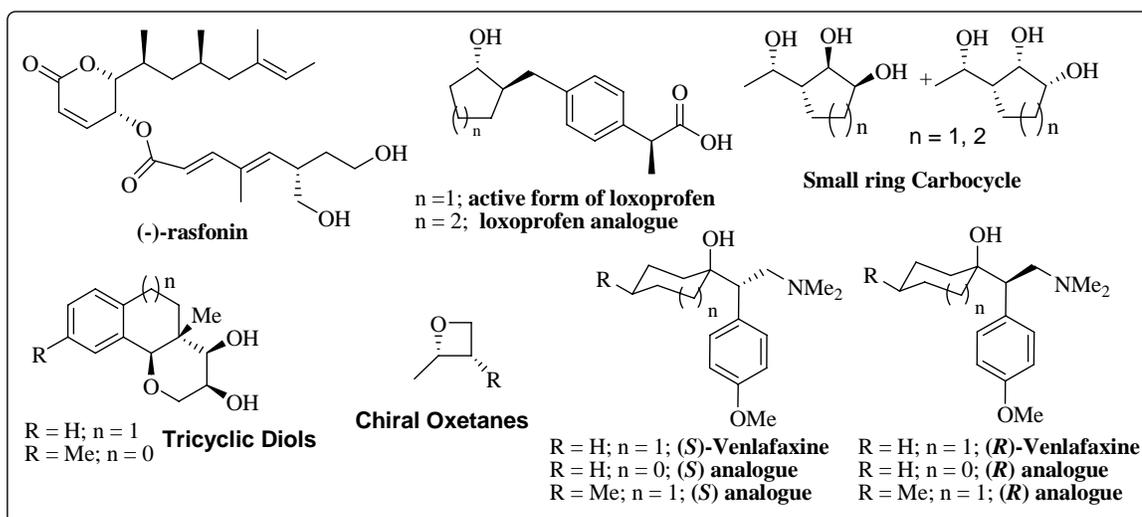


## ABSTRACT

### Thesis Title: Asymmetric Synthesis of Rasfonin, Loxoprofen, Venlafaxine and Small Ring Carbocycles and Heterocycles

**Abstract:** In the first part (Part A) of my thesis I have described an asymmetric total synthesis of (-)-rasfonin, a new apoptosis inducer in *ras* dependent Ba/F3-V12 cells, by chemoenzymatic approach. In the next part (Part B) asymmetric synthesis of two drug molecules Loxoprofen (a NSAID agent) and Venlafaxine (well known antidepressant agent generally known as SNRIs) have been elucidated. Stereoselective synthesis of novel tricyclic diols based on 1-tetralone, 1-indanone scaffolds have been presented in Part C by employing Lipase PS (*Burkholderia cepacia*) catalyzed kinetic resolution stereo selective ketoreduction by microbial ketoreductase enzymes and further synthetic manipulation. In the Part D, I have explored the synthetic potential of fungal ketoreductase from *Klebsiella pneumoniae* for the synthesis of small ring carbocycles and heterocycles in enantiopure fashion.



**Key Words:** Asymmetric Synthesis, Enantioselective enzymatic desymmetrization (EED), oxidative kinetic resolution (OKR), Yamaguchi esterification, Achmatowicz reaction, Negishi cross coupling reaction, enzymatic kinetic resolution (EKR), enzymatic transcyanation reaction, asymmetric alkylation, *Klebsiella pneumoniae*.