The use of many chemotherapy and other drugs is often accompanied by a great deal of adverse side effects. Increased exposure to industrial effluents, environmental pollutants and other chemicals also pose a threat to human health, as many of these chemicals are genotoxic and cause clastogenic and mutagenic changes in the genome, which can result in carcinogenesis. This imposes a great necessity to search for natural compounds with therapeutic potential as well as chemopreventive abilities to diminish the adverse effects of synthetic drugs or environmental pollutants. Natural compounds can be employed as adjuvants in therapeutic strategies or may be included as dietary supplements to strengthen the innate defense mechanisms, to counter the genotoxins. A great number of plants and their active constituents exhibit medicinal properties. Natural compounds, especially those which have been in use in ethno-pharmacological systems since a long time, are generally assumed to be safe. But it is vital to validate the safety of these substances in terms of genotoxic and clastogenic effects.

This doctoral thesis is written on the genotoxic and antigenotoxic properties of two plant active constituents Apocynin and Diosgenin. These two compounds have displayed valuable therapeutic potential in different experimental models, in addition to being used in traditional medicinal systems like Ayurveda. But the information regarding the genotoxic/antigenotoxic nature of these two compounds was scarce. Hence, they were chosen for this doctoral research work.

The thesis is presented in six chapters. The chapter-1 is an introduction to various concepts involved in the study, like the effects of genotoxicity, the need to overcome such effects, importance of plant based and other natural substances in biochemical processes and the methodology that can be adopted to evaluate these substances.

Chapter-2 comprises of the review of literature with respect to the mechanisms underlying the genotoxic effects of substances, available experimental methods to
assess genotoxic end points, pharmacological potential of natural substances and the underlying molecular mechanisms.

Chapter-3 is a description of all the materials used in the present study and the experimental procedures. The results of all the experimental studies carried out are compiled into chapter-4.

In chapter-5, a detailed discussion of the antigenotoxic and anticytotoxic effects displayed by apocynin and diosgenin is done. The different mechanisms that have been proposed for such effects of other natural compounds are mentioned since they would form a basis for understanding the protective effects displayed by the compounds of interest in the current study.

The complete study has been summarized and future perspectives laid out, in chapter-6. This is followed by a list of references that have been reviewed for the present study and list of publications and paper presentations.