

# A STUDY ON CLASSIFICATION OF HETEROCYCLIC COMPOUNDS AND THEIR BIOLOGICAL IMPORTANCE

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## ABSTRACT

*The Heterocyclic compounds play a great role in the research work of organic as well as in inorganic chemistry. Heterocyclic chemistry is the branch of chemistry which deals with the study of cyclic structure in which at least one of the elements in ring is other than carbon atom. The word Heterocyclic derived from two words as hetero and cyclic; Hetero means different and cyclic means closed ring of atoms. The Heterocyclic compounds have great importance in our daily life. It has a various biological application such as antioxidants, dyestuff, agrochemical, drugs etc. The Heterocyclic compounds are mostly played a great role in chemistry as well as biology. This research paper covers the some active Heterocyclic compounds which have shown important biological actions as anti-inflammatory, anticancer activity, anti-allergic, antibacterial, anticonvulsant, herbicidal, anticancer activity, antifungal activity.*

## KEYWORDS

*Heterocyclic compounds, drugs, antioxidants, medicinal chemistry.*

## INTRODUCTION

*The Heterocyclic compounds have play great role in chemistry as they are used in the synthesis of some others organic compound products such as penicillin, antibiotic, morphine, enzymes etc. These all are great importance in biological system. The Heterocyclic compounds mostly contain one nitrogen or sulfur or oxygen atom in ring and due to their structure it has play great role in daily life. They are also used in medicinal chemistry*

for treatment of various diseases. In this research paper, our focus on the structural and biological importance of Heterocyclic compounds. Some of the most common Heterocyclic compounds used in the medicines are as amino acids like histamine and tryptophan, the vitamins and coenzymes precursors such as thiamine, riboflavin, pyridoxine, folic acid, biotin, B12 and E families of the vitamins. There are many number of pharmacologically active Heterocyclic compounds, some of them have important regular clinical use. The pyrimidine and its derivatives have a great role in biological system. Some of the important Heterocyclic compounds are used in cancer therapy. Heterocyclic structures have played great role in anti-cancer drug design. Nitrogen-based Heterocycles have importance in anti-cancer drug design. Oxygen based Heterocycles are also used in anti-cancer drug design.

### CLASSIFICATION OF HETEROCYCLIC COMPOUNDS

The Heterocyclic compounds are broadly classified into two common cases as :

1. Aromatic Heterocyclic compound.
2. Non-aromatic Heterocyclic compounds.

Let us we compare these two cases with examples as diagrammally. In below fig 1.1 show all the aromatic Heterocyclic compounds.

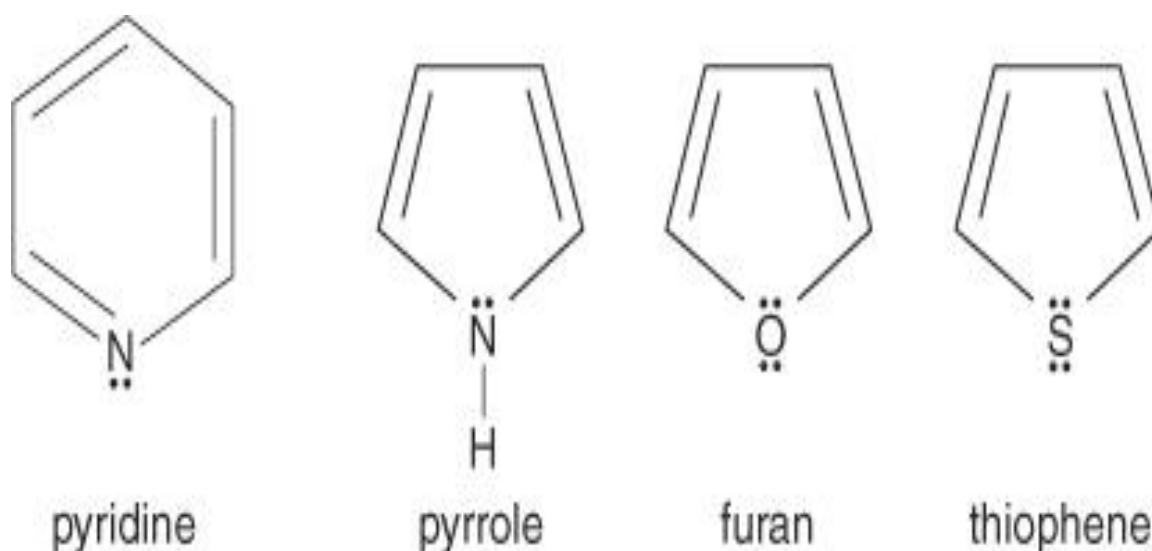


Fig.1.1 Chemical structure of aromatic Heterocyclic compounds

The non-aromatic Heterocyclic compounds are listed below fig 1.2

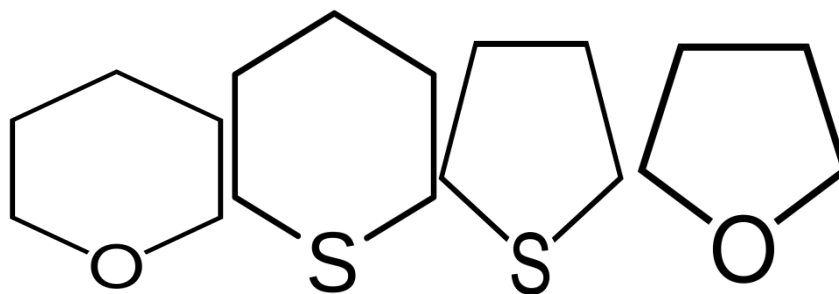


Fig.1.2 Chemical structure of aromatic Heterocyclic compounds.

