

# STUDYING OF BIO- CHEMICAL BEHAVIOR FOR (BIS AND BI)-CYCLIC SYSTEM

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## ARTICLE INFO

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## ABSTRACT

In previously study of our work<sup>(1,2)</sup>, we synthesized and characterization of [18] compounds , but in this work we will study various chemical behaviors like (DSC –Analysis Measurements , polarity of compounds , chromatography applications ) for some compounds and antimicrobial applications against(3) types of bacteria and (2) types of fungi towards compound [1- 18].

**Key words:** synthesized and characterization system, behavior .

## INTRODUCTION

Since bicycles compounds have a variety of potential biological activities and utilities as technologically useful materials, several methods for the preparation have been developed<sup>(1-4)</sup>. Furthermore, bicycles have been put to much use in the chemistry of dyes, drugs, coordination chemistry , as a ligands with transition metals , in bio-molecules like nueclic acids , Therefore, bicycles compounds represent an important heterocyclic scaffold of compounds which display a wide range of different activities<sup>(5-9)</sup> and widely used in the production of pharmaceuticals, have taken an important place among the compounds of biological interest because of the conjugation and the groups that they might included in their molecules<sup>(10-14)</sup>.

This class of compounds play magnificent role in recent years due to their versatility work that can be done

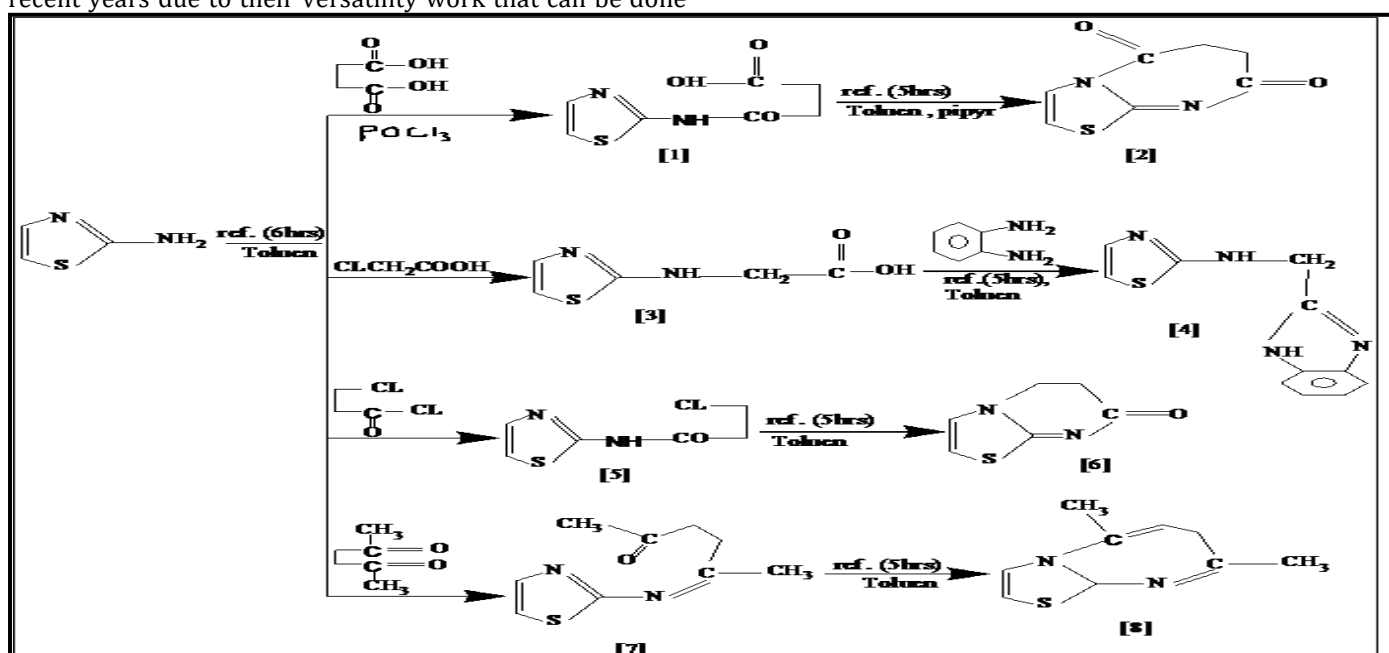
by these building blocks in deferent fields, for instance in biological fields they play as antifungal, antibacterial ...etc<sup>(1-5)</sup>.

