Chapter one

1.Tntroduction:

1.1. The chemistry of heterocyclic compounds:

Heterocyclic compounds are compounds that contain rings made up of more than one kind of atom commonly nitrogen's oxygen , or sulphur ,in many compounds such as benzene, naphthalene , cyclohexanole , and cyclopentadiene the rings are made up only of carbon atoms such compounds are called homocyclic compounds (Morrison and boyd,1992).

Hetero cyclic compound are very widely distributed in nature and are essential to life in various ways , most of the sugars and their derivatives including vitamin C for exist largely in the form of five-membered (furan) or six-membered(pyran) rings which contain one oxygen atom, most members of the vitamin B group possess nitrogen . hetero cyclic ringes . one example is vitamin $B6$ (pyridoxine) most of alkaloids , which are nitrogenous bases occurring in plants and many antibiotics including penicillin , also contain heterocyclic rings systems. A large number of heterocyclic compounds obtain only by laboratory syntheses have valuable properties as chemotherapeutic agents, drug dyestuffs or copolymers (GUPTA,2005). Heterocyclic compounds may be aliphatic heterocyclic, where specific effects due to the constitution of the compound are excluded are very similar chemically to their open-chain aliphatic and loges ,for instance tetra hydro furan (1) has many properties characteristic of diethyle there are several convention for numbering the atoms and substituents in sample heterocyclic rings that are generally accepted and are used by chemical abstracts (Bakulev and Dehan ,2004).

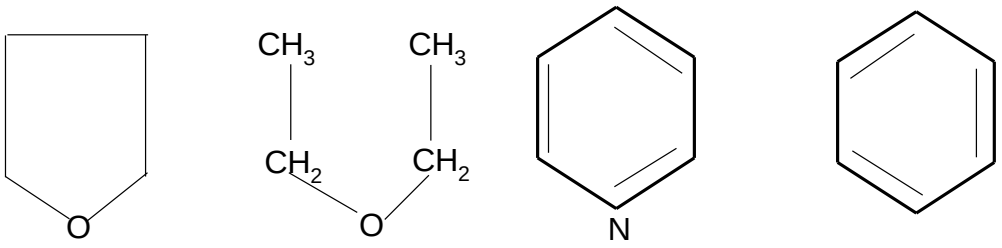

Figure (1.1) – example for aliphatic and aromatic Heterocyclic compounds .

In the heterocyclic rings containing more than one hetero atom , the order of preference for position -1- is oxygen , sulphur and nitrogen .if there are two ways of numbering the ring the way which gives the second hetero atom the lowest possible number is chosen . Iso oxazole (5),thiazole(6) and thiadiazole(7) are there four numbered as shown below (Gubta,2004).

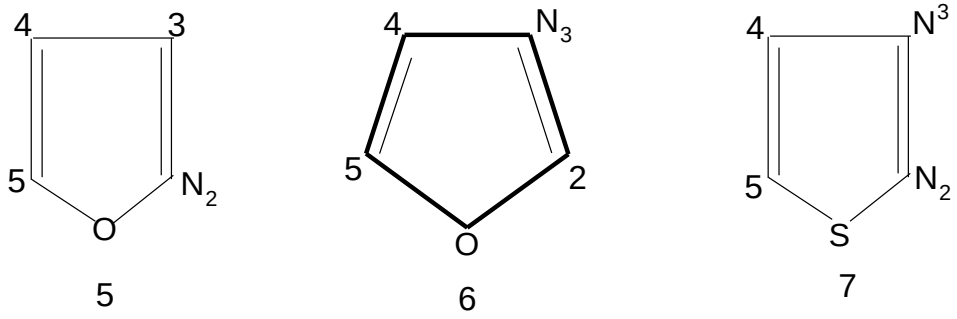

Figure (1.2) - heterocyclic rings containing more than one hetero atom

1-2 Five membered ring heterocyclic compounds.

1.2.1- Five membered ring with one hetero atom

Pyrrole (8),furan (9)and thiophene (10) are all related to cyclopentadine , formed through replacement of the methylene group (ch2)by the appropriate hetero atoms .these molecules all possess six- π electrons .

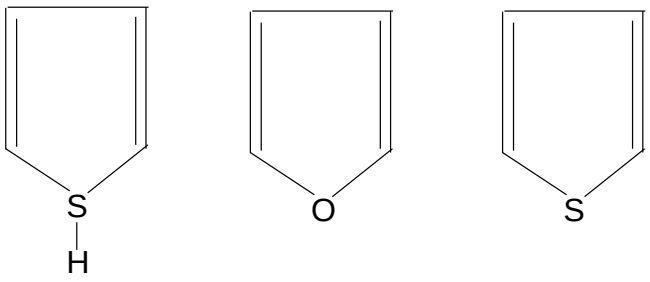

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Figure (1.3)- five membered ring with one hetero atom.

1.2.2- Five membered ring with metal hetero atom:

Selenophene(11)can be synthesized by many of methods applicable to thiophene, but employing intermediates containing selenium instead of sulphur analysis of the compounds and deuterated derivatives has shown that the molecular is planar and has given molecular dimensions selenophene resembles thiophene in many respects undergoing electrophilic substitution at position 2 and going the 2-lithium derivatives (12) with butyl lithium .in faster than those at position 2 are exchanged 5×10000 those at position 2 of thiophene.

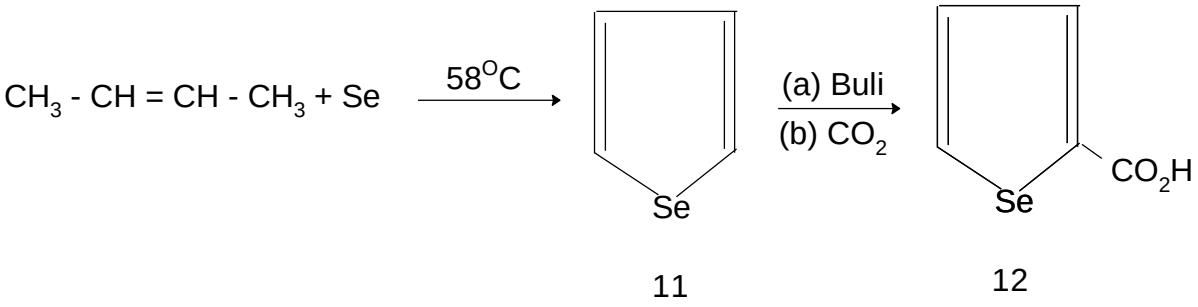

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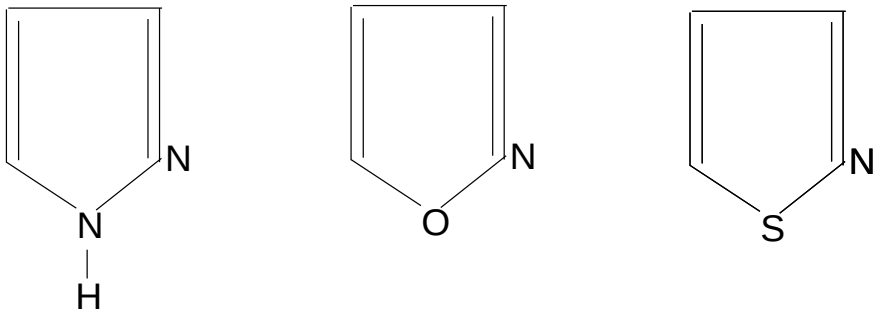
Figure (1.4)- five membered ring with metal hetero atom.

The aromaticities of thiophene ,selenophene,tellurophene,and furan decreasein this order.1:3.6:36.8:107 respectively (Bakulev and Dehan ,2004).

1.2.3- Five membered rings with two hetero atoms:

The great majority of the known compounds with two hetero atom in a five membered ring are methine (=CH) groups by a nitrogen atom . they can be derived similarly from pyridine by replacing two methine groups(-CH=CH-) by an amino group (NH), or oxygen or sulphur atoms to produce pyrazole (13), isoxazole (14) , and iso thiazole(15), imidazole (16) , oxazole(17)and thiazole(18).



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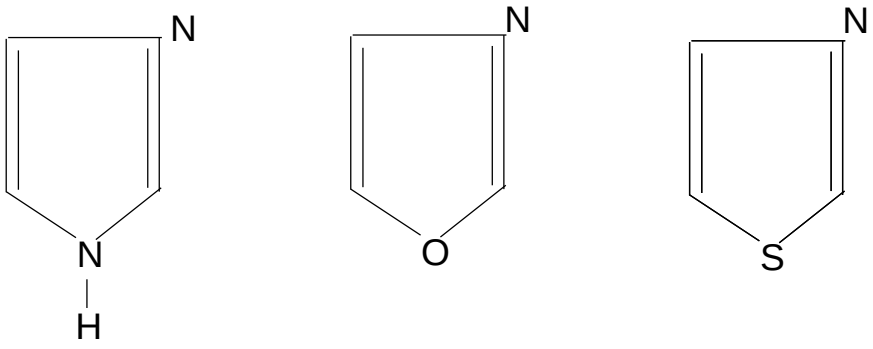

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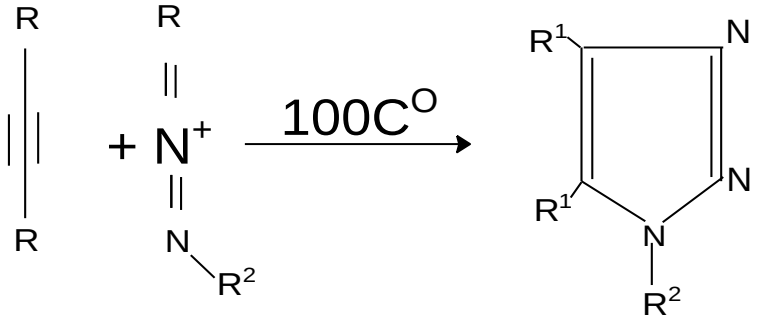
Figure(1-5)- five membered rings with two hetero atoms.

1.2.3- Five membered rings with three hetero atoms:

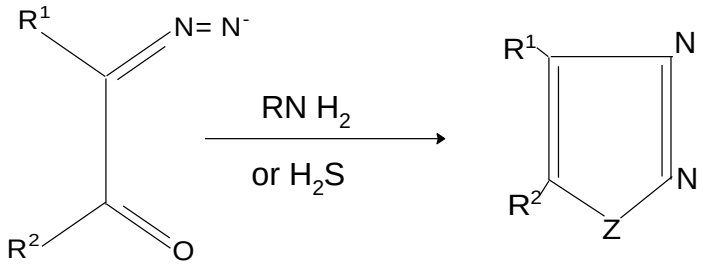
Scheme below deals with the synthesis of azoles containing 3 hetero atoms and gives a variety of methods of common use for the construction of these ring systems . the thiazoles are often prepared by the 1,3-dipolar cyclo addition of an azide to an acetylene αdiazoketones them selves exist in the non-cyclized form ,but on reaction with H2S.cyclization take place to give respective a 1,2,3thiazoles or 1,2,3thiadiazoles or 1,2,3 thiazole , 1,2,4-oxadiazole can both readily be ring closure of amidrazone or amidoximes , respectively .1,2diacylhy drazines can be converted by methods that recall the paol-knorr synthesis to 1,2,4-triazoles,1,2,4-oxadiazole or 1,2,4-thiadiazoles(lipshutz,1986).

1.2.4.1- 1,2,4-triazoles by 1,3dipolar cyclo addition :



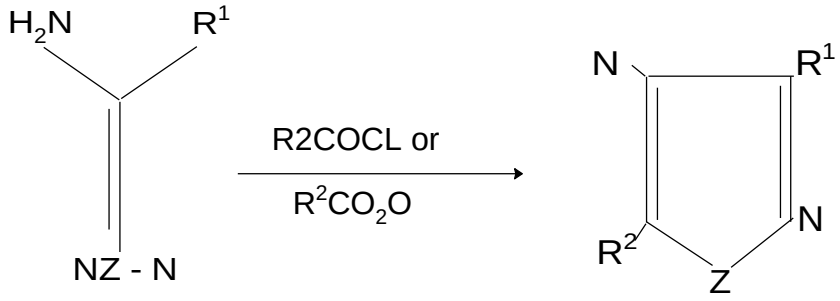
Figure(1.6) -1,2,4-triazoles by 1,3dipolar cyclo addition .

1.2.4.2-1,2,3-triazoles and 1,2,3thiadiazoles from diazoketones:



Figure(1.7) 1,2,3-triazoles and 1,2,3thiadiazoles from diazoketones.

1.2.4.3.- 1,2,4-triazoles,1,2,4-oxadiazole from amidrazones:



Figure(1.8)- 1,2,4-triazoles,1,2,4-oxadiazole from amidrazones.

1.2.4.4.- 1,2,4-triazoles,1,3,4-oxadiazole or 1,3,4-thiadiazoles diacylhydrazines:

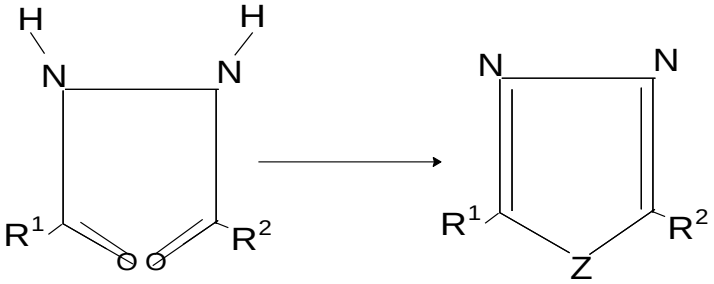
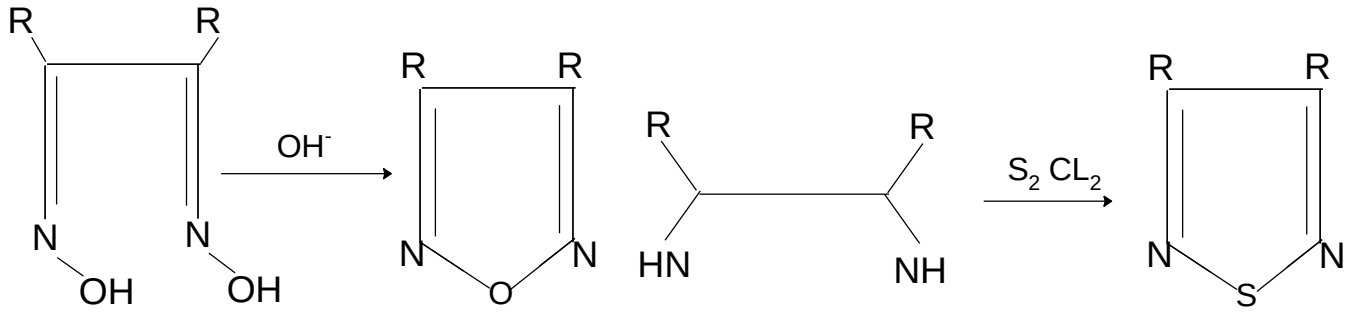


Figure (1.9) -1,2,4-triazoles,1,3,4-oxadiazole or 1,3,4-thiadiazoles diacylhydrazines.

1.2.4.5.-1,2,5-oxadiazoles and 1,2,5thiadiazoles from 1,2-diketone:



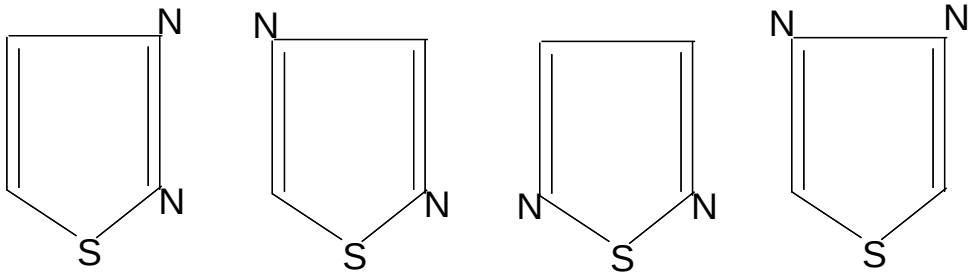
Figure(1-10)- 1,2,5-oxadiazoles and 1,2,5thiadiazoles from 1,2-diketone.

