

STUDYING OF THERMAL ANALYSIS WITH CHARACTERIZATION OF PHYSICAL PROPERTIES AND RESISTANCE OF BACTERIA AGAINST (AZO-THIAZEPINE AND THIAZANE) COMPOUNDS.

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ABSTRACT

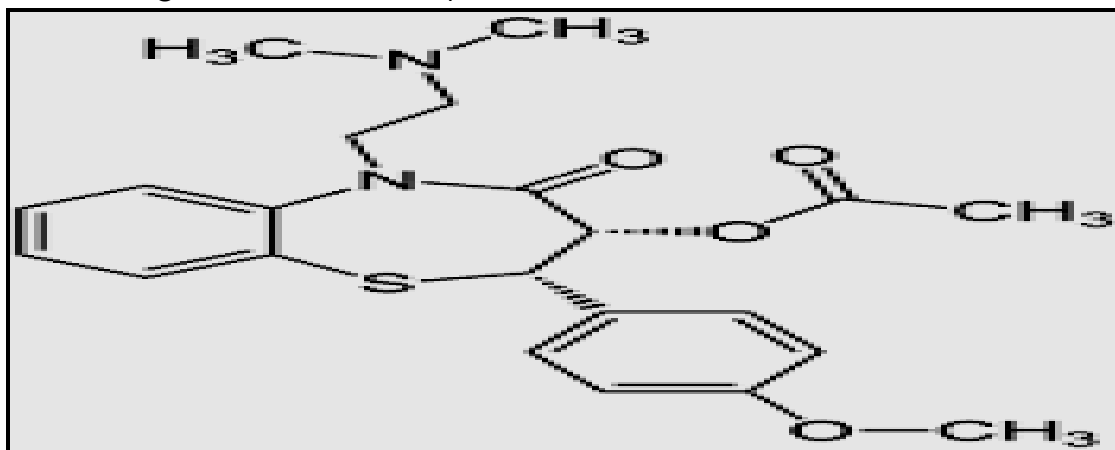
This paper involved preparation of many organic compounds from (thiazepine and thiazan) linked with azo or carbohydrate or sugar and hetero cycle like thiazole and imidazole which have wide spectrum from biological activity which act main part in bio- molecule like hemoglobin , vitamin B12 and some drugs, for this , all compounds in this work tested against five types of bacteria to determine biological activity of prepared compounds , then studying of some physical properties with studying of thermal analysis .

Keywords: antibacterial , thiazepine , thiazine , azo , anil , Schiff base .



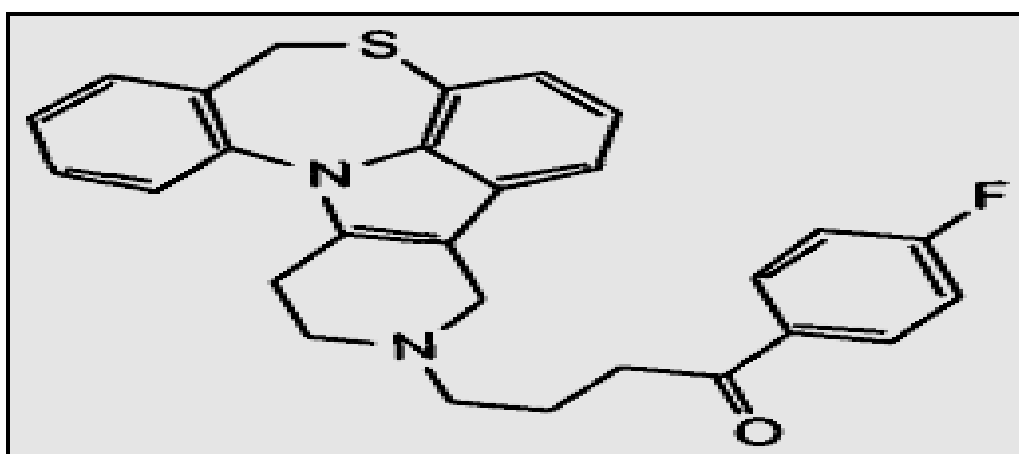
INTRODUCTION

Thiazepine and thiazan compounds are a class of hetero cyclic compounds which contain the (S, N) atoms, it is present in various chemical compounds, which linked with azo group are very important to prepare a wide range of industrial compound⁽¹⁾ in preparation of monomers with polymers in chemistry fields, and got a special importance in the medical and pharmaceutical industry because play an active role in biological molecular system⁽²⁾.



