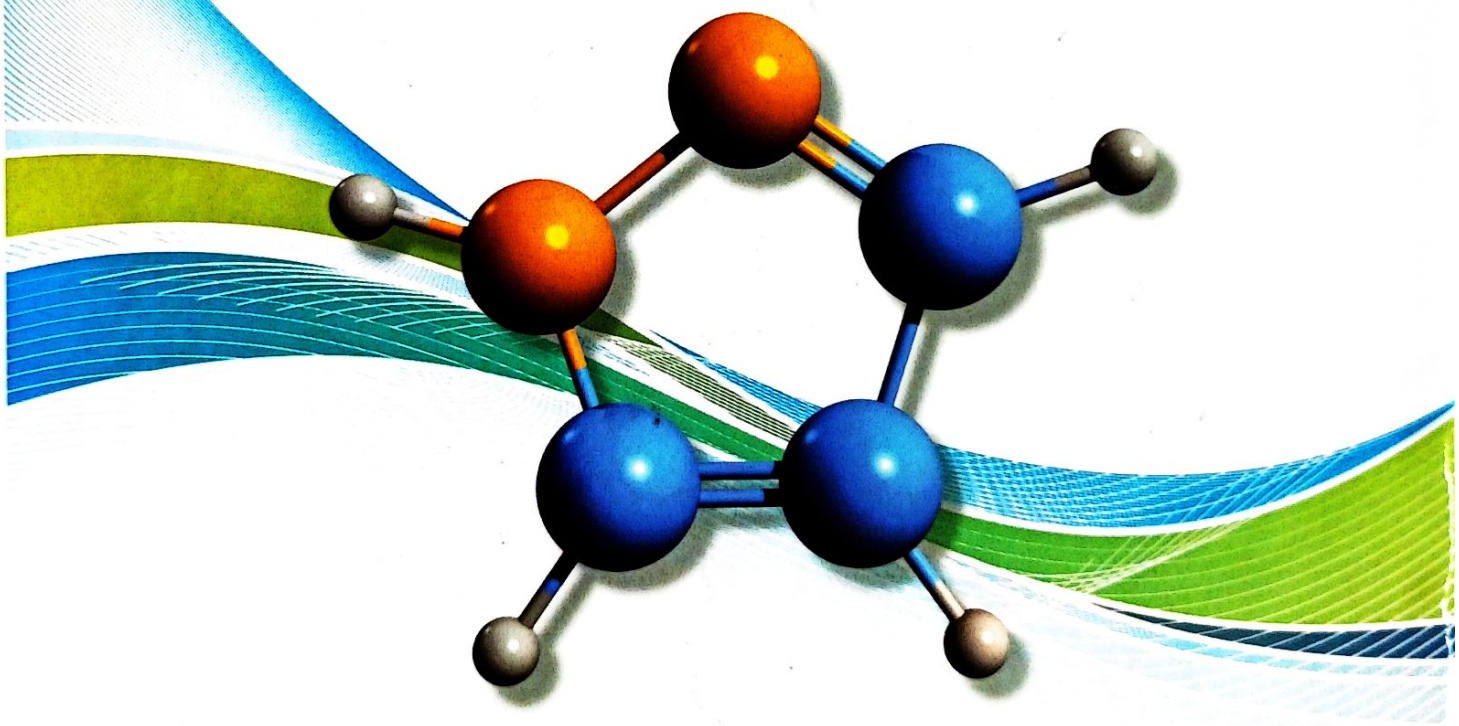
CHEMISTRY RESEARCH AND APPLICATIONS

Pyrazole

Preparation and Uses



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Chapter 1

CURRENT STATUS OF PYRAZOLO MOIETY IN DRUG DISCOVERY (SYNTHETIC VS. NATURAL)

Chandi Charan Kandar[1,*] and Dilipkumar Pal[2]

[1]Department of Pharmaceutical Chemistry, Institute of Pharmacy, Jalpaiguri, Government of West Bengal, West Bengal, India

[2]Department of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, Chhattisgarh, India

ABSTRACT

Drug discovery is an ongoing process to search the best formulation that relieves from illness using a small amount of drug molecule causing fewer hazards in the administration of drug formulation and to overcome side effects of synthetic compounds. Phytomedicine or natural medicine is the science, art, and exploration of using botanical remedies to treat illness. Herbalists believe that the body is a self-healing organism and that herbs should be used to enhance wellness, not simply relieve symptoms or treat disease. The pharmaceutical industry specialized in as well as relied on natural products aimed at optimizing the quality of herbal drugs by standardization and scientific basic research. This development was paralleled by an intensified evaluation of herbal drugs and a search for the active principles of phytopreparations. Besides this, nowadays pyrazole compounds have taken an important role in the platform of new drug discovery. Due to a lack of abundance of pyrazolo ring containing compounds in the natural system, scientists are trying to develop various synthetic compounds by addition or fusion of pyrazole ring to the existing molecule to explore and develop a new class of drug having an alteration of bioactivity as well as a potent drug. The scientists throughout the world have prepared various pyrazolo-compounds that are useful in psychiatric disorder, anxiety, depression and also as anthelmintic. The main objective of this chapter is to

*Corresponding Author's Email: cckandar@rediffmail.com.

highlight the present scenario of biologically active synthetic pyrazole derivatives and natural products containing pyrazole ring obtained from various fields and their comparison.

Keywords: drug discovery, synthetic pyrazolo compounds, natural products

INTRODUCTION

The new drug development program for the different compounds is initiated because there is a disease or clinical condition without suitable pharmacotherapeutic products available. New drug development can proceed along various pathways for different compounds. Drug invention programs result in the synthesis of compounds that are tested in assays and animal models. The drug development process involves rigorous testing and optimization of selected compounds to identify the most effective drug. This testing is done in cells (*in vitro*) and animals (*in vivo*) to study the metabolism and to produce a product that is safe and has passed all regulatory requirements.

Among the organic compounds, the heterocyclic moiety is abundant in the different pharmacological classes of drug molecules. As a consequence, the heterocyclic compound has become important as well as the unparalleled class of compounds. The plant is the source of phytoconstituents containing various heterocyclic rings. Therefore, heterocyclic compounds like as pyrrole, pyrazole, pyridine, etc. are available in nature and take part in metabolism process to produce different secondary metabolites of plants which are regarded as drugs of various kinds such as alkaloids, glycosides, tannins, vitamins, hormones, minerals, antibiotics, etc. [1, 2, 3].

Amongst naturally occurring heterocyclic compounds, most of the drugs and natural products such as narcotic analgesic, anti-psychotic, anti-depressant, anti-anxiety, CNS stimulants, cardiovascular drugs, gastrointestinal agents and antihistaminics, etc. contain heterocycles having one or more nitrogen atoms. As a result, such compounds have taken an important place in the field of natural science and widely distributed in natural products like as alkaloids, glycosides, hormones, antibiotics, and vitamins, etc. [4, 5].

The scientists are attempting to prepare a new drug molecule that contains a pyrazole ring structure in the center for a long time. It is published in different journals that pyrazole compounds have created a new opportunity in the field agrochemical industry to manufacture herbicides or pesticides, pharmaceutical industry to synthesize new drug molecules as well as chemical industry to prepare pyrazole based chemicals [6, 7].

Pyrazole or pyrazole derivatives have created immense importance in the synthetic field of medicinal chemistry. The development in the synthesis of pyrazole having compounds by chemical architects have been generated a lot of compounds which show different biological activities in various systems like as antimicrobials, against hormone-related disease, diabetes, CNS activities i.e., analgesic, antipyretic, anti-inflammatory,

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