INTRODUCTION
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Eversince the appearance of man on the earth, man is dependent on nature for his existence, and nature is so kind to him that it fulfills all his requirements. But his advancement in technology which ultimately has lead to a giant leap in industrialization and the concomitant urbanization followed resulted into the unlimited exploitation of every bit of natural resources. It seems that man has forgotten the fact that "The splendid plentifullness of nature is heritage, that should be conserved for future generations and not to be spoiled". The splendid natural resources like air and water, which are once considered unlimited will no longer be so, and a mouthful of breathable air or drinkable water will soon become a luxury.
Rapid industrialization, uncontrolled urbanization, unlimited use of fossil fuel, indiscriminate use of pesticides have resulted in the impairment of the ecosystem and thereby threaten its integrity. Well known examples of threat include global effects, such as greenhouse gases and its consequent global warming, regional effects, such as acid rain, non-point source runoff from agricultural and other activities and the point source discharges from industries and sewage. Practically every component of the environment namely hydrosphere, lithosphere, and biosphere, have been affected. The delicate ecological balance between the living and non-living components of the biosphere has been disturbed and the unfavourable condition thus created by man has threatened the survival not only of other living organisms but also of man himself. The number of species likely to become rare, threatened, endangered or near extinction in the Red Data Book of I.U.C.N. is increasing with time.

Since the dawn of civilization many water bodies have been used for disposal of sewage and other wastes. They can assimilate wastes to a certain degree and restore its quality before becoming polluted. However, with increased human interference, its self purification power is diminished, leading to water pollution, a problem of great biological, technological and sociological complexity.
Industries are the main culprits behind the present state of water pollution problem. In India industrial production has increased many folds during the last two decades. Mahajan (1985) has summarised the mode of waste disposal in India, showing the major industries disposing their waste in rivers or sewers. The majority of wastes are generated through tanneries, textiles, sugar mills, pulp and paper industries, dairies, industries producing antibiotics, synthetic drugs, organic chemicals, oil refineries, petrochemicals, nitrogenous and phosphate fertilizers, steel mills etc. The toxic chemicals, discharged from these industries mainly contains cyanides, heavy metals, ammonia, phenols, pesticides, acids and alkalies.

The study of river ecology has gained immense importance because of the multiple use of river water. Further, the role of river water in maintaining a healthy as well as prosperous nation is amply understood from the very existence of civilization. The river water is primarily used to meet the day to day requirements of human settlement, for production of hydral and most important of all agricultural and industrial needs. For people of India rivers are not mere means of irrigation, transport, recreation, power generation or treasure house of natural resources, but something divine and holy. They sentimentally attached to rivers and they do worship them.
Gross pollution of water is clearly an immediate hazard to aquatic environment. The micro and macrocommunities in a natural water body is in definite order, and they play an important role in keeping the water clean and acceptable for various purposes. The life of the aquatic organisms depends directly on physical and chemical characteristics of the aquatic environment. The physical characters such as temperature, colour etc. and the chemical characters such as pH, dissolved oxygen and various nutrients have direct influence on the survival of organisms in aquatic ecosystem. The alterations caused by anthropogenic activities, like input of toxic substances, increased suspended solids, oxygen depletion etc. will have serious effect on aquatic life. The changes in the chemical composition of water may lead to drastic changes in the structure of biota; some of which exploit the increased nutrients, while others may diminish. Such changes in the biota, form the basis of water quality assessments and various mode of pollution monitoring programs using biota as
intermittent. Further, no chemical analysis system can detect all the trace organic pollutants, and moreover biological data may sometime give conflicting results with chemical data. Therefore an assessment program using both the chemical and biological methods will give more reliable results than a chemical or biological method alone.

In aquatic toxicology the term bioassay and toxicity testing are often used synonymous and refers to the laboratory testing of a waste or toxic chemical using standard test organisms. The data generated from aquatic toxicology studies helps in regulating waste water discharges, to receiving waters and thereby reduce many ecological problems.