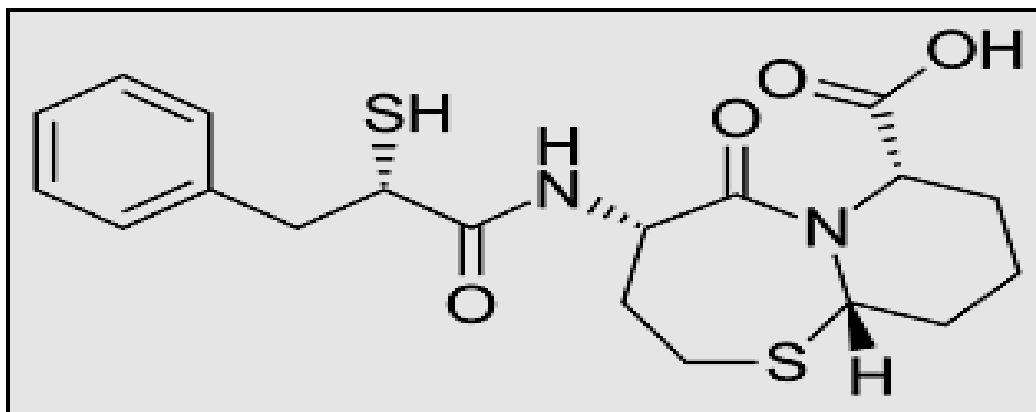
Fig(1) : Thiazepine compound as antibacterial

Some of them are used to treat several diseases like medicine of the thyroid gland and thyroid leukemia⁽³⁾, Effective in stimulating the heart and lungs work⁽⁴⁾, Effective against types of cancer such as breast cancers⁽⁵⁾, and thiazole ring and azo compound showed a wide biological activity towards bacteria and fungi⁽⁶⁾, types of viruses⁽⁷⁾. Effective towards bacteria *Staphylococcus aureus* and *E. coli*⁽⁸⁾. Azo are pervasive in nature and technology as structural materials.



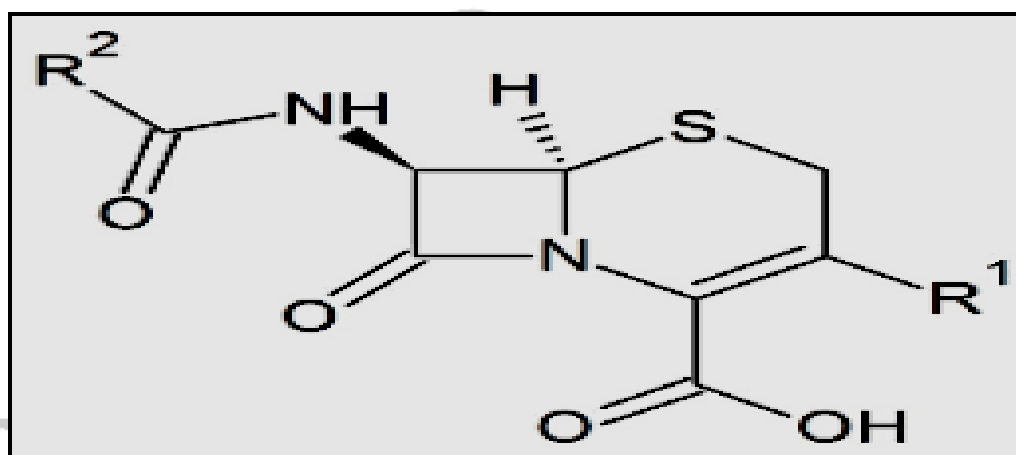
Fig(2) : Thiazepine compound as Antifungi

The thia and azo linkage is easily formed, confers structural rigidity, and resists hydrolysis. Thia or sulfur and azo linkages constitute a defining molecular.



Fig(3) : Thiazepine compound as Drug

Thiazane cycle linkages in a biochemical context are called bridge bonds when they occur in the main chain of drugs. Many drugs are amides, including thia or azo drug, and in other applications⁽⁹⁻¹¹⁾ and uses in most fields⁽¹²⁻¹⁵⁾



Fig(4) : Thiazane compound as Drugs

The term Azo is normally prepared and applied to most compounds when they are being used as ligands to form coordination complexes with metal ions. Such complexes do occur naturally, for instance in Core in, but the majority of (N=N-) are artificial and are used to form various important catalysts.

Experimental & Materials :

All chemical materials and instrumentals carried out in college of education, biological studying carried out in Bio – lab in biological department, college of science., Chemical Studying carried out in chemistry department.