1.3.Thiadiazoles:

Thiadiazole are considered to be derived from thiophene by replacing two (-CH=)(methaine)groups by pyridine type nitrogen (-N=)and include four isomeric members depending on the relative position of the nitrogen atoms.

1.3.1.Nomenclature of thiadiazoles:

Thiadiazoles are named as 1,2,3-thiadiazole(19),1,2,4-thiadiazole (20),1,2,thiadiazole(21), 1,3,4 –thiadiazole (22)are called isomeric thiadiazoles.



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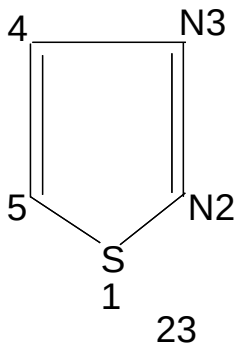
Figure(1.11). nomen cloture of thiadiazoles.

1.4. The 1,2,3-thiadiazoles:

1.4.1 General:

1,2,3-thiadiazoles are Heterocyclic of great practical and Heteroretical interest. derivatives of 1,2,3-thiadiazole are important in industry ,medicine and agriculture, a lot of attention has been devoted to the thermal and photometrical decomposition reaction 1,2,3-thiadiazoles ring because this system is the only thiadiazole isomer where loss of nitrogen molecular can readily occur (wim-dehan,2010). 1,2,3-thiadiazole is a natural five – membered aromatic hetero cyclic with three continuous hetero atoms and is numbered as shown is structure (23).



Figure(1.12)-numbering of 1,2,3-thiadiazole.

1,2,3-Thiadiazole have been found to possessanti-be cterical insecticidal and herbicidal activity .

The analogues of 1,2,3-thiadiazole-4-carboxylic acid exhibit sedative and hypnotic activity comparable to benzo diazopines.

1.4.2.Structure of 1,2,3-thiadiazole:

1,2,3-Thiadiazole is a planer molecule with the following structural parameters.

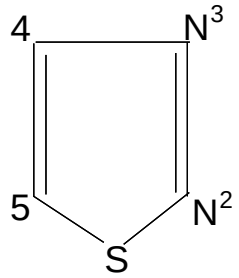


Figure (1.13)- structure of 1,2,3-thiadiazole compound.

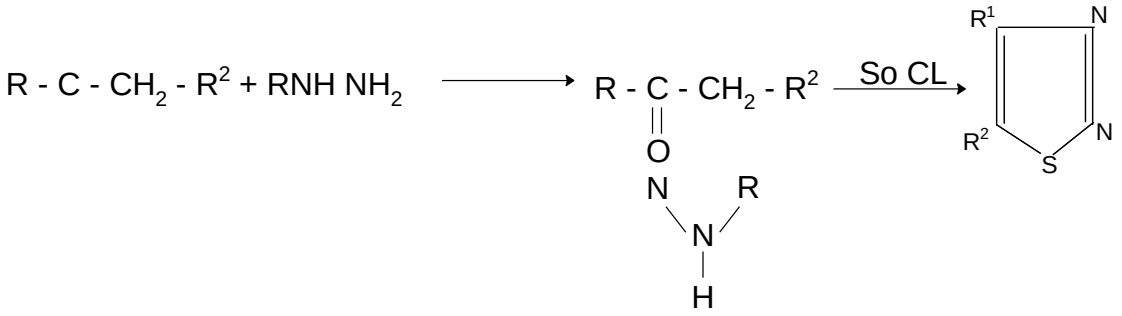
Bond length(a`)	Bond length(`)
S-N_2=1.692	S-N_2-C_5=92.9
N_2-N_3=1.290	N_2-N_3-C_4=114.0
N_3-C_4=1.366	S-N_2-N_3=111.2
C_4-C_5=1.369	N_3-C_4-C_5=114.2
S-C_5=1.689	S-C_5-C_4=107.8

The bond lengths in 1,2,3-thiadiazole indicated considerable π-electron delocalization . the interesting structural features exhibited by 1,2,3-thiadiazole molecule include the nearly equal bond length of S-N_2 and S-C_5 bond and very short N_2-N_3 bond (Demasonetal,1982).

1.5.- Synthesis of 1,2,3-thiadiazoles:

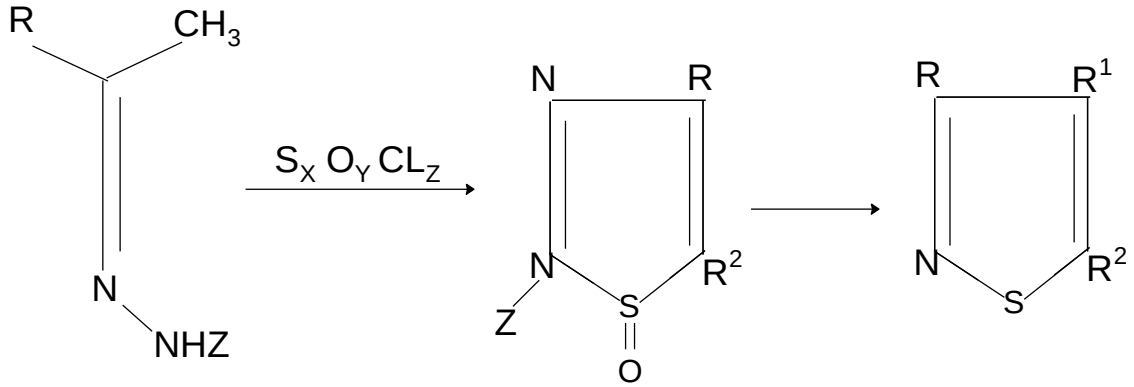
1.5.1-Hurd-mori's classical synthesis(from hydrazones):

This is the most widely used method for the synthesis of 1,2,3-thiadiazoles and involes cyclo condensation of αmethylene hydrazones (24),derived from αmethylene ketones, with thionyl chloride.



Figure(1.14)-cyclization of 1,2,3-thiadiazole ring from hydrazones.

Retro syntheltcally , the hurd-mary synthesis is a [4+1] approach using four atoms from the hydrazine's and one sulfur atom from the thionatis agent . the cyclization occurs predominantly at the more reactive methylene site rather than at the methyl site[1fR_1=CH_3] however ,sulphure dichloride (SCl_2)has also been used in place of thionyl chloride to oblain 1,2,3-thiadiazole..in improved yield (hurd and mori , 1956)hydrazones derivatives (25) that are substituted at N_2 with an electron with drawins group (z=-$CONH_2$,-COOMe), (COR , SO_2 R) and possessing an adjacent methylene group can be cyclized in the presence of thionyl chloride with the formation of 1,2,3 thiadiazoles (26)



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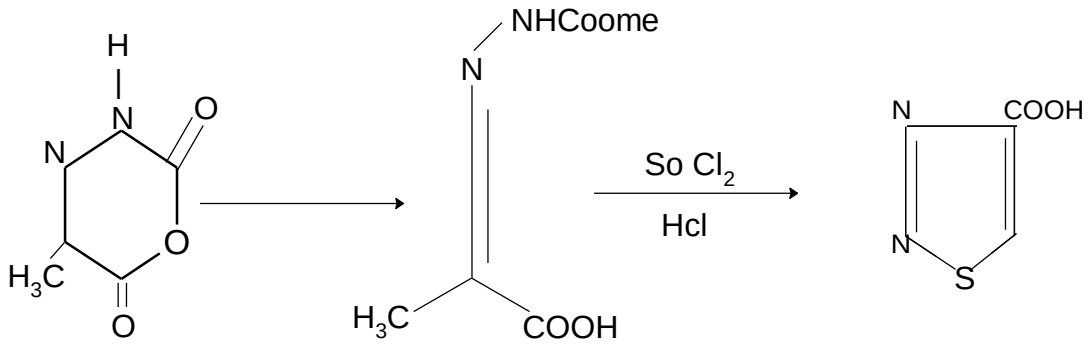
Figure(1.14)-cyclization of 1,2,3-thiadiazole ring from thionyl chloride

This reaction was discovered in 1956 by Hurd and Mori during their unsuccessful attempts prepare oxadiazinedione (28) from

hydrazone (27) by treatment with thionyl chloride (1,2,3 thiadiazole-4- carboxylic acid (29) was unexpectedly formed leading to a new synthetic approach to 1,2,3, thiadiazoles.



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1-5-2: Pachmann and Nold Synthesis:

This method involves dipolar cyclo addition of diazomethane to phenyl iso thio cyanate to provide 1,2,3, thiadiazoles (30).

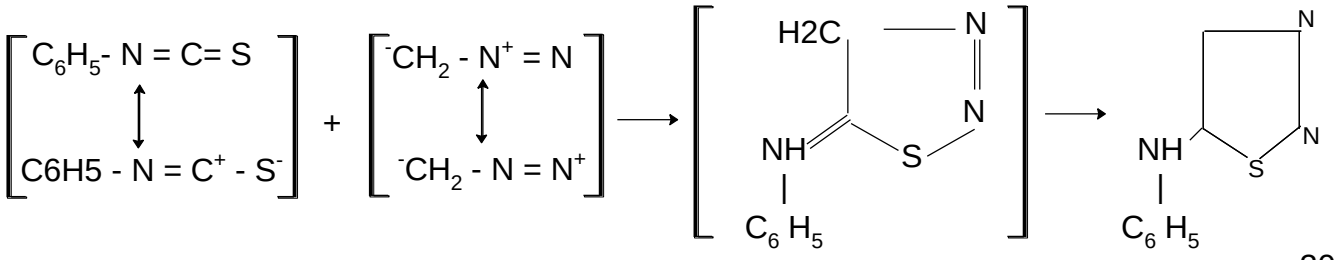

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Figure (1-16): Pachmann and Nold Synthesisof 1,2,3, thiadiazoles ring

This method has some limitations as methyl isothiocyanate does not react with diazomethane at room temperature but at higher temperature 1,2,3 thiodiazole (31) produced reacts further with the second molecule of diazo methane and provides 1,2,3- triazole (32) involving Dimroth rearrangement (Gupta, 2005).

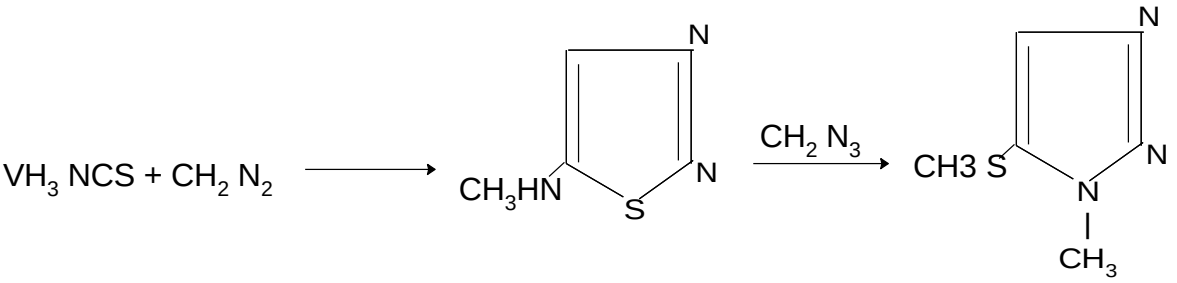


Figure (1-17): Dimroth rearrangement of 1,2,3, thiadiazoles derivative,

Lacteal, 1955) claborate a four step synthesis of compound (33) the S- alkyl unit serves a crucial funcation as a thiol protecting group . (Lee el al, 1955) shown that the best choice of the prolecting group is the 3- alkoxy carbonyl ethyl moiety because of its ease of in corporation and eventual smooth removal from alkyl thio thia diazole via retro Michael addition.

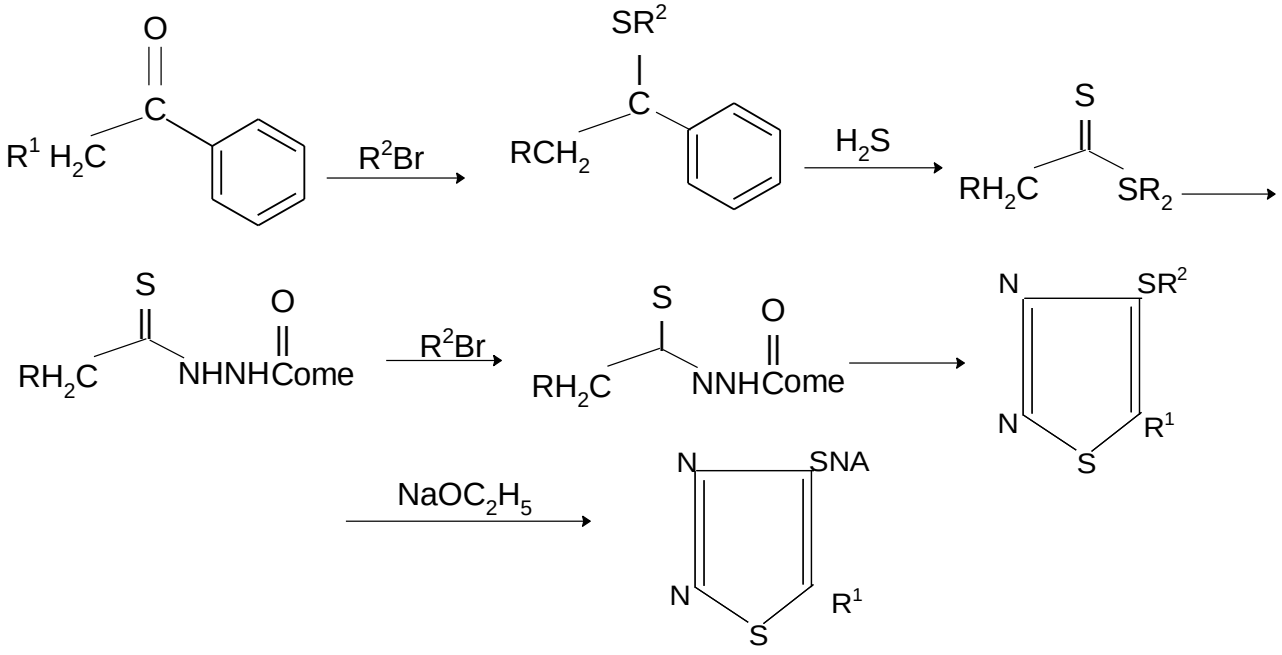


Figure (1-18) : Synthesis of (1,2,3) thiadiazole via retromichaele addition

1.5.3: Rearrangements:

1,2,3 Thiadiazole -3 oxides (35) are isomerized into 1,2,3 thiadiazole -2- oxides (36).

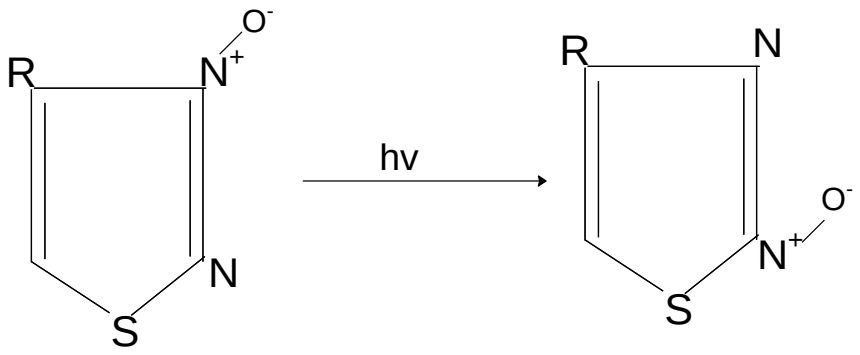


Figure (1-19): isomerization of 1,2,3 thiadiazole -3 oxides into 1,2,3 thiadiazole -2- oxides

1.6. Reactions of 1,2,3 thiadiazole :

1,2,3 thiadiazole is a $\pi - excessive$ hetero cyclic in which the nitrogen atoms particularly (N_3) are comparatively with higher electron density and the carbon atoms are with lower electron density the attack of electrophiles at carbon is very rare and there fore occurs at the nitrogen atom. The attack of nucleophiles occurs at the carbon atom and results in either nucleophilic substitution or ring cleavage.

