Original Article

BIO ASSESSMENT OF NEW LIGANDS AS A BIOINORGANIC COMPOUNDS

Muhammed Abdel Hasan Shallal

Lecturer, M. Sc, Chemistry Field, Educational Directorate Thi-Qar, Thi-Qar, Iraq.

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Abstract

The aim of present study to bio evaluation of ligand compounds as a bio-compounds in bio-inorganic field. Pyrimidine derivatives have been used in the manufacture of dyes for fabrics that contain nylon to give colors between yellow and coffee, series of bio ligands were prepared from pyrimidine and sulfur compounds to formation heterocyclic ligands from Schiff base compounds and other derivatives. Present assessment of the abundant importance of the heterocyclic derivatives and its admittance into a lot of features of life, containing facets of curative and energetic prominence, where it was recognized to be a portion of the production of essential amino acid, in tally to its admittance into the arrangement of a lot of managements like anti-lump, seditious and anti-mycological. Counting that the automated compactness of this ring is concentrated in the two spots containing the double hetero atoms as (N) nitrogen atoms, and then it becomes clear that when a suitable electrophile is available, it can bind with the imidazole cycle in one of the double stated locations. It has been habitual to demonstrate the constructions and specificity of the equipped ligands concluded chemical programmed earnings to analyze ligands, besides to comportment energetic readings for them to estimate their inefficiency.

Keywords: Microbial, Ligand, Assessment, Treatment.

Introduction

The pyrimidine derivatives are colored compounds due to the occurrence of electronic transitions that cause bright colors in their structures [1, 2], including red, purple, black, orange and blue. It depends on the structures of the derivatives to which this color belongs. It has wide uses, as a ligands are used in inorganic chemistry and as a textile dye [3], whether in industry or the field of Pathological analyzes [4,5]. Micro -organisms are the causes of many diseases, so we find a lot of research in the field of studying the biological activity of compounds containing pyrimidine rings [6-10] on various types of pathogenic bacteria: Spherical and helical**.** Nowadays there are increasing numbers of infections caused by bacteria that are resistant to most of the antibacterial treatments currently available [11-13]. In some experiments conducted on mice, results were given that the association of pyrimidine with some compounds used as chemotherapy for tumors improves its effectiveness and reduces the spread of the tumor as well as reduces the toxic effects [14-18] that result from the chemotherapy itself. In reducing the spread of breast cancer in mice [19-23]., The pyrimidine substitutes have similar efficacy to the pharmaceutical-pharmaceutical compounds [24-28] used in the treatment of ulcers and infections, nerve paralysis [29,30], ulcers, and they are also used as lipid oxidation inhibitors in experiments conducted on rats [31, 32]. The pyrimidine substitutes are effective in the industrial field [33-38]. Pyrimidine derivatives have been used in the manufacture of dyes for fabrics that contain nylon [39-46] to give colors between yellow and coffee from series studies [47-55], also used as a dyes-Azo [56-63].

Materials and Methods

The pyrimidine derivatives that contain the sulfone or sulfur group in their composition have high biological activity, high absorption in the body, and low toxicity, so they are widely used in the pharmaceutical industry, so they are characterized by being highly sensitive, so high purity materials were used to prepare them. Spectrophotometers with extremely high accuracy for its diagnosis and measurement from the University of Isfahan in the Chemical Research Center.

Production of Pyrimidine-Anile Ligand {1}

2-methyl-4-formal mercaptophenyl (0.01 mole) condensed with aminopyrimidine (0.01 mole) in occurrence of acid-drops in refluxing step (2 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine- Anile Ligand {1} appreciative to studies [4,6].

Production of Pyrimidine-Imidazole Ligand {2}

Pyrimidine- Anile Ligand {1} (0.01 mole) condensed with amino acetic acid (0.01 mole) in occurrence of benzene as a solvent in refluxing step (5 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine-Imidazole Ligand{2} appreciative to studies [4,6].