EXPERIMENTAL PROCEDURES

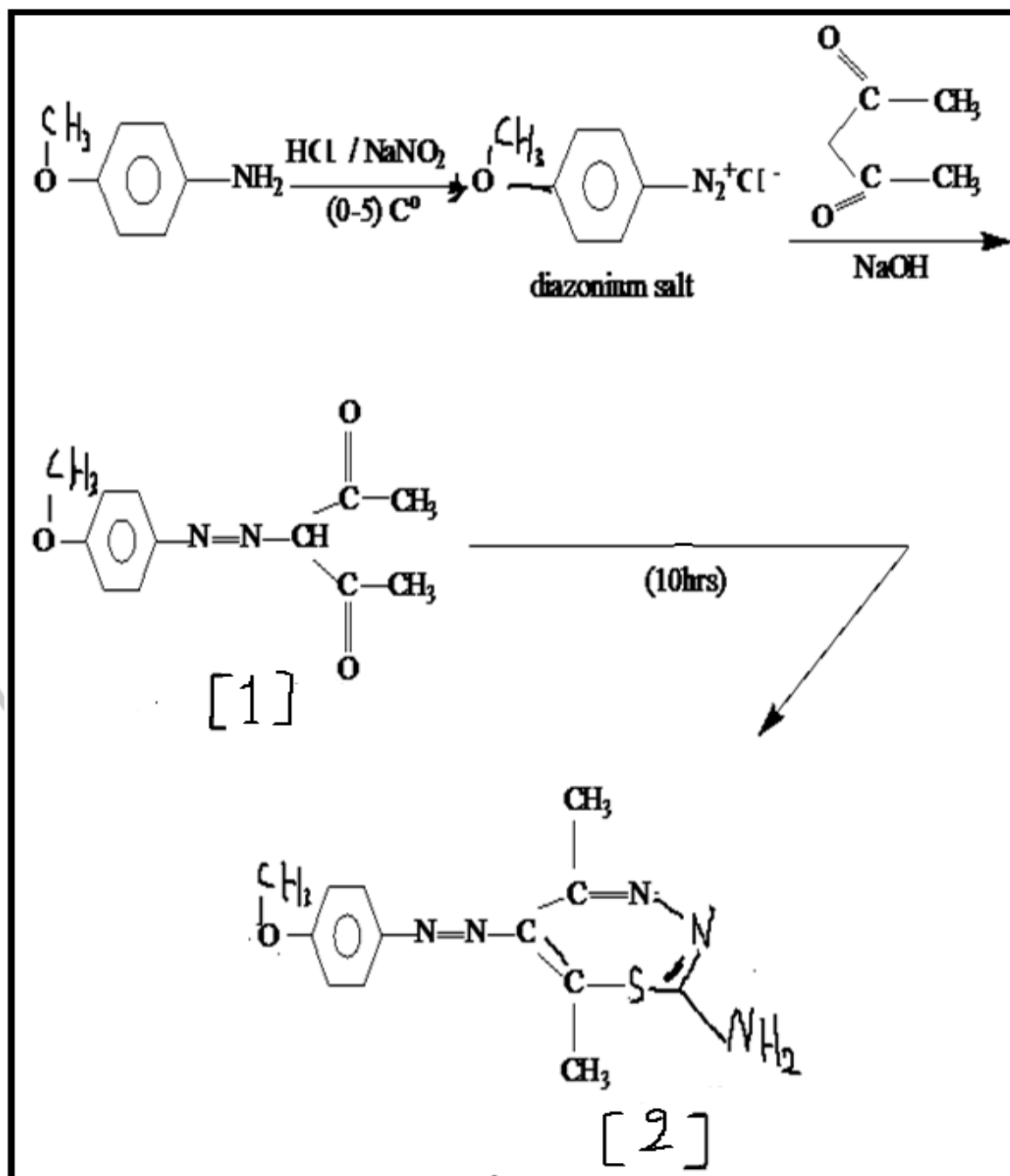
The test for biological activities of formatted compounds have been screened for their antibacterial activities by agar via biological methods^(13, 17-19). The antibacterial activities were done at (0.001 M) concentrations in (DMSO) solvent by using five types of bacteria (**bacteria- *B. subtilis***) and (**bacteria - *Pseudomonas .aeruginosa***), (**bacteria-**

