



IMIDAZOLE-CYCLIC DERIVATIVES (PREPARATION, SPECTRAL STUDIES, MICROBIAL STUDIES)

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Abstract: The study aimed to prepare organic compounds that are more resistant to fungi, where antimicrobial resistance occurs when bacteria, viruses, fungi or parasites change their shape over time and do not respond to drugs, which poses a threat to health and development at the global level. New compounds have been prepared from heterocyclic imidazole rings, chalcone, and cyclic-chalcone compounds. Although some new antibiotics are being developed, none of them is expected to be effective in combating the most dangerous forms of antibiotic-resistant bacteria, but these compounds have been studied on several Different types of microbes, some prepared to know their effectiveness in eliminating microbes., Also organic identifications were carried out to supporting results in this study .

Keywords: imidazole, cycle, bacteria, microbe, medical, health

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INTRODUCTION

Organic compounds of wide fame in this field are imidazole derivatives and chalcone [1,2], which were used in the development of many anti-cancer, anti-bacterial, anti-viral, anti-fungal and antihypertensive drugs [3-5]. They were also used in the field of analytical chemistry to detect many transitional and non-transitional elements as organic ligands [6-9]. Among the organic compounds of great importance in many fields are chalcone-cycle compounds [10-13], which are famous for their wide use in inhibiting the growth of bacteria and germs [14-17], anti-corrosion and as organic reagents, which are used to detect many metal ions [18-22], whether transitional or non-transitional, and good extraction reagents for some transitional element ions from aqueous solution [23-25].

This type of biological compound has been widely used in recent times because of its distinct properties, as it is coordinated through a nitrogen atom [26-29], which has an empty orbital with an energy similar to the orbital of the donor atom of the same ring [30-33], and if these rings contain one or more substituted group in A suitable site for the azo group [34-37], chalcone, or imine qualifies for coordination through it, producing a chelated ligand in coordination chemistry or the field of biochemistry [38-40].

EXPERIMENTAL PART

It is known to us that any new chemical compound for which the evidence for its preparation is to prove its chemical composition by various means, including spectral and non-spectral, and the study of its vital behaviors, and this is what we have proven through several diagnostic methods that were carried out in this study which carried out in Asfahan university, as follows:

Production of Anile Compound {1}

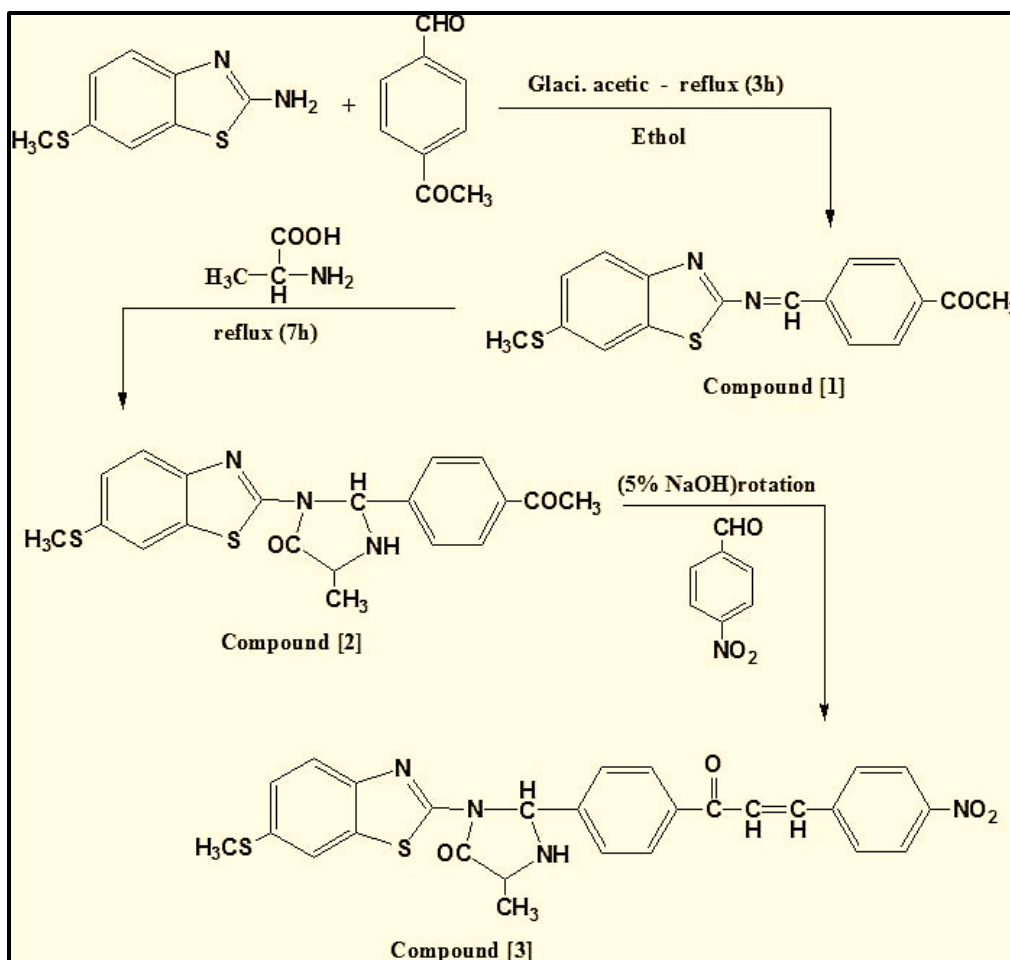
2-Amino-4-methyl sulfide benzothiazole (0.01) mole liquefied with (0.01) mole of p-acetobenzaldehyde in acidic medium, the resulted was separated, purified, desiccated to offer Anile compound {1} obliged to ways in references [6, 7].