Production of Pyrimidine-Imidazole Sulfide Ligand {3}

Pyrimidine- Imidazole Ligand {2} (0.01 mole) condensed with p-nitro benzoyl chloride (0.01 mole) in occurrence of potassium carbonate in refluxing step (3 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine- Imidazole Sulfide Ligand {3} appreciative to studies [4,6].

Production of Pyrimidine-Imidazole Sulfide Ligand {4}

Pyrimidine- Imidazole Ligand {2} (0.01 mole) condensed with p-chloro ethylbenzoate (0.01 mole) in occurrence of acetone as a solvent (more favorable in this step) in refluxing step (2 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine- Imidazole Sulfide Ligand {4} appreciative to studies [4,6].

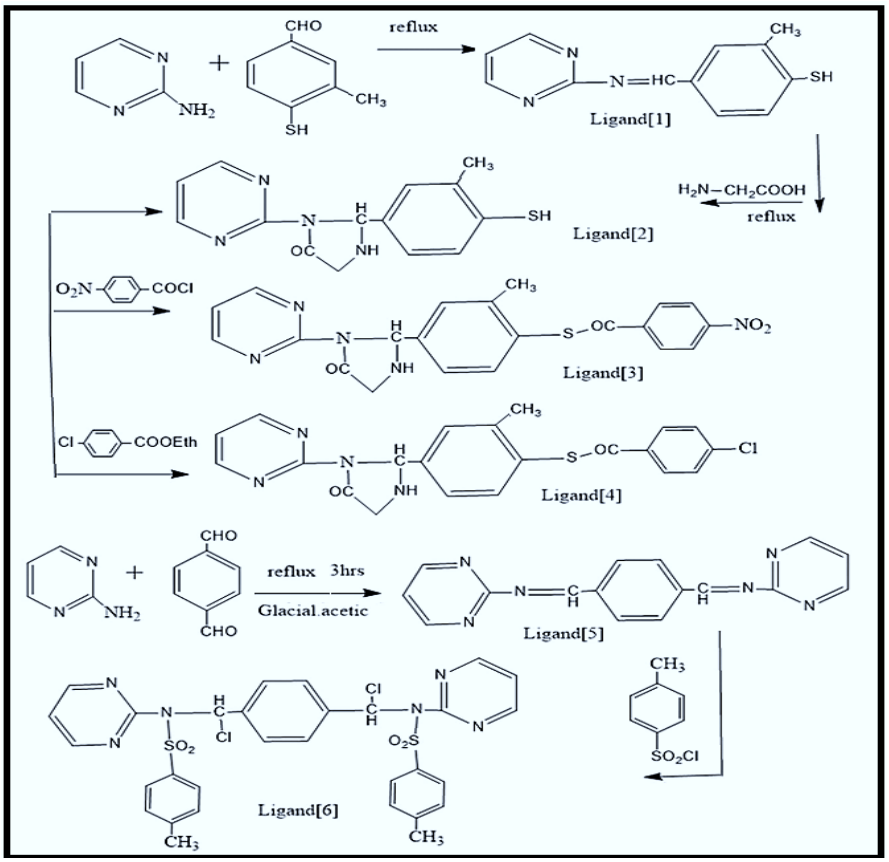
Production of Pyrimidine-Imine Ligand {5}

4-Formal benzaldehyde (0.01 mole) condensed with aminopyrimidine (0.02 mole) in occurrence of acid-drops in refluxing step (2 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine-Imine Ligand {5} appreciative to studies [4,6].

Production of Pyrimidine-Sulphone Ligand {6}

Pyrimidine-Imine Ligand {5} (0.01 mole) condensed with p-toluine sulphonyl chloride (0.02 mole) in occurrence of benzene as a splvent in refluxing step (2 hrs), then separation, desiccating, manifestation with absolute ethanol to Pyrimidine- Imidazole Sulphone Ligand {6} appreciative to studies [4,6].

