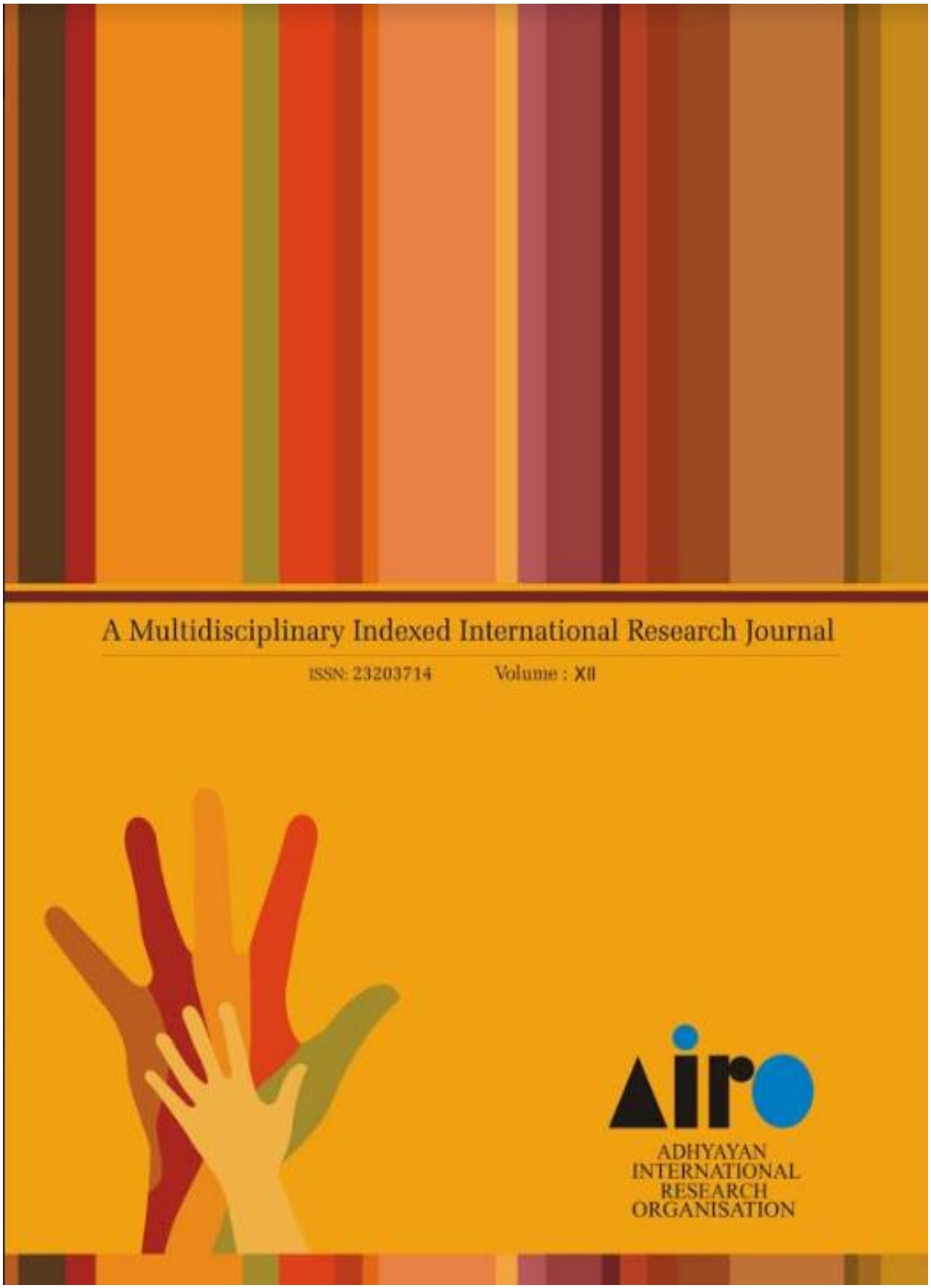
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BIOLOGICAL EVALUATION OF NOVEL THIAZOLIDINONE COMPOUNDS

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ABSTRACT

During the early stages of medicinal chemistry development, scientists were primarily concerned with the isolation of medicinal agents found in plants. Today, scientists in the field are also equally concerned with the creation of new synthetic drug compounds. Medicinal chemistry is always geared towards drug discovery and development. Medicinal chemistry provides understanding of drug mechanism of action, structure activity relationship, acid base and physicochemical properties like –adsorption, distribution, metabolism and excretion. [1, 2]

KEYWORDS: *Thiazolidinone, Compounds, Biological, Evaluation*

INTRODUCTION

Organic compounds have an enormous diversity of structures. Many of the structures contain ring systems. If a ring system is made up of atoms of carbon and one other element, the compound can be classified as heterocyclic compound. Heterocyclic compounds are the organic compounds whose molecules contain one or more rings of atoms with at least one atom (the heteroatom) being an element other than carbon. Although heterocyclic compounds may be inorganic, most contain within the ring structure at least one atom of carbon, and one or more elements such as sulphur, oxygen, or nitrogen. Heterocyclic compounds may consist of either aromatic or non-aromatic rings. Heterocyclic compounds constitute by far the largest of classical divisions of organic chemistry and are of immense importance biologically and

industrially. Majority of pharmaceuticals and agrochemicals are heterocyclic compounds. Most of heterocyclic systems are of five or six member ring structure. A variety of atoms, such as N, O, S, Se, P, Si, B, and as can be incorporated in to ring structures of heterocycles. Some common heterocyclic nuclei.

