

PREFACE



The Biological productivity and diversity of aquatic and terrestrial environment seems to be high threatened due to disposal of alarming large quantity of industrial effluent from various industrial process, having lower DO and higher BOD, COD, alkalinity, acidity and heavy metal contents. A wide varieties of both, inorganic and organic pollutants are present in effluent from breweries, tanneries, distilleries, sugar factories, printing, dyeing textiles, paper and pulp mill, steel industries, mining operation and plant based on chemical technology, radio nucleoides, thermal power plant etc. The pollutants include oils greases, metallic wastes, suspended solids phenols, toxins, acids, salt, dyes, cyanides, DDT etc., many of which are not readily susceptible to degradation and thus cause serious pollution problem.

Effluents are generally discharges or diverted in water bodies like lakes, river, ocean and in fields etc. Its disposal has become a global problem, as it causes pollution of inland waters, particularly rivers. It is creating problem for beauty of cities as well as for sanitary conditions. Disposal of industrial effluent poses a serious threat to soil and water ecosystem, especially with regard to causing several water borne plant and animal diseases.

Like developed countries, the problem of pollution of air, water and soil has created alarming situation in developing countries including India. The carpet belt of eastern Uttar Pradesh comprises of part of Varanasi, Ravidash Nagar Bhadohi, Mirzapur, Allahabad and Jaunpur district spreading to nearly 4000 square kilometers, are no exception and a large area of cultivated land in the region is likely to be polluted by effluent coming from the dyeing factories. Land application of effluent water in agricultural fields has a lot of implication in agro-ecosystems. The physico-chemical properties of soil is altered considerably influencing the qualitative and quantitative characteristics of general soil microflora, including the pathogenic forms. Consequently the pathogenesis, incidence and severity of soil borne diseases could be considerably affected and depend upon the nature of effluent water used in the field.

It was therefore thought to study the effect of irrigation of effluent released from carpet dyeing factory Khamaria, district Ravidas Nagar Bhadohi, into nearly agricultural fields, on the qualitative and quantitative nature of microflora of soil samples collected from effluent irrigated as well as tube-well irrigated control fields (for comparison) in relation to development of a soil borne disease namely wilt of tomato caused by *Fusarium oxysporum* f. sp. *lycopersici*.

Various detailed aspects studied includes the physico-chemical properties of the effluent, tube well water and soil samples at seasonal interval; isolation and study of qualitative and quantitative nature of fungi but only quantitative nature of bacteria and actinomycetes at monthly intervals; survey of percent incidence of wilting; population dynamics of the pathogen in the selected fields; colony interactions between the test pathogen and some dominant microflora; effect of volatile and nonvolatile metabolites on growth of the pathogen; effect of pesticides on radial growth of the pathogen; effect of effluent on radial growth of the pathogen and on dominant microflora; and effect of some heavy metals on growth of the pathogen and other microflora. The data obtained have been analysed statistically.

The thesis covers six chapters, chapter – I contain introduction, II materials and methods, III observations, IV results, V discussion and VI includes the summary. The references cited in the text are listed after summary. The tables of statistical analysis are appended in the end.