SURFACE WATER QUALITY MONOTORING AT PARTICULAR POINTS OF WATER BODY OF GURVINDAPLLI, ANDHRA PRADESH, INDIA

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Abstract - India is bestowed with a network of that meets a variety of water requirements of the country. However, the available water resources in many parts of the country are being depleted and the water quality is deteriorating with the rapid increase in the population. The surface water is bound to get polluted from various pollutants, thus making it unfeasible for anthropogenic activities. The present study is aimed at monitoring and evaluating the physicochemical parameters of water quality from different points of a water body of Gurvindapalli, Andhra Pradesh, India. In present study we have chosen four different points for water sampling from pedda canal of Gurvindapalli and the collected samples were be analyzed for pH, total dissolved solids (TDS), Alkalinity and Acidity according to standards.

***Key Words*:** pH, TDS, Alkalinity, Acidity

1.INTRODUCTION

In the entire world, especially in India, river water is the main source for all anthropogenic activities, such as drinking, irrigation, agriculture, fisheries, recreational activities, etc. (Parmar and Bhardwaj 2014; Herojeet et al., 2016). However, some of these activities also pollute the rivers. The water quality of the rivers is deteriorated time to time, and water pollution is the main reason for degradation in the recent years. Pollution can be either from point sources such as industrial or sewage effluent discharges, or can be diffused from roads or agricultural runoff. India is rich in water resources, being gifted with a network of rivers and blessed with snow cover in the Himalayan range that can meet a variety of water requirements of the country (Bhardwaj, 2005). However, with the rapid increase in the population of the country and the need to meet the increasing demands of irrigation, human and industrial consumption, the available water resources in many parts of the country are getting depleted and the water quality has deteriorated. Indian rivers are polluted due to the discharge of untreated sewage and industrial effluents.

PROBLEM STATEMENT

Therefore, in view of the above-mentioned scenario of the pedda canal, the present study is aimed at monitoring and evaluating the variation in the physicochemical parameters of water quality at different points of a water body of Gurvindapalli, Andhra Pradesh, India., considering the time frame and resources available.

2 LITERATURE SURVEY

The water quality monitoring aids in rationally planning the pollution control strategies and their prioritization; it helps in assessing the nature and extent of pollution control needed for different water bodies or their part; it assists in evaluating water quality trend over a period of time; it helps to understand the environmental fate of different pollutants and assess the fitness of water for different uses (Bhardwaj, 2005).Therefore, water quality evaluation is prominent for water quality management and thus, periodical monitoring of water quality of any river aids to regulate pollution status and maintain water quality of the river (Rani et al., 2011).

A study was conducted by Gaikwad et al. (2016) to assess the water quality of the river Krishna, Sangli Maharashtra, India. It was reported that different physicochemical parameters were periodically investigated during the assessment period in order to signify the level of contamination from the study region. Physicochemical properties showed significant variation and denote the better water quality along with continuously polluting status of the river Krishna in study region.

Lamare and Singh (2016) in their study investigated the seasonal variation in water quality of Lukha River, Meghalaya, India. It was reported that the water quality of River Lukha is getting affected by anthropogenic activities, such as mining of coal and limestone and manufacturing of cement in the catchment area of the river.

3. MATERIALS AND METHODS

3.1 Chemical Reagents

This section describes different techniques and methods followed in the present project work. All chemicals and reagents used in this study were of analytical grade and supplied by Hi-Media Pvt. Ltd., India, LOBA Chemie Pvt. Ltd., India, SRL Chemicals Pvt. Ltd., India, Merck India Ltd., and CDH Pvt. Ltd., India.

3.2 Study area

Water samples were collected from three locations, from upstream and downstream of pedda canal of Gurvindapalli, Andhra Pradesh, India

Fig – 1 Surface water of Gurvindapalli canal

3.3 