1.6.1: Reactions with electrophiles:

The reaction of 1,2,3 thiadiazoles with dimethyl sulfate results in N-alkylation with the formation of a mixture of quaternary salts (42) and (43)- However in some cases, alkylation occurs exclusively at the position-3.

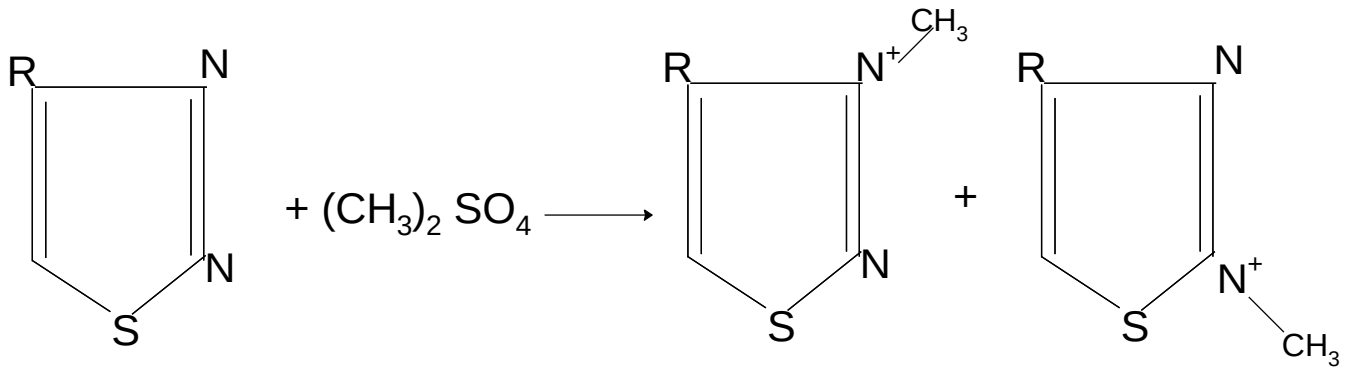


figure (1-20): Electrophilic attack at nitrogen.

1.6.2: Reactions with nucleophiles:

1.6.2.1: Nucleophilic substitutions:

The halogen atom 1,2,3 thiadiazoles at the position-5 in reactive and can be replaced by nucleophiles. The reaction of 5-chloro-1,2,3 thiadiazoles (44) with sodium methoxide proceeds with the replacement of chloride substituent.

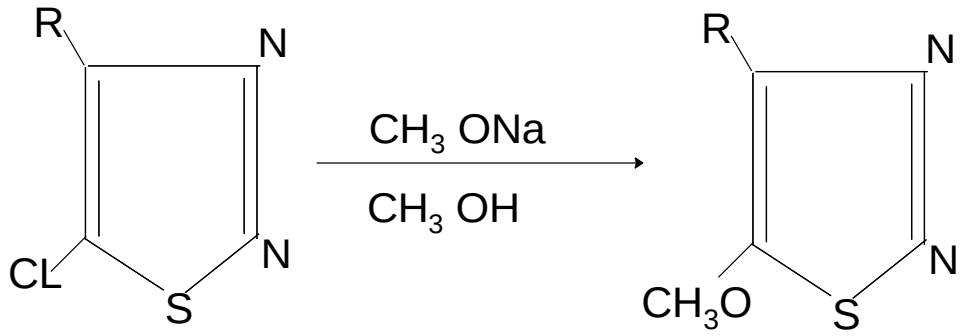


figure (1-21): Nucleophilic substitutions

1.6.2.2: Nucleophilic attack at sulphur:

If 1,2,3 thiadiazoles is substituted at both the carbons (C-4 and C-5) , the rection with n-butyl lithium followed by methyl iodide proceeds with initial attack of nuclephile at sulphur and results in the framentation of the ring with the evolution of nitrogen,

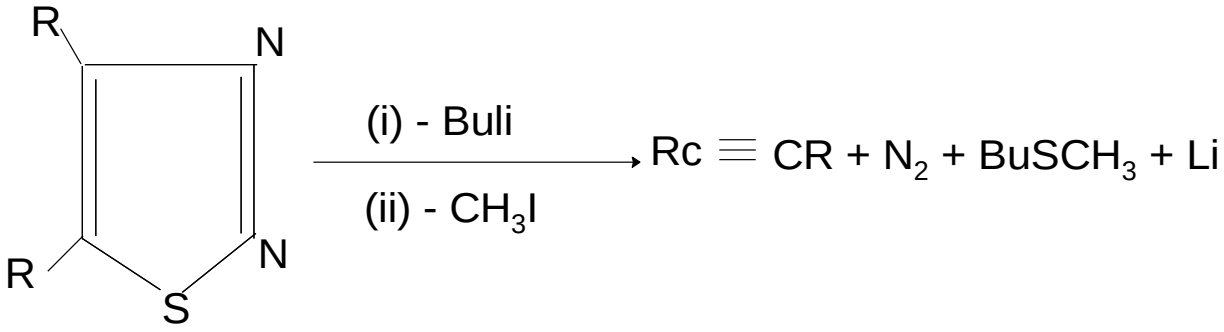


Figure (1-22)- Nucleophilic attack at Sulphur

1.6.3: Ring cleavage via C-deprotonation:

The (C_5-H) in 1,2,3 thiadiazoles is reactive and can be abstracted as a proton by a base. Deprotonation of 1,2,3 thiadiazoles ring occurs at (C-5) under strongly basic conditions and leads to the ring cleavage with extraction of nitrogen. However, 1,2,3 thiadiazoles substituted at (C-5) can be deprotonated at (C- 4) and the resulting anion (45) can be alkylated .

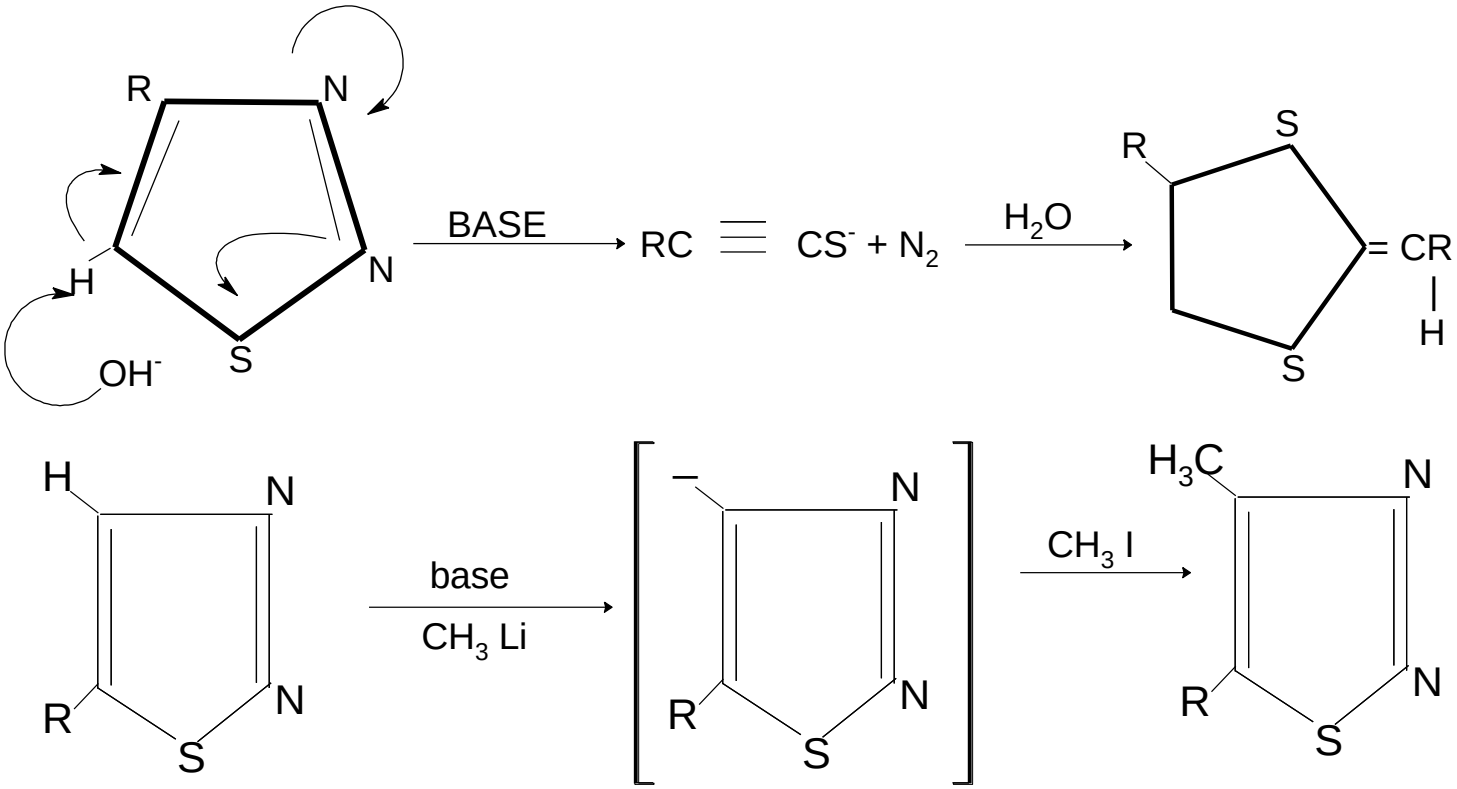


Figure (1-23) : Ring cleavage via C- deprotonation

1.6.4: Oxidation

Oxidation of 1,2,3 thiadiazoles with one equivalent of peracid occurs at N-3 with the formation of 1,2,3 thiadiazoles-3-oxide (45), but with three equivalent of per acid 1,2,3 thiadiazoles tri oxide(46) is produced involving oxidation of N-3 and of the sulphur atom

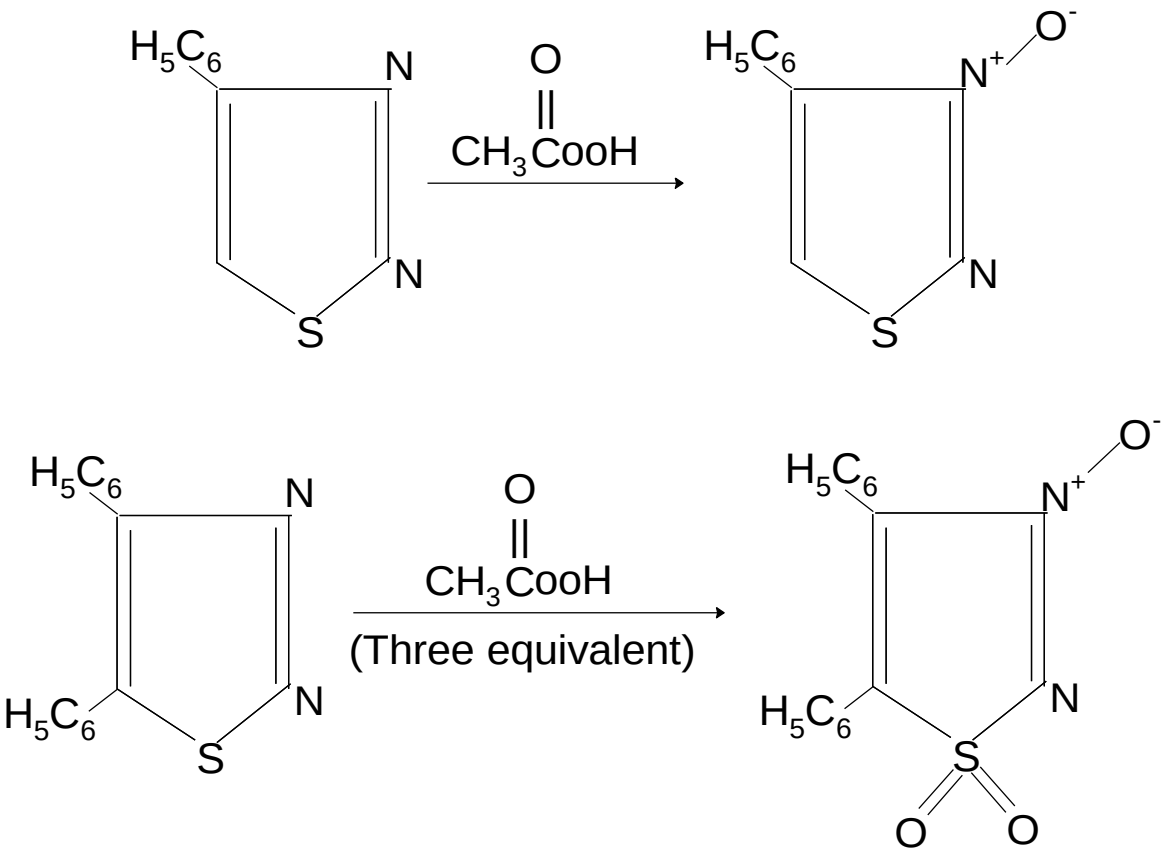


Figure (1.24): oxidation of 1,2,3 thiadiazoles with one equivalent and three equivalent of peracid.

1.6.5: Thermal and photo chemical reaction:

Thermal and photo chemical reactions are considered to proceed via diradical intermediates with the rxtrusion of nitrogen (Katritzky, 2005).

1.6.5.1: Thermal reactions:

Thermal decomposition of 1,2,3 thiadiazoles leads to the formation of thio ketones via adiredical intermediate (48).

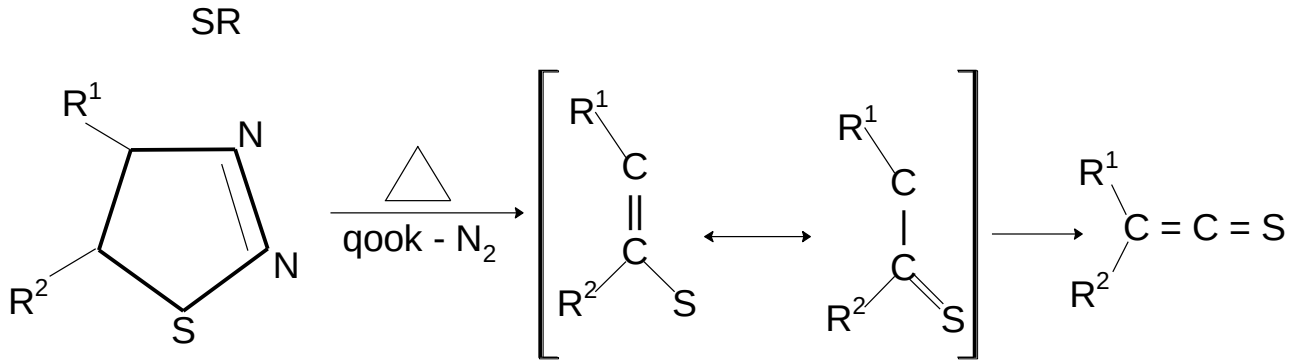


Figure (1-25): Thermal decomposition of 1,2,3- thiodiazole. ,

1.6.5.2: Photochemical Reaction:-

Photolysis of 1,2,3 thiadiazoles produced thiirine (49) which can be trapped by alkyne to provide thiophenone (50),

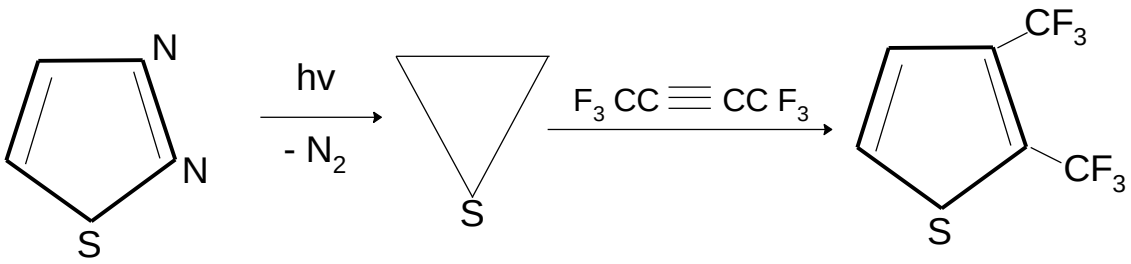


Figure (1-26):photolysis of1,2,3 thiadiazoles

However irradiation of 1,2,3- thiodiazole in an argon matrix at 8 k gives thiirine which upon further irradiation affords thioketene.