Production of Imidazole Compound {2}

Anile-benzothiazole compound {1} (0.01) mole liquefied with (0.01) mole of alanine acid in condensation step for cyclization reaction through (7 hrs), the resulted was separated, purified, desiccated to offer Imidazole compound {2} obliged to ways in references [6, 7].

Production of Imidazole-Chalcone Compound {3}

Imidazole compound {2} (0.01) mole liquefied with (0.01) mole of p-nitro benzaldehyde in rotation process through (9 hrs) in basic medium, the resulted was separated, purified, desiccated to offer Imidazole-Chalcone compound {3} obliged to ways in references [6, 7].



Form.1: Production of Imidazole-Chalcone Compounds{1, 2, 3}

Production of Imidazole-Cyclic Compound {4}

Imidazole-Chalcone compound {3} (0.01) mole liquefied with (0.01) mole of thiourea in rotation process with refluxing through (6 hrs) in acidic medium, the resulted was separated, purified, desiccated to offer Imidazole-Cycle compound {4} obliged to ways in references [6, 7].

Production of Imidazole-Cyclic Compound {5}

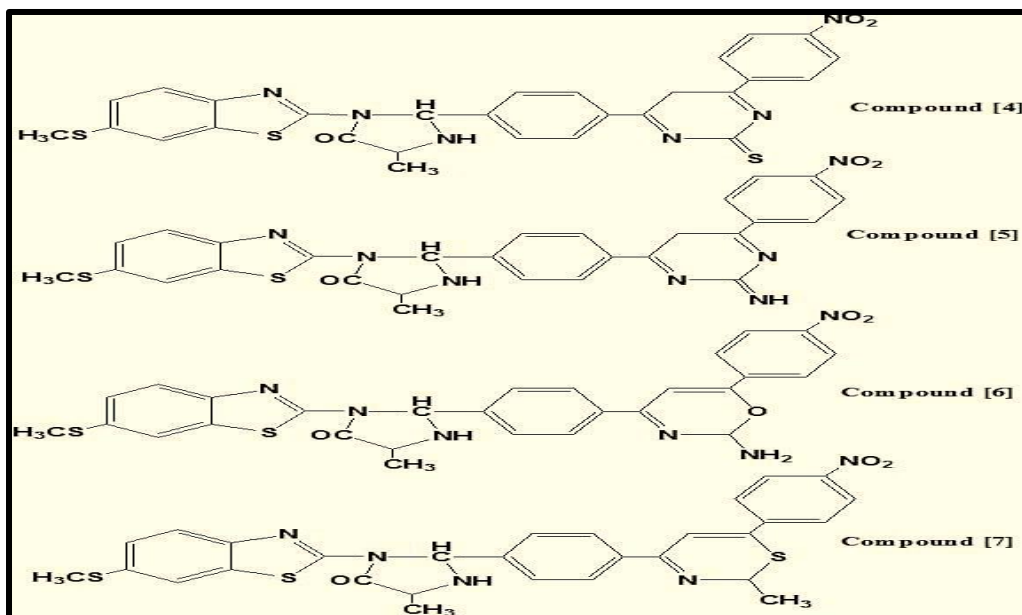
Imidazole-Chalcone compound {3} (0.01) mole liquefied with (0.01) mole of guanidine in rotation process with refluxing through (5 hrs) in acidic medium, the resulted was separated, purified, desiccated to offer Imidazole-Cycle compound {5} obliged to ways in references [6, 7].