Configuration 1: Production of Pyrimidine Ligands {1-6}



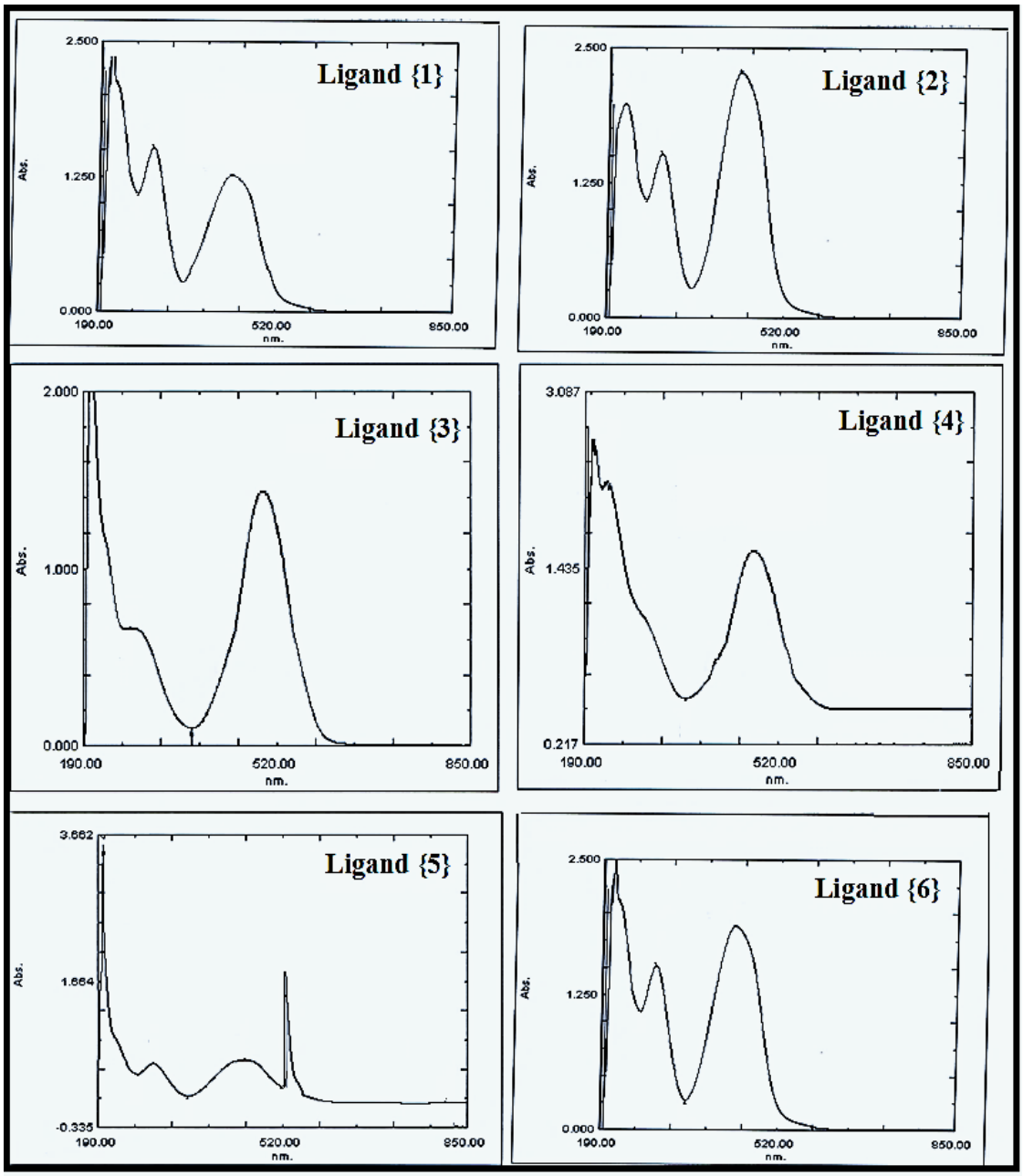
Results and Discussion

The multi-biological activity of these compounds prompted us to prepare new derivatives of them and encouraged us to do so because their derivatives have benign effects. All the prepared compounds have pharmacological qualities, that is, they have biological activity, and accordingly, the opinion settled on the preparation of derivative compounds, some of which are cyclic and others are noncyclic. Based on the foregoing, the organic compounds prepared in this study were diagnosed using well-known diagnostic methods, including.

