Environment pollution is “the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected”. India has been ranked as seventh most environmentally hazardous country in the World by a new ranking released recently. The study is based on evaluation of “absolute” environment impact of 179 countries. The environmental impacts of the dyeing and printing industry is associated with its high water consumption as well as by the color, variety and amount of chemicals which are released in waste water. Thousands of hazardous waste sites have been generated worldwide resulting from the accumulations of xenobiotics in soil and water over the years. Xenobiotic compounds are human made chemicals that are present in the environment at unnaturally high concentrations.

Dyes and phenol are such xenobiotic compounds which accumulate in environment after being produced from various industrial operations. Textile dyes are one of the most prevalent type chemicals used today. Sanganer is famous for dyeing and printing of colorful dresses, bed sheets, curtains, dress material and variety of other textiles. Sanganer town is nearly 20 kms away from the main city of Jaipur. There are estimated to be around 500 block and screen-printing units in Sanganer.
The Amanishah drain originating from the Aravalli hills N.E. of the Jaipur city (26°49′ - 26°51′ E longitudes), receives sewage of the city and industrial waste waters. At Sanganer (about 16 kms. South of Jaipur city) it again receives sewage from the town and industrial waste waters (mostly from textile dyeing and printing industries). Apart from the Amanishah drain, the untreated dye wastewater is also discharged on the land, forming shallow pools (depth = 60-75 cm) adjoining the dyeing units. The effects of the waste waters on the moist bank vegetation were monitored at near Gullar ka Bandha sites which are near the Amanishah drain.

A survey was conducted from time to time round the year that is in winter, summer and rainy season to explore the plant species of different categories herb, shrub and trees that were growing healthily during the year. The plants which were very weak with ill growth and that perished early, were not taken for the study. The plants were listed round the year with good growth and flowering and fruiting according to their season and well established in the heavily contaminated soil were taken for consideration in the present study.

Their number increased in late - rainy season as compared to spring. An increase in species richness of these habitats in rainy season was perhaps governed by the availability of more moisture in the dry areas, together with a decrease in soil toxicity due to loss of
pollutants in run-off of the Amanishah drain, favouring an increase in species richness of these habitats during this period. In all 24 plant species were recorded in the vegetation of Amanishah drain.

During this survey *Parthenium hysterophorus*, *Verbesina enceloidies* and *Chenopodium album* were selected as experimental material for the present investigation. Plant of *P. hysterophorus*, *V. enceloidies* and *C. album* was collected from the area of Gullar ka bandha, near Shikarpura, Sanganer, Jaipur. Specimens were compared and identified with the voucher specimens of Herbarium, Department of Botany, University of Rajasthan, Jaipur, and deposited with RUBL nos. 20329, 20327 and 20333.

Endophytic bacteria and fungi were isolated from the *P. hysterophorus*, *V. enceloidies* and *C. album* plant leaves, stems and roots of the plant were sampled for the investigation of endophytic bacterial and fungal communities. With the completion of the purification step, total 23 bacterial and 04 fungal isolates. i.e. in total 27 isolates were obtained from the three plants, *Parthenium hysterophorus*, *Verbesina enceloidies* and *Chenopodium album*. The *Parthenium hysterophorus* plants contributed more bacterial, as well as, fungal isolates (11 isolates) in comparison to the corresponding *Chenopodium album* (9) and *Verbesina enceloidies* (7). The bacterial micro flora is widely distributed in whole plant, root, stem and leaf, with high population in root and leaf.
In the present study, emphasis has been given on the screening of dye decolorizing microorganisms (bacteria and fungi) among the various endophytic microorganisms isolated from the plant samples of *Parthenium hysterophorus* L., *Verbesina encelodies* Cav. and *Chenopodium album* Linn. which are collected from the selected sites of Sanganer to study their decolorization capacity against various synthetic dyes.

Five commercial synthetic dyes-Azo dyes (Reactive VS dyes) i.e. Red-5B, Orange-3R, Yellow-GR, Black-B and Turquoise Blue-G, manufactured by Metrochem Industries Ltd., Ahmedabad, were selected for the decolorization experiments in the present study. Four fungal and twenty three bacterial isolates obtained from the three plant species *Parthenium hysterophorus*, *Verbesina encelodies* and *Chenopodium album*, which were growing near the contaminated effluent release site of textile dye industry. Gullar ka bandha in Sanganer, Jaipur were screened for their dye decolorizing capabilities against the selected dyes.