Production of Imidazole-Cyclic Compound {6}

Imidazole-Chalcone compound {3} (0.01) mole liquefied with (0.01) mole of urea in rotation process with refluxing through (5 hrs) in acidic medium, the resulted was separated, purified, desiccated to offer Imidazole-Cycle compound {6} obliged to ways in references [6, 7].

Production of Imidazole-Cyclic Compound {7}

Imidazole-Chalcone compound {3} (0.01) mole liquefied with (0.01) mole of thioacetamide in rotation process with refluxing through (5 hrs) in acidic medium, the resulted was separated, purified, desiccated to offer Imidazole-Cycle compound {7} obliged to ways in references [6, 7].



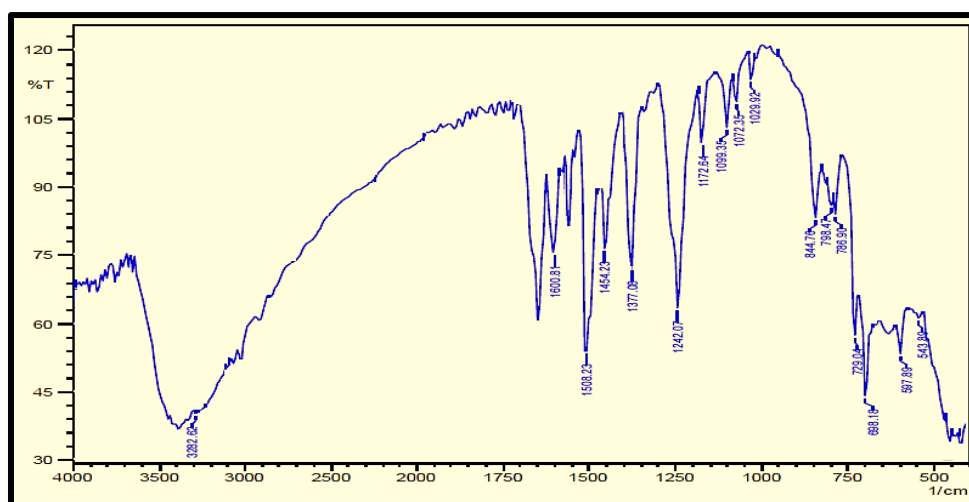
Form.2: Production of Imidazole-Cycles Compounds{4, 5, 6, 7}

