Synthesis and Pharmacological Activity of Bicyclic Heterocycles

INTRODUCTION

Heterocyclic compounds are those cyclic compounds whose ring contain besides, carbon, one or more atoms of other elements. The non-carbon atoms such rings are referred to as hetero atoms. The hetero atoms are nitrogen, sulphur and oxygen. The heterocyclic compounds having three to six carbons in the ring are numerous, but only those having five or six atoms in the ring are by far the most important. Several of the important compounds contain heterocyclic rings, e.g. most of the members of vitamin B complex, alkaloids, antibiotics, chlorophyll, other plants pigments, amino acids, dyes, drugs, enzymes, the genetic material, DNA etc. Heterocyclic compounds are very widely distributed in nature and are particularly important because of the wide variety of physiological activities associated with this class of substances.

Coumarin derivatives are important source of heterocyclic compounds of pharmacological interest, as they shown a wide spectrum of biological activity viz antibacterial, antifungal, herbicidal and antitumour activities. Furthermore it has been reported by different scientists that coumarin derivatives incorporating thiazole, azetidinone and oxazole ring were also found to possess interesting antibacterial and antifungal activities. In the light of these observation several new coumarin derivatives fused with different heterocycles. will be synthesized with the hope to possess better antibacterial and haematostatics agents.

Coumarin is a phytochemical (benzopyrone); a toxin found in many plants, notably in high concentration in the tonka bean, vanilla grass, woodruff, mullein, lavender, licorice, strawberries, apricots, cherries, cinnamon, sweet clover and bison grass having vanilla like flavor and is a
oxygen heterocycle. Coumarin can occur either free or combined with the sugar glucose (coumarin glycoside). It has a sweet scent, readily recognized as the scent of newly-mown hay, and has been used in perfumes since 1882. Coumarins are naturally occurring polyphenolics distributed widely in plants, fungi, and bacteria and have found applications for centuries in traditional medicine. Synthesis of coumarins and their derivatives has attracted considerable attention from organic and medicinal chemists for many years as a large number of natural products contain this heterocyclic nucleus. Coumarins constitute an important class of compounds with several types of pharmacological agents possessing anticancer, anti-HIV, anticoagulant, spasmolytic and antibacterial activity among others. Of the many actions of coumarins, antioxidant and antiproliferative effects standout. A large number of structurally novel coumarin derivatives had shown substantial cytotoxic activity in vitro and in vivo. Moreover, the inhibitory action on inflammatory cells appeared to surpass any other clinically available compounds.