PREFACE
This thesis is a compilation of the work done under the project titled "Biogenetic studies on a medicinal plant and effect of chloramphenicol and mutagens on secondary metabolites".

The first chapter comprises an introduction of *Datura innoxia* and *Adhatoda vasica*, the two plants undertaken for the study. An introduction of chloramphenicol, N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) and ethyl methanesulfonate (EMS) are also given in this chapter.

The second chapter comprises of the literature available on *Datura innoxia* and *Adhatoda vasica*. It covers the traditional uses of these plants, pharmacologically active constituents, their biosynthesis, the methods developed for the analysis of these compounds and their pharmacological activity. In this chapter the literature available on the effect of chloramphenicol, MNNG and EMS is also reviewed in detail.

The third chapter gives an overview of the plan followed to study the problem at hand.

The fourth chapter covers the materials and methods used in the experimental work. It includes the cultivation
of the plants, treatment of plants with different compounds, collection of plant material and analysis of active principles. It also includes the analysis of labeled compounds isolated after feeding L-phenylalanine-\(^{14}\)C(U).

Chapter five includes the results obtained and their discussion. The seasonal variation of tropane alkaloids of *D.innoxia* grown in monsoon and summer seasons is discussed which includes the variation in total alkaloids, hyoscyamine and scopolamine in roots, leaves, stems and fruits of *Datura innoxia*. Effect of chloramphenicol on the alkaloids of *D.innoxia* and *A.vasica* and the effect of chloramphenicol on the morphological parameters of summer crop of *D.innoxia* are also discussed. Attempt has been made to study the mechanism of action of chloramphenicol in increasing the alkaloidal content by feeding L-phenylalanine-\(^{14}\)C(U). Through the feeding experiment we are able to throw some light on the biogenesis of scopolamine in *D.innoxia*. The seasonal variation in the total alkaloids of leaves of *A.vasica* over a period of two years is detailed in this chapter. Effect of two concentrations each of the mutagen, MNNG and EMS on total quinazoline alkaloids during a period of two years and also
their continued effect in the $M_2$ generation of vasaka, raised by vegetative propagation, is discussed.

In chapter six, the results are summarized. The chloramphenicol treatment improved the alkaloid yield of both *D. innoxia* and *A. vasica*. The feeding experiments with precursor provided an insight into the mechanism of action of chloramphenicol. Chloramphenicol is expected to inhibit the protein synthesis, thereby providing more amino acids for the synthesis of alkaloids. Feeding experiments also suggested the possibility of occurrence of an alternate pathway for the biosynthesis of scopolamine. The treatment with MNNG and EMS proved beneficial as far as the alkaloid content is concerned and they did not have any lethal effect on the plants at the concentrations used in the experiment.

Chapter seven consists of the list of references cited at various places in this dissertation.