The properties and application of heterocyclic compounds are different from that of homocyclic compounds. The aromatic as well as non-aromatic compounds are of great importance in biological system. The heterocyclic compounds provide the great research work in the area of organic, analytical, pharmaceutical and medicinal chemistry. There are 70% of top branded drugs have Heterocyclic structure.

## BIOLOGICAL IMPORTANCE OF VARIOUS HETEROCYCLIC COMPOUNDS

In this section we discuss the some Heterocyclic compounds used in biological system.

In broad sense, the Heterocyclic compounds are used as biological activity in following are

- (1) Heterocyclic compounds used in antimalarial.
- (2) Heterocyclic compounds used in diuretic agent.
- (3) Heterocyclic compounds used in anthelmintic.
- (4) Heterocyclic compounds used in psychotic agent.

(5) Heterocyclic compounds used in antiulcer agent.

(6) Heterocyclic compounds used in antidepressants.

### 1. Antimalarial :

Antimalarial drugs have important medicines which treat the malaria. The malaria takes place in tropical, subtropical and in mostly temperate region of worlds. Chloro quinine is one of the most main drug that are used in malaria. The chemical structure of chloroquinine is show below fig.1.3

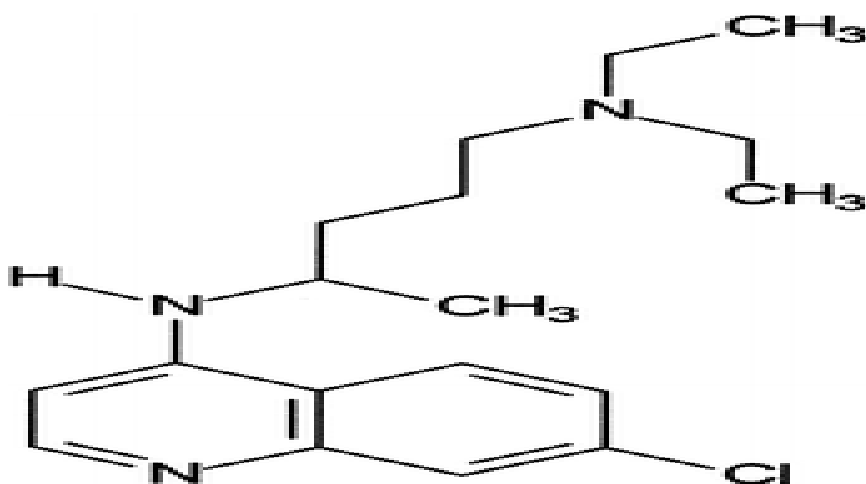


Fig 1.3 Chemical structure of Chloroquinine.

Heterocyclic ring has played an important role in the design and discovery of new malaria active compounds. There are many antimalarial drugs which are further classified based on their chemical structure e.g. 4-aminoquinolines like chloroquine, 8-aminoquinolines like primaquine, sulfonamides like sulfalene, sulfadoxine etc. Each of above classes has their own mode of activation against malaria parasite.

In human beings the symptoms of malaria with fig. 1.4 are show below.



Fig.1.4 Symptoms of malaria

Some others important heterocyclic compounds as antimalarial drug are: triazole, imidazole, benzimidazole, pyrimidine, aminoquinoline etc.

## 2. Antidepressants:

In recent researches, it is found that the depression is most serious diseases in humans being. Antidepressants have the drugs used to reduce the depression or mood disorder and some chronic pain. The Heterocyclic compound such as iodole is an aromatic compound has bicyclic structure contain six membered benzene ring fused to five membered pyrrolerings. The chemical structure of imidazole showing Heterocyclingring are show below fig. 1.5

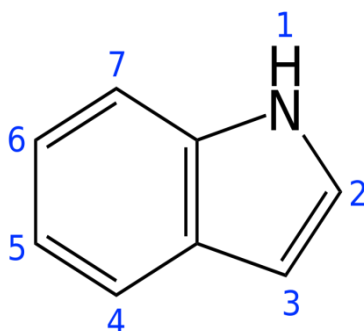


Fig.1.5 Chemical structure of imidazole

### 3. Anthelmintic:

The antiemetic drugs are antiphrostatic drugs used for treatment of infectious occurs by parasitic worms. The most common anthelmintic drugs in that class contain albendazole and mebendazole, from their name, both drugs contains imidazole ring in their structure As fig. 1.6

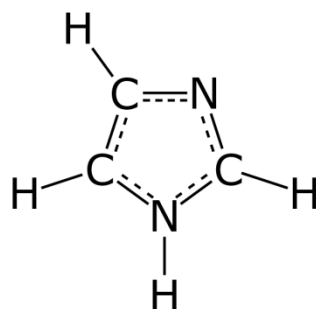


Fig.1.6 Chemical structure of imidazole

### Conclusion:

The Heterocyclic compound hasplayed a great role in the research area of medicinal chemistry. In present research paper, we conclude that various Heterocyclic compounds drugs has used for treatment of various diseases in our daily life. It has been also found that the Heterocyclic compounds play a vital role in anti-cancer therapy.

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