of confidence during the poject work as it could successfully reach to completion.

ABBREVIATIONS

General abbreviations:

MEASUREMENTS

Aq - Aqueous

Equiv - Equivalent

Fig. - Figure

g. - Grams

min - Minutes

mmol - Millimole

m.p - melting point

r.t. - room temperature

^0C - Degree Celcius

mL - milliLitre

TECHNIQUES

TLC - Thin Layer Chromatography

IR - Infra red

cm^{-1} - Frequency in Wavenumber

PMR(^{1}H-NMR) - Proton Magnetic Resonance

$CDCl_3$ - Deuterated Chloroform

Δ - Delta(Chemical shifts in ppm)

DEPT - Distortionless Enhancement by Polarisation Trasnsfer

DMSO-d6 - Deuterated dimethyl sulfoxide

Hz - hertz

J - Coupling constant

ppm - parts per million

s - singlet

Br.s - Broad singlet

d	-	Doublet
t	-	triplet
q	-	quartet
m	-	multiplet
MHz	-	Mega Hertz

SOLVENTS:

Pet Ether	–	Petroleum Ether
$CHCl_3$	–	Chlorofom
THF	–	Tetrahydrofuran
EtOH	–	Ethanol
H_2SO_4	–	Sulphuric acid
HCl	–	Hydrochloric acid
H_2O	–	Water
Conc.	–	Concentrated
NaOH	–	Sodium Hydroxide
C-H	–	Carbon Hydrogen Bond
C-O	–	Carbon Oxygen Bond
Ph	–	Phenyl
anhyd.	–	Anhydrous
HNO_3	–	Nitric Acid
hr	–	Hours

GENERAL REMARKS

1. IR spectra were recorded on Shimadzu FT-IR spectrophotometer (solid- KBr pellet)
2. All metling points were measured by normal Thiel's tube and are uncorrected.
3. Distilled solvents were used in all cases.
4. Commercial reagents were used without any further purification.
5. Hexanes or pet ether for recording TLC refers to petroleum fraction boiling between 60 and 80^0C.
6. All the reactions were monitored by thin layer chromatrography (TLC) on silica gel.
7. Room temperature = 25-27^0C.

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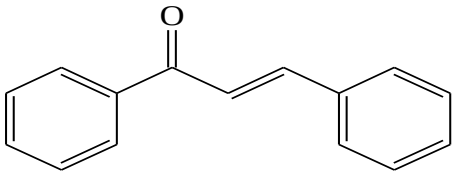
CHAPTER 1

INTRODUCTION

INTRODUCTION

Chalcones:



Chalcones represent a group of compounds with interesting biological activities. The name "**Chalcones**" was given by **Kostanecki and Tambor**. Chalcone is an **aromatic α, β-unsaturated ketone** containing the reactive keto-ethylenic group **–CO-CH=CH-** which is found to be responsible for their biological activities. It contains two aromatic rings having a diverse array of substituents. It is basic in nature and skin irritant. Other name for chalcones are benzalacetophenone and phenyl styryl ketone.

Importance of chalcones:

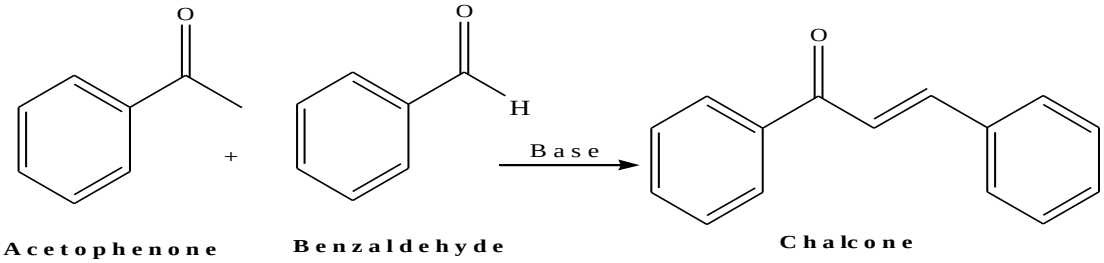
They are abundant in edible plants and are considered to be precursors of flavonoids and isoflavanoids.

The compounds with the backbone of chalcones have been reported to possess various biological activities like antibacterial, antifungal, anti-inflammatory and antitumor etc. depending on the substitution made on them.

Chalcone bear very good synthon so that variety of novel heterocycles with good pharmaceutical activity have been synthesized.

A classical method for the synthesis of chalcone is **Claisen-Schimidth Condensation reaction**, which involved cross Aldol Condensation of equimolar quantities of a substituted acetophenone with substituted benzaldehydes in presence of base catalyst resulting into α,β-unsaturated carbonyl compound. Chalcones are also synthesized by using **microwave irradiation, ultrasound irradiation and by Suzuki reaction**. Recently various modified methods for synthesis of chalcones has been reported using different catalyst such as $SOCl_2$, natural phosphate lithium nitrate, KF / natural phosphate, acyclic acidic ionic liquid, Na_2CO_3, high temperature water, silica-sulphuric acid, ZrCl and ionic liquid, $NaOH/Al_2O_3$ and silica chloride.

Reaction:



Heterocycles:

The bi-electrophile character of chalcone makes them more attractive to be used as synthon in the synthesis of heterocyclic compounds, such as pyrazoline, pyrimidinone, isoxazole, oxazine, thiazine, etc. through cyclo-condensation reaction with a bi-nucleophilic species.

Heterocyclic compounds can be synthesized by cyclization reactions, addition reactions, ring transformation reactions. Formation of heterocycle from acyclic compounds alters the reactivity.

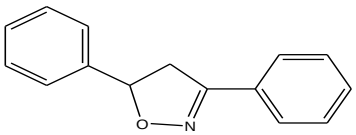
Heterocyclic compounds have a wide range of applications.

They are predominantly used as pharmaceuticals, as agrochemicals, and as veterinary products.

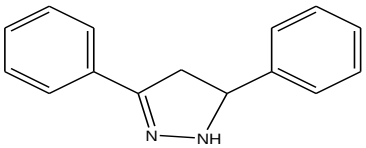
They also find applications as sanitizers, antioxidants, as corrosion inhibitors, as copolymers, dye stuff.

Some of the natural products e.g. antibiotics such as penicillin, cephalosporin; alkaloids such as vinblastine, morphine, reserpine etc. have heterocyclic moiety.

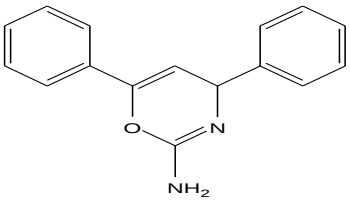
Some of the heterocyclic compounds derived from chalcones are:



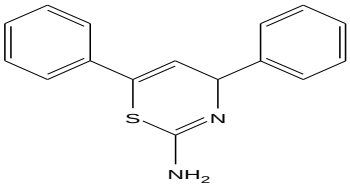
ISOXAZOLE



PYRAZOLINE



OXAZINE



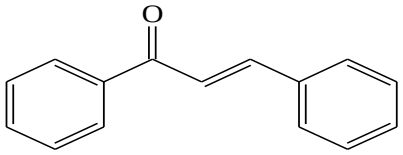
THIAZINE

CHAPTER 2

LITERATURE REVIEW

LITEATURE REVIEW

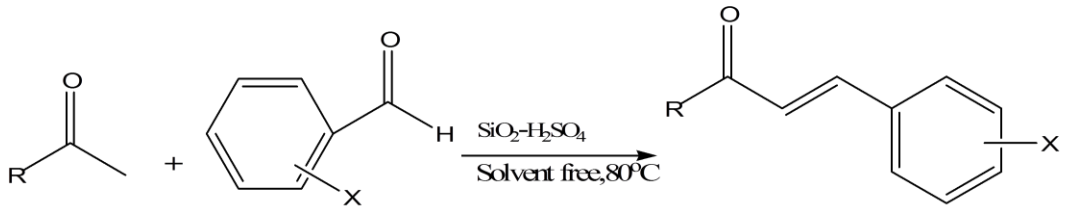
CHALCONES:



Chalcone is a pale yellow, crystalline **1,3-diphenyl-2-propene-1-one,** in which two aromatic rings are linked by a three carbon a, ß-unsaturated carbonyl system. Chalcone is a class of open-chain flavonoids that is not only biosynthesized by plants but also can be prepared synthetically by Claisen- Schmidt Condensation reaction.

Scheme 1: G. THIRUNARAYANAN et.al. [1]

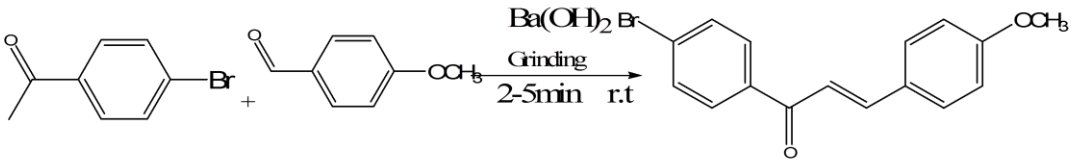
Solid phase synthesis of chalcones was also conducted using silica-sulfuric acid as catalyst. The conversion of reactants into product proceeded completely by heating the reaction mixture at 80^0C for 2hrs until 3 hours. The catalyst was made by the reaction of silica gel with chlorosulfonic acid.



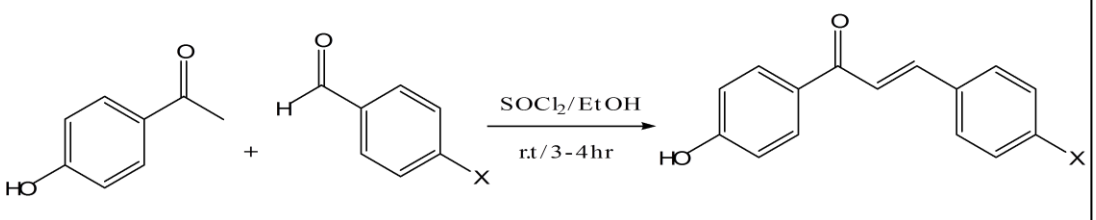
R = 4-biphenyl or 9H-2-fluorenyl

X = H, m-NH_2, p-NH_2, m-Br, m-Cl, p-Cl, p-OH, p-OMe, o-NO_2, m-NO_2, p-NO_2

Scheme 2: S. Kumar et al.[2] reported the synthesis of chalcones which involves the grinding of a mixture of 4-methoxy-benzaldehyde, 4-bromo-acetophenones and anhydrous $Ba(OH)_2$ in mortar and pestle in absence of any solvent. The product was obtained by acidifying the mixture without extraction.

