Abstract

Heterocyclic compounds are widely distributed in nature and they play a vital role in the metabolism of all living cells. Among them, furanoids and triazoles represent one of the most privileged classes of naturally occurring versatile building blocks in synthetic organic chemistry due to their wealth of unique functional, conformational, and stereochemical information. These compounds possess a distinct place in the field of medicinal and pharmaceutical chemistry with diverse biological activities and plays pivotal roles in organic transformation. Numerous synthetic methods have been developed to access the heterocyclic core. However, development of general and efficient methods from readily available starting material remains an emerging research area. On the other hand, axially chiral compounds are widespread in biologically active or medicinally important compounds and being used as a chiral ligands or organocatalysts in asymmetric catalysis. With respect to other alkenes, styrene are one of the most abundant and important building block for chemical synthesis and their enantiomers exist due to the restricted rotation around a single bond between a substituted alkene and an aromatic ring. Therefore, the establishment of new approaches towards the atroposelective synthesis of styrenes is an important task in organic chemistry. This thesis mainly described the design and development of new strategies towards the synthesis of furotropones, benzofurans, triazole and axially chiral styrenes. In this regard, chapter 1 and 2 will highlight the utilization of readily available starting material 3-furancarboxaldehyde towards the synthesis of furotropones and benzofuran. Chapter 1 elaborates the efficient diversity oriented approach towards the synthesis of functionalized furotropone via mild base mediated cyclisation followed by oxidative aerobic aromatization and further identified as an unique chromophores, have potential to be selective sensor probe for the detection of Fe 3+ ion. While, chapter 2 explains the NHC catalyzed efficient approach for the synthesis of highly functionalized dihydrobenzofuranones and their synthetic utility towards the synthesis of functionalized benzofuran. Chapter 3 describes development of efficient organocatalytic radical β-azidation reaction of enone via electron acceptor-donor-complex with Zhdankin reagent. Subsequently, a series of one-step elaboration of the azides have been demonstrated to access tricyclic triazoles and 1,4-disubstituted triazoles. Chapter 4 describes effort taken towards the efficient synthesis of axially chiral styrenes via Suzuki-Miyaura cross coupling reaction.