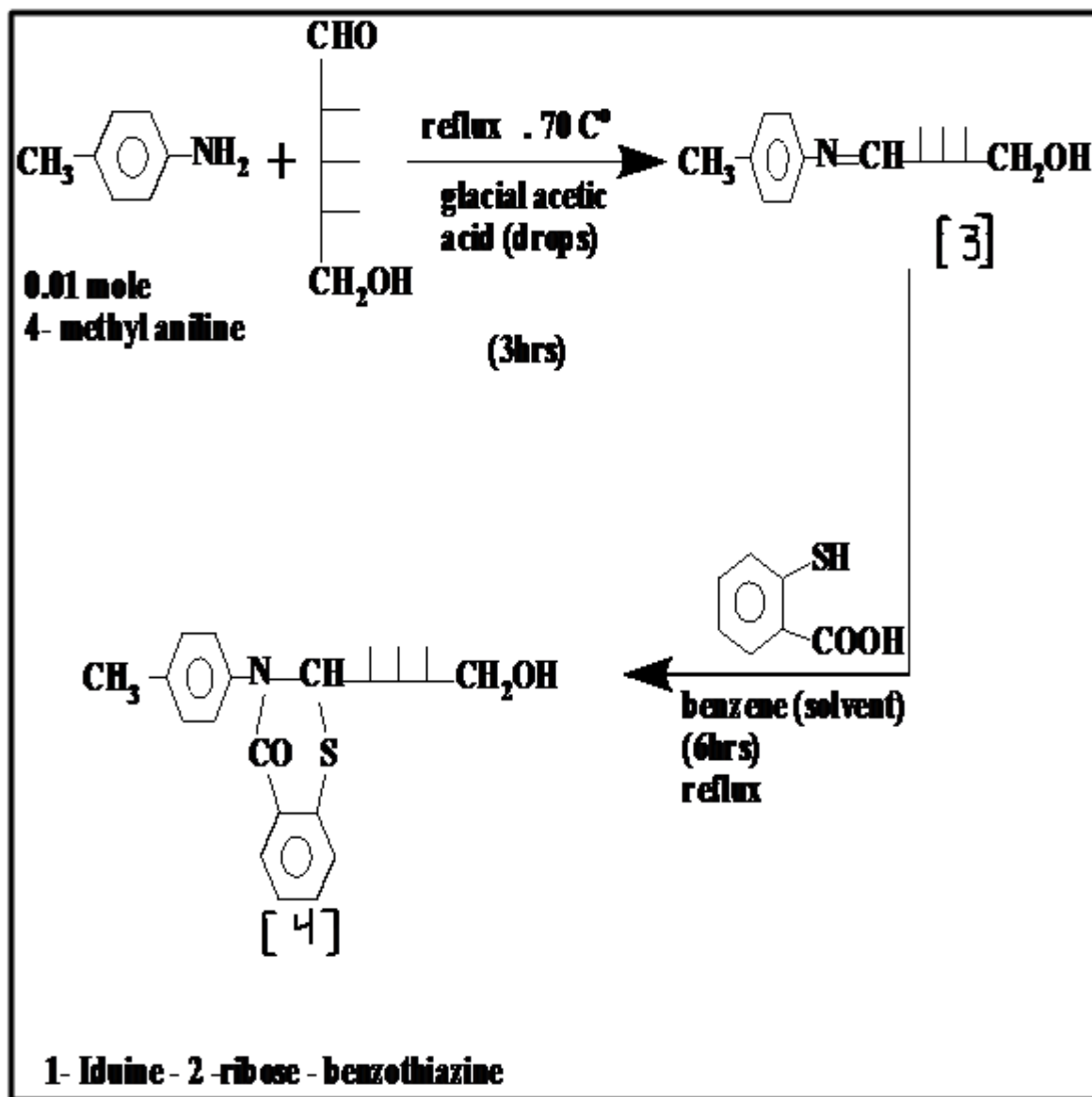
Staphylococcus. Aureu), (*bacteria -Escherichia .Coli*) , (*bacteria - Lactobacillus .sp*).

These bacterial strains were incubated for 24 hr at 37°C.

Synthesized Compounds In Schemes:

In our schemes , we prepared many compounds , but now we will study the biological activity for them in this work :





RESULTS AND DISCUSSION

The formatted compounds screened for Biological Activity against five types of bacteria .

Biological Tests^(9,13) :

The test of the sensitivity of the bacterial isolates were included work on five types of bacteria to measure the biological activity of bacteria for (**bacteria- *B. subtilis***) and (**bacteria - *Pseudomonas .aeruginosa***), (**bacteria- *Staphylococcus. Aureu***), (**bacteria - *Escherichia .Coli***) , (**bacteria - *Lactobacillus .sp***), Table (1)and Table (2) showed the diameter of inhibition zone for vehicles chemical measured in mm towards the species bacterial.