RESULTS AND DISCUSSION

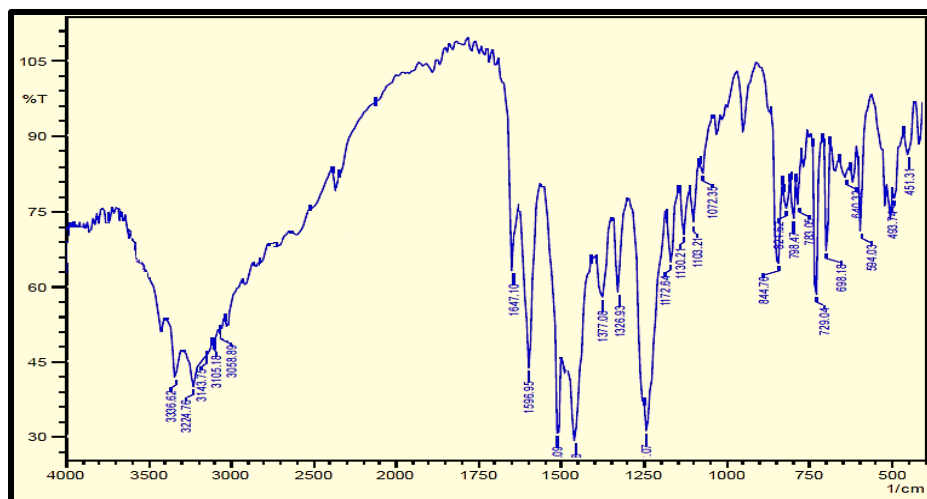
Imidazole derivatives occupied a unique place in the field of medicinal chemistry, as many of them are known for their wide use in the medical and pharmacological fields. Some of them are used as analgesics, anti-fungal, anti-inflammatory, anticoagulants and stimulants. For the heart (Cardiovascular Activity) Some of the azo-imidazole compounds were also used as anticancer, due to their formation of complexes with ions of transitional elements and the ability of their complexes to link with coordination bonds with the nitrogen atoms present in the DNA bases to form a ring.

FT.IR- Analysis of Data

This chemical-spectral conclusion presented robust values of gatherings of resulting Imidazole-Chalcone derivatives [1-7] as a result of existence exciting groups of frequency at (1617) cm^{-1} of Anile group for compound [1], other frequency at (1683) cm^{-1} of carbonyl of amide in imidazole (CO-N), frequency at (3280) cm^{-1} of Amine group (NH) for compound [2], while frequency at (1694) cm^{-1} for carbonyl group for chalcone and (3092) cm^{-1} for (CH=CH) in chalcone in compound [3], frequencies at (3312 ,3334) cm^{-1} of Amine group (NH₂) for Imidazole-Cycle compound [6], frequency at (748) cm^{-1} of (C-S) endocycle for compound [7], depending on identification literature [15].