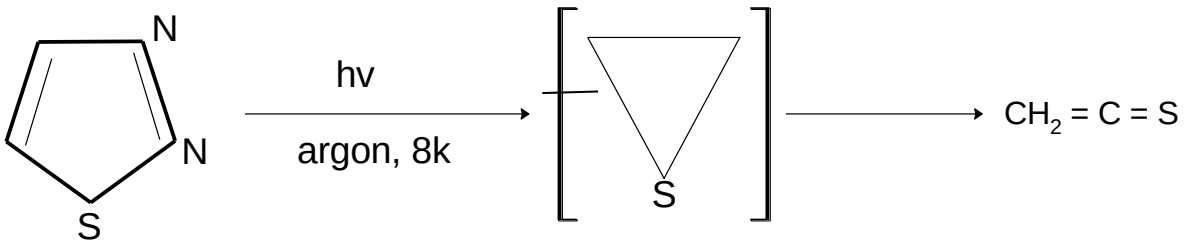


Figure (1-27):irradiation of1,2,3 thiadiazole

1.6.5.3:Decomposition of 1,2,3- thiodiazoles.

The highly reactive particles generated by cleavage of the 1,2,3-thiodiazole ring are widely used in organic synthesis, examples of organic compounds that can be obtained by transformation of the 1,2,3- thiazole ring are presented below:

1.6.5.3.1: Acyclic compounds:

The photochemical decomposition of 1,2,3- thiodiazoles (51) in the presence of amines leads to the formation of thioamides (53),

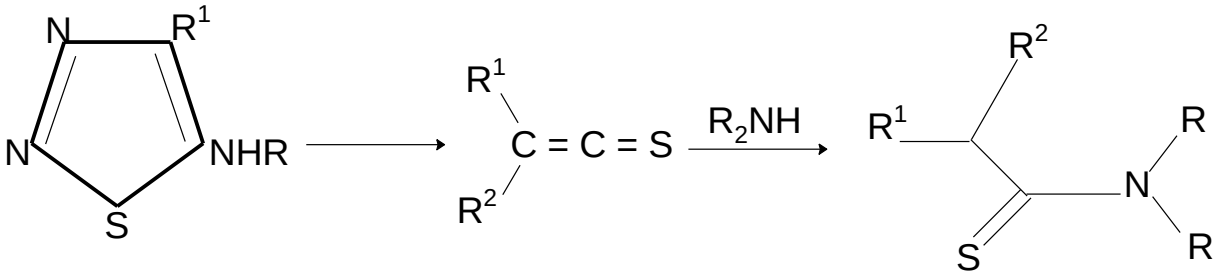


Figure (1-26.b): photochemical decomposition of 1,2,3- thiodiazole

An original method for the synthesis of thio amides by the transformation of derivatives of 1,2,3- thiodiazole ring , the ethylene thiolates (55) generated by the treatment of 1,2,3-thiodiazole (54) with butyl lithium were alkylated with the bromo ally derivatives (56) the obtained compounds (57) which react with

amines to gave thioamides (59) containing a double bound at the 8-position.

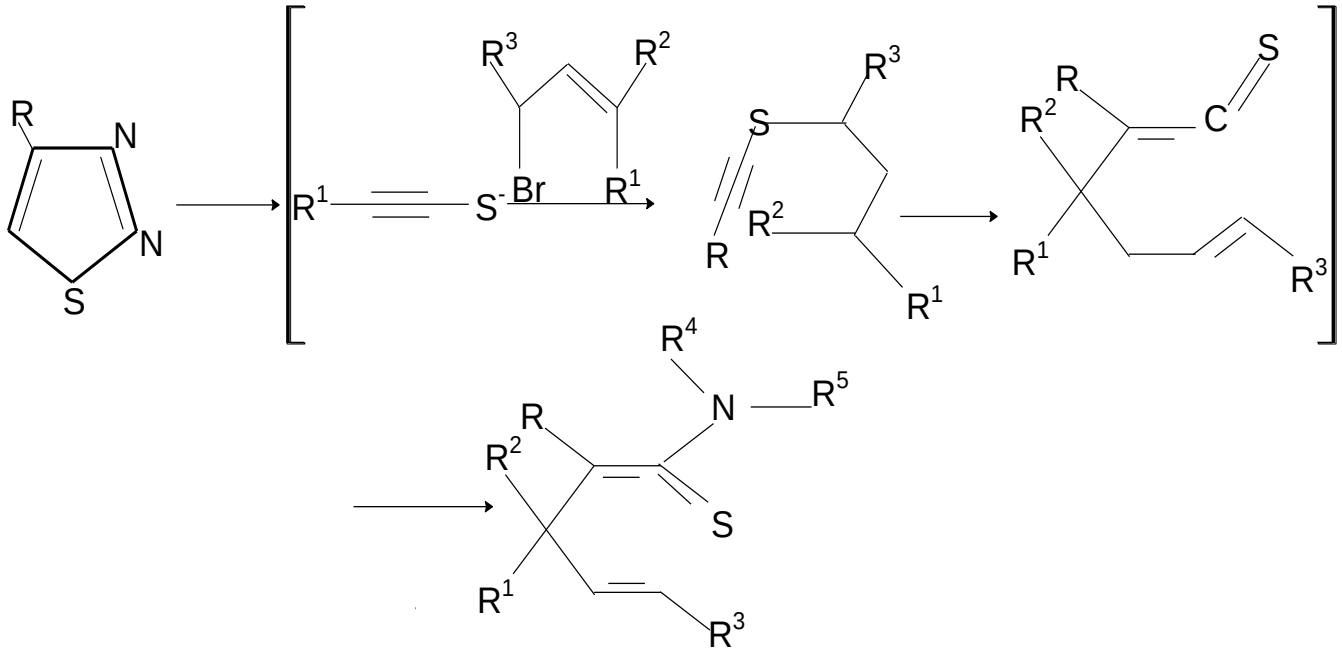
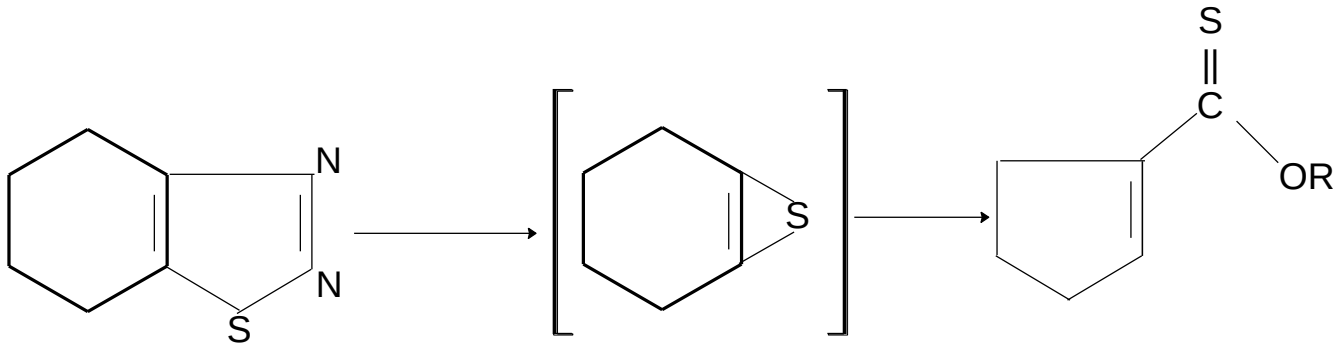


Figure (1-28): transformation of derivatives of 1,2,3- thiodiazole ring

Thermal or photo chemical decomposition of (54, 55, 56 and 57)-tetrahydro- 1,2,3- thiodiazole (61) in solutions of glycol [ethylene glycol or diglycol] leads to the formation of the cyclopentane thiocarboxylic ester (62), i.e, the reaction was accompanied by concentration of the cyclohexene ring to cyclopentane.



R=CH_2CH_2OH, $(CH_2)O(CH_2)_2OH$

Figure (1-29.b):themolysis or photolysis of tetrahydro 1,2,3-thiodiazole -

thioesters of acetic acid were obvtained during acyclation of the products from decomposition of the benzothiadiazoles(63) it was shown that the reaction took place with the formation of the two isometric thioesters (64) and (65),

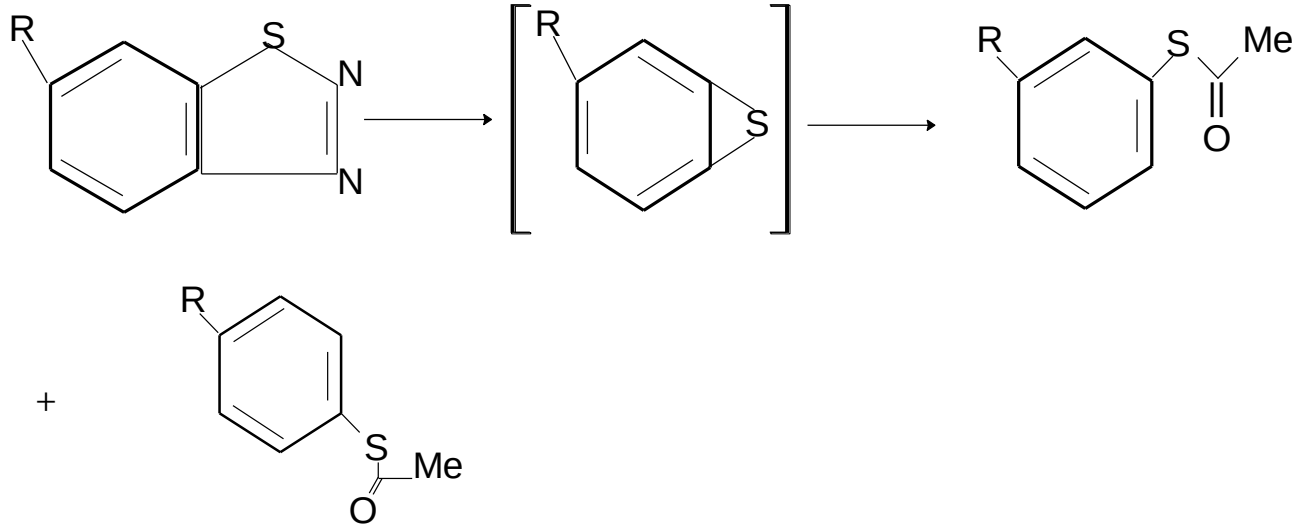


Figure (1-29.c):decomposition of the benzo- 1,2,3- thiodiazole -

The nitriles (67) and 1,2,3,4- dioxathiazole-1-oxides(68) were synthesized by the decomposition of 1,2,3- thiadiazole-1-oxides, 1.1,2- trioxides (66) on hydrolysis gave the hydroxyamic acids (69) with yields of (38-85%).

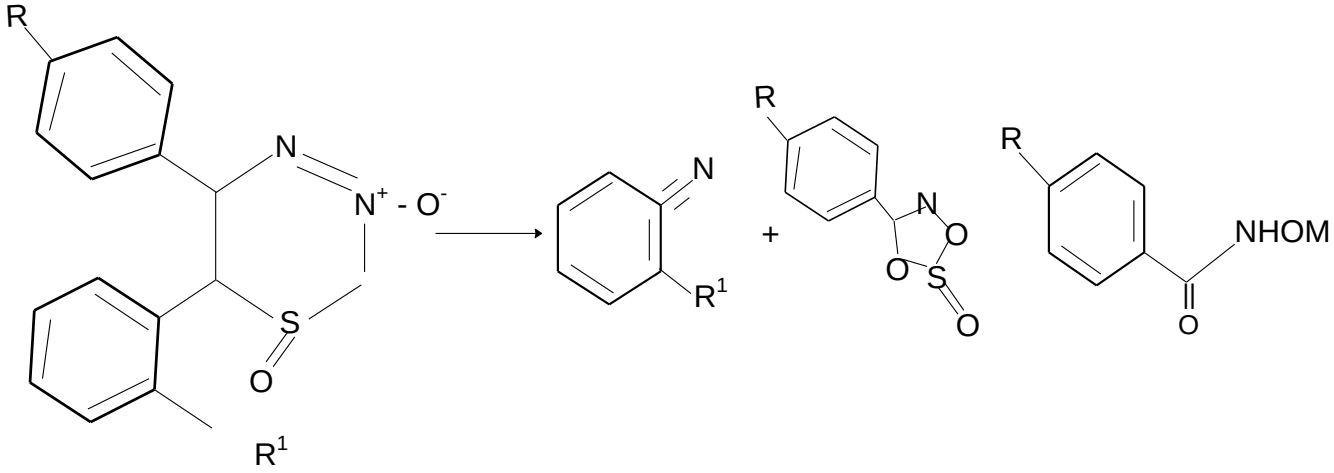


Figure (1-29.c):hydrolysis of decomposition product of 1,2,3-thiodiazole

Reduction of benzothiadiazole (70) with hydrogen on Palladium gives methyl-3-amino-2-mercaptobenzoate(71),

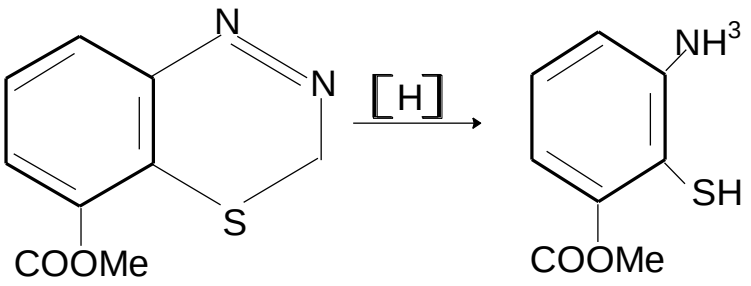
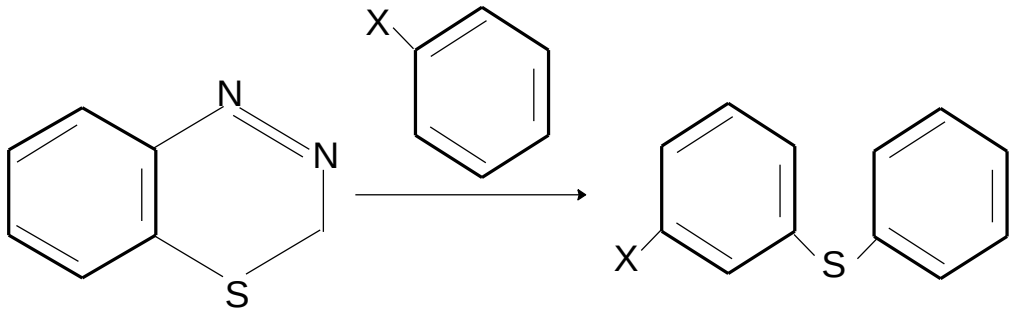


Figure (1-31): Reduction of the benzothiadiazole with hydrogen on Palladium

Decomposition of the benzothiadiazole which takes place by a radical mechanism, often leads to the formation of the sulfides (72),



X=H,Me,OMe.