The antimicrobial results are listed at table (1) and table (2). From results of antibacterial studies it was found to be potentially activity against towards five types of bacteria

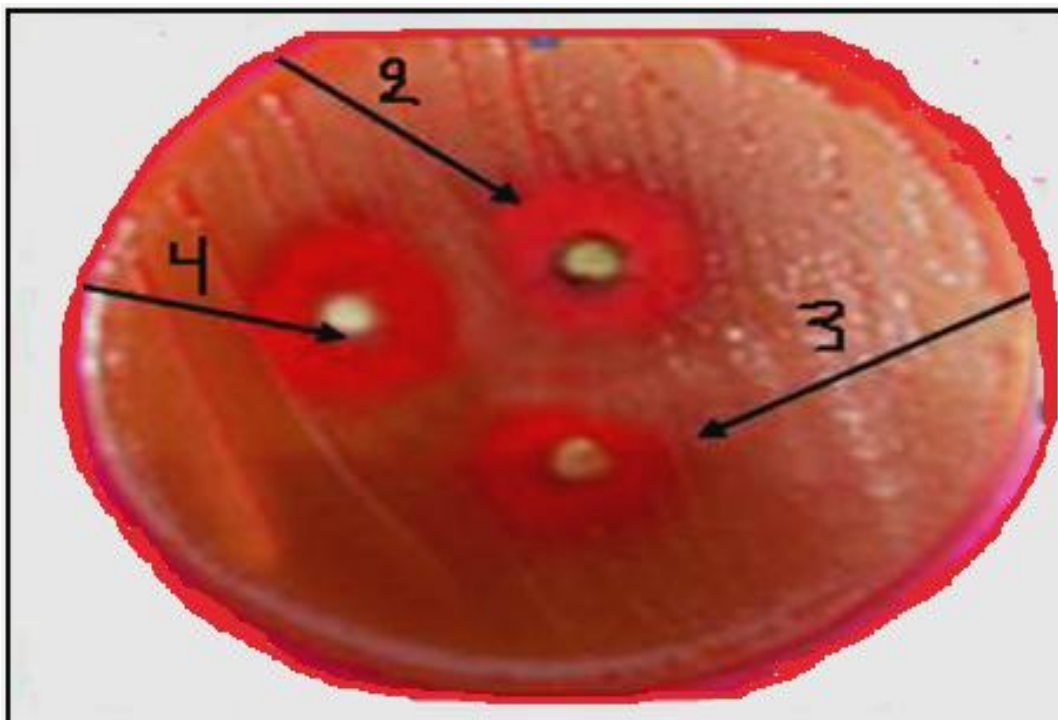
,which gave good indicators from the results that the biological activity of all compounds have high biological activity which inhibit the growth of bacteria . The formatted compounds [2 , 4] have higher activity than other compounds which due to presence of sulfur atoms in their structures^(13, 17-20) ,the mechanism of action for this compounds involved formation of hydrogen bonding with the active positions of the cell constituents resulting in the interference with the normal cell process.

Table(1):Antibacterial Activity of Compounds (Inhibition Zone in (mm))as average of three Concentrations (5 ,10,15mg.ml⁻¹)for (3)types Bacteria

