Abstract

Polycyclic aromatic hydrocarbons (PAHs) generally emitted from incomplete combustion of fossil fuels, cigarette smokes, industrial effluents are important class of organic compounds due to their interesting structural and electronic properties. The PAHs along with their derivatives and heterocyclic analogues (containing O, N, S atoms) are collectively known as polycyclic aromatic compounds (PACs). PAHs get metabolized by cytochrome P_{450} to *trans*-dihydrodiols and *trans*-diolepoxides, which are the potent carcinogenic moieties compared to their parent polyarenes. These diolepoxides get bind to nucleic acids, DNA, RNA and proteins which causes abnormal cell growth.

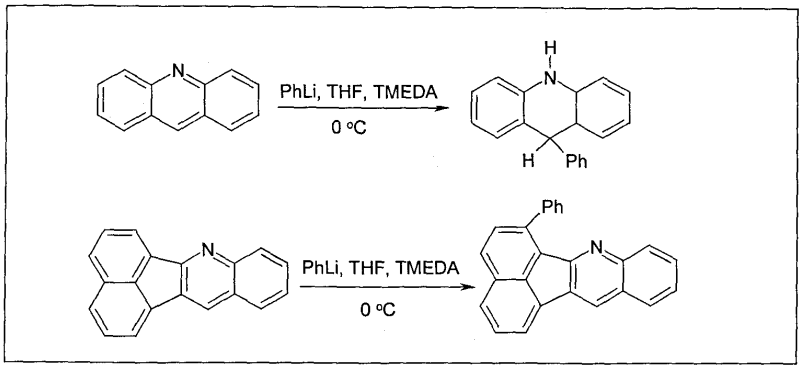
Alkylation or arylation from structural point of view improves the solubilities of acridine derivatives in common organic solvents, thus increasing their potential use as substrates in molecular recognition. Investigations in this dissertation entitled " Synthetic Studies towards polycyclic aza arenes and indoloquinoline alkaloids" are primarily an effort towards the development of new synthetic strategies for the phenylation of acridine derivatives.

We have also developed a concise total synthesis of aza dihydrodiols from suitable polycyclic aza arenes and some indoloquinoline alkaloids via triethyl phosphite mediated deoxygenation of suitably substituted nitro group.

The deliberation are presented in three major chapters:

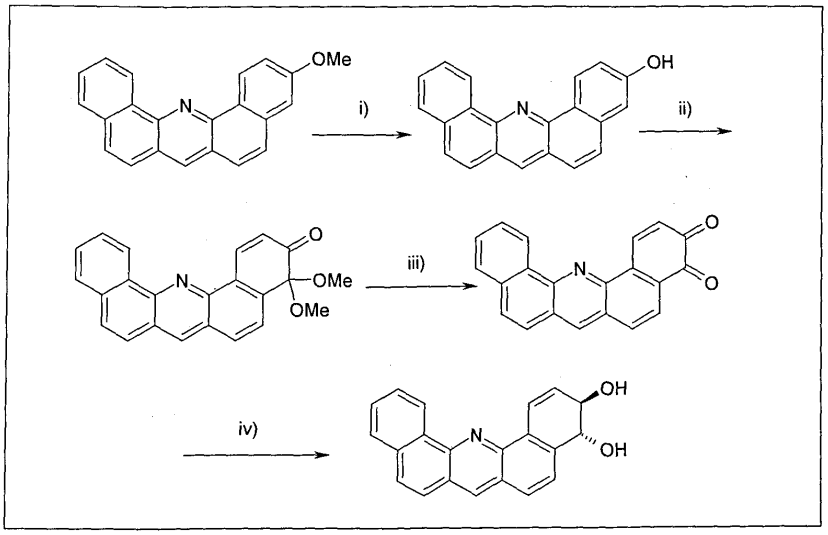
Chapter 1. Direct regioselective phenylation of acridine derivatives by Phenyllithium