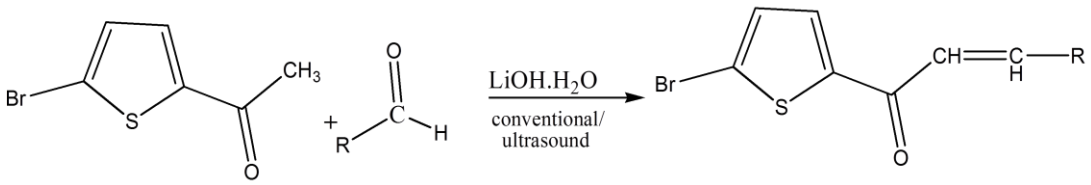


Scheme 3: Samer A. Hasan et al/J. Pharm. Sci., 2018,[3] reported the synthesis of chalcone derivatives by Claisen-Schmidt condensation using $SOCl_2$/EtOH as a catalytic system.

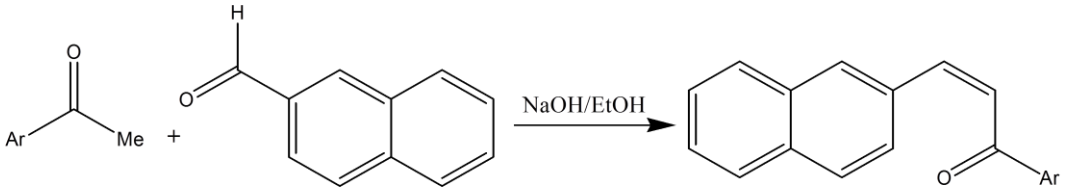


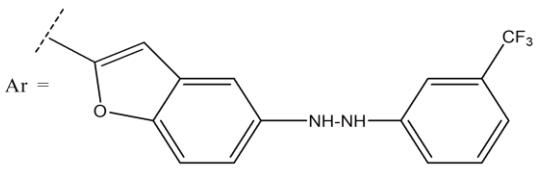
X=F or Br

Scheme: 4 (NARESH PANIGRAHI, 2014)[4] presented a synthesis of thiophene- chalcones in presence of $LiOH.H_2O$ as a base under conventional and ultrasound irradiation method.

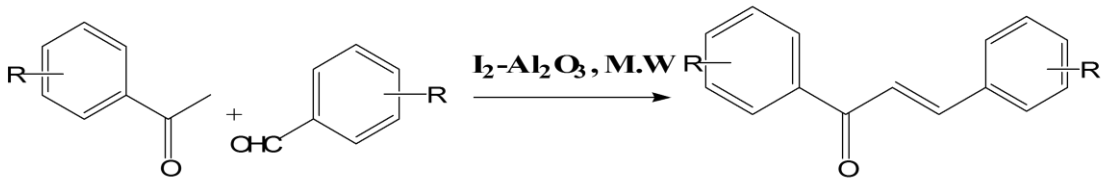


Scheme 5: (Rasha S Gouhar, 2018) reacted a mixture of acetyl benzofuran and naphthyl-4-carboxaldehyde in alcoholic sodium hydroxide and stirred overnight at room temperature. The formed precipitate was filtered, washed with water, dried and recrystallized from ethanol to form chalcone.



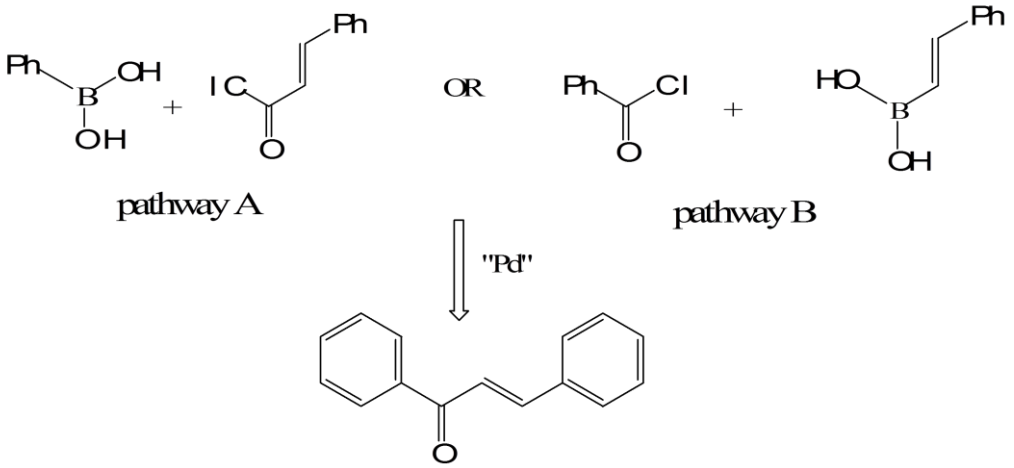


Scheme 6: A single step synthesis protocol of chalcone was reported, in which chalcones were synthesized using molecular iodine impregnated over neutral alumina as catalyst, and employing microwave irradiation as source of energy without any solvent.[6]

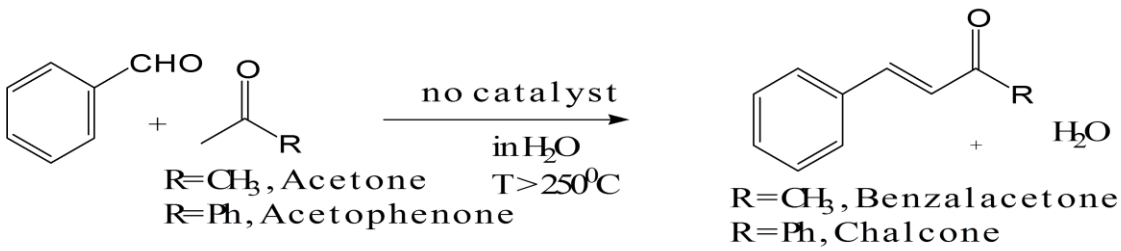


R=OH

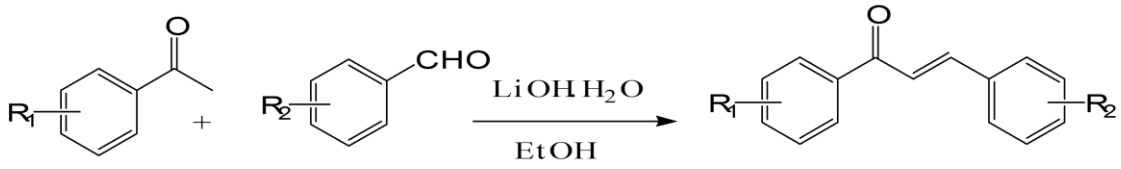
Scheme 7: A general method for the synthesis of chalcones based on the Suzuki reaction either between cinnamoyl chlorides and phenylboronic acids or between benzoyl chlorides and phenylvinylboronic acids is described.[7]



Scheme 8: Craig M, Comisor P, Sarage E, 2004.[8] carried out crossed aldol condensation of benzaldehyde and acetophenone in high temperature water to give chalcone.

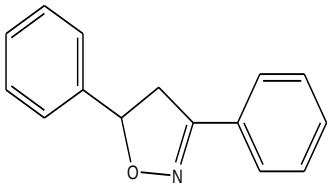


Scheme 9: Srikant Bhagat, Ratnesh Sharma, (2006)[9] reported synthesis of chalcone using $LiOH.H_2O$ as a novel dual activation catalyst, by Claisen- Schmidt condensation under mild conditions.



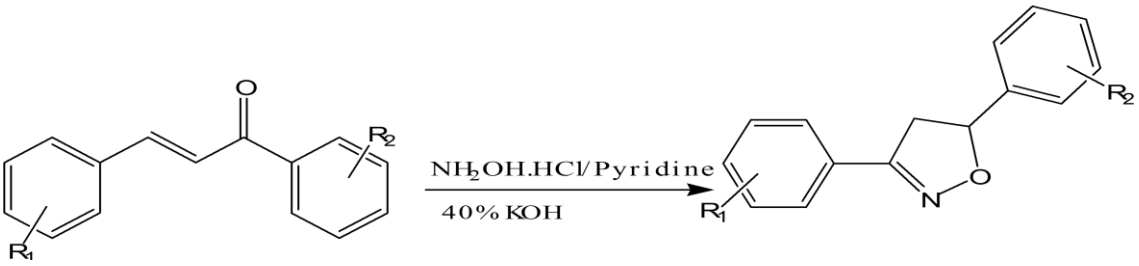
HETEROCYCLES:

1. ISOXAZOLE

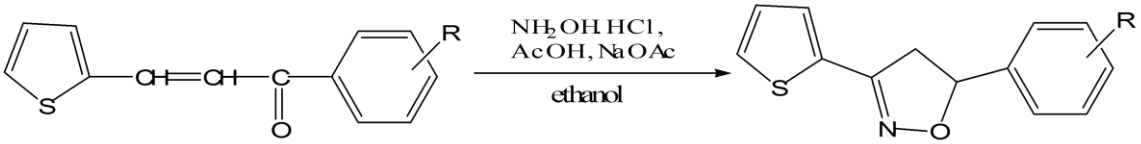


The isoxazole is a five membered heterocyclic ring system containing oxygen atom next nitrogen atom in the 1,2-positions. Isoxazoles occupy unique position for their antibacterial, anti-inflammatory ,antiviral and anti-fungal activities.

Scheme 1: Anjani Solankee* and Yogesh Prajapati in the year 2009:[10] Chalcone, hydroxylamine hydrochloride in ethanol and 40% KOH solution were refluxed for 10 h. Then the reaction mixture was cooled and poured into crushed ice and the product separated out was filtered, washed with water, dried and recrystallised from alcohol to give isoxazole.

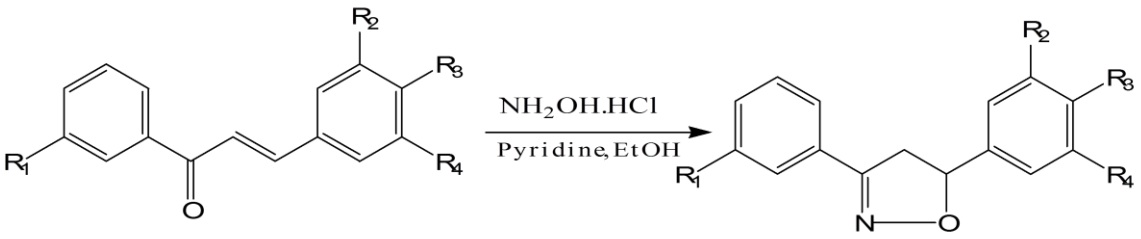


Scheme 2: Kamala Chand Gautam and Dharmchand Prasad Singh, 2013[11] reported a synthesis of thiophene derivative of isoxazole by action of chalcone solution of ethanol and anhydrous sodium acetate dissolved in minimum amount of acetic acid, solution of hydroxylamine hydrochloride was added. The reaction mixture was refluxed on oil bath for hours. The completion of reaction was monitored by TLC. After the completion of reaction, the solution was cooled to get the products, which were purified by recrystallization from ethanol.