Figure (1-29-d): decomposition of the benzothiadiaz by aradical mechanism

A synthesis of sulfides, where the key stage is a Dimeroth rearrangment of the 1,2,3- thiadiazole ring. The transformation of 5-amino-1,2,3- thiadiazoles (73) to 5- sulfonyl -1,2,3-triazoles (74) followed by reaction with alkyl halides with the fornation of 1,2,3-triazolyl sulfides (75) gives yields of (80-98%).

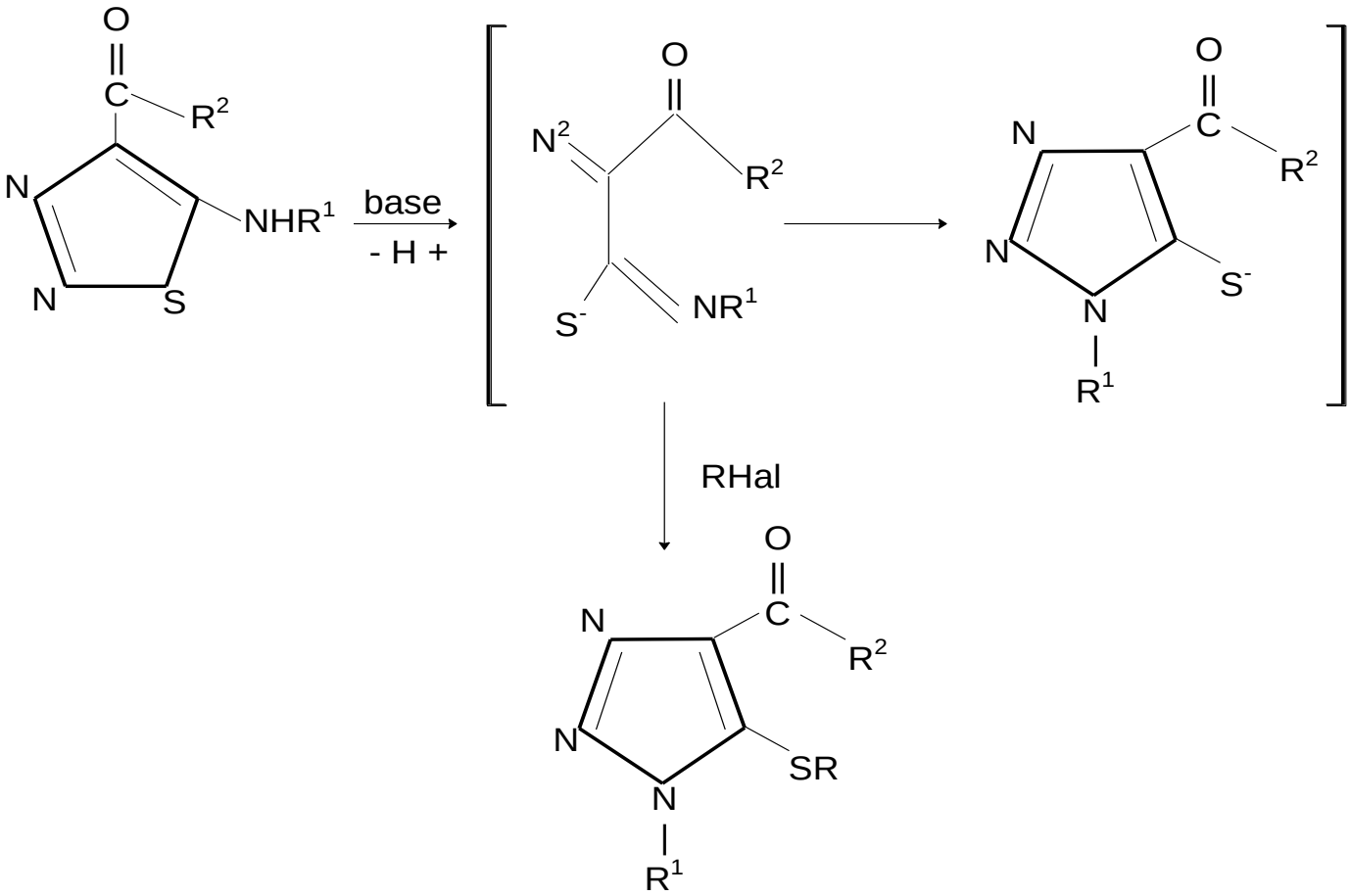


Figure (1-29-d): The transformation of 5-amino-1,2,3- thiadiazoles (73) to 5- sulfonyl -1,2,3- triazoles

Decomposition of the 1,2,3- thiadiazoles ring was also used for the generation of such highly reactive intermediates as hetro cumulenes. The propadienethione (77) and ethylene were produced by the photolysis of cyclopentene- 1,2,3-thiadiazole (76)

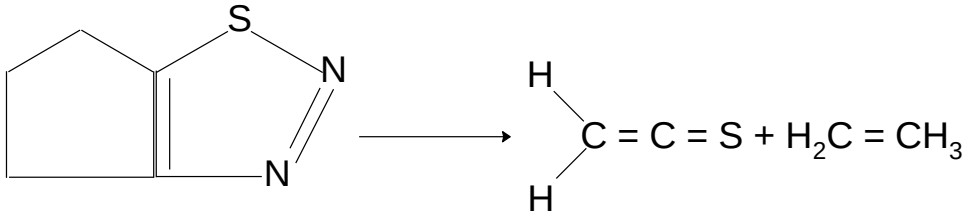


Figure (1-29-e): Decomposition of the 1,2,3- thiadiazoles ring for the generation of such highly reactive intermediates

Study of the thermal decomposition of 4-acetyl-5-methyl-1,2,3-thiadiazole (78) showned that the intermediates in the production of the thioketone (79) and the ketone (80) are the (s-cis-s-cis) and s-trans-s-cis stereo ispmers of obtained carbene (81) and (82) respectively. The isomerization is explained by the existence of the cyclic thiirene structure (83).

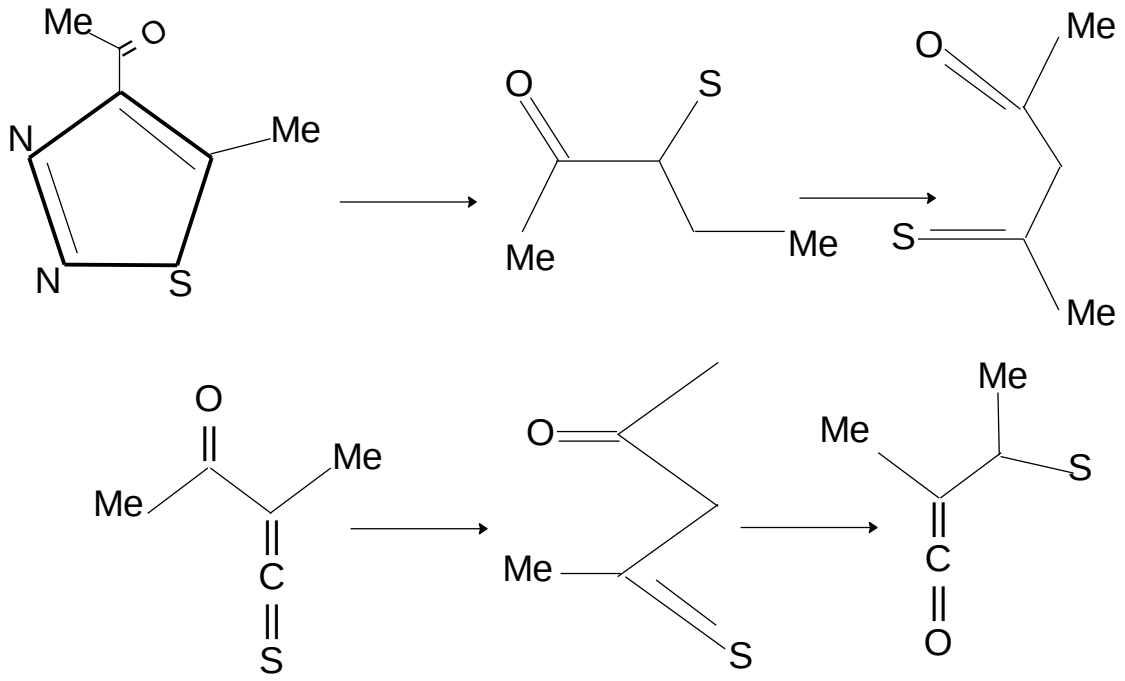


Figure (1-29-f): thermal decomposition of 4-acetyl-5-methyl-1,2,3-thiadiazole

the hetero cumulenes (84) and *85) were obtained by photolysis of the thiadiazole(86) and the bis thiadiazole (87),

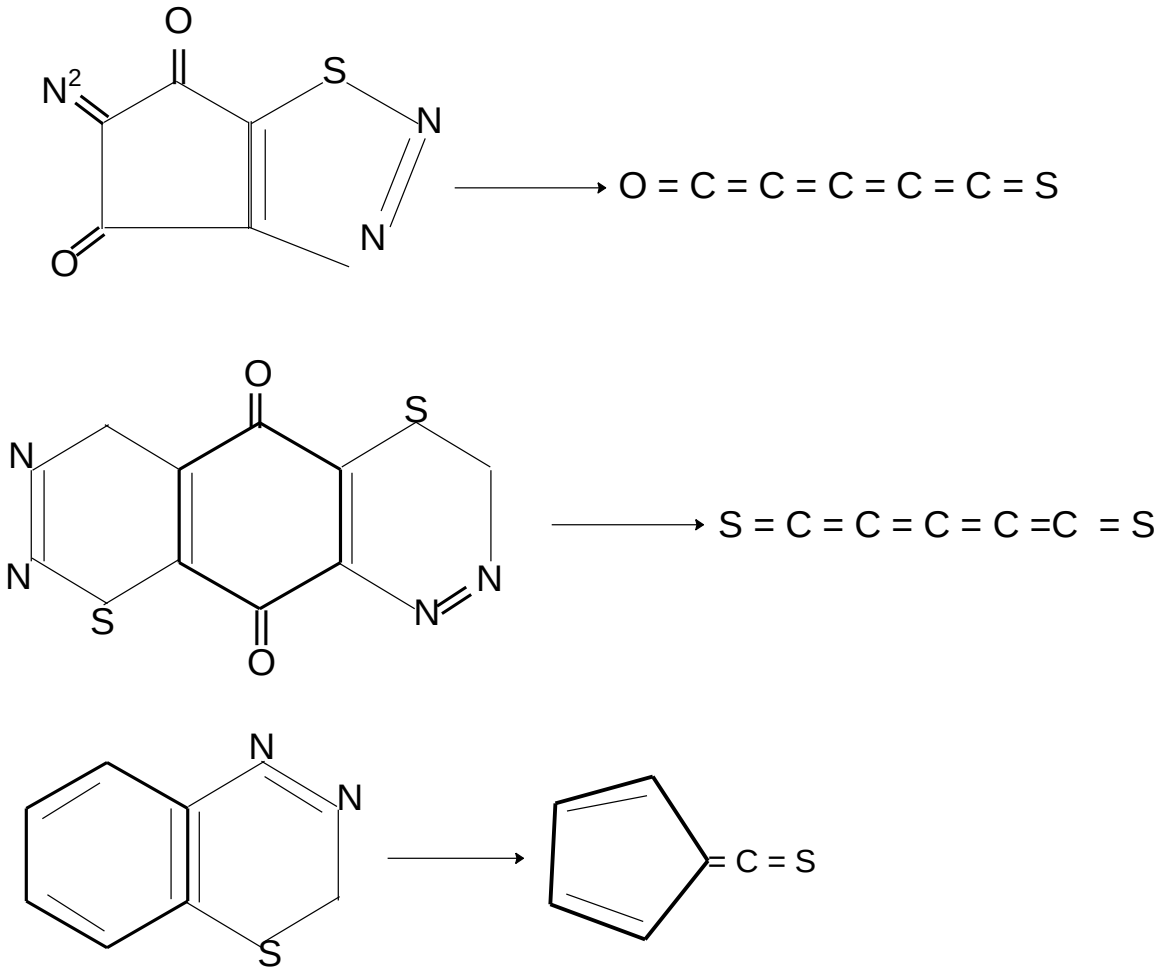


Figure (1-29-g)- Thermolysis of the benzo thiodiazole (63) forms the thioketone(88).

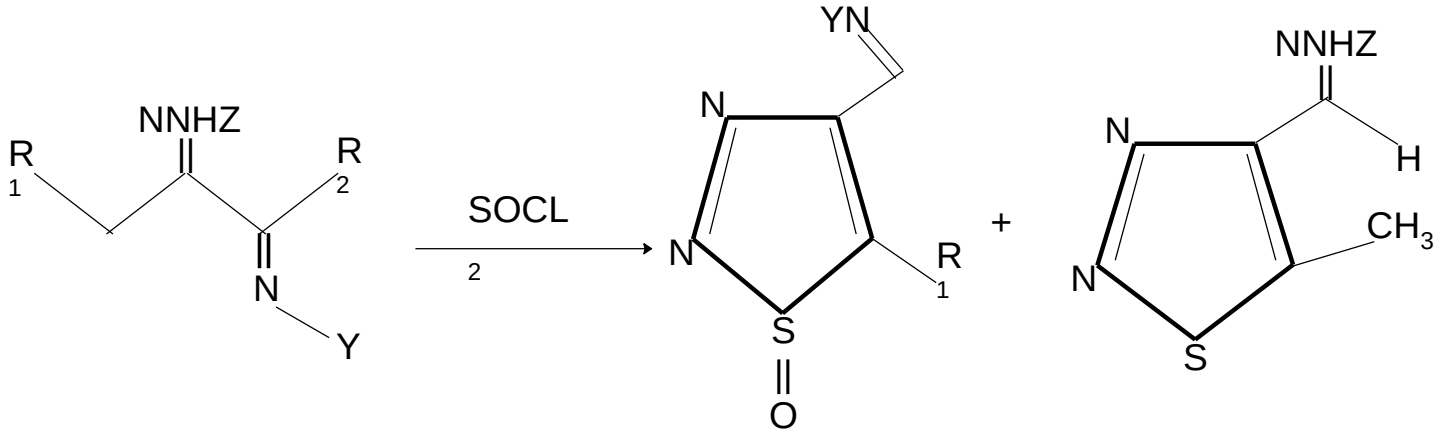
The transformation of 1,2,3- thiadiazole are used more widely in the synthesis of various heterocyclic synthesis than for production of linear structure,

1.7.Biological activities of 1,2,3- thiadiazoles:

1,2,3- thiadiazole , an important synthetic active substructure are nowadays becoming one of the important branches in novel pesticide development. To develop pesticide candidates with divers biological activities and prode their structure activity relation ship, three series of 5-methyl- 1,2,3- thiadiazoles were rationally

designed and synthesized using a simple and convenient one-step synthetic procedure via ugi reaction. Biological activities of the target compounds including fungicidal activities, antivirus activities, and systemic acquired resistance were systematically evaluated. The results showed broad- spectrum of activities against most fungi tested, also showed excellent potential antivirus activities as compared to positive control agent ribauirin .

The results of these studies indicated that the 5-position substituted 1,2,3- thiadiazole exhibited good antivirus activities and were worthy of further study in pesticide development. A series of 4,5-disubstitute-1,2,3- thiadiazole compound were designed and synthesized as potent anticancer against , some of them exhibited excellent in vitro and in vivo inhibitory activities [Bioorg.Med. Chem let,2007), 1,2,3- thiadiazole have been found to possess anti-bacterial insecticidal and herbicidal activities . 1,2,3-thiadiazoline -1-ones (89) are a syclic sulfonamides that are potential anti-bacterial drugs.



Z=COOEL , Ts:R¹ R²=Me , Et ,i-Pr : Y=Et , OMe

Figure (1,33) – structures as anti-bacterial drug

fujita et-al,2003) managed to prepare a series of 1,2,3- thiadiazole line -1- one (89) under the conditions of the Hurd- Mori's reactions. 4-meracepto – 1,2,3- thiadiazoles (91) that are the intermediates in the synthesis of new cephalosporine antibiotics.