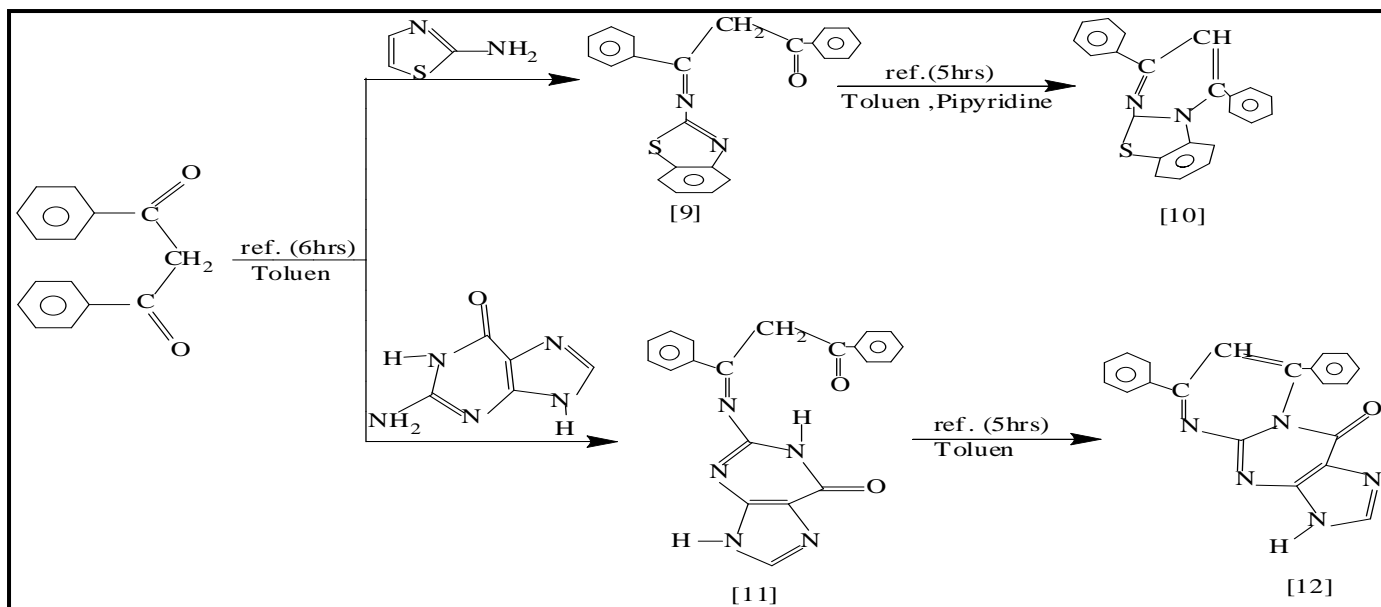
## MEASUREMENTS & PROCEDURES:

Chemical Measurements of compounds [1-18] carried out in Canada and other measurements in Baghdad university while biological studying carried out in Bio – lab in biological department of education college .