Form.(3):I.R of Imidazole-Cycle Compound{4}

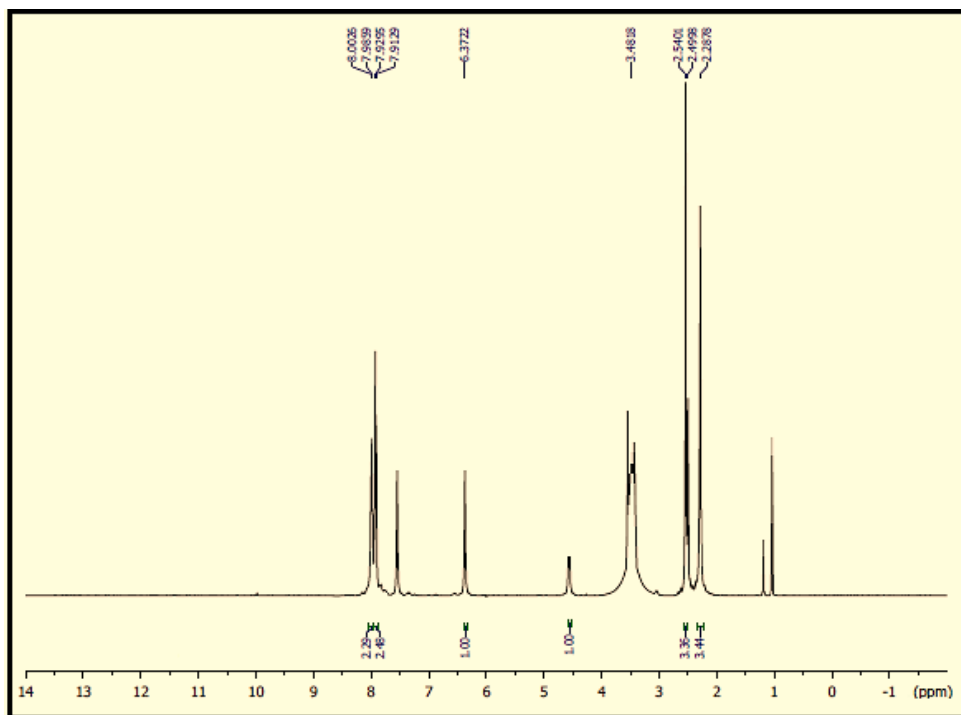


Form.(4):I.R of Imidazole-Cycle Compound{6}

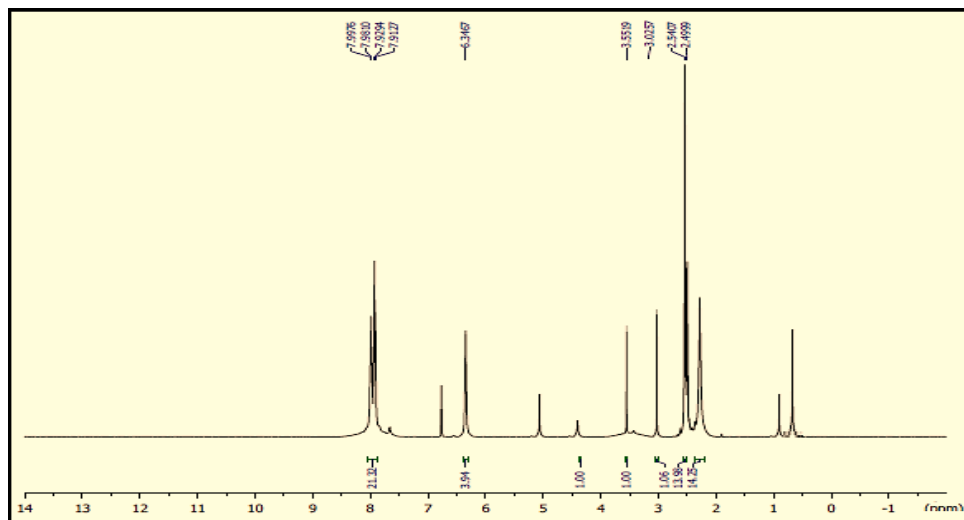
¹H.NMR- Analysis of Data

This chemical-spectral conclusion presented robust values of gatherings of resulting Imidazole-Chalcone derivatives [1-7] as a result of existence exciting groups of peak at δ (8.55) to proton of (CH=N) in Imidazole compound {1}, also of peak at δ (4.73) to proton of (NH) in Imidazole –Cycle compound

{2}, other of peaks at δ (6.01 , 6.11) to protons of (CH=CH) in Imidazole-Chalcone compound {3, also of peak at δ (4.91) to proton of (NH) in Imidazole –Cycle compound {5}, peak at δ (5.03) to protons of (NH₂) in Imidazole –Cycle compound {6}, depending on identification literature [15] .



Form.(5):H.NMR Imidazole-Cycle Compound{4}



Form.(6):H.NMR Imidazole-Cycle Compound{5}

Impost of the resistance of Imidazole-Chalcone compounds against Bacteria

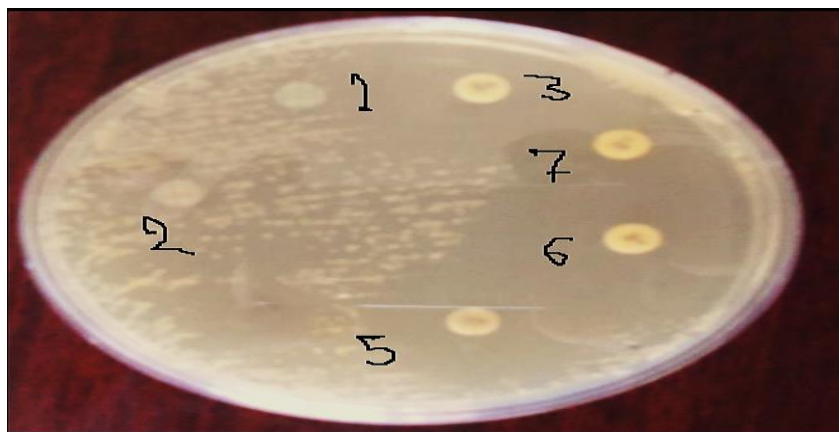
Studying the biological activity of the prepared compounds and the extent to which they can be used in the medical field through their effect on inhibiting the growth of types of

pathogenic bacteria, some of bacteria is Gram positive, symbolized concluded (Staphylococcus aureus , Streptococcus pneumonia), and the another classification is Gram negative, symbolized by dint of (E.Coli) on (three concentrations :30 , 50 , 80 micro gram) depending on literatures [6, 15] .