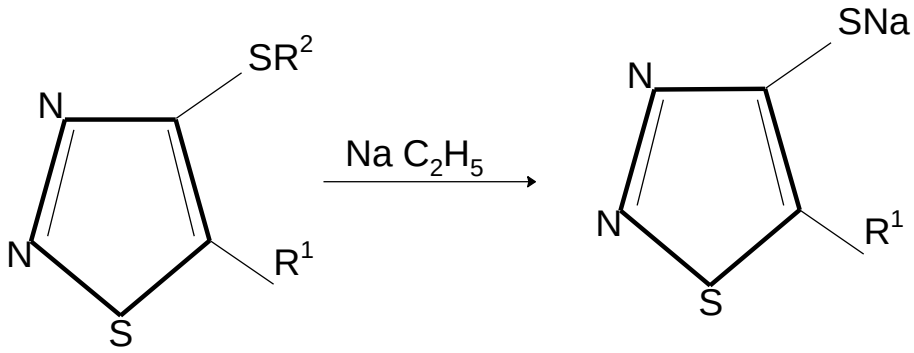


figure (1,34)- structures show the intermediates in the synthesis of new cepalosporin antibiotics-1,2,3-thiadiazole-5-thiol(93) is used to prepare sefuzoname ^{Tm} · New semi synthetic cephaosporin antibiotic. An approach this compound was devised where ring construction yakes places from dulfide (92) bearing a hydrazobes group. By cyclization of hydrazones with thionyl chloride.

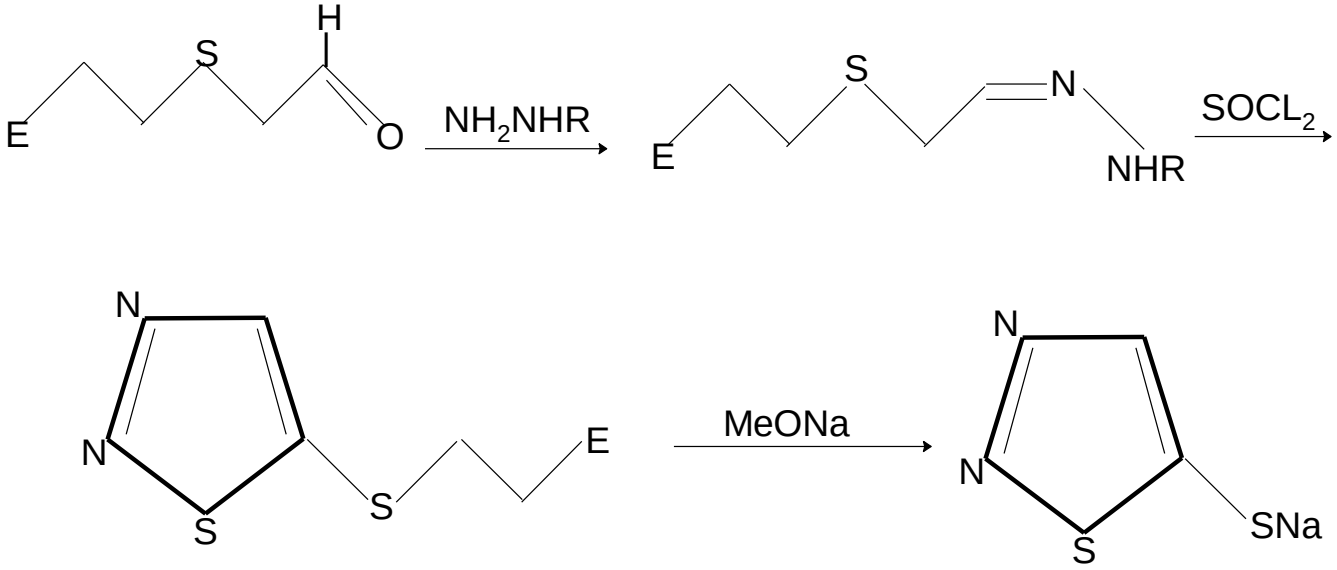


figure (1,35)- structures show new semi synthetic cephalosprin antibiotic

The Hurd- mori's reaction was applied on an industerial scale to prepare 5-chloro-1,2,3-thiadiazole (94), which key intermediate in the synthesis of 5-phenyl ureido 1,2,3-thiadiazole, a rary effective cotton defoliant with the commercial name of thidazuron(95).

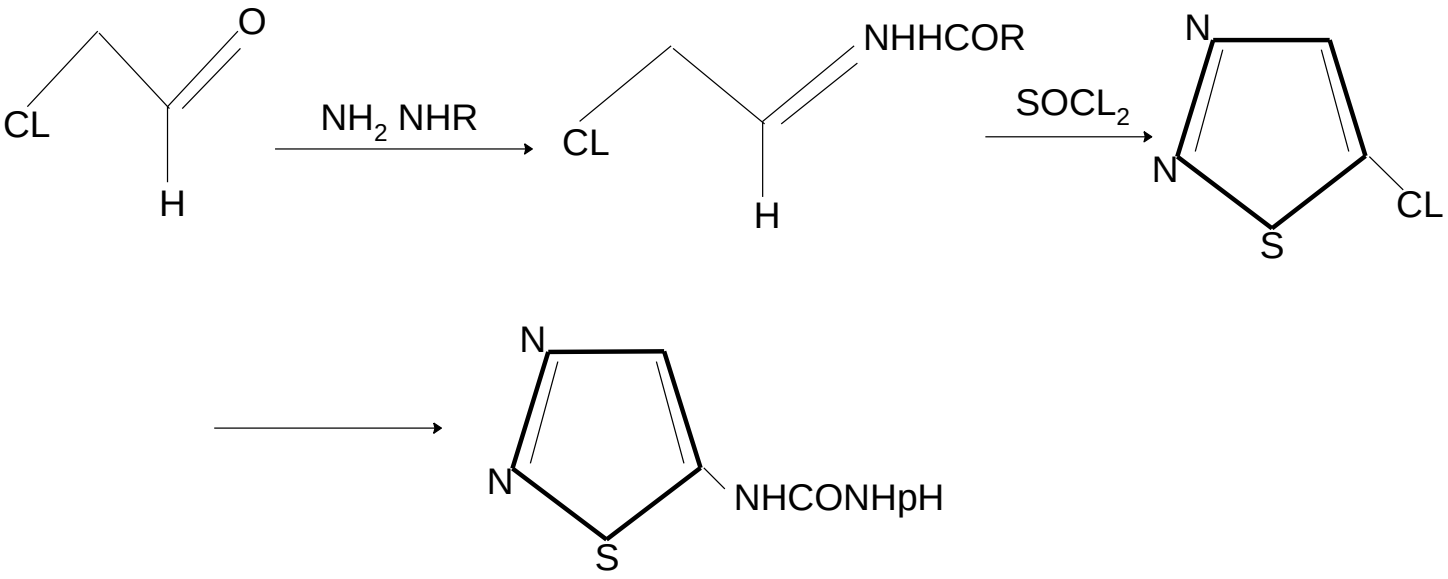


Figure (1.36) – structures show the thidazuron cephalosporin analogue. (Kobori.et-al, 2008) described a two- step synthesis of 4-formyl- 1,2,3- thiodiazole (96).

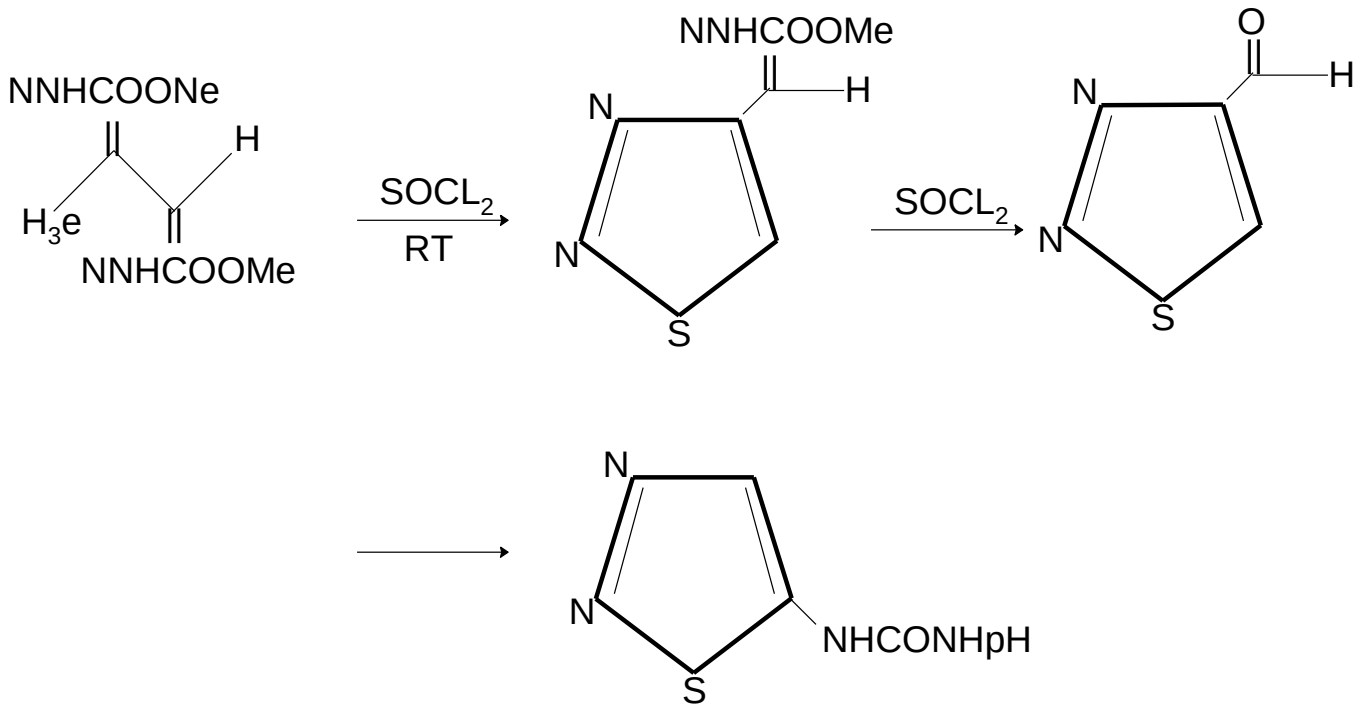


Figure (1.37)- synthesis of 4-formyl-1,2,3- thiadiazole as a new antibacterial cephalosporin analogue.

A series of 6-substituted-3-(4-methyl-1,2,3-thiadiazoyl[1,2,4]-triazolo[3,4-b][1,3,4]- thiadiazoles were retionally designed and synthesized according to the principle of combinations of bioactive substructures by the condensation of 3-(4-methyl-1,2,3-thiadiazolyl)-4-amino-1,2,4-triazole-5-thione with various carboxylic acids and phosphourus oxy chloride.

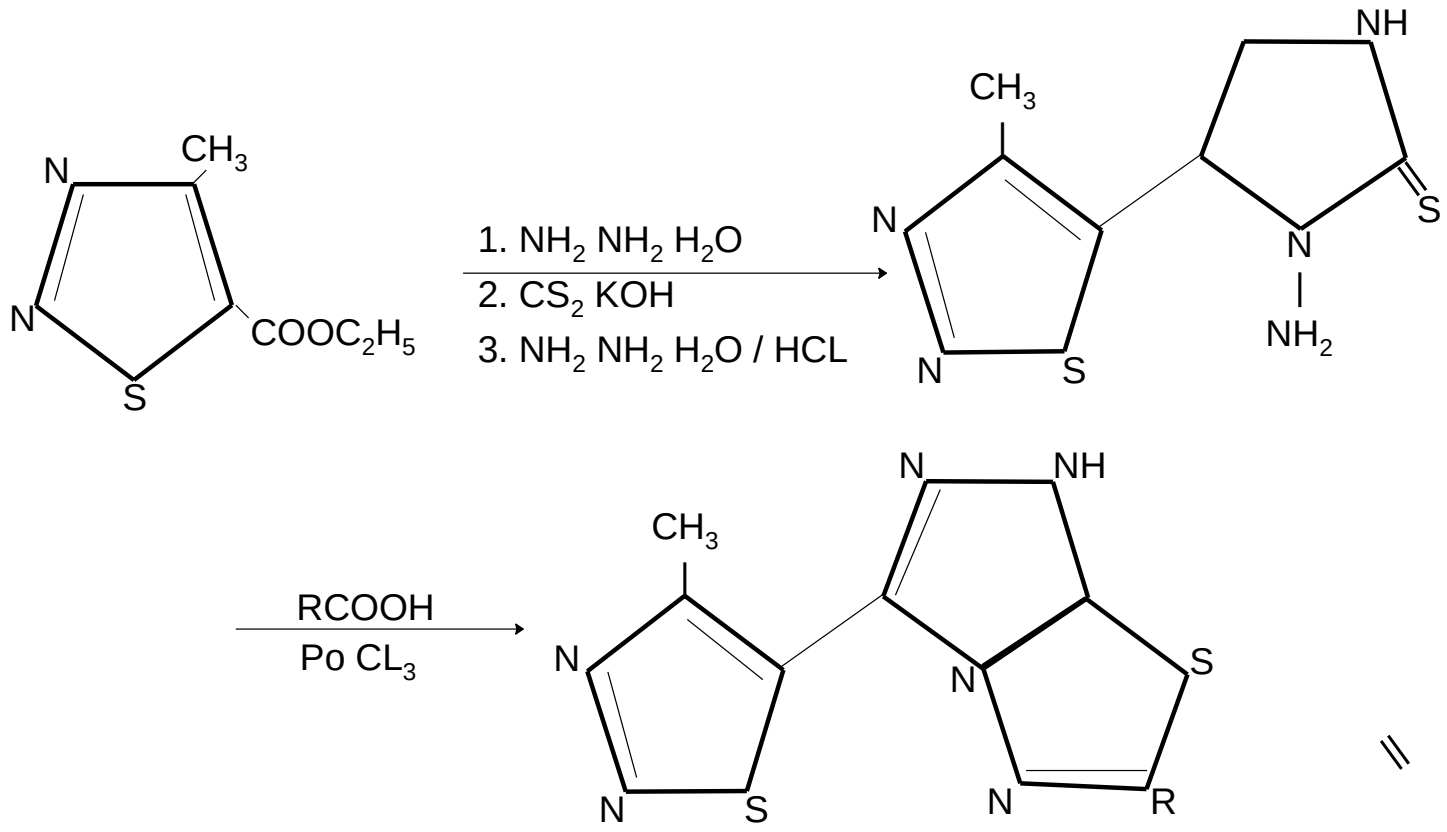
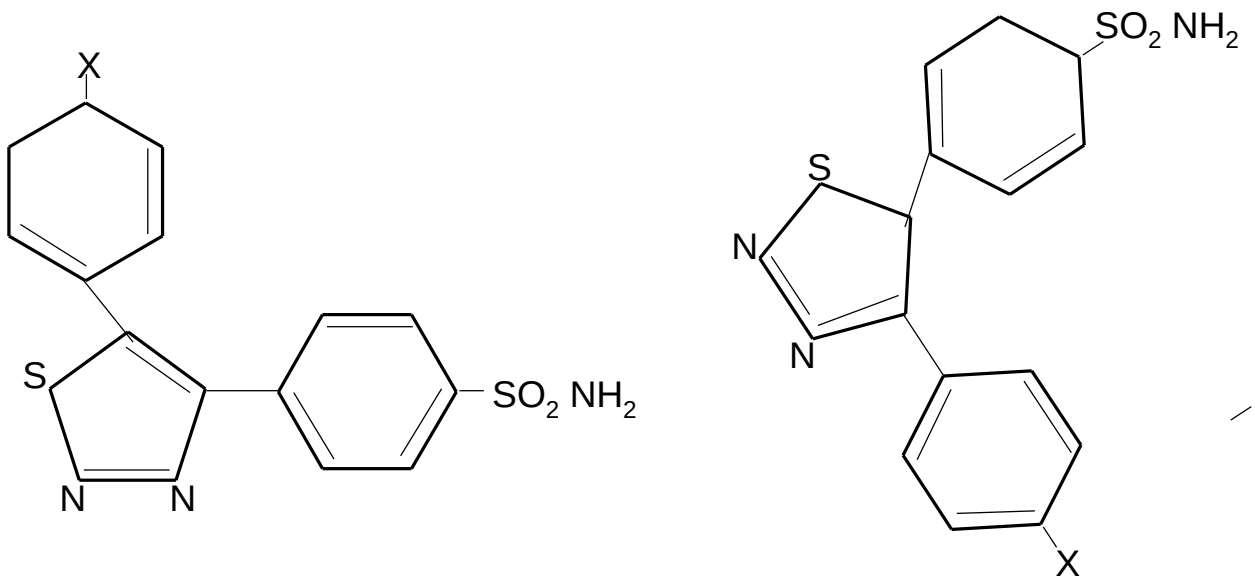


Figure (1.38) show- the bioactive substructures cyclooxy geauase (Co x-2) inhibitor drugs that possess a central give- membered heterocyc;ic ring diarylthiadiazol (100) and (101) showed moderate Cox-2 inhibition activity (L-karimi et-al,2009).



a) $X=H_1$

b) $_{X=F}$

Figure (1-39)- structures show diaryl thiadiazole.