### Synthesized Compounds In Our Past Paper<sup>(1)</sup>:

In our past paper<sup>(1,2)</sup> , we synthesized and characterization ( 18 ) compounds from various organic compounds like ( bis cycles , bi cycles , Schiff bases , selenazane , thiazane ), but in this studying we will study the bio and chemical behaviour for them



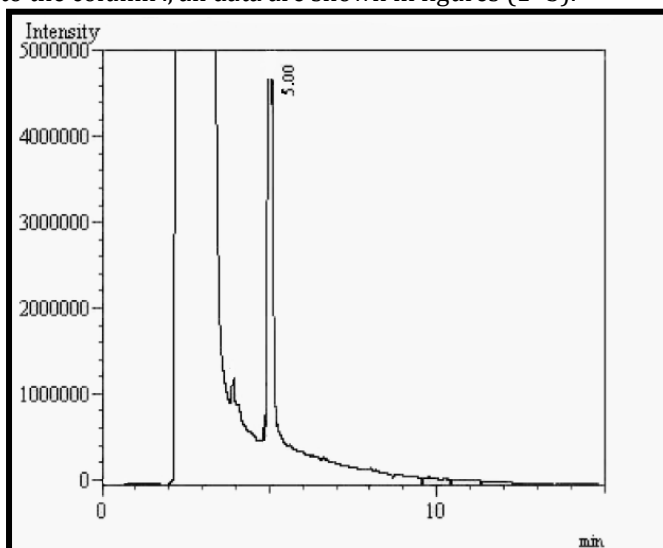


## RESULTS AND DISCUSSION

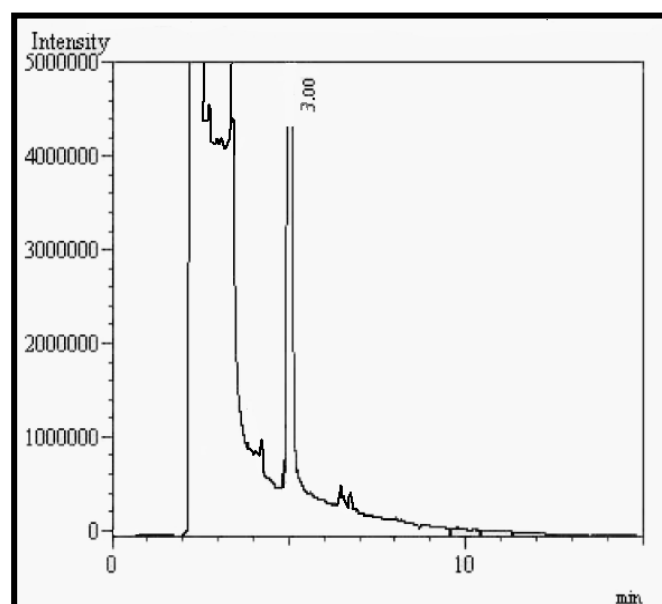
We synthesized bis and bi cyclic compounds in previously work<sup>(1,2)</sup> but now (in the present study) we will study of chemical behavior like (DSC - Analysis, affinity and polarity of compounds in polar and non polar solvents, chromatography behavior) for some compounds and bio-applications like antimicrobial activity against types of bacteria and types of fungi:

### Studying of Chemical Behaviors<sup>(9)</sup>:

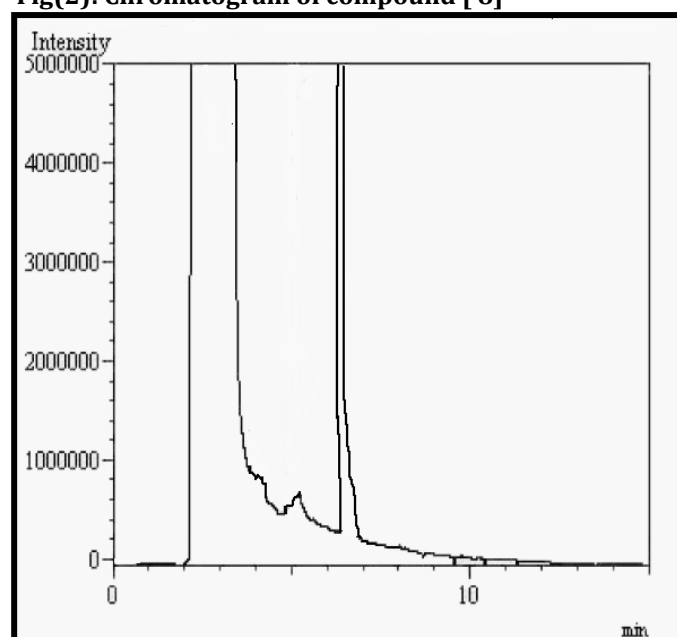
**Studying of Chromatography Behavior (for some compounds):** According to studying<sup>(9)</sup>, diluted solutions of some compounds were prepared ((concentration of 1ppm for vehicles)) of compounds [4, 8, 10, 12, 14] after dissolved with ethanol was also attended by a mixture of compounds which prepared by mixing 10ml of each solution individually after shaking continuous., injected models by using a syringe(Hamilton) with a capacity of 10ml individually and then injected the mixture, and then install the measurement conditions through the use of nitrogen a gas flow of 25ml/min bus speeds and injection temperature was 25C° degrees higher than the temperature separation column and then use a flame ionization detector is 50C° higher than the temperatures of the column either column temperature programmed gradual increase of of(90-160)C°, taking into consideration the maximum temperature to avoid damage to the column., all data are shown in figures (1- 5).