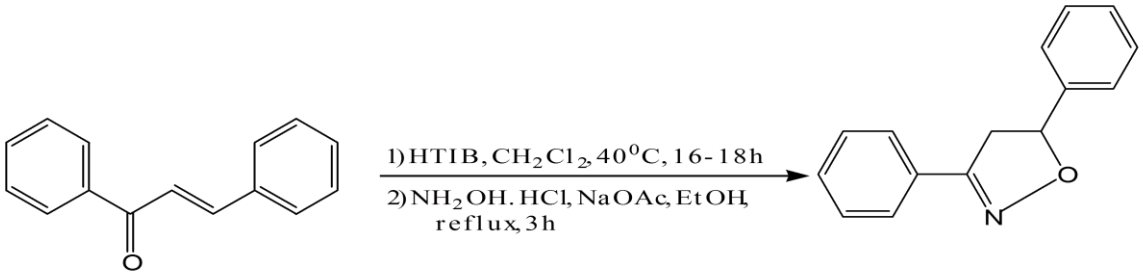


R=4-C_8H_7O, 3-NO_2, 4-NO_2, 3-OCH_3, 3-Cl, 3-CH_3

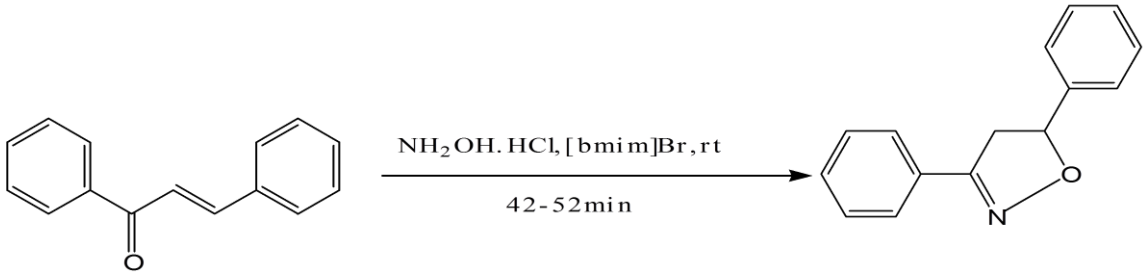
Scheme 3: Mayur R. Adokar*, Mangesh V. Kadu[12] have reported the synthesis of Some Isoxazolines from methyl substituted Acetophenone and Substituted Benzaldehyde via Chalcone by the action of NH_2OH/pyridine on chalcone.



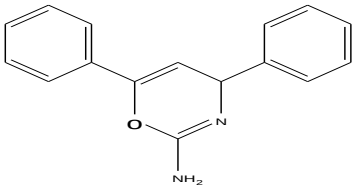
Scheme 4: Kamal.; sharma, D.; Wadhwa, D.; Prakash, O, (2012)[13] showed that 4,5-Disubstituted isoxazoles can also be obtained in a two step synthesis starting from the tosylation of chalcones to give corresponding α,β-ditosylate derivatives and subsequent reaction with hydroxylamine to afford the desired isoxazoles.



Scheme 5: Helio M.T. Albuquerquea Clementina M.M. Santosa,b, Jose A.S. Cavaleiroa and Artur M.S. Silva a, et al.,(2014)[14] reported, an eco-friendly reaction occurs efficiently in the presence of the ionic liquid butylmethylimidazoliumbromide acting as solvent and catalyst.

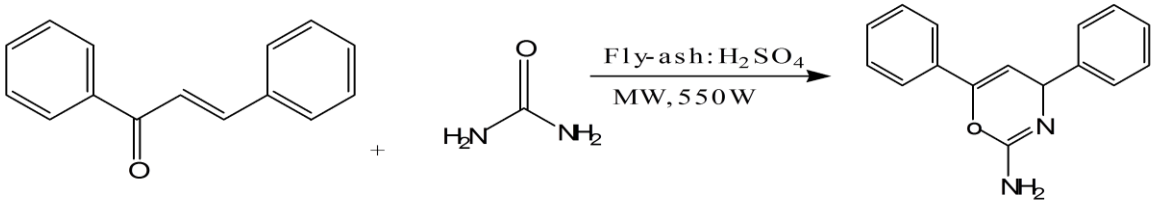


2) OXAZINE:

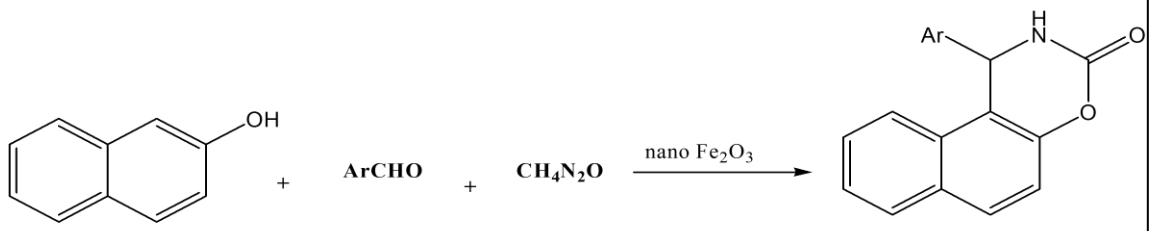


Oxazines are heterocyclic compounds containing two hetero atoms (N and O), which have attracted much synthetic interest due to their wide range of biological activities like they are, antipyretic, anticonvulsant, antitumor, antimicrobial, and antimalarial. The three isomers of oxazine exist, depending on the relative position of the heteroatoms and relative positions of double bonds. 1,2- , 1,3- , 1,4- , are the O-analogue of the three isomeric diazines.

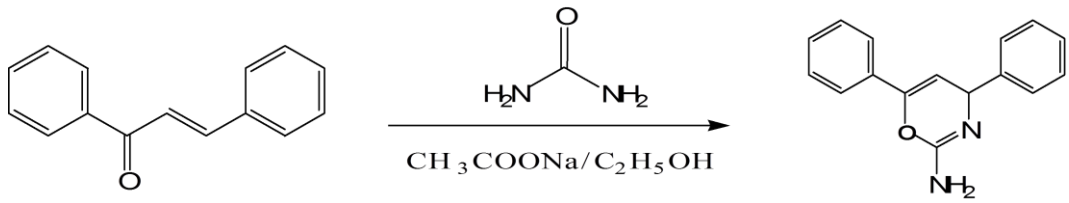
Scheme 1: G. Thirunarayanan, R. Sundararajan, R. Arulkumaran[15] carried out the green synthesis of oxazines under microwave conditions.



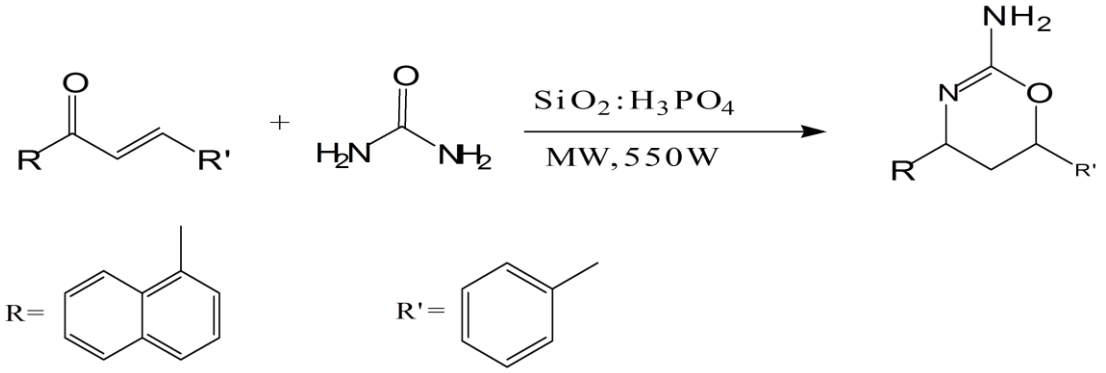
Scheme 2: Farhad Hatamjafari et al[16], oxazine-3-one derivatives with medicinal properties were synthesized with rapid, high yield, novel, facile, and one-pot condensation of β-naphthol, aromatic aldehydes, and urea using nano-Fe_2O_3 under solvent free conditions. The one-pot synthesis on solid inorganic support provides the products in good yields.



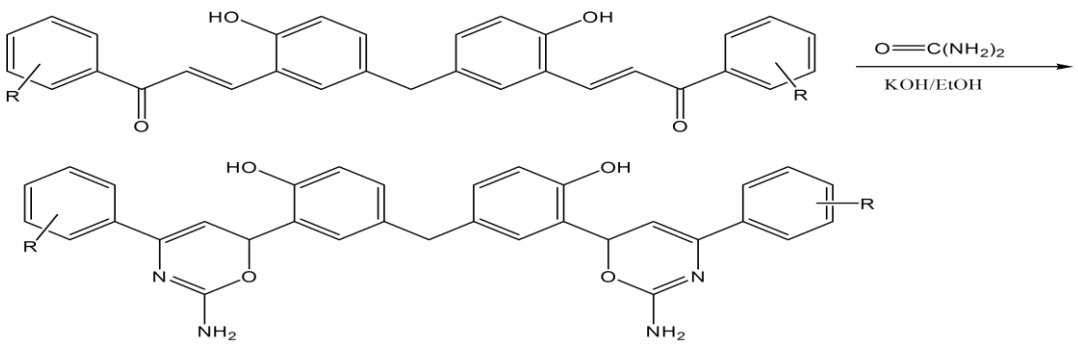
Scheme 3: Lincy Joseph, Mathew George and Surekha S. R.[17] reported the synthesis of some oxazine deivatives by cyclisation of chalcones with urea and sodium acetate, using ethanol as a solvent.



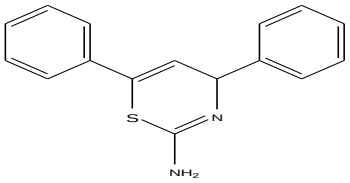
Scheme 4: Ganesamoorthy Thirunarayan and Renuka[18] reported synthesis of a some 1, 3-oxazine amine derivatives including 4-(1-naphthyl)-5,6-dihydro-6-(substituted phenyl)-oxazine-2-amines by solid SiO_2-H_3PO_4 catalyzed solvent-free cyclization of aryl chalcones and urea under microwave irradiation.



Scheme 5: Sayaji. S et al in 2013[19], a series of novel oxazine derivatives were prepared from Bis chalcone with urea and potassium hydroxide in ethanol.