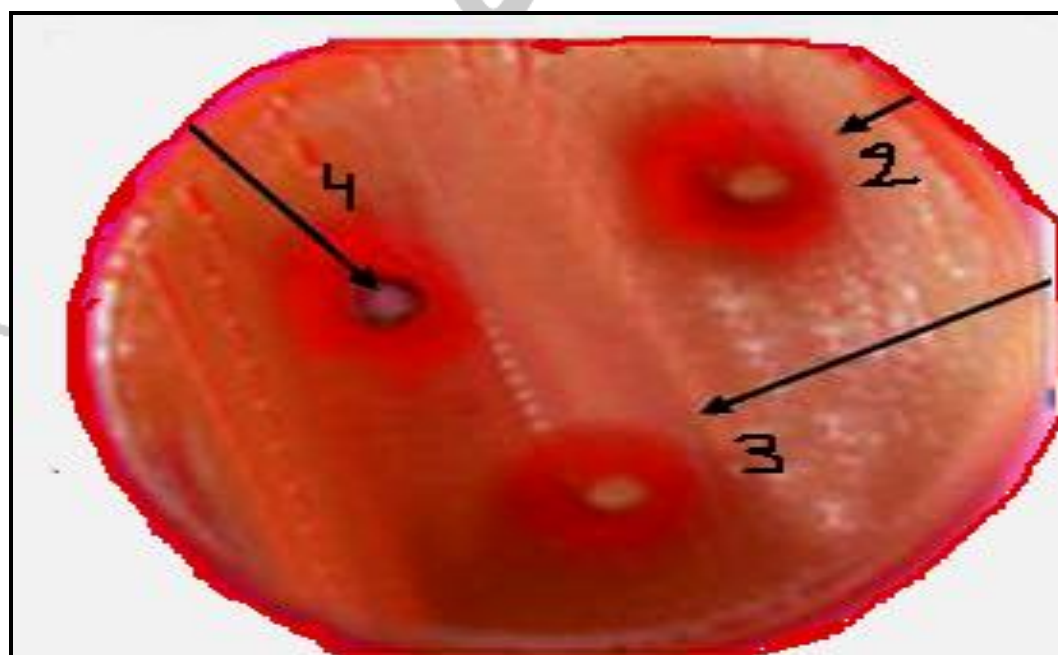
Compounds	(average of three Measurements)	(average of three Measurements)	(average of three Measurements)
	<i>Pseudomonas .aeruginosa</i>	<i>B. subtilis</i>	<i>Staphylococcus. Aureus</i>
[1]	4	8	8
[2]	14	12	16
[3]	10	12	12
[4]	14	14	16

Table(2):Antibacterial Activity of Compounds (Inhibition Zone in (mm))as average of three Concentrations (5 ,10,15mg.ml⁻¹) for (2)types Bacteria

Compounds	(average of three Measurements)	(average of three Measurements)
	<i>Escherichia .Coli</i>	<i>Lactobacillus sp.</i>
[1]	6	4
[2]	12	10
[3]	8	8
[4]	12	12



Picture (1) : Inhibition zone on *Staphylococcus. Aureu*



Picture (2) : Inhibition zone on *Pseudomonas .aeruginosa*

Biological activities of compounds were evaluated according to their action against bacteria are described tables (1 , 2). The presence of heterocyclic ring such like thiazole , imidazol , thiadiazine are reported to posses antibacterial and antifungal effect may enhance or increase the biological activity of the sulfur derivatives

The results showed the Biological Activity for compounds (2 and 4) the effectiveness of anti-resistant bacteria is much higher than other vehicles in the inhibition of the positive and negative bacteria, gram growth. And also Because these compounds contain

multiple episodes of thiazole, which gives vital to the effectiveness of many of the bacteria.

Physical and Chemical Properties of Compounds [1 – 4] :

In the following results , table (3) appeared many physical properties and chemical characterization represented by :{ (R_f) of TLC- Technique for following the chemical reactions ,type of solvent which was used in TLC – Plate , products from reactions % }, all data are summarized in Table (3):

Table(3): Some Physical and Chemical Properties for Compounds [1–4]

Compounds	Products %	R _f	Solvents of (TLC)
[1]	69	0.72	Ethanol : Hexane
[2]	74	0.68	Ethanol : Hexane
[3]	70	0.64	Ethanol : Hexane
[4]	72	0.70	Ethanol : Hexane

Thermal Scanning Studying of Compounds :

DSC–Thermal scanning carried out for all compounds according to procedures of studying⁽⁹⁾, all results in figures(3-6) ,DSC-scanning measurements of formatted compounds showed high stability toward high temperature in most of curves :