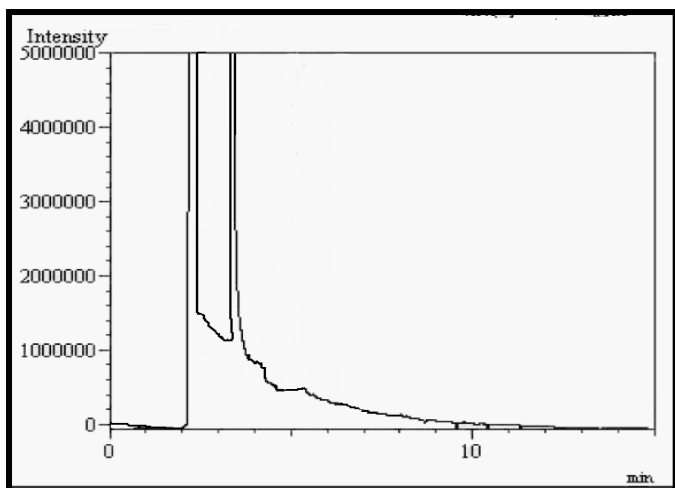
Fig(1): Chromatogram of compound [4]



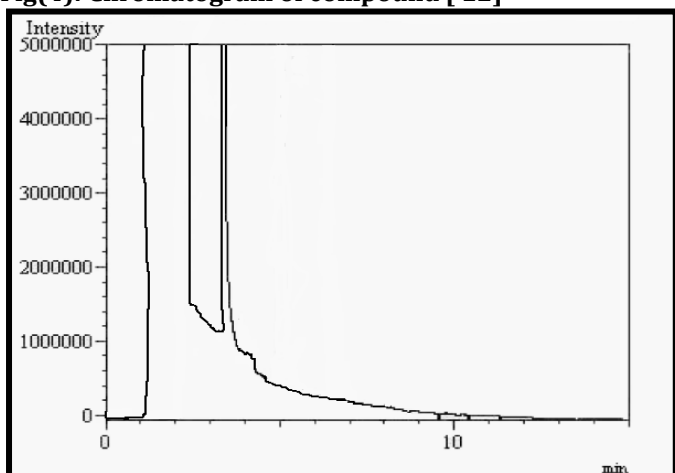
Fig(2): Chromatogram of compound [8]



Fig(3): Chromatogram of compound [10]



Fig(4): Chromatogram of compound [ 12]



Fig(5): Chromatogram of compound [ 14]

**Polarity of Compounds :**

The polarity behavior and solubility of compounds was studied in several solvents according to polarity of solvents, the results are shown in table (1).