Ultraviolet-Visible Spectroscopy

The prepared ligands were distinguished by their bright colors because they absorb light in the visible region of the spectrum, as they are accompanied by other absorptions in the near regions of both the infrared and ultraviolet-visible region, which is a result of the magnetic and color properties of those ligands containing color-deep groups that increase the wavelength of the ligands.

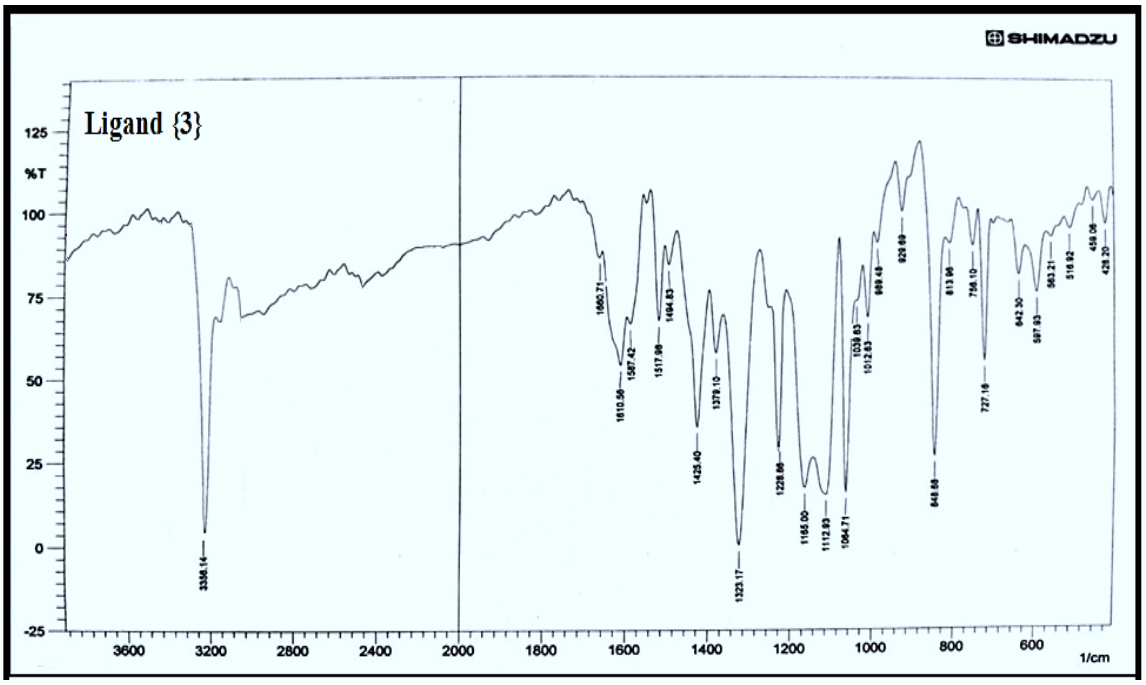
Configuration 2: UV. Vis of Pyrimidine Ligands {1-6}