Thiazole is a heterocyclic compound having both nitrogen and sulphur atom as a part of aromatic five membered ring system. Thiazole is a clear to pale yellow liquid having boiling point of 116-118oC and molecular formula C3H3NS, sparingly soluble in water. It is soluble in alcohol and ether. The odour of thiazole is similar to pyridine Thiazole ring is of great biological importance as it is used as an intermediate to manufacture synthetic drugs, fungicides and dyes. A thiazole ring is found naturally in the essential vitamin B1 (Thiamin). Thiazole is aromatic through delocalization of a lone pair of electrons from the sulfur atom completing the needed 6 electrons to satisfy Huckel's rule. Thiazole is resistant to oxidizing agents; even hot nitric acid has little effect. It is either unaffected by reducing agents or at most some ring opening occurs it is therefore not possible to make dihydrothiazoles or thiazolidinones by catalytic dehydrogenation but they need to be prepared by means of condensation reactions. [4]

Thiazolidinone is a saturated form of thiazole with carbonyl group on fourth carbon and has been considered as a magic moiety which posses almost all types of biological activites. In thiazolidinone ring, substitutions can occur on 2, 3 and 5 positions but substitution on second position carbon atom ring exert valuable effect on structure and property of thiazolidinones. Thiazolidinone, an important ''privileged scaffold,'' is a very attractive target for combinatorial library synthesis because of their structure activity relationship and is an important class of N and S containing heterocycles, which are widely used as key building blocks in the field of drugs and pharmaceutical agents. [7] Further, the presence of the N–C–S linkage in the thiazolidinone is also responsible for nematocidal, fungicidal, antibacterial and antiviral activities In addition, the spiro[indole-thiazolidine] system.

The spiro compound is a bicyclic organic compound with rings connected through just one atom. The rings can be different in nature or identical. All the spiro compounds have infix spiro followed by square brackets containing number of atoms in the smaller

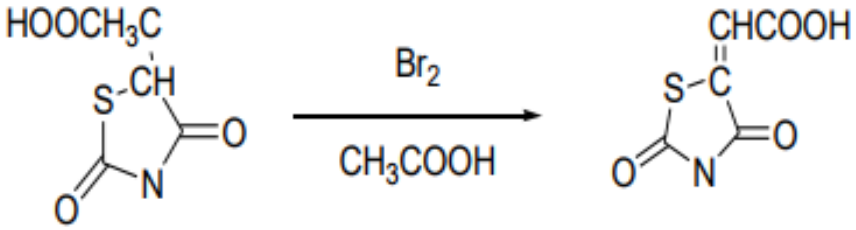
rings and number of atoms in the larger ring excluding the spiro atom itself, the number being separated by a dot. Spiro-hetreocyclics containing thiazolidine moiety have been recently shown to exhibit a wide array of interesting biological activites.

CHEMICAL REACTIONS OF THIAZOLIDINONES

Thiazolidinones show several types of chemical reactions, some important are described in the proceeding text.

a) Oxidation Reactions:

The effect of an oxidizing agent depends on the groups attached to thiazoline ring, chemical nature and also on reaction conditions. 2,4-Thiazolidinedione-5- acetic acid with bromine in acetic acid solution causes the evolution of hydrogen bromide and yields 5-carboxymethlidene-2,4-thiazolidinedione. [12]



b) Reduction Reactions:

Raney nickel is used to desulphurise thiazolidinones in the presence of dioxane. [13]

THIADIAZOLES

Thiadiazole is five membered ring system containing sulphur and nitrogen atom. It acts as a bioisoteric replacement of thiazole moiety. The numbering of monocyclic azole systems begins with the heteroatom that is in the highest group in the periodic table. Hence numbering of 1, 3, 4-thiadiazole is done in the following manner.

• Dipole movement: The dipole movement of 1,3,4-thiadiazole in the gas phase by microwave technique found a value of 3.28+-0.33D .By use of geometry, the π-electron distribution, and the bond moment a dipole moment of 3.0D can be calculated,

directed from the sulphur atom towards the centre of nitrogen-nitrogen bond.

• Structure and aromatic properties: Analysis of difference between the measured bond lengths and covalent radii, the author came to the conclusion that the aromatic character, as measured by the π-electron delocalization decreases in the order – 1, 2, 5-thiadiazole > thiophene > 1, 3, 4-thiadiazole > 1, 2, 5-oxadiazole. [17]

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