**Table (1) :Affinity and Solubility of Compounds in several Solvents.**

Compo unds No.	Types of Solvents					
	Ethanol	Methanol	DMS O	Benz ene	Diox ane	DMF
{1}	+	+	+	-	-	-
{2}	+	+	+	-	-	-
{3}	+	+	+	-	-	-
{4}	+	+	+	+	+	-
{5}	+	+	+	-	-	-
{6}	+	+	+	+	+	-
{7}	+	+	+	-	-	-
{8}	+	+	+	+	+	-
{9}	+	+	+	-	-	-
{10}	+	+	+	+	+	-
{11}	+	+	+	-	-	-
{12}	+	+	+	-	-	-
{13}	+	+	+	-	-	-
{14}	+	+	+	+	+	+
{15}	+	+	+	+	+	-
{16}	+	+	+	-	-	-
{17}	+	+	+	+	+	+
{18}	+	+	+	+	+	+

**Measurements of DSC – Analysis :**

DSC – curve measurements of some compounds carried out for ( bi and bis cycles, Schiff bases and other compounds in this work )) in some figures ( 6 - 10 ) :

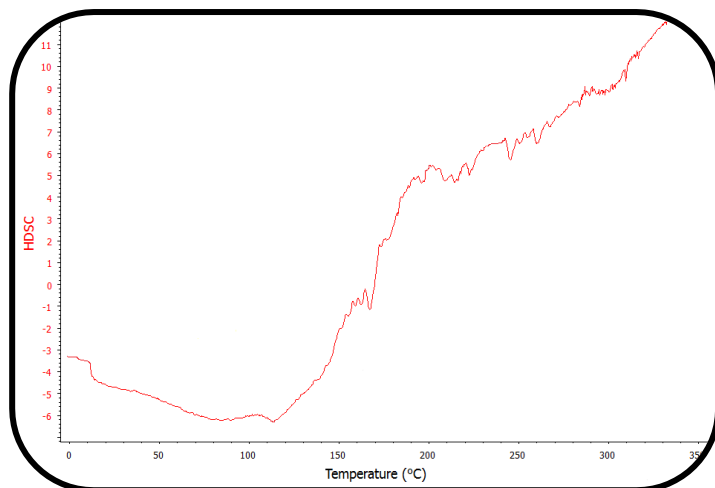


Fig (6) : DSC of Compound [ 5 ]

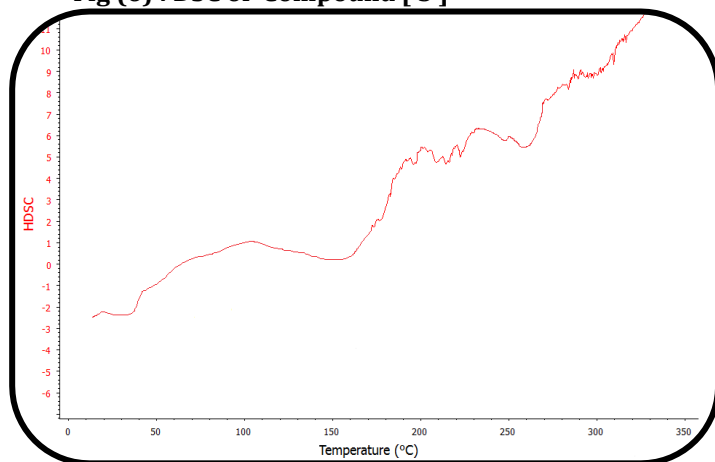


Fig (7) : DSC of Compound [ 7 ]

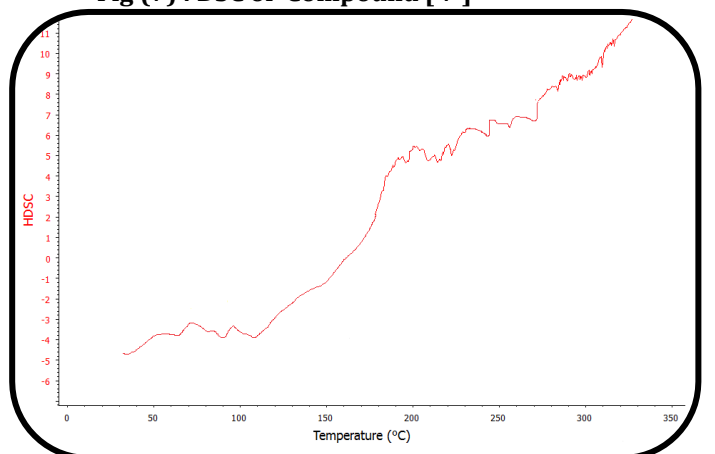


Fig (8) : DSC of Compound [ 10 ]