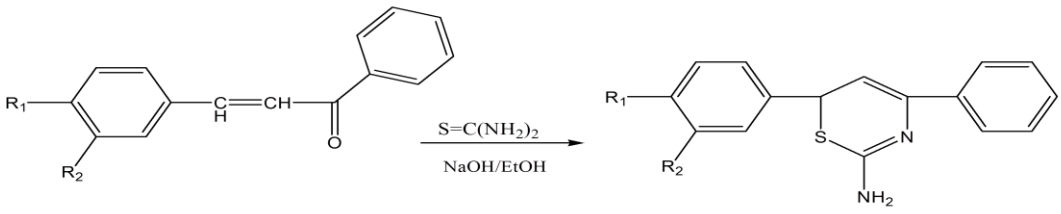


3) THIAZINE:

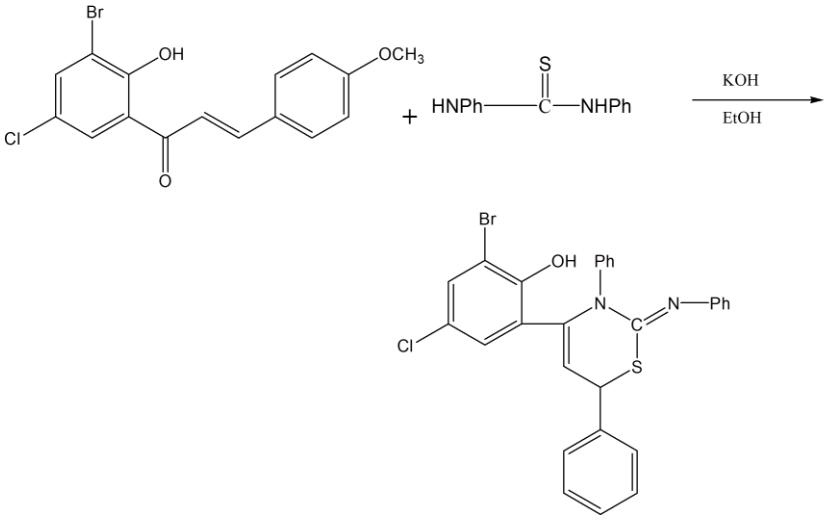


Thiazine is a six- membered Heterocyclic ring system which contains two hetero atoms (N & S) placed at 1,3- position. Structure of 1,3-thiazine rimg substituted with two phenyl rings at 4,6th positions possesses an N-C-S linkage, that is believed to be very useful units in the fields of medicinal and pharmaceutical chemistry, and have been reported to exhibit anti-bacterial, anti-fungal, anti-inflammatory activites etc.

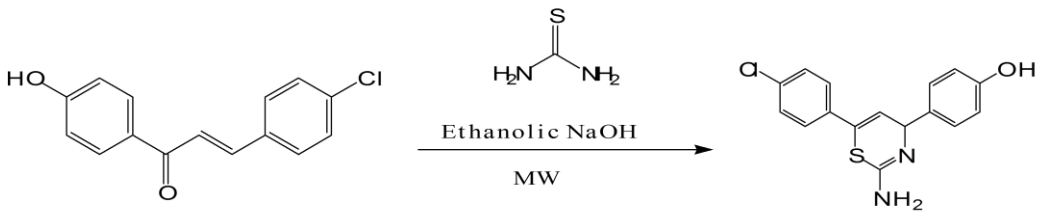
Scheme 1: Kalirajan et al. 2009[20], a mixture of Chalcone, thiourea were dissolved in ethanolic sodium hydroxide and was stirred for about 2-3 hours with a magnetic stirrer. This was then poured into 400 ml of cold water with continuous stirring for an hour and then kept in refrigerator for 24 hours. The precipitate obtained was filtered, washed and recrystallized. The completion of the reaction was monitored by TLC.



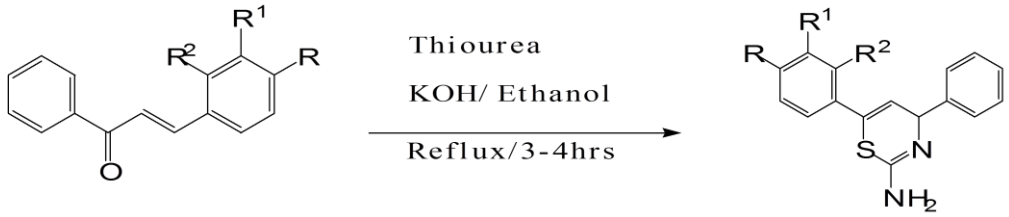
Scheme 2: Reshal Deshmukh in 2015[21], a mixture of chalcone, diphenyl thiourea and aqueous potassium hydroxide in ethanol was refluxed for about three hours. It was then diluted with water and acidified by 1:1 dil HCl. A solid obtained was crystallized from ethanol to get the product thiazine.



Scheme 3: D.Jayaseelan, M.Ganapathi, S.Guhanathan (2015)[22], reported Microwave assisted synthesis of 4,6-diphenyl substituted thiazine deivatives by action of thiourea on chalcone.



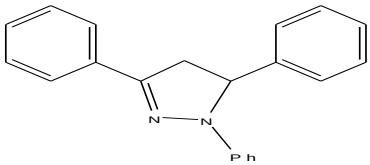
Scheme 4: Ravindar Bairam and Srinivasa Murthy Muppavarap,(2018)[23], reported the synthesis of 1,3-thiazine derivatives. Chalcones were subjected to cyclocondensation with thiourea.



R = H , F, CH_3 , NO_2 , Cl , $N(CH_3)_2$

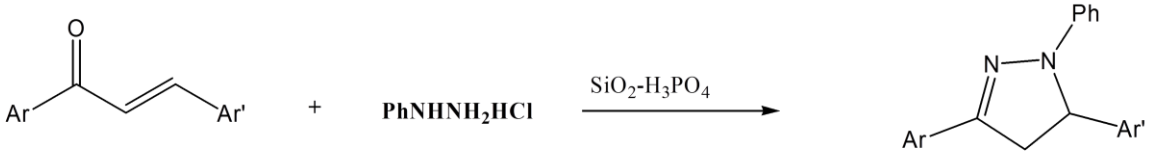
R_1 = H , OCH_3,

4) PYRAZOLINES:

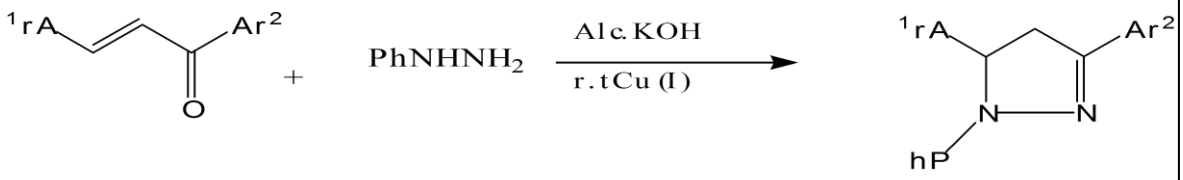


Pyrazole is a π-excessive aromatic monocyclic heterocycle containing two nitrogen atoms in a five membered 1,2-diazole ring, with properties resembling those of both pyrrole and pyridine. 1-pyrazoline, 2-pyrazoline and 3-pyrazoline are the three partially reduced forms of the pyrazole structure with different positions of the double bonds and exists in equilibrium. 2-pyrazoline is more stable than the rest three types.
Pyrazole is being reported to have a large spectrum of biological effects, especially antibacterial, antifungal and anti-inflammatory properties.

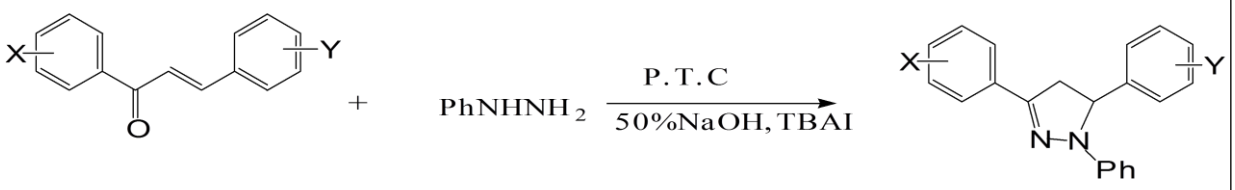
Scheme 1: Mahesh *et al*. 2017[24], an appropriate equi-molar quantities of chalcones, phenyl hydrazine hydrochloride and SiO_2-H_3PO_4 is taken in borosil tube and tightly capped. The mixture is subjected to microwave irradiation for 6-8 min in a microwave oven and then cooled to room temperature. After separating the organic layer with dichloromethane the solid product is obtained on evaporation. The solid, on recrystallization from benzene hexane mixture affords glittering product.



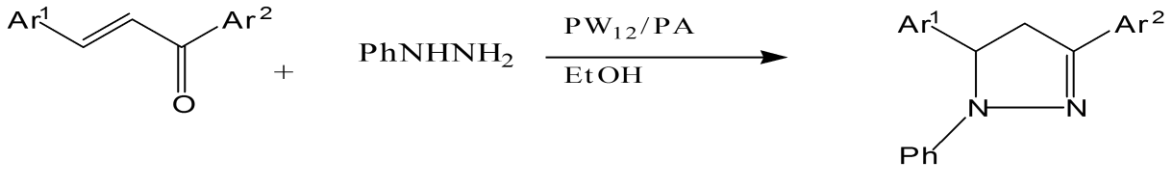
Scheme 2: Ashok S. Pise, Sunil D. Jadhav, Arvind S. Burungale[25], reported Ultrasound assisted synthesis of 1,5-Diaryl and 1,3,5-Triaryl-2-pyrazolines by using KOH/EtOH system with Cu(I) catalyst.



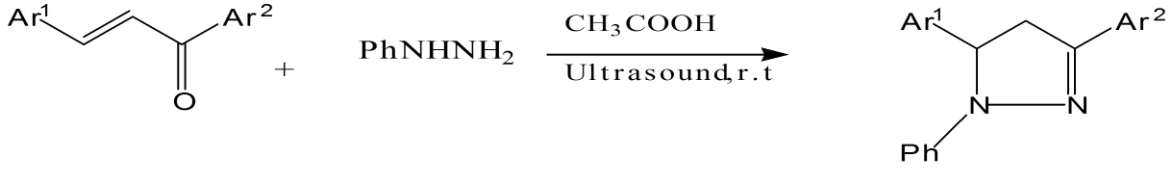
Scheme 3: Mowafaq *et al*.[26] reported the synthesis of 1,3,5-triaryl-2-pyrazolines from chalcones and phenylhydrazine using tetrabutylammonium iodide (TBAI) as a phase transfer catalyst in 50% NaOH as a base.