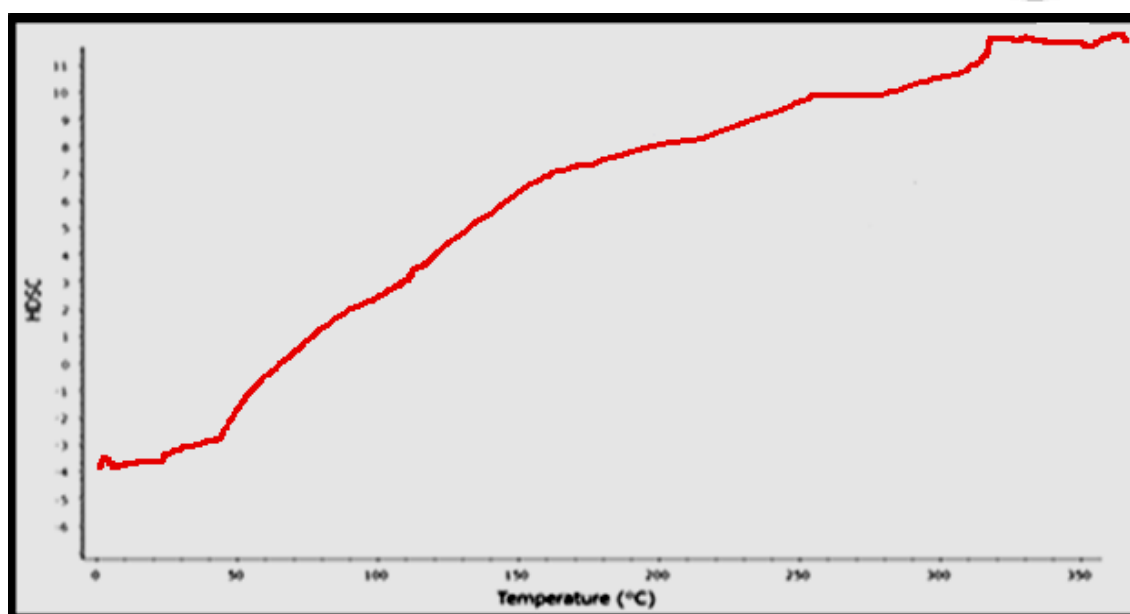


Fig (3) : DSC- Thermal Analysis of Compound [1]

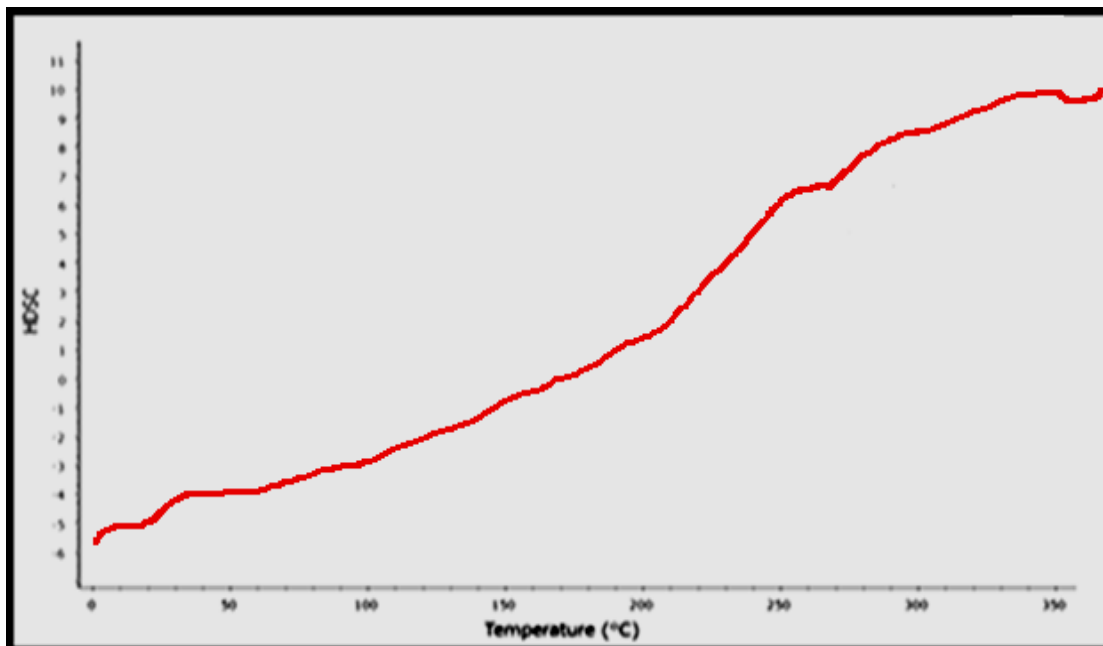


Fig (4) : DSC- Thermal Analysis of Compound [2]