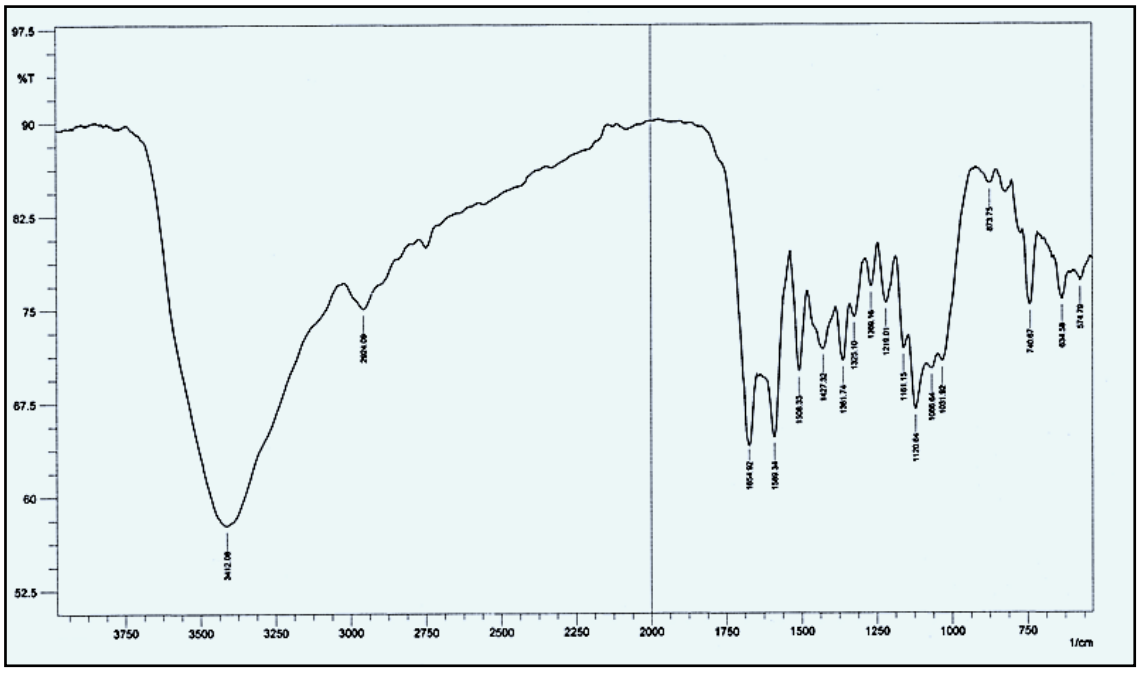
FT.IR- Revealing

The bands in the spectra of the ligands suffered from the difference in the intensity of the bands compared to the bands of the ligands, as well as the occurrence of varying displacements for most of these bands., We noted appearance bands at [(2410) (2398)]cm^{-1} for (SH-) thiol group in Ligands {1,2} respectively, while it disappeared in Ligands {3,4} as a result to formation (S-CO-) groups, also new bands represented by [(3289) (3241)]cm^{-1} for (NH-) amine group for endocylce –imidazole ring in Ligands {3, 4}., But in ligand {5} appeared band at (1619) cm^{-1} for (CH=N-) anile group that disappeared in ligand {6} as a result to formation Sulphone group (-SO_2-) at (1205) cm^{-1},all spectral revealing approving to investigation reference [14], some of spectra:

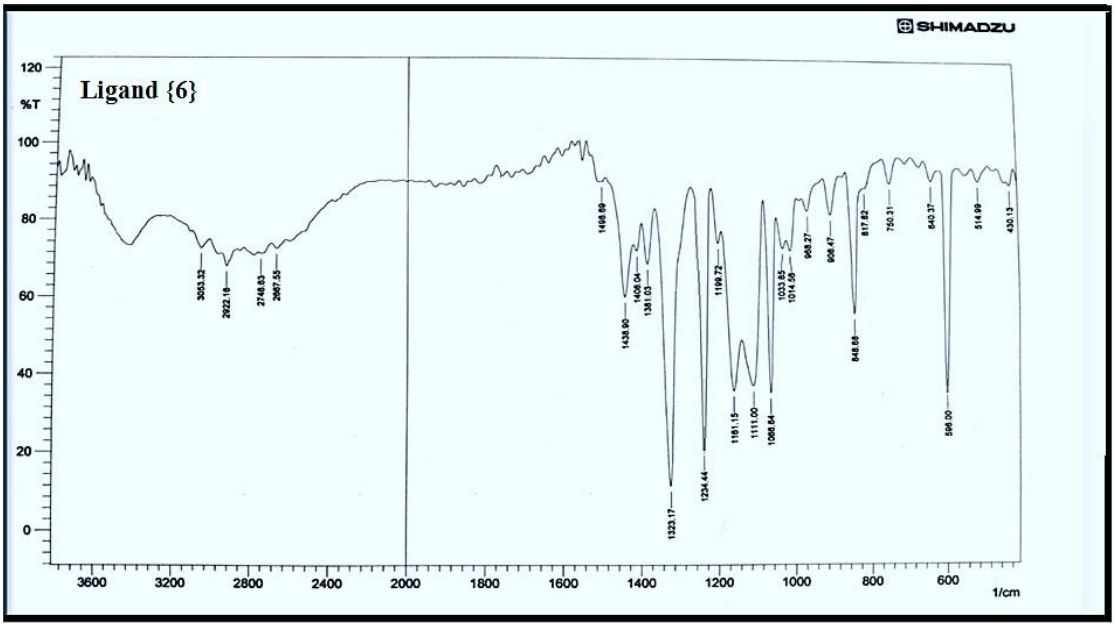
Configuration 3: I.R Pyrimidine Ligand {3}



