Preface

Refinery waste water (RWW) pollution has been one of the key environmental problems faced by the global communities for the last few years. Although, sensitive monitoring regimes employing the analytical techniques like HPLC and GC have been developed, there is a growing demand for studying the harmful effect of RWW pollution on this planet. Such studies are expected to provide an insight as to what is happening in the biosphere at the gross biochemical level in the midst of such environmental onslaughts. Thus biomarker utilization in monitoring programmes is increasingly gaining popularity. Contrary to chemical analysis of contaminants, biomarkers can offer more and biologically relevant information on the potential impact of toxic pollutants on the health of organisms. They can be used as early warning signals for the general as well as particular stress.

PAH, heavy metals and phenols are the major water pollutants of refinery waste water. This study was conducted with an aim to develop simple and cost effective biomarkers of toxicity for Mathura refinery waste water (MRWW) in view of its contamination in water bodies. For this purpose, some toxicity testing systems of both the animal and plant origins as well as various genotoxicity tests were employed.

In the first chapter of the thesis, a comprehensive overview has been presented on the available literature related with the pollution, toxicity and biomarkers of MRWW.

Second chapter describes the general materials and common methods like moderate exposure of *Allium cepa* to MRWW, preparation of onion microsomal homogenate and inhibitor studies.

The use of enzymatic antioxidants as the potential biomarkers of MRWW in *Allium cepa* bulbs is the matter of discussion in the third chapter.

Fourth chapter incorporates the data on the role of non-enzymatic antioxidants in MRWW exposed *Allium cepa* bulbs.
The study on certain isozymes of CYP450 of *Allium cepa* for the selection of toxicity biomarkers in the test system has been embodied in the fifth chapter.

Sixth chapter of this thesis deals with the assessment of cytotoxic and genotoxic potential of refinery waste water using plant and animal systems.

Seventh chapter has been devoted for the *in vitro* genotoxicity testings of the test water sample employing comet assay, S1 nuclease assay, plasmid nicking assay and absorption spectral study.

The last chapter is dedicated for general discussion. The bibliography and summary are presented in the end.