Water is one of the most important components of our environmental resources. Water is essential for the survival of any form of life. All biochemical reactions take place in water medium. In addition water is required for various domestic purposes, irrigation, shipping sanitation, power generation and industries. With exploding population resulting in urbanization, industrialization and agriculture etc., the demands for water supply have been increasing constantly. The presence of any pollutant in the environment influences the abiotic and biotic components of an ecosystem by changing the functions of normal life systems.

Water pollution is a phenomenon that is characterized by the deterioration of the quality of water as a result of various human activities. Man has polluted much of quantity of water with sewage industrial wastes and wide array of synthetic chemicals. The poor quality of drinking water in our country is more due to contamination than due to the natural inferiority of source.

Due to the discharge of huge quantities of sewage industrial and agricultural effluents containing large amounts of toxic
chemicals, pesticides and other agricultural chemicals, the water is being continuously polluted all over the world, adversely affecting the ecological balance, leading to unwanted mortality of the aquatic biota in general and fishes in particular. In fact for centuries, rivers and lakes have been used as dumping grounds for human sewage and industrial wastes of every conceivable kind, many of them have been highly toxic. Added to this have been the materials leached and transported from land by water percolating through the soil and running on its surface to aquatic ecosystems. In the area of urbanization and industrialization the problem of water pollution is emerging very fast.

Release of industrial effluents into water bodies is one of the major sources of water pollution in India. The treatment of industrial wastewater before discharging it into the main stream is extremely necessary. Many types of methods and devices are being used for this purpose. Chemical treatment of effluent by coagulants/flocculants is one of them and the most popular one.

My aim is to show feasibility of using natural polymers such as plant polysaccharides and their modified forms as
flocculants for the treatment of various types of industrial wastewater. I hope this study would add a new dimension in the field of effluent treatment in an eco-friendly way.

The thesis entitled "Biodegradable flocculant based on natural polysaccharides: Materials and Applications" contains the work done on some food grade natural polysaccharides like mucilage of Plantago *psyllium* husk and Fenugreek seeds and their vinyl monomers grafted copolymers as flocculants. The contents of the thesis have been divided into six chapters.

Chapter 1, the **Introduction**, defines the general introduction of the subject and need for this study. It includes the description of various types of effluents and their treatments, the coagulants, the polymeric flocculants and the role of natural food grade polysaccharides for this purpose.

Chapter II reports a comprehensive **Literature Review** containing 127 references on historical background of water treatment, devices used, role of polymeric flocculants and the work done by our research group and other workers.
Chapter III, **Materials and Methods**, has been divided into two parts: (i) Materials and (ii) Methods. First part includes selection of natural polysaccharides, and a description of other chemicals used for extraction, purification and chemical modification of the selected polysaccharides. It also includes a description of the instruments used Viz. fourier transform infra-red, ultraviolet visible, scanning electron microscopy, x-ray diffraction, differential scanning calorimetry, pH meter, conductivity meter, turbidity meter, flocculator and AAS etc. for the characterization of the graft copolymers prepared and the evaluation of flocculating/adsorbing efficiency of these polymers. Second part incorporates a description of the detailed methods used for extraction and purification of natural polysaccharides, preparation of graft copolymers, characterization of real industrial wastewater samples, preparation of synthetic effluent samples and the evaluation of the flocculating/adsorbing efficiency of these polymers.

Chapter IV, **Results and Discussion**, gives details of the result obtained and a discussion based on them. This is divided into two parts. First parts deals with the synthesis of
graft copolymers of natural polysaccharides and the second part describes the evaluation of flocculating/adsorbing efficiency of natural polysaccharides and that of their graft copolymers. This chapter incorporates a section wise compilation of the results and discussion based on them.

Chapter V, **Conclusion** includes the conclusions drawn on the prominent observations and results of the study.

Chapter VI reports the **References** cited in the thesis on the subject of synthesis of graft copolymers and the flocculation/adsorbing efficiency of the synthetic, natural and modified natural polymers.

In the end of the thesis, the observations in the form of tabular presentation are included as appendices. A list of papers published and communicated for publications is also included.

In spite of all care and caution, some errors might have crept in for that the author is apologetic.