Scheme 4: Razieh Fazaeli *et al.*[27] reported the synthesis of 1,3,5-triaryl-2-pyazolines by the reaction of chalcones with phenylhydrazines in the presence of tungstophosphoric acid supported on highly organosoluble polyamide (PW_{12}/PA).



Scheme 5: ZHI-PING LIN *et al.*[28] reported the synthesis of 1,3,5-triaryl-2-pyrazoline with chalcone derivatives and phenylhydrazine in acetic acid under ultrasound irradiation at room temperature.



CHAPTER 3

PRESENT WORK

PRESENT WORK:

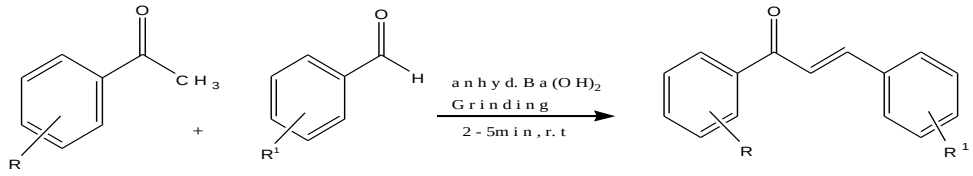
We have synthesized heterocycles from chalcone derivatives.

A) Synthesis of chalcones was done by two methods:

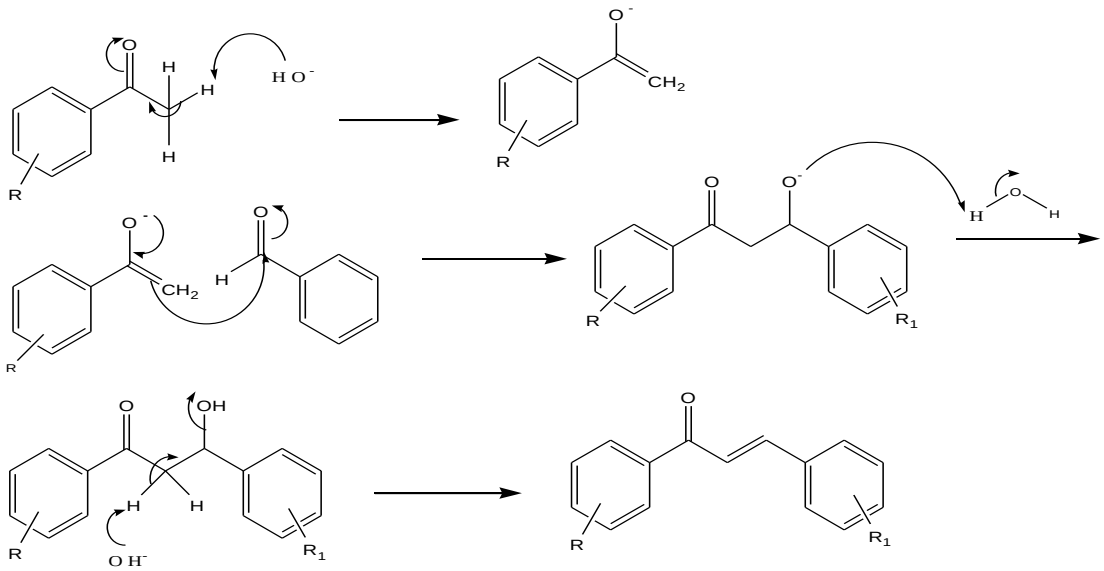
1. By green method using anhydrous $Ba(OH)_2$.[2]
2. Using $LiOH.H_2O$ as a base.[9]

Step A: Synthesis of chalcones:

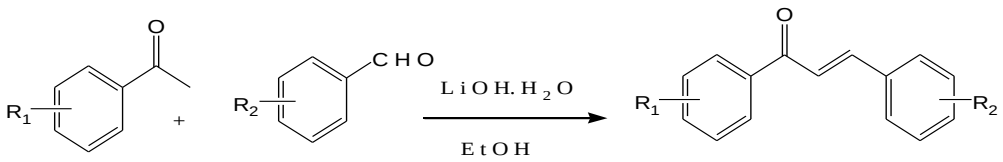
1. By green method by using $Ba(OH)_2$.



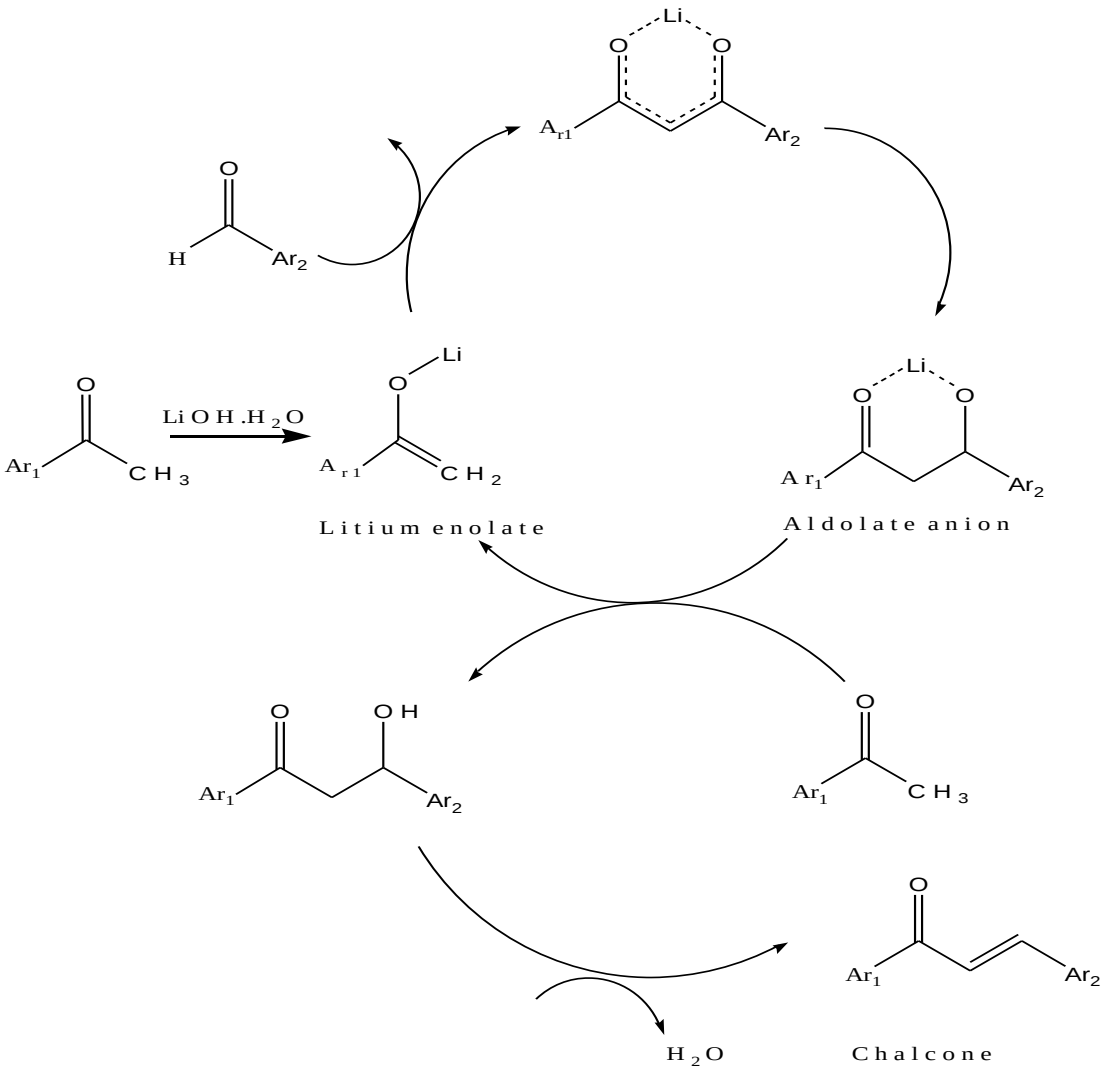
Mechanism:



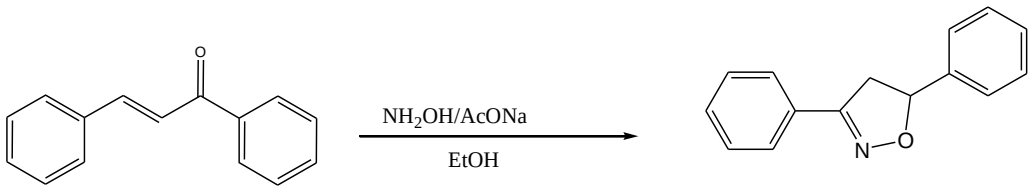
2. Using $LiOH.H_2O$ as a base.



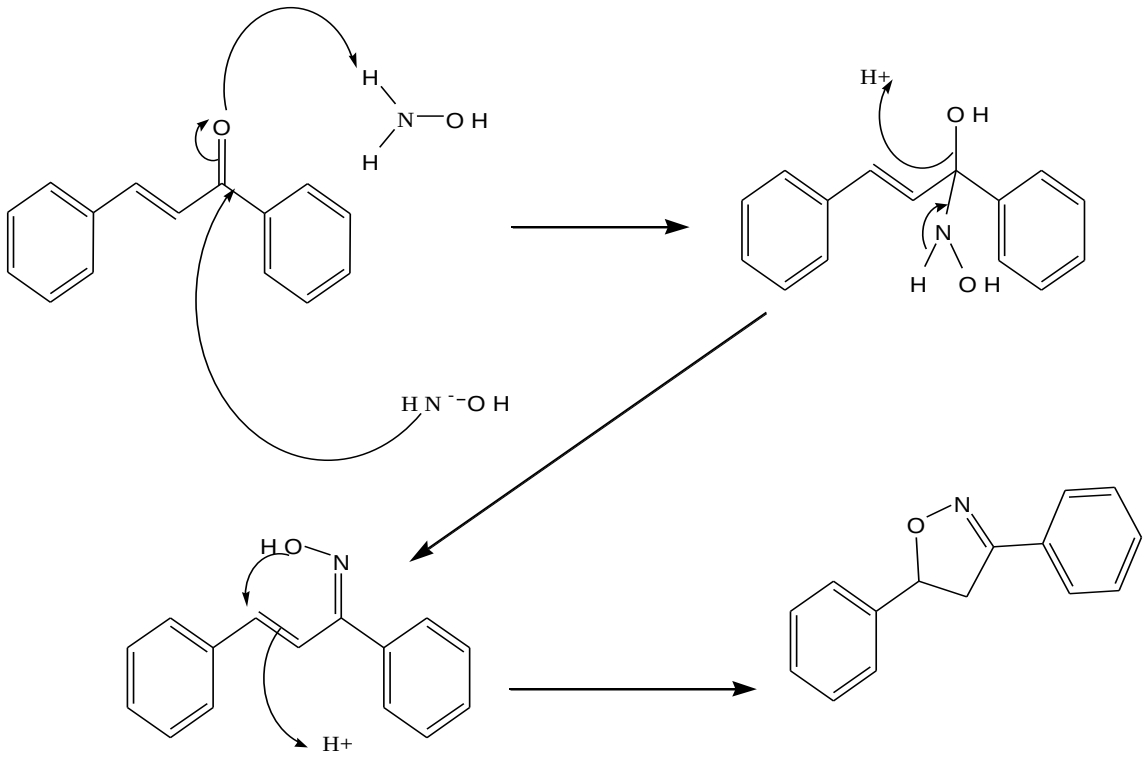
Mechanism:



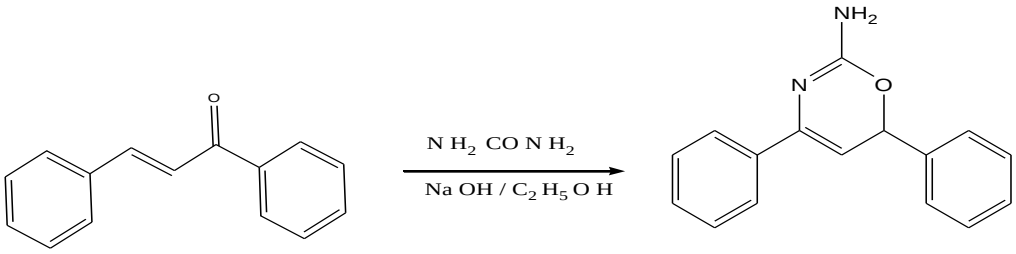
B) Synthesis of Isoxazole:



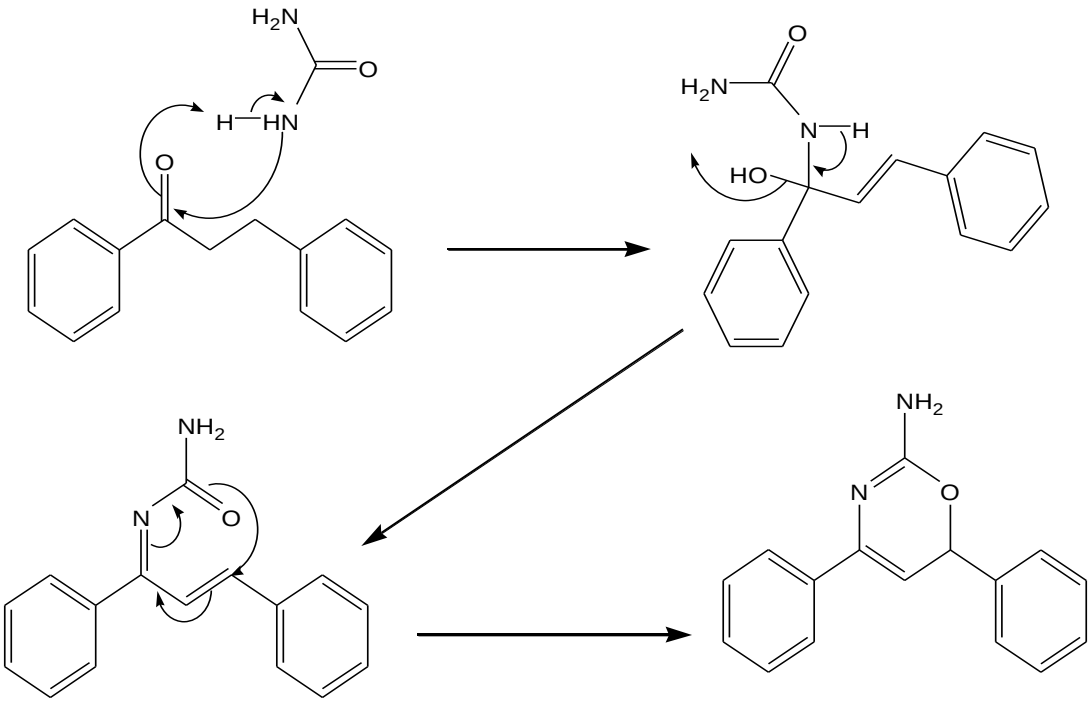
Mechanism:



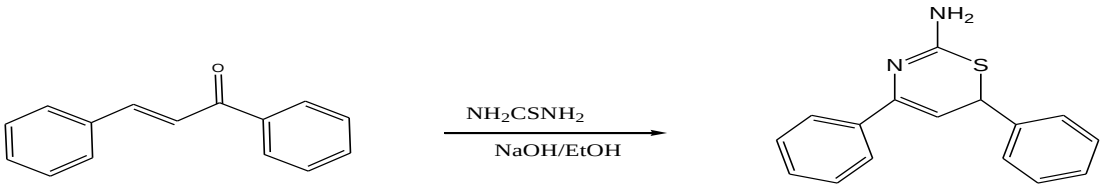
C) Synthesis of Oxazine:



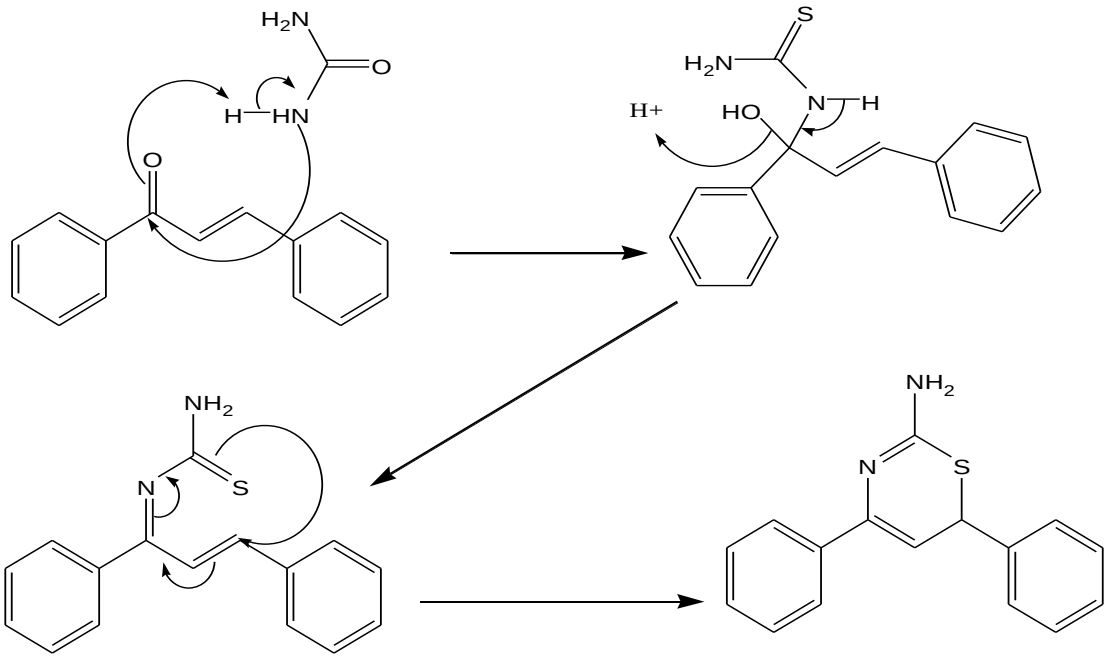
Mechanism:



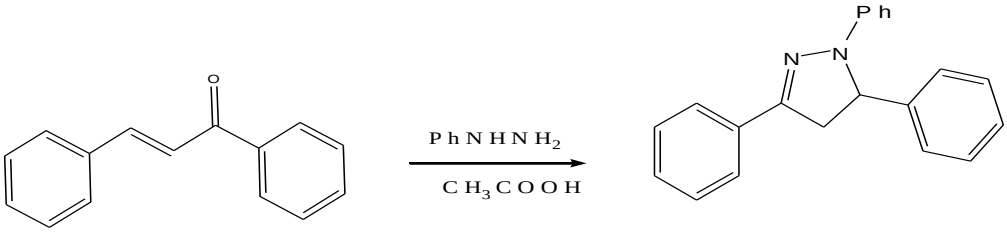
D) Synthesis of Thiazine:



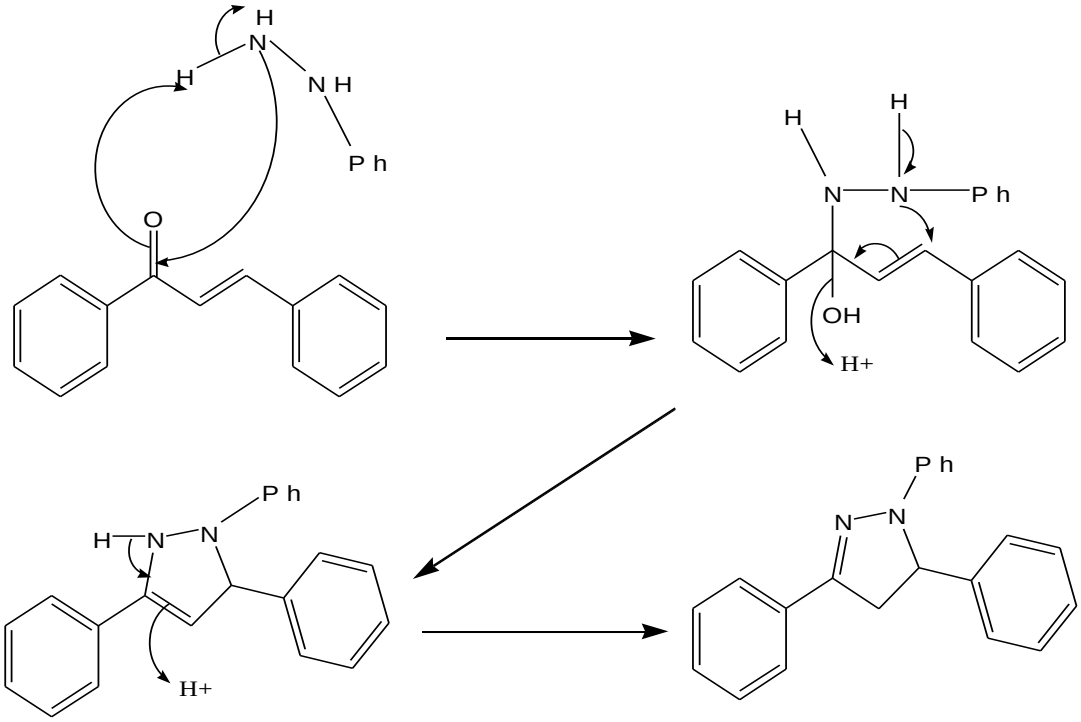
Mechanism:



E) Synthesis of Pyrazolines:



Mechanism:



CHAPTER 4

EXPERIMENTAL WORK

EXPERIMENTAL WORK

1. **Procedure for the synthesis of chalcones:**

A) Green method using anhydrous $Ba(OH)_2$[2]:

Chemicals required:

Acetophenone: 4mmol

Aromatic aldehydes: 4.1mmol

Anhydrous $Ba(OH)_2$

In a mortar and pestle, a mixture of aromatic aldehyde (4mmol), acetophenone (4.1mmol) and anhydrous barium hydroxide (C-200) (2g) was taken and it was ground well at room temperature for 2-5minutes. Then the reaction was allowed to stand for 10minutes. Then 30ml of ice cold water was added to the reaction mixture and acidified it with conc. HCl. The product then was collected by vacuum filtration and recrystallized from ethanol. In the cases where an orange oil was formed, the mixture was extracted with DCM, the extracts were dried (Na_2SO_4) and the solvent was evaporated to give the chalcone as a solid.