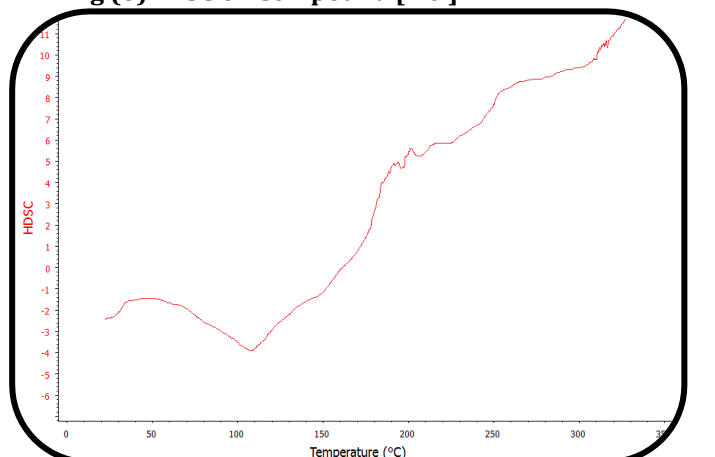


Fig (9) : DSC of Compound [ 11 ]

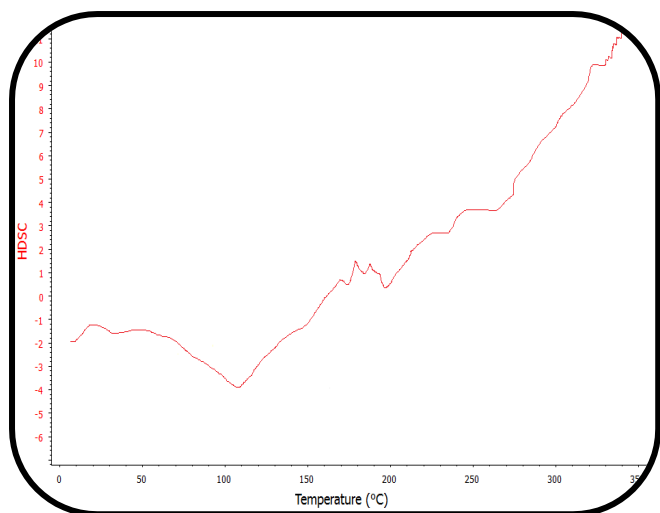


Fig (10) : DSC of Compound [ 17 ]

**Antibacterial and Antifungal assay:**

Five pathogenic bacteria have been tested to study the antibacterial activity of the [18] compounds in this study . These were types of bacteria (*Klebsiella Pneumonia* , *Proteus Vulgaris* and *Salmonella typhi* ) and types of fungi (*Aspergillus. fumigatus* and *Candida. Albicans*)).

The antimicrobial activities of synthesized compounds have been studied for their antibacterial and antifungal activities by agar via biological methods<sup>(1)</sup>. The antibacterial and antifungal activities were done at 200 mg/ml concentrations in DMO solvent through using three types of bacteria (*Klebsiella Pneumonia* , *Proteus Vulgaris* and *Salmonella typhi* ) and two types of fungi (*Aspergillus. fumigatus* and *Candida. albicans*). These bacterial strains were incubated for 24hr at 37°C and fungi strains incubated for two days at 37°C.

The antimicrobial results are summarized in table (2). From results of antibacterial studies it was found to be potentially activity against all types of bacteria and fungi . while antifungal activity were listed in table (3). It is evident from the results that the biological activity of all compounds have high biological activity which inhibit the growth of bacteria and fungi .