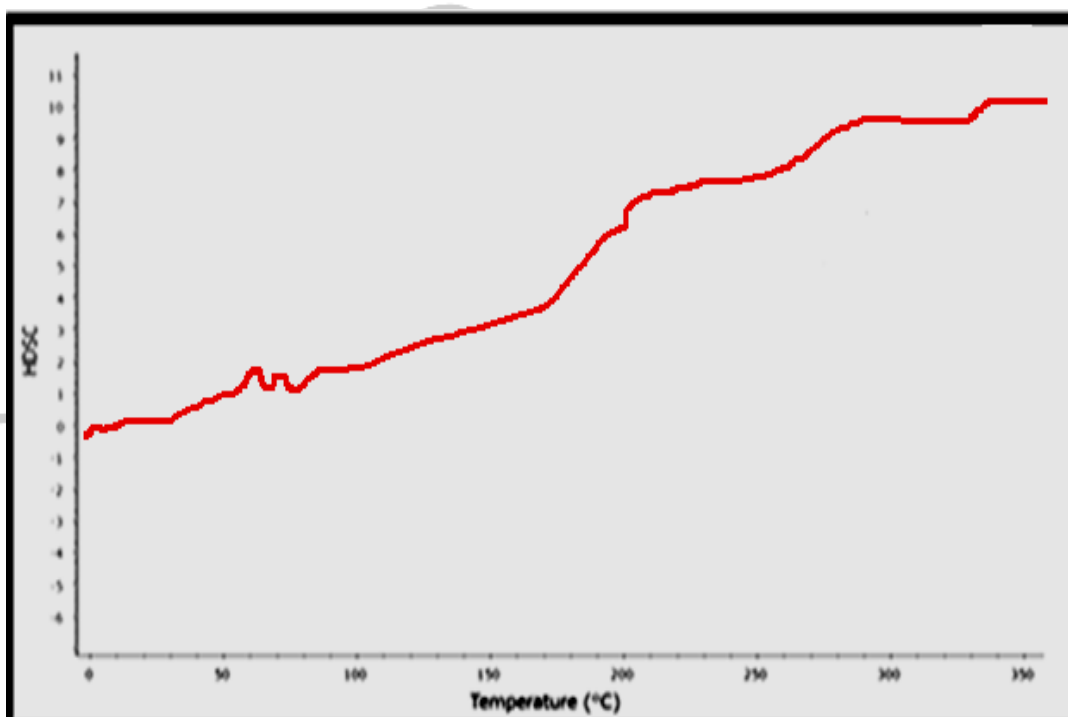


Fig (5) : DSC- Thermal Analysis of Compound [3]

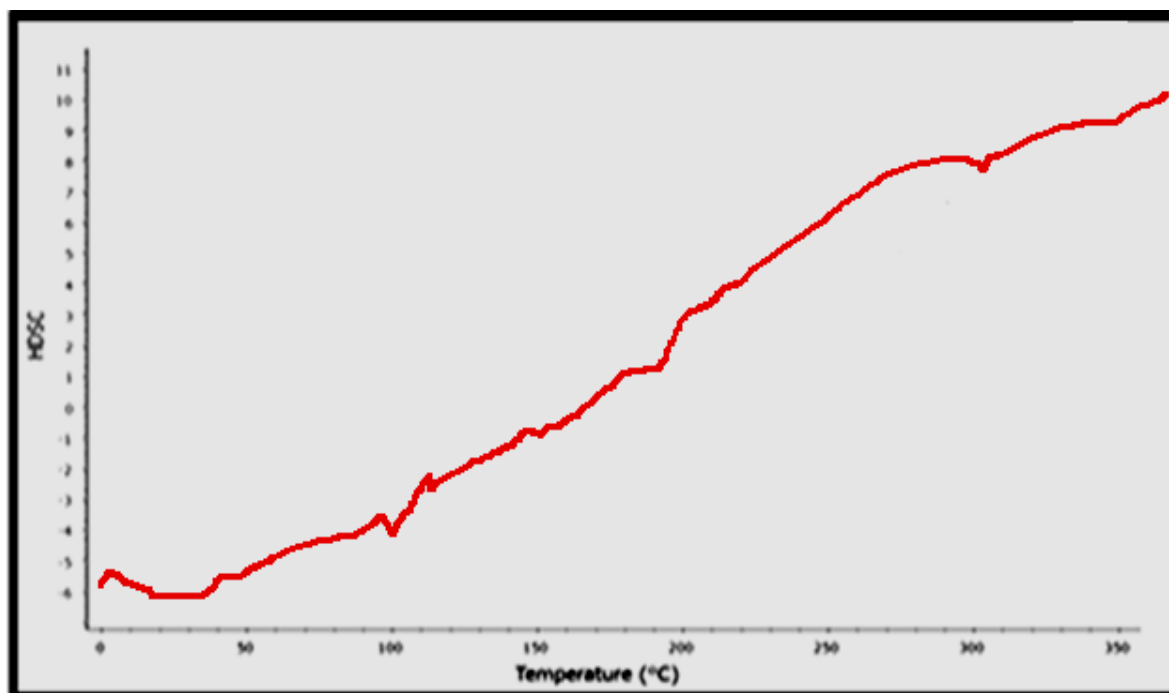


Fig (6) : DSC of Compound [4]

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