Benzo- (1,2,3)- thiadiazole-7- carbothioic acid 5-methyl ester, anon- toxic , synthetic chemical, was applied as a foliar spray to cucmber plants and evaluated for it is potential to induce defenses mechanisms in root tissues infected by the soil born pathogen in grass towards the vascular stele.(james. N.seiber, 2010).

1.8 Aim of the project :

1.8.1 Back ground to role of thiadiazoles :

Thiadiazoles has become increasingly important in our day life ,this importance include in their growing interest in this type of compounds also due in primary to biological activity of the derivatives of this heterocyclic .the1,2,3- thiadiazole ring is a compound of such preparations as drug ,antibiotics ,pesticide's ,and 1,2,3- thiadiazoles are widely used as synthase in organic synthesis

1.8.2 Back ground of the study :

This study dealing with synthesis of 1,2,3- thiadiazoles .

1.8.3 Hybothesis of the research:

* The synthesis of 1,2,3- thiadiazole is going through huard-mors procedure.

* The reaction between semicarbazide and ketones compound (acetone, acetophenone , and p-amino acitophenone) compound in first step with thionyle chloride as second step to give 1,2,3-thiadiazole ring as five. membered heterocyclic compound.

1.8.4 objectives of the study:

***** Synthesis and structured characterization of 1,2,3-V and it is derivative's.

*Investigation of reaction conditions and reaction mechanism.

1.8.5 Methodology of investigation:

IR,H-NMR, and mass spectrophotometer.

Chapter two

Experimental and methods

2.1 **Experimental**

2.1.1 materials and instruments.

2.1.1.1 materials.

2.1.1.1.1 solvents.

- chloroform 99.0%(GC),dimetheylethy (CDH).India
- distilled water.
- Ethanol 98% (B.DH England) .

2.1.1.1.2 Chemical:

Acetic anhydride .(assay 98%), acetanilide, acetophenone(assay=99%.UK), benzoyl chloride (98.5-100%),sodium acetate. Sodium hydroxide , silica gel 60gf 254(H).(Mumbai 400002)(CDH India)

Chlorosulphonic acid .(assay 97%) CDH new Delhi 10002.

Ethanol 98%(B.d.H. England).

Ferric chloride an hydro use (CDH India assay) (isomeric anhydrous min96%).

Hydrochloric acid(assay 35.38%).Mumbai 400005 India.

Iodine (assay 99.5%)p-amino acetophenone (assay 98%)thionyl chloride(assay 97-98%); Qualikene fine chemicals Pvt . new Delhi.

Semicarbazide hydrochloride (assay=99%Galaxo India limited Mumbai 400025.

2.1.1.1.3 Thin layer chromatography:

Thin layer chromatography was carried out using reacted plates 20× 10 ,10 □ 5 cm ,also by using silica gel (H.Mumbai 400002 India) and glass plates 20× 10 ,10 □ 5 cm activated by heating at 80°c for six minute's

2.1.1.2 Instrument:

2.1.1.2.1 Infrared spectrometry :

The instruments used are thermo Nicolette ftir-84005(shimdzw-japan) spectro meter , potassium bromide dise are used.

2.1.1.2.2 H-NMR spectrometry:

The instruments used ae mercury -300BBFT size 65536 the pulse sequence used is solvent used is DMSO at temperature 30°c /303.1K,width 8000.0HZ.

2.1.1.2.3.Mass spectrometry:

The M.S was carried out using mass spectrometry (MS) instrument model GP1000 EX.

2.1.1.3 General equipments:

- fume cupboard.
- magnetic stirrer with hot plat model L.M.S100 volts, 220 volts 50/60 HZ serial no. 0401401,melting point apparatus (SMP 10, BIbby stuart scientific,UK).
- rotary evaporator .R.E300B,England
- water bath.RE300B,Bibby sterilin UK.
- all of the glasses were used of pyrex tybe.

2.2 Methods:

2.2.1 Preparation of p-acetamideacetophenon

0.60gm (0.015 mole) of sodium hydroxide dissolved in 10ml distilled water were added to 2.00gm (0.0113 mole) of p-amino acetophenone and plased on water bath for a few minutes to complete dissolving . 1.5ml (0.0159mole)of acetic stirring , a few addition ,the mixture was cooled in ice bath until the crystals were collected filtered , washed with water and air dried Y=81.5% ;recrystallization solvent used is chloroform . M.P=168-170°c ,IR analysis showed the bonds 3184.26 and 31147.61 cm^{-1} for CH_3st. vib. ,1674.10cm^{-1} for C=O group . 3481.27 cm^{-1} for CO-NH, and 1583.45, 1514.02cm^{-1} for C=C aromatic ring and 831.26cm^{-1} for para disubstitution.

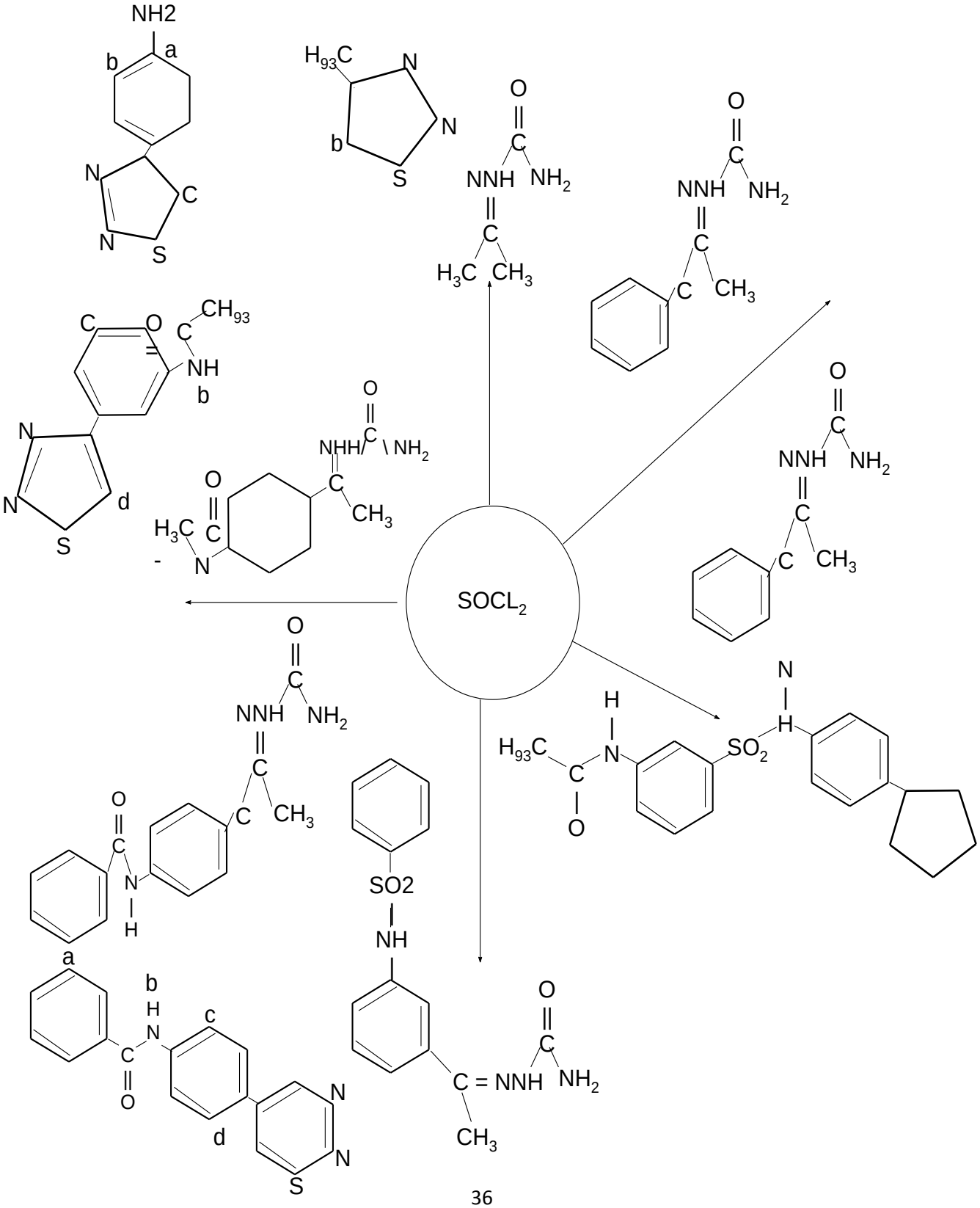
2.2.2 Preparation of ethyl 2-(azoaryl) acetoacetate:

The primary aromatic amines (aniline ,p-amino benzoic acid anthranilic acid ,sulphonamide , sulphadiazine and p-nitroaniline) (0.1 mole). The content were stirred and cooled (0-2o c),and a cold solution of sodium nitrite (7g,0.101mole)in 30ml H2O was slowly added to it maintaining the temperature below 5oc .

The cold diazotized solution was added to a well cooled and stirred mixture of ethyl acetoacetate (10ml,0.079mole)in aqueous ethanol 5% (10ml,0.217mole).stirringwas continued for1.5 hour and the resulting yeiiow crystals were washed with water and recrestalized