Table 1: Impost of the resistance of Imidazole-Chalcone compounds against Bacteria in Conc. (50 micro gram)

Imidazoles	Staphylococcus aureus	Streptococcus pneumonia	Escherichia. Coli
Imidazole {1}	+	+	+
Imidazole {2}	+	+	+
Imidazole {3}	++	++	++
Imidazole {4}	+++	+++	+++
Imidazole {5}	+++	+++	+++
Imidazole {6}	++	+++	++
Imidazole {7}	++	++	++

(+) : inhibition (2-6) mm
 (++) : inhibition (7-10) mm
 (+++) : inhibition (11-16) mm

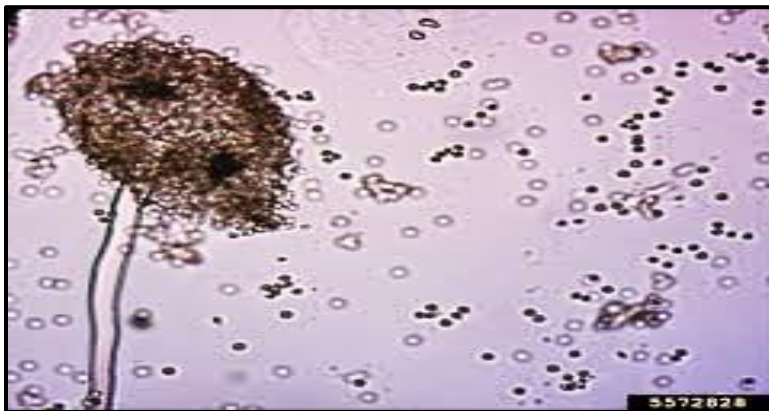


Form. 7: Inhibition of Imidazole-Chalcone Derivatives on Staphylococcus aureus

Impost of the resistance of Imidazole-Chalcone compounds against Fungi (6)

The effect of the ligands and their combination complexes referred to above on three types of pathogenic fungi isolated

and diagnosed in the laboratory using biochemical and microscopic tests were also studied, namely (Aspergillus flavus , Aspergillus terreus) depending on literature(6, 15) .



Form. 8: Aspergillus flavus

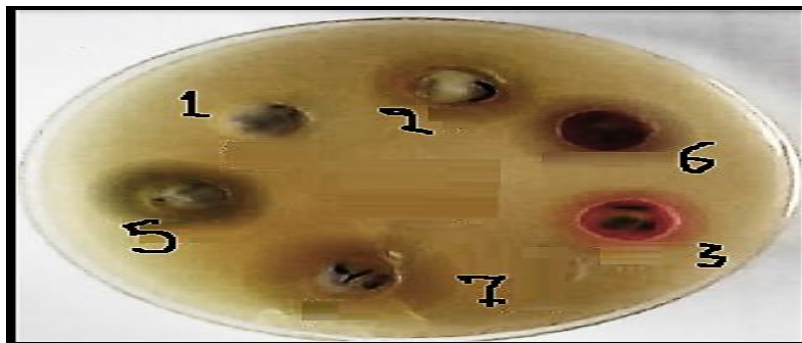


Form. 9: Aspergillus terreus

Table 2: Impost of the resistance of Imidazole-Chalcone compounds against Fungi in Conc. 5 micro gram)

Imidazoles	Aspergillus. flavus	Aspergillus. terreus
Imidazole {1}	+	+
Imidazole {2}	+	+
Imidazole {3}	+	++
Imidazole {4}	+++	+++
Imidazole {5}	+++	+++
Imidazole {6}	++	++
Imidazole {7}	++	++

(+) : inhibition (2-6) mm
 (++) : inhibition (7-10) mm
 (+++) : inhibition (11-16) mm



Form. 10: Inhibition of Imidazole-Chalcone Derivatives on *Aspergillus. flavus*

CONCLUSIONS

When comparing the preparation course of the compounds, it was found that the difference in the compensated groups on the base compound has a clear effect on the time to complete the reaction, which was followed up by TLC technique), as well as the difference in effectiveness as a result of the difference in these groups. Also the preparation compounds have high efficacy against bacteria and fungi

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