Bioassays were first introduced in the late 1940s and early 1950s, but it did not get wide acceptance till 1970s the peak time of lake eutrophication. Algae being the primary producers in the aquatic food chain, and considered more sensitive to many contaminants than fish or invertebrates (Sloff et al., 1983; Baylock et al., 1985; Miller et al., 1985) algal assays are now an indespensible part of water pollution monitoring test batteries. Unlike fish and invertebrate assays, which are routinely employed in acute lethality tests, algal assays measure, chronic effects of contaminants over a span of several algal generations. Algal assays can be used for two main purposes, to
detect toxicity or to predict the likely effects of the water on the development of algal populations.

Among aquatic organisms both phytoplankton and zooplankton play a major role in the biogeochemical cycles. The study of the effects of toxicants with zooplankton can be very useful, as the data obtained from these tests can be considered to represent the response of a natural population. Although limited in predictive capability and realism they can be of great use as a component of assessment strategy. Lalande and Pinel-Alloul (1986) strongly argues on this view. Reeve et al. (1976) strongly supported the usefulness of conventional short term LC-50 laboratory experiments with zooplankton in screening hundreds of potentiality toxic substances.

Discharge of industrial effluents and other hazardous waste into the rivers is a common practice. Since the river water is used for irrigation, the toxicity of these waters to the crop plants should be studied. Seed germination and early seedling survival and growth tests are highly useful in assessing the effluent phytotoxicity.

Toxicity testing through fish bioassay is a simple basic laboratory tool for detection, evaluation, and abatement of water pollution. Fish have been a popular and useful test organisms in aquatic toxicological studies, with the logic that if fish life is
protected the rest of the aquatic food chain will also be protected as well. The commercial importance of fish industry is also a factor that goes in favour of this choice.

A multispecies toxicity testing covering the various components of the ecosystem is very important since stability of ecosystem rests upon the healthy existence of its various components. An alteration in any one component may lead to a change in the other and this process may ultimately lead to the destabilization and destruction of the ecosystem. Cairns (1983) argued in favour of multispecies toxicity testing over single species and advocated the use of test organisms from different biological organization.

On industrial map of India, Gujarat occupies second position. Traditionally Gujarat is known for textile industries and its ancillary engineering units. Chemical and Pharmaceutical industries have been more recent additions. Over 4000 large scale and 63,000 small scale industries are there in Gujarat and they are the leading producers of Soda Ash, polyethylene, azodyes, vatdyes, polyester fibers, and phosphatic fertilizers (Sinha, 1986). The above industries while generating wealth for the state have also, even if unwillingly, brought problem of air and water pollution. Their contribution of water and air pollution, may nullify the good they might be doing. There are about 8000 water
polluting industries in the state. The total discharge is about 83.5 million liters a day and domestic effluent 1,391 million liters a day (Sinha, 1986). The facilities available hitherto for the disposal of industrial and urban community wastes are meager, and therefore, large quantities of untreated waste found their way into the natural water bodies. Virtually no water bodies are free from pollution. Almost all the rivers have become polluted either by sewage or industrial discharges or both. No comprehensive studies have been made on the river ecology of this state. The present study was undertaken to study the ecology of various rivers in and around Kheda region of Gujarat.

1. The pollution status of following four rivers viz. river Sabarmati, river Khari, river Shedhy and river Vatrak at Kheda region of Gujarat were studied.

2. Seven sampling stations were selected to study them.

3. Monthly physico-chemical parameters were studied for two years to evaluate their pollution status.

4. Phycological components were collected and identified to correlate the effect of pollution.

5. To study the toxicity, the effluent toxicity test using algae, *(Anacystis nidulans)* zooplankton, *(Daphnia)* fish, *(Puntius sps.)* and seed germination tests, *(Bajra, Mustard and Radish)* were carried out.