INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student	:	VANAPARTHI SATHEESH
Roll Number	:	136122023
Programme of Study	:	Ph.D.

Thesis Title: **"Synthesis of Nitrogen, Oxygen, Sulfur and Selenium Containing Five-Membered Heterocycles"**

Name of Thesis Supervisor(s)	:	Prof. T. PUNNIYAMURTHY
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SHORT ABSTRACT

Five-membered heterocyclic motifs having O, N, S and Se atoms are previlaged structural scaffolds due to their interesting biological and medicinal properties. The development of simple and efficient synthetic methods for their construction is thus important in synthetic chemistry. The thesis has six chapters. The first chapter describes the synthesis of oxazolidines *via* an intramolecular C(sp^3)-H alkoxylation of *N*-methyl amino alcohol. In the second chapter, the synthesis of substituted imidazolidines is presented *via* an intramolecular C(sp^3)-H alkylamination of *N*-methyl 1,2-diamines. The third chapter focuses on domino ring opening and oxidative cyclization of styrene oxides with *N*-methylanilines. In the fourth chapter, Al(salen)Cl-catalyzed cycloaddition of optically active aziridines with isoselenocyanates is discussed. The fifth chapter deals with $BF_2OTf{\cdot}Et_2O$-catalyzed cycloaddition of thiirane with isothiocyanates, isoselenocyanates and carbodiimides. The sixth chapter is focused on the Pd-catalyzed *ortho*-alkylation of amides with epoxides.