Preparation of anhydrous $Ba(OH)_2$[29]:

Barium hydroxide cystallizes as octahydrate[$Ba(OH)_2.8H_2O$]. The thermal dehydration of crystalline barium hydroxide octahydrate has been studied. Gradual thermal treatment in air leads to the formation of a dihydrate, in addition to the monohydrate. Anhydrous barium hydroxide is formed at 375°C.

B) Using $LiOH.H_20$ as a base[9]:

Chemicals required:

Acetophenone: 10mmol

Aromatic aldehyde: 10mmol

$LiOH.H_20$: 1 mmol

In 100ml round bottom flask, acetophenone (10mmol) in EtOH (5ml) was treated with $LiOH.H_2O$ (1mmol) under magnetically stirred condition for 10min at room temperature, followed by addition of aromatic aldehyde (10mmol). The mixture was stirred magnetically until complete consumption of the starting materials (8-10mins). After the completion of the reaction, a yellow precipitate was formed. 5gm of ice was added and precipitate formed was filtered, washed with water and recrystallized using EtOH.

2. Procedure for synthesis of heterocycles from chalcones:

A) **Preparation of Isoxazole derivatives**[30]:

Chemicals required:

Chalcone: (0.01 M)

Hydroxylamine hydrochloride: (0.02M)

KOH: (0.02 M)

Methanol: (50ml)

Chalcone (0.01M), Hydroxylamine hydrochloride (0.02M) and potassium hydroxide (0.02M), methanol (50ml) was refluxed for 4hrs. The reaction mixture was cooled and acidified with acetic acid. The solid obtained was filtered, washed with water and crystallized from ethanol to give a desired compound.

B) **Preparation of Oxazine derivatives**[17]:

Chemicals required:

Chalcone: (0.01M)

Urea: (0.015M)

Sodium acetate: (0.015M)

Chalcones (0.01M) was cyclized with Urea (0.015M) and Sodium acetate (0.015M) in 25ml ethanol by refluxing (6hrs).The reaction was monitored by TLC. The mixture was concentrated and poured into ice. The precipitate obtained was filtered, washed with water and recrystallized from ethanol.

C) **Preparation of Thiazine derivatives**[23]:

Chemicals required:

Chalcones: (0.01M)

Thiourea: (0.01M)

KOH: (0.02M)

Different chalcones (0.01M) dissolved in ethanol (25ml) were added to Thiourea (0.01M). To this, aqueous potassium hydroxide solution (0.02M) was added (prepared from KOH in small amount of distilled water). The reaction mixture was refluxed for 3-4hrs, cooled, diluted with water and acidified with conc. HCl. The reaction was monitored using TLC. Then the product was filtered, dried and recrystallized from ethanol.

D) **Preparation of 1,3,5-triphenyl-2-pyrazolines**[31]:

Chemicals required:

Chalcone: (1.0 mmol)

Phenylhydrazine: (2.0 mmol)

Methanoic acid: (2.5 ml)

To a stirred solution of chalcone (1.0 mmol) in 10ml EtOH, phenylhydrazine (2.0 mmol) and methanoic acid (2.5 ml) was added at room temperature. The reaction mixture was heated to reflux for 25minutes. The progress of the reaction was monitored by TLC. The EtOH was removed under reduced pressure and residue recrystalized from EtOH to afford the pure product.

