

**An executive summary of the final report of work done on the Minor  
Research Project**

**“ EFFECT OF INDUSTRIAL EFFLUENTS ON RIVER WATER AT  
MANGALORE”**

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**SUMMARY**

Good quality of water resources depends on a large number of physico-chemical parameters and source of pollution load and to assess that monitoring of these parameters is essential. Rivers have always been important freshwater resources, along the banks of which our ancient civilizations have flourished and most developmental activities are still dependent upon riverine water resources. Polluted waters contain vast amounts of organic matter that serve as excellent nutritional sources for the growth and multiplication of microorganisms. Analysis of water samples on a routine basis would not be possible if each pathogen required detection. Therefore water is examined to detect *Escherichia Coli*, the bacterium that indicates fecal pollution.

The physical, chemical, and biological aspects of the eight sites of three rivers, Nethravathi, Gurpur and Shambhavi had been monitored over a period of one year from 2011 to 2012. Air temperature, water temperature, dissolved oxygen, biochemical oxygen demand, chemical oxygen demand; carbon dioxide, total suspended solids, total dissolved solids, total

solids and pH were found out from the water samples. Water samples were collected and analyzed for the presence of coliform and Gram negative bacteria (AWWA, APHA, WPCF, 1992). The samplings were made during February-May (pre monsoon), June-September (monsoon) and October-January (post-monsoon).

During the study period, the air temperature ranged from 27 (October 2011, Site 1) to 39 °C (November 2011, Site 4), whereas the water temperature varied between 27.5 (July 2011, Site 2) and 37 °C (November 2011, Site 5 and May 2012, Site 6). High (9.72 mg L<sup>-1</sup>) values of DO were recorded during April 2012 in site 3, whereas low (1.94 mg. L<sup>-1</sup>) values were noticed during February 2012 in site 1. The BOD varied from 0.11 to 4.89 mg. L<sup>-1</sup> and these values are found in the same Site 8 in our study, with its minimum in March 2012 and maximum in January 2012 followed by June 2011 (4.85 mg. L<sup>-1</sup>). In each site the fluctuation of BOD values is not uniformity during the different seasons. The lowest average concentration (0.86 mg. L<sup>-1</sup>) of BOD occurred in Site 7 and highest (1.62 mg. L<sup>-1</sup>) in Site 3 and 5 based on the entire period study.

The overall COD ranged from 0.90 to 230.4 mg. L<sup>-1</sup>, with its minimum in September 2011 and maximum in November 2012 at Site 8 and 4 respectively. Higher values of COD were found from each station from the entire period study. In our present study, free carbon dioxide content varied from 2.2 to 13.2 mg. L<sup>-1</sup>. The maximum and minimum values of total solids were 94.06 (April) at Site 7 and 0.10 mg L<sup>-1</sup> (October) at Site 5 respectively.

During the study period, the pH of river water ranged from 6.1 (August 2011, Sites 3) to 7.66 (April 2012, Site 1). The average pH ranged from 6.78 (Site 3) to 7.06 (Site 6). The minimum concentration of potassium (0.5 ppm) occurred in Site 4 and Site 6 in the same month, June. But the same minimum value was found in Site 3 in October and December, and January during the post and early pre monsoon periods. The maximum (450 ppm) was found from Site 1

in April. The maximum concentration of potassium occurred when the temperature was high and the minimum when the temperature was low in the present study. In the period of study, the maximum concentration (2800 ppm) of sodium was found in Site 1 in May (pre monsoon) and the minimum concentration (3.0 ppm) was observed in Site 3 and Site 4 in June (rainy season). From the above results, it is found that the sodium concentration showed higher values than that of potassium.

The most probable number (MPN) for the presumptive total coliform count of the water samples increased steadily from the month of June 2011 to May 2012. Sites 4, 5 and 6 were highly contaminated where as contamination of coliform bacteria in site 1 was minimum. It indicates that water was contaminated by coliforms, because of high inflow of defecated water into the rivers from domestic sewage water, poorly maintained sanitation, vehicle cleaning, washing clothes and bathing. Because of this contamination it may lead to the spread of dangerous diseases. The dilution of water during rainy season might be the reason for low count during June and the desiccation of water during summer might cause the increase in the MPN of coliform bacteria. Most common bacteria present in water bodies were *E coli and Enterobacter sp.* These enter the water bodies due fecal contamination. This leads to the outbreak of intestinal disorders.