The higher activity of compounds [ 12 ,17, 18 , 11, 10, 8] may be due to the fact that, is an essential micronutrient during transcription and transformation of nuclei

Acids which shown to inhibit cellular protein and RNA , they included one or more hetero atoms like (N- atoms , S- atoms , more than one hetero atoms in same cycle ) with sulfur atoms and hence inhibit the bacterial growth. Furthermore, the mechanism of action of the compounds may involve the formation of hydrogen bond with the active centers of the cell constituents resulting in the interference with the normal cell process. These compounds had a good ability to attack the bacteria through their effects on the synthesis of ribonucleic acid which could be resulted from the inhibition action of compounds on the DNA of the bacteri<sup>(14-18)</sup>.

Table (2): Inhibition Zone in (mm ) of Compounds [1-18] in Concentration (200 mg.ml<sup>-1</sup>)

Comp. No.	<i>Klebsiella Pneumonia</i>	<i>Proteus Vulgaris</i>	<i>Salmonella .typhi</i>
{1}	16	18	18
{2}	20	18	16
{3}	20	24	20
{4}	22	26	24
{5}	22	24	20
{6}	26	24	26

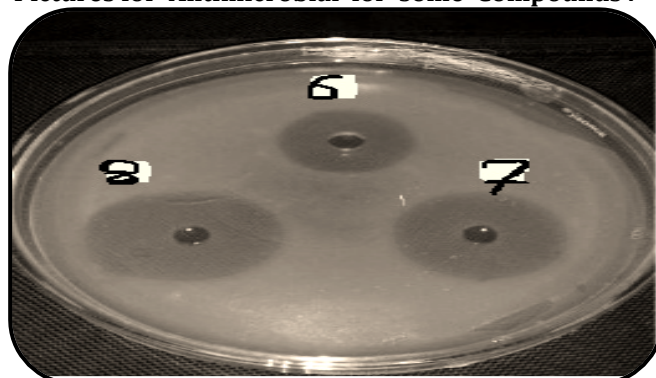
{7}	28	28	26
{8}	28	26	28
{9}	28	24	28
{10}	32	30	34
{11}	18	16	14
{12}	38	30	26
{13}	14	12	10
{14}	16	14	18
{15}	14	18	16
{16}	18	14	16
{17}	38	32	30
{18}	34	34	30

While The formatted compounds gave excellent activity against bacteria and fungi.

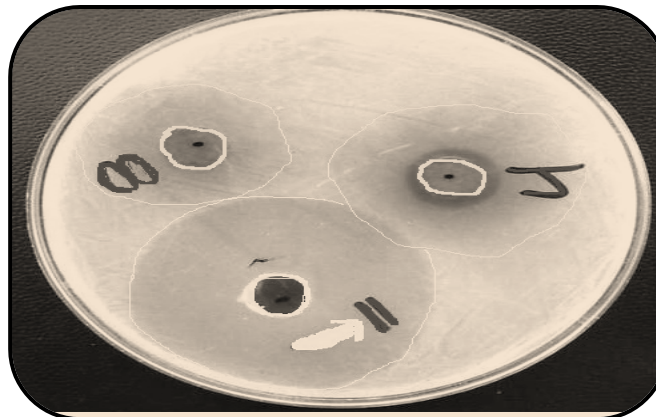
Table (3):Inhibition of Compounds [1- 18] in Concentration (200 mg.ml<sup>-1</sup>)

Comp. No.	<i>Aspergillus. fumigatus</i>	<i>Candida. albicans</i>
{1}	16	18
{2}	18	18
{3}	20	22
{4}	14	18
{5}	16	12
{6}	22	24
{7}	24	26
{8}	20	22
{9}	28	26
{10}	22	22
{11}	22	24
{12}	28	30
{13}	8	10
{14}	12	10
{15}	10	8
{16}	18	16
{17}	28	28
{18}	24	24

Pictures for Antimicrobial for some Compounds :



Picture (1):Antibacterial activity - *Klebsiella Pneumonia*



Picture (2):Antibacterial activity - *Proteus Vulgaris*

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