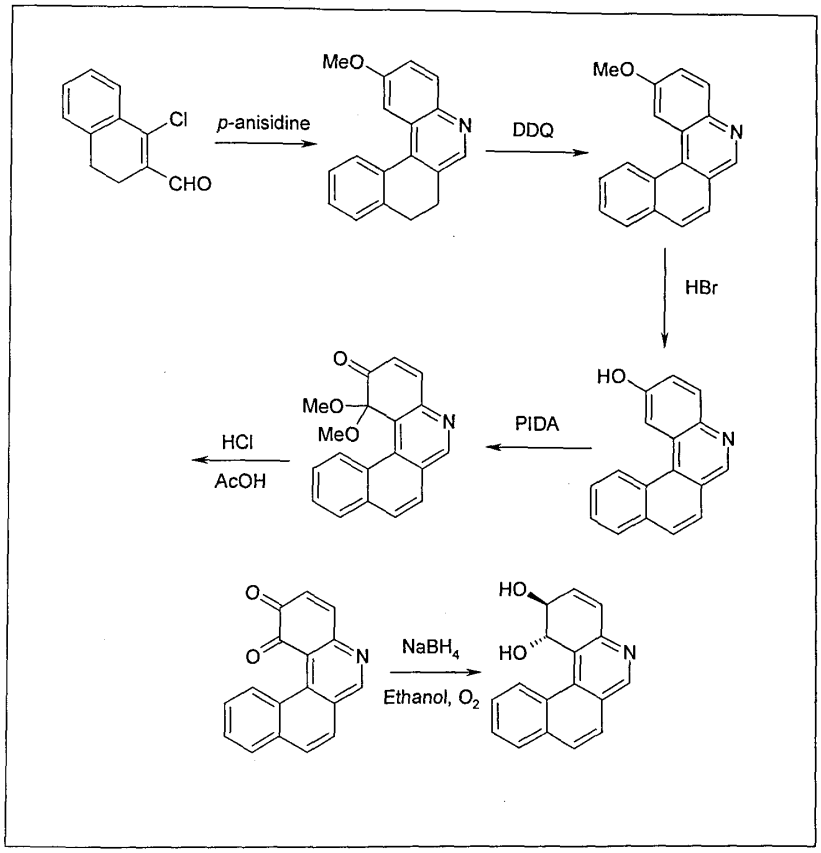
This chapter describes the synthesis of phenylated acridine derivatives via the direct phenylation protocol.



Chapter 2: Total Synthesis of oxidative metabolites of dibenz[c,h]acridine and 1,2 benzo [k]phenanthridine

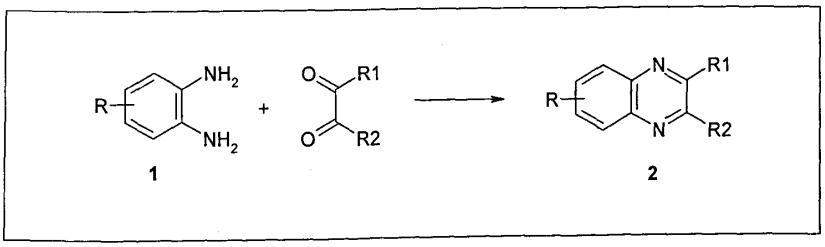
This chapter describes a formal synthesis *trans*-3,4-dihydroxy-3,4-dihydrodibenz [*c,h*]acridine and *trans*-1,2-dihydroxy-1,2-dihydrobenzo[*k*]phenanthridine.





Chapter 3A: Uncatalyzed condensation between aryl-1,2-diamines and diethylbromomalonate in neat at room temperature: A one-pot access to substituted ethyl-(3-hydroxy-quinoxaline)-2-carboxylates.

This chapter describes the synthetic route for the synthesis of quinoxaline derivatives.



Chapter 3B: Thermal cyclization of 3-arylamino-3-(2–nitrophenyl)-propenal Schiff base hydrochlorides followed by triethyl phosphite mediated deoxygenation: a facile synthesis of quindolines.

The chapter describes the synthetic approach to the synthesis of various 2-substituted cryptolepine.