2.3 The scheme:

2.3.1 Chemical structure of 1,2,3 - thiadiazoles:



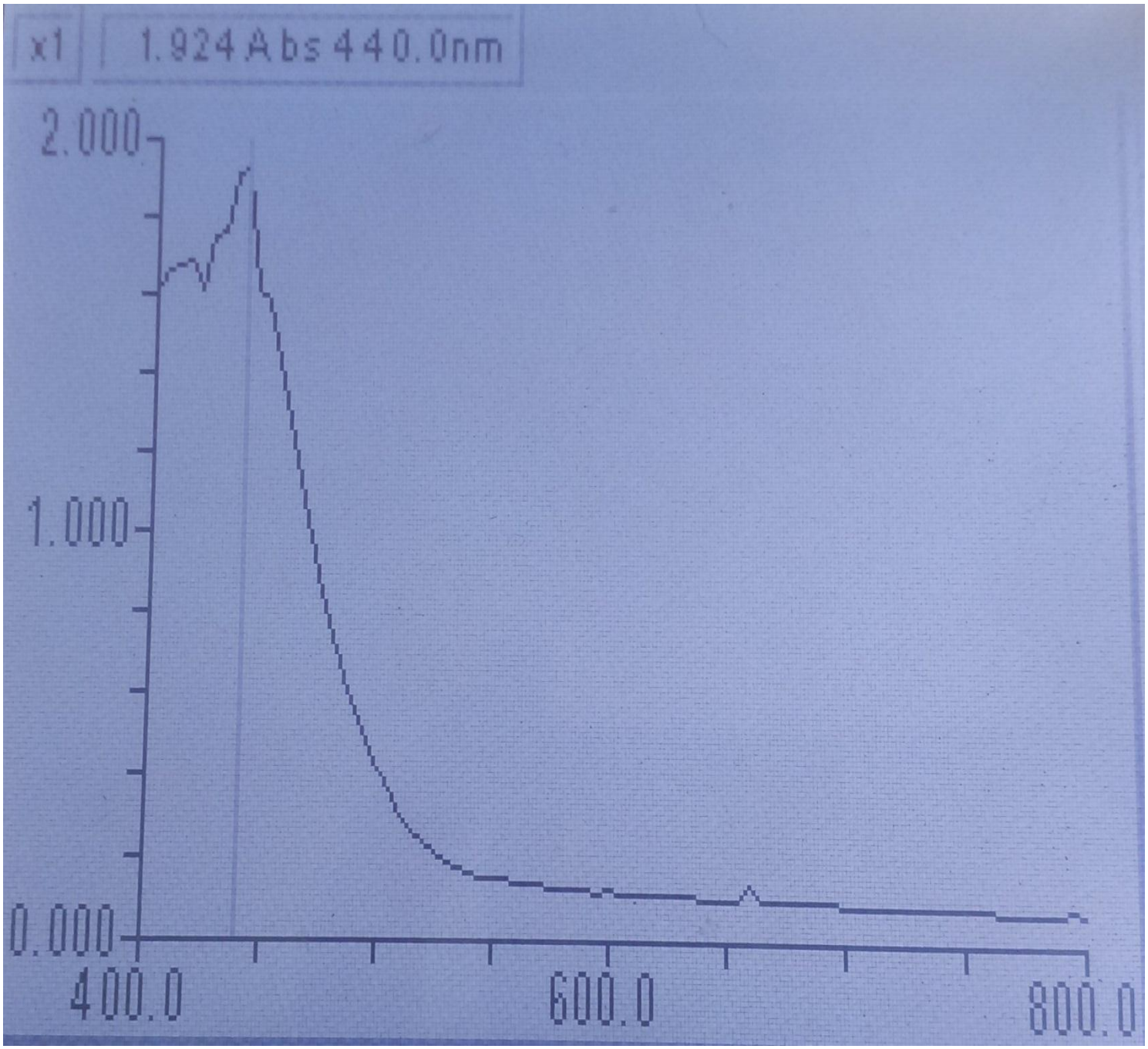
Chapter three

Result and disscution

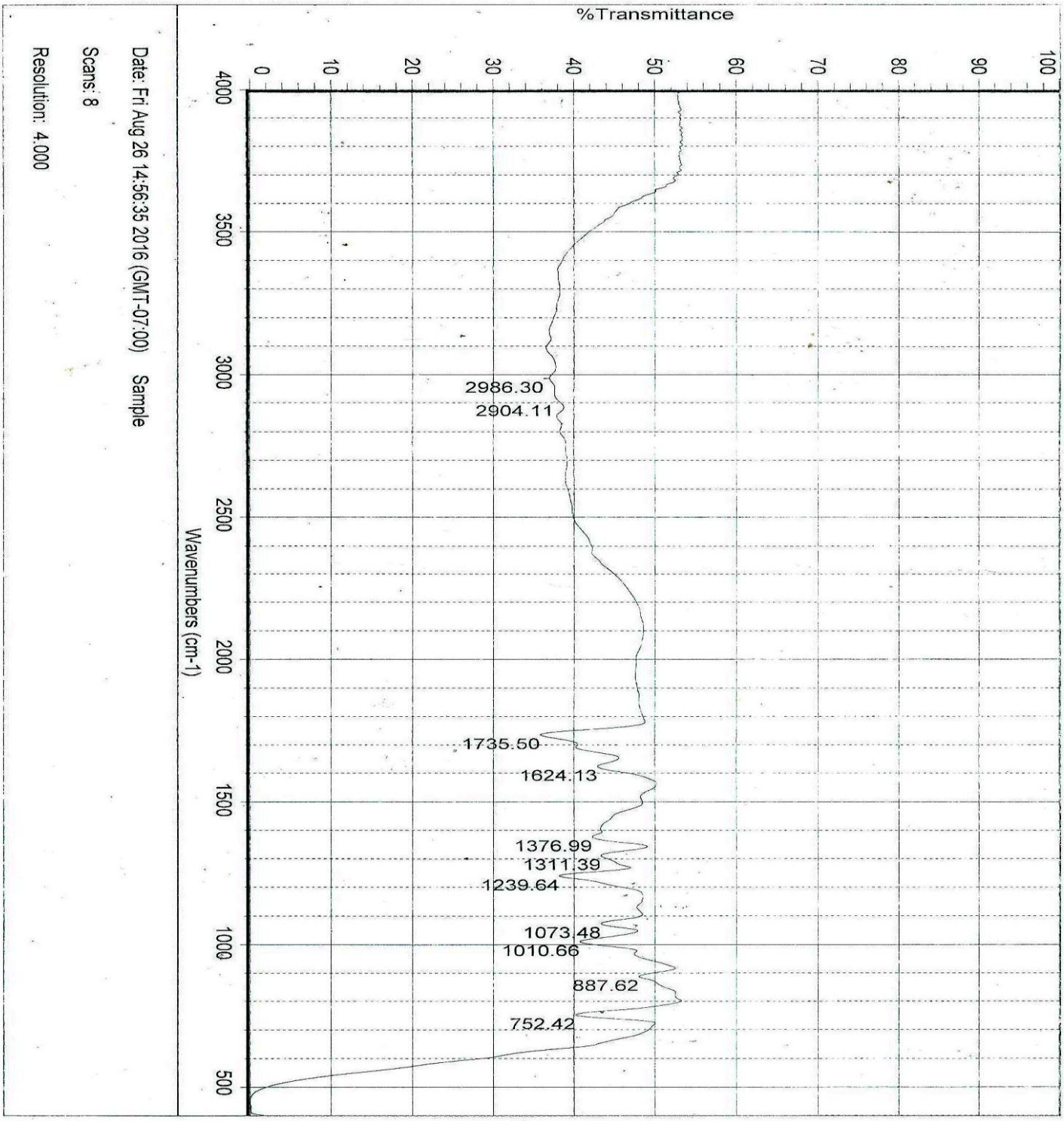
1.1 results:

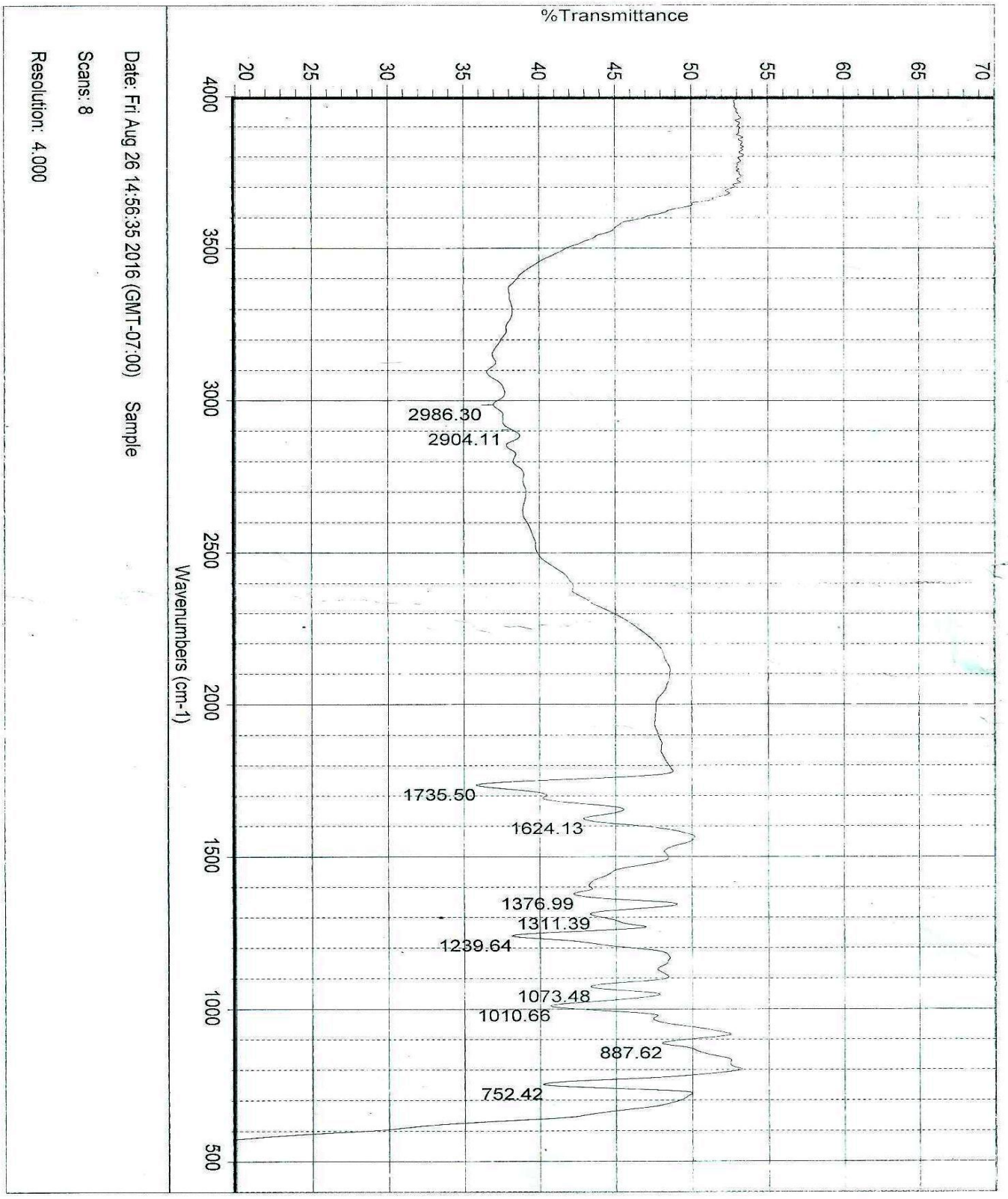
1.1.1 The Result of compound (1)

1.1.1.1 UV spectra result:



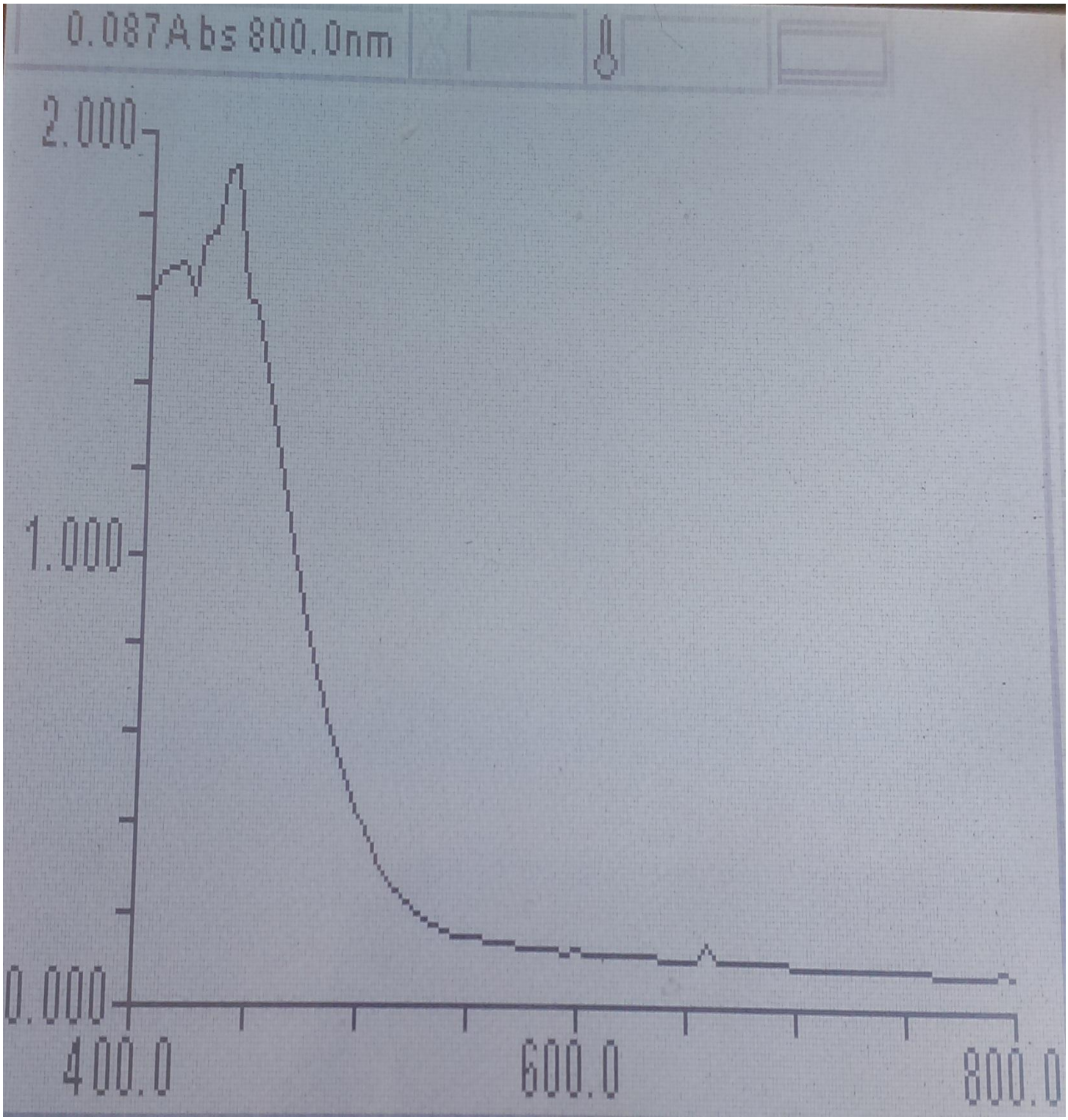
1.1.1.2 The IR spectra result:



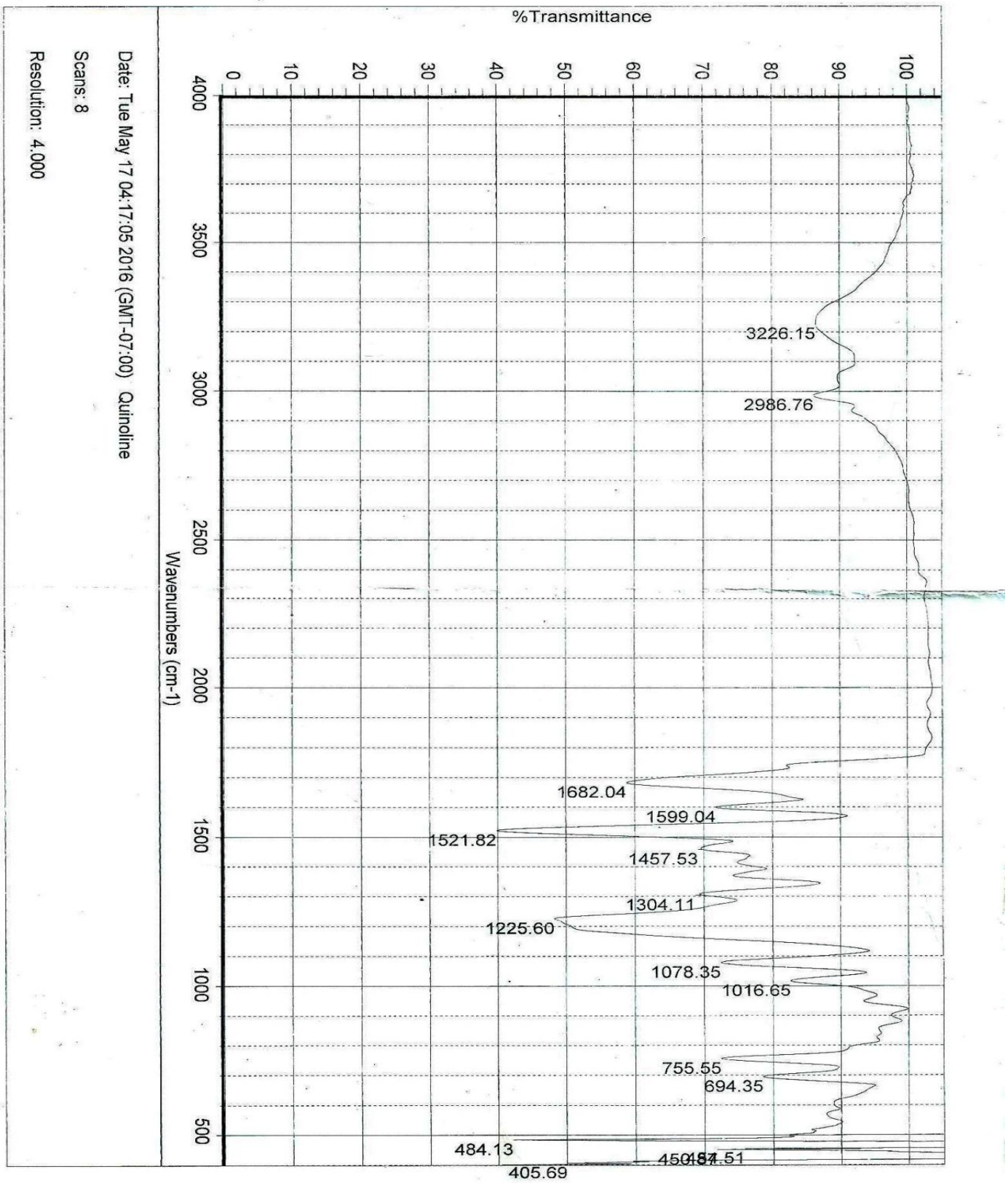

%Transmittance
20
25
30
35
40
45
50
55
60
65
70
4000
3500
3000
2500
2000
1500
1000
500
Wavenumbers (cm-1)
2986.30
2904.11
1735.50
1624.13
1376.99
1311.39
1239.64
1073.48
1010.66
887.62
752.42
Date: Fri Aug 26 14:56:35 2016 (GMT-07:00) Sample
Scans: 8
Resolution: 4.000

1.1.2 The Result of compound (2)

1.1.2.1 UV spectra result



1.1.2.2 IR spectra result:



1.2 Dissections

1.2.1 IR (infrared) spectra of compound (1):

The absorption around 3500cm-1 is due to presence of (N-H)stretching vibration , the absorption around 2986 cm-1 is related to (-C-H) SP3 stretching vibration , the absorption around 1735 cm-1 is due to carbonyl group(–c=o-)stretching vibration , absorption around164 cm-1 is related to(c=c) for aromatic ring ,the absorption around 1378 cm-1 due to (C-H) SP3 bending vibration and the absorption around1010 cm-1 due to(C-O) stretching vibration.

1.2.2 U.V spectra of compound(1):

The absorption band around 440nm related to n→π transition which indicate the presence of hetero atom .

1.2.3 I R spectra of compound(2):

The absorption around 3300cm-1 is due related to (N-H)stretching vibration , he absorption around 2986cm-1 is due to (-C-H) SP3 stretching vibration, The absorption around 1682cm-1 is due carbonyl group(–c=o-),multi absorption around 1521 – 1457 cm-1 is due to conjugating (c=c) for aromatic ring and the absorption around 1225 cm-1 due to presence (C-O) stretching vibration.

1.2.4 U.V spectra of compound(2):

Compound 2 shows The absorption band around 440nm related to n→π^* transition there for we suggest that it contains hetero atom .

Due to this results we synthesis two compounds of quenoline , which confirm it by spectroscopy which emphasis that by functional groups ,illustrated by IR and electronic transition illustrated by U.V.

Chapter four

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