Configuration 4: I.R Pyrimidine Ligand {4}



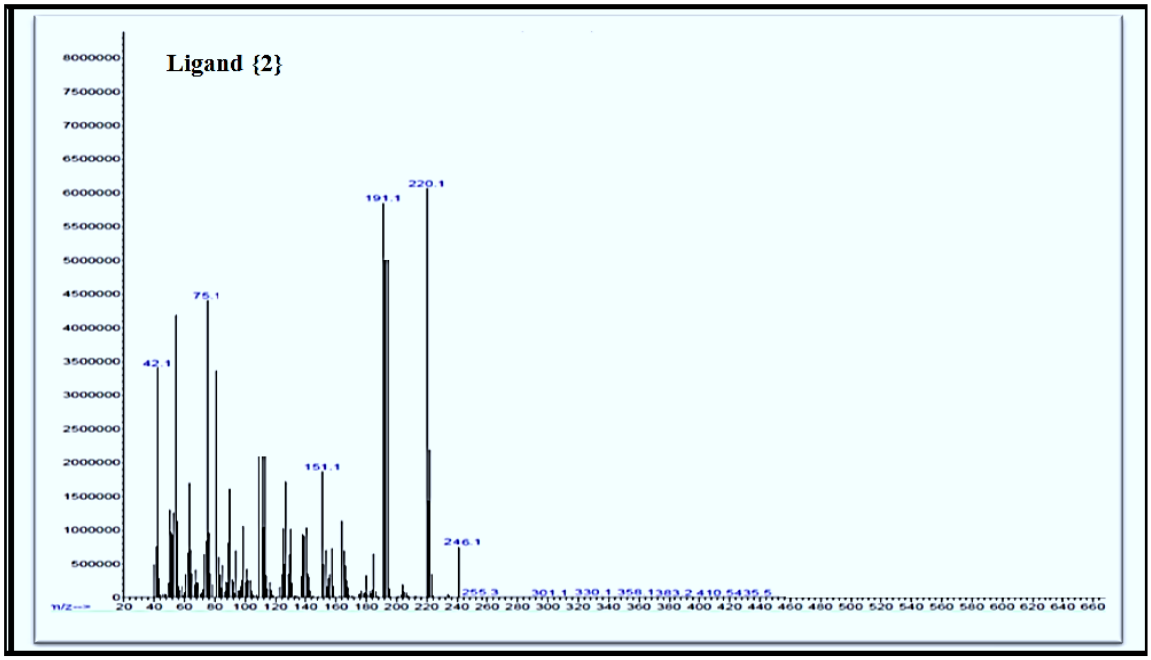
Configuration 5: I.R of Pyrimidine Ligand {6}