CHAPTER 5

SPECTRAL DETAILS

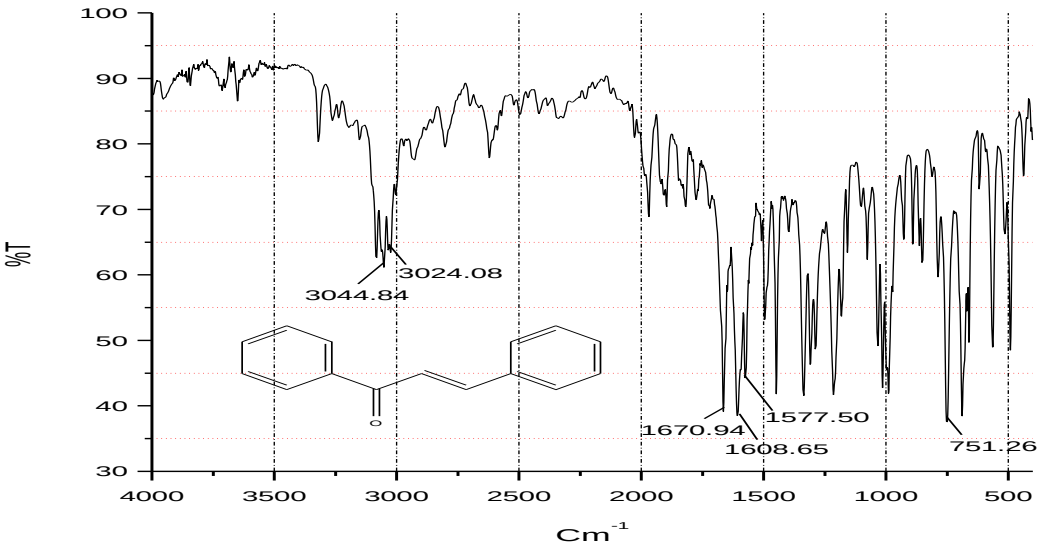


Fig.1. IR spectrum of 1,3-diphenyl-2-propenone

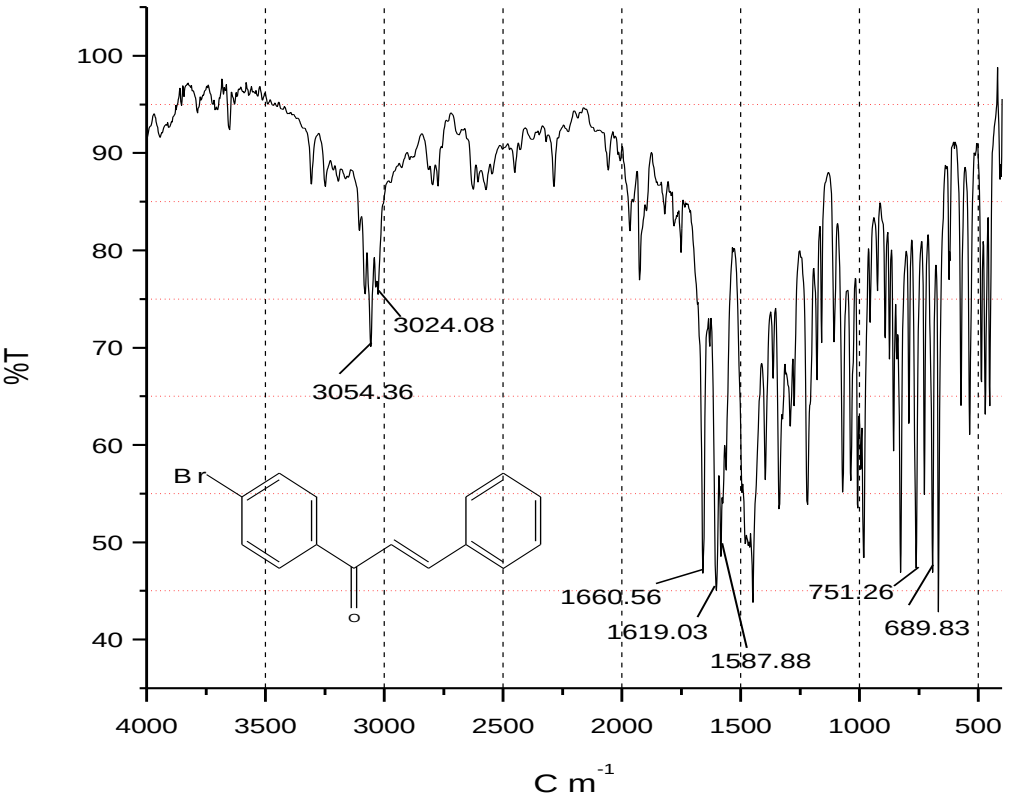


Fig.2. IR spectrum of 1-(4-bromophenyl)-3-phenyl-2-propenone

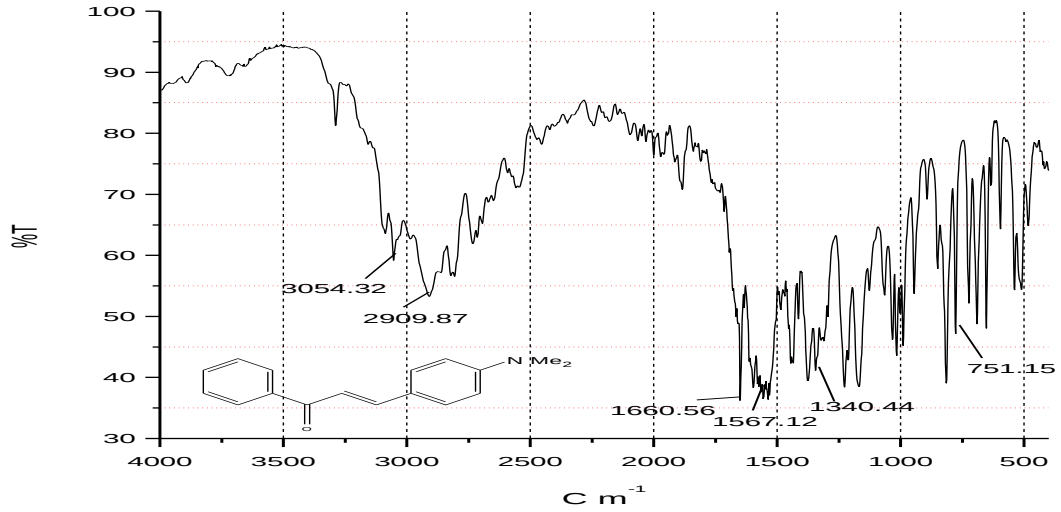


Fig.3. IR spectrum of 1-phenyl-3-(4-dimethylaminophenyl)-2-propenone

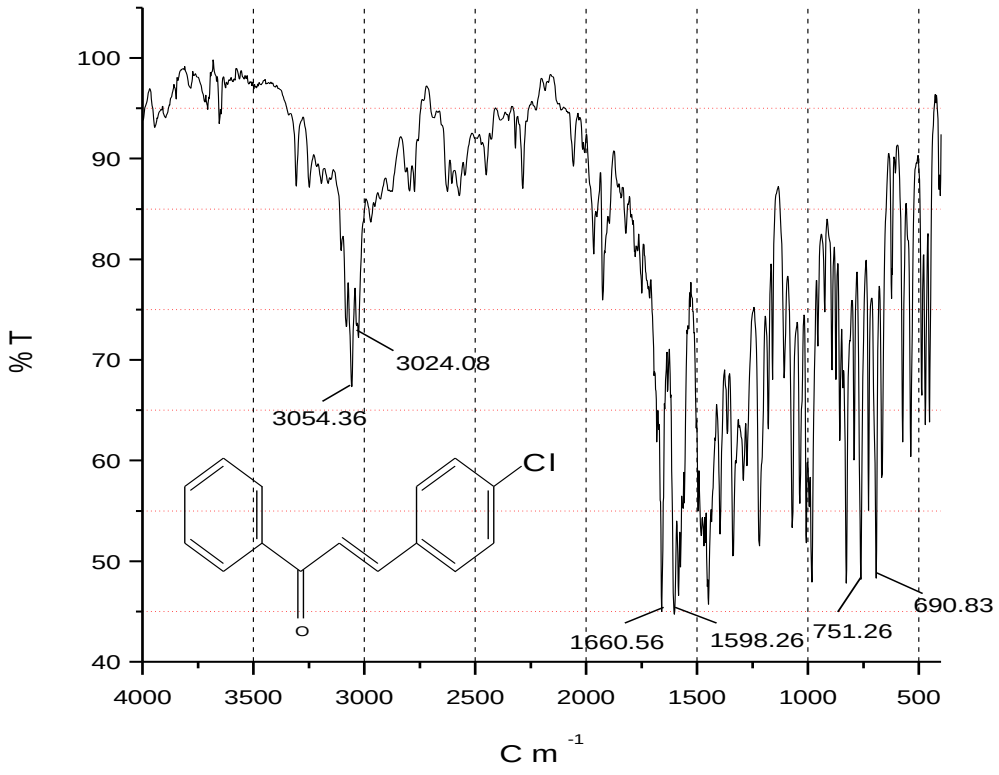


Fig.4. IR spectrum of 1-phenyl-3-(4-chlorophenyl)-2-propenone

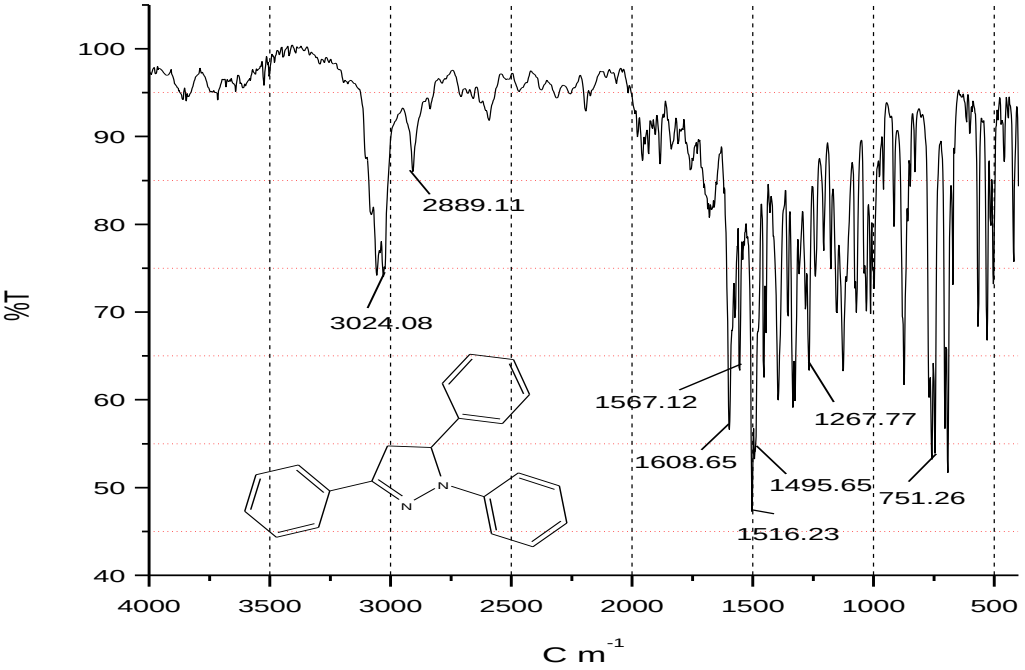


Fig.5. IR spectrum of 1,3,5-triphenyl-2-pyrazoline

CHAPTER 6

RESULTS AND DISCUSSION

Results and discussion:

1) Synthesised Chalcones:

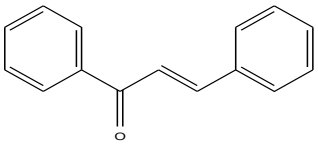
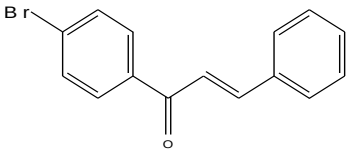
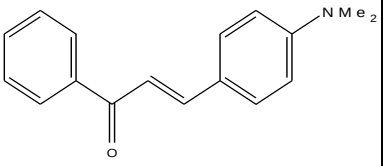
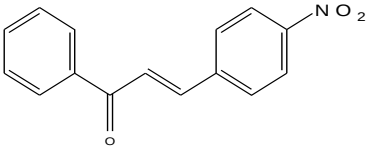
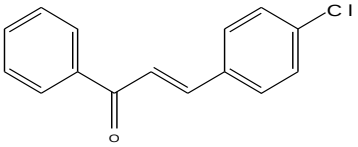
Entry	Chalcones	Time $Ba(OH)_2$ Minutes	Time $LiOH.H_2O$ Minutes	Yield $Ba(OH)_2$	Yield $LiOH.H_2O$	Melting point (^oC)
1.		15	5	85%	60%	56
2.		20	30	80%	55%	102
3.		15	10	80%	55.6%	96
4.		5	2	80%	60%	157
5.		20	15	80%	50%	113

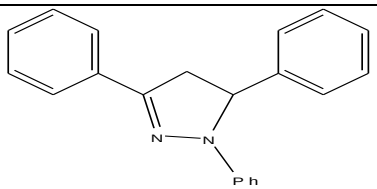
Table 1. Yield and melting points of Chalcone derivatives

The grinding technique was found to be the rapid procedure for the synthesis of chalcones which involved grinding of a mixture of substituted aryl aldehydes, substituted acetophenones and anhydrous barium hydroxide in a motar and pestle for 2-5minutes in the absence of any solvent. The product was also easily obtained by acidiying the mixture without extraction, and yields were also good and reaction time was also reduced from hours to minutes.

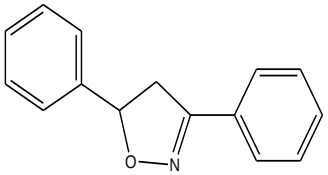
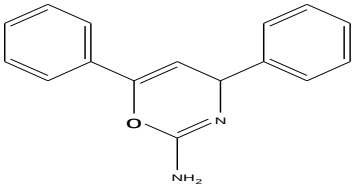
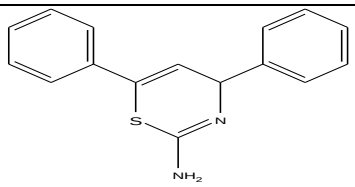
We have carried out Claisen-Schmidt condensation of substituted acetophenones with several benzaldehydes derivatives in the presence of $LiOH.H_2O$. And we observed that there was rapid fomation of chalcones. We could also see that the yield of the chalcones obtained using $LiOH.H_2O$ was less. But the yield can be increased by optimizing the reaction conditions.

Entry	Name of the Chalcones	Molecular formula
1.	1,3-diphenyl-2-propenone	$C_{15}H_{12}O$
2.	1-(4-bromophenyl)-3-phenyl-2-propenone	$C_{15}H_{14}OBr$
3.	1-phenyl-3-(4-dimethylaminophenyl)-2-propenone	$C_{17}H_{20}NO$
4.	1-phenyl-3-(4-nitrophenyl)-2-propenone	$C_{15}H_{14}NO_3$
5.	1-phenyl-3-(4-chlorophenyl)-2-propenone	$C_{15}H_{14}OCl$

3. Synthesised heterocycles:

Entry	Heterocycle	Colour	Molecular formula	Yield	Melting point	Time
1.	 1,3,5-triphenyl-2-pyrazoline	Apricot yellow solid	$C_{21}H_{18}N_2$	70%	133^oC	25 mins

Heterocycles that we tried to synthesise but failed to obtain:

Entry	Heterocycles	Name
1.		4,5-dihydro-3,5-diphenylisoxazole
2.		4,6-diphenyl-4H-1,3-oxazin-2-amine
3.		4,6-diphenyl-4H-1,3-thiazin-2-amine

CHAPTER 7

CONCLUSION

CONCLUSION:

Our aim is to prepare heterocyclic compounds from different chalcone derivatives.

So first of all we prepared different substituted chalcones by green method using a grinding technique and also by one alternative method using $LiOH.H_2O$. We observed that yields were good in case of grinding technique and it was an easy way to prepare chalcones where there was no use of any solvent. It was time efficient technique. Also we say that $LiOH.H_2O$ can be used as an efficient catalyst for the synthesis of chalcones under mild conditions. The yield of the chalcones obtained using $LiOH.H_2O$ was less. But the yield can be increased by optimizing the reaction conditions. Advantages of $LiOH.H_2O$ are: it is commercially available, non-toxic and thus it is easy to handle. And the compounds were identified from IR spectra and melting points.

From these chalcones we tried to prepare Isoxazole, Oxazine, Thiazine and Pyrazoline deivatives.

But only Pyrazoline we could synthesise and identify from IR spectra and melting point. Isoxazole derivative we were able to synthesise but due to lack of time, we were not able to identify it from IR spectra and melting point. Other two heterocycles we were not able to synthesise.

CHAPTER 8

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