ABSTRACT OF THESIS

Many important proteinogenic and non-proteinogenic amino acids play critical non-protein roles within the body. In humans, non-protein amino acids have important roles as metabolic intermediates, such as in the biosynthesis of the neurotransmitter gamma-aminobutyric acid. Glutamic acid (glutamate) and the non-standard gamma-amino acid, gamma-amino-butryric acid (GABA) are respectively the brain's main excitatory and inhibitory neurotransmitters. Pregabalin (3-isobutyl GABA) is an important drug structurally related to the antiepileptic drug gabapentin having anti convulsant, anxiolytic and analgesic actions. Because of its pharmaceutical applications, pregabalin has been synthesized by many researchers. However it was of interest to develop new methodologies for the synthesis of pregabalin. Chapter 1 deals with the synthetic method development of pregabalin. Section 1.1 gives the general introduction and brief literature survey of pregabalin. Section 1.2 of this chapter describes the formal synthesis of (±)-pregabalin by oxidation and reduction strategy, while section 1.3 deals with the enantioselective synthesis of (S)-(+) 3aminomethyl-5-methylhexanoic acid (pregabalin).

Heterocyclic compounds are the most important class of organic compounds. Many heterocyclic compounds occur in nature and their functions are often of fundamental importance to the living systems. Nucleic acids, plant alkaloid anthocynins, flavones, haem and chlorophyll contain heterocyclic rings. Additionally certain vitamins, hormones also contain heterocyclic systems. Synthetically produced heterocycles designed by organic chemist are used in agrochemicals and pharmaceuticals. In fact most of the top selling drugs fall in the heterocyclic category. In view of the remarkable biological activity shown by the heterocyclic compounds a lot of efforts have gone in the research and development of newer heterocycles with improved activity. Of late research has been focussed on designing new molecules which contain two or more heterocyclic rings in the same molecule in order to obtain better drug molecules. The systematic investigation of such molecules based on structure activity relationship has now become the thrust area of research in heterocyclic chemistry.
Hence it was of interest to design and synthesize new heterocyclic systems with more than one heterocyclic rings and to evaluate their pharmacological activity. The results are described in chapter 2-4 of the thesis. Chapter 2 is divided into four sections; section 2.1 gives brief literature survey of thiazole containing heterocyclic compounds. Section 2.2 provides an efficient synthesis of 2,4-disubstitutedthiazole-5-carbaldehyde promoted by iodoxybenzoic acid (IBX) as mild oxidizing agent while section 2.3 describes the synthesis and antimicrobial activities of novel series of 1-((4-methyl-2-substituted thiazol-5-yl)methyleneamino)-2-substituted isothiourea derivatives. Section 2.4 provides synthesis and biological activity of (2-substituted-4-methylthiazol-5-yl)(4-substituted piperazin-1-yl)methanone derivatives.

Chapter 3 deals with the synthesis and pharmacological evaluation of thiazolidinone derivatives. The chapter is divided in three sections. Brief literature survey of thiazolidinone nucleus containing heterocyclic compounds is given in section 3.1. Section 3.2 reports the synthesis and pharmacological evaluation of a novel series of 3-aryl-2-(2-substituted-4-methylthiazole-5-yl)thiazolidin-4-one as possible anti-inflammatory and antimicrobial agents while section 3.3 describes the synthesis and antimicrobial activities of novel series of 3-(4-(2-substituted thiazol-4-yl)phenyl)-2-(4-methyl-2-substituted thiazol-5-yl)thiazolidin-4-one derivatives.

Chapter 4 describes the synthesis and biological screening of thiazole substituted oxadiazole derivatives. This chapter is divided in four sections. Section 4.1 describes brief literature survey of oxadiazole containing heterocyclic compounds. Section 4.2 provides synthesis and antifungal evaluation of a novel series of 2-((2-substituted thiazol-4-yl)methyl)-5-(substituted thio)-1,3,4-oxadiazole derivatives while section 4.3 describes synthesis and antimicrobial activity of N'-benzylidene-2-(2-phenylthiazol-4-yl)acetohydrazide and 2-aryl-5-((2-substituted thiazol-4-yl)methyl)-1,3,4-oxadiazole. Section 4.4 reports synthesis and antifungal activities of 2-(2-aryl thiazol-4-yl)-N'-(4-methyl-2-substituted thiazol-5-yl)methylene)aceto-hydrazide and 2-((2-aryl thiazol-4-yl)methyl)-5-(4-methyl-2-substituted thiazol-5-yl)-1,3,4-oxadiazole derivatives.