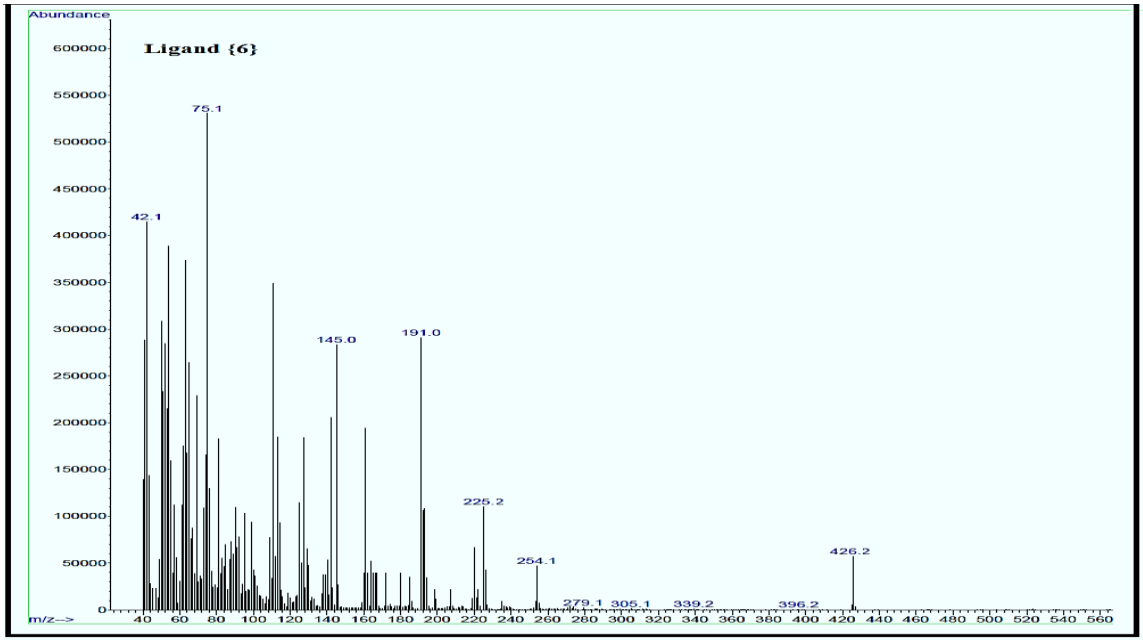
Mass – Revealing

The illuminating of pyrimidine Ligands subsidized another indication of prepared ligands {1-6} that acted by fractions of practical groups in matching molecular weight., all spectral revealing approving to investigation reference [14], some figures (6,7).

Configuration 6: Mass –Spect. of Pyrimidine Ligand {2}



Configuration 7: Mass –Spect. Of Pyrimidine Ligand {6}



Bio - Studies

In previous studies, some researchers have used several biological studies in the treatment of types of cancer (leukemia, lung, colon, skin, ovary, kidney and central nervous system cancer), as well as the use of pyrimidine derivatives as anti-bacterial and anti-fungal agents, so we completed this study with tests for the efficiency of prepared derivatives against microbes. These germs were chosen because of their importance in the medical field, as they cause many different diseases, as well as differ in the nature of their resistance to antibiotics and therapeutic chemicals. The results in the table indicate that all the tested compounds have the ability to inhibit the bacteria used, and it was noted that with the increase in the concentration of the substance, the diameter of the area free of bacterial growth increased.

Table 1: Influence of the resistance of Pyrimidine Ligands against Bacteria in Conc. (60 micro gram)

Pyrimidine Ligands	***Staphylococcus aureus***	***Streptococcus pneumonia***	***Escherichia. Coli***
Pyrimidine {1}	*+*	*++*	*+*
Pyrimidine {2}	*++*	*++*	*++*
Pyrimidine {3}	*++*	*++*	*++*
Pyrimidine {4}	*+++*	*+++*	*+++*
Pyrimidine {5}	*++*	*+*	*++*
Pyrimidine {6}	*+++*	*+++*	*+++*

(+): inhibition (2-6) mm

(++): inhibition (7-10) mm

(+++): inhibition (11-16) mm

Photo. 1: Inhibition of Ligands on Streptococcus pneumonia

Photo. 2: Inhibition of Ligands on Escherichia. Coli

Conclusions

The bands in the spectra of the ligands suffered from the difference in the intensity of the bands compared to the bands of the ligands, as well as the occurrence of varying displacements for most of these bands.

Conflict of Interest:

The authors declare that there is no conflict of interest.

Funding Source:

None.

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