It was observed that five bacterial isolates which were isolated from *Parthenium hysterophorus* and *Verbesina encelodies* could grow under static, as well as, agitated condition of incubation. The bacterial isolates that showed decolorizing capabilities completely decolorized all the five dyes in both static and agitated condition of
incubation, while nineteen bacterial isolates which were unable to grow in the decolorization medium were unable to decolorize the dyes even after 7 days of incubation.

Out of 9 bacterial isolates from plant *Parthenium hysterophorus*, 4 isolates (44%) could completely decolorize all the five dyes and only 5 isolates (56%) were unable to decolorize the dye. In case of *Verbesina enceloides*, out of 6 bacterial isolates, 1 (16%) completely decolorized the all five dyes and 5 (83%) isolates showed no decolorization. But in the case of plant *Chenopodium album* none of the bacterial isolates could decolorize dyes. In totality out of 23 bacterial isolates, 5 (22%) isolates decolorized the all five dyes and 18 (78%) isolates were unable to decolorize them. However, it can be clearly noticed that more number of bacterial isolates from *Parthenium hysterophorus* had dye decolorization capacity, compare to *Verbesina enceloides* and *Chenopodium album*.

All the fungal isolates except for one (V.R.7F from *Verbesina enceloides*) could grow under static, as well as, agitated condition of incubation. The fungal isolates that showed decolorizing capabilities were completely decolorizing the all five dyes in both static and agitated condition of incubation. Considering all the three plants together, out of total 4 fungal isolates 3 (75%) decolorized the dyes, while 1 (25%) isolate which was unable to grow in the decolorization medium was unable to decolorize any of the five dyes.
However to conclude it can be said that fungal isolates were better decolorizers over bacterial isolates. The plant *Parthenium hysterophorus* harbors a number of bacterial and fungal endophytes in all its plant parts, root, stem as well as leaves which are good source of dye decolorization, compared to the other two plants *Verbescina encelodies* and *Chenopodium album*. It can be said that it is a good plant for bioremediation of textile dyes.

Identification of the bacterial isolates were done on the basis of results obtained from the studies on their colony characteristics, Gram’s reaction and biochemical characteristics. The identification has been done following the manual of Cappuccino and Sherman (2005). All the isolated bacterial cultures belonged to different genus - Bacillus, Citrobacter, Planococcus, Alcaligens and Proteus. In case of the plant *Parthenium hysterophorus* all the four bacterial isolates belongs to the different genus.

The three fungal isolates purified from the two plants species (*Parthenium hysterophorus* and *Verbescina encelodies*) were characterized on the basis of colony characteristics and microscopic observations of the mycelium and the reproductive structures. Majority of the isolates obtained were of genus *Aspergillus*. *Aspergillus* was identified by its asexual reproductive structures. Several vertical, aseptate, aerial, hyphal branches (conidiophore) arise
singly at right angles from the cells of hyphae, the foot cell. The conidiophore terminates into a swollen tip, the vesicles. Several finger-shaped projections called phialides/sterigmata develop on the surface of the vesicle, which bear basigenous chains of conidia.

Five bacterial isolates obtained from *P. hysterophorus* and one bacterial isolates obtained from *V. encelodies* and three fungal isolates obtained from *P. hysterophorus* and one fungal isolate obtained from *C. album*, which decolorize the dyes in dye decolorization experiment were tested for nitrogen fixation study. All the 4 isolates, 3 from *P. hysterophorus* and 1 from *V. encelodies* tested for nitrogen fixation give negative results. Hence it can be concluded that these were non nitrogen fixers. To compare the nitrogen fixers shown by zone of decolorization on N-free malate media containing BTB, the control was taken having no inoculums on the culture plate.

These selected 8 isolates were tested for Phosphate Solubilization for which they were grow on Pikovskaya medium supplemented with tri calcium Phosphate. 4 isolates, (P.L.4B, P.R.5B and P.L.11F) from *P. hysterophorus* and (V.L.2B) from *V. encelodies* produced halo zones around the colonies, indicating the Solubilization of Phosphate source used. The detection of Phosphate solubilizing microbes are done by the observation of formation of clear haloes
around their colonies. The halo is produced due to Solubilization of insoluble phosphate provided in the medium via production of organic acids in this surrounding medium. The isolate P.L.4B showed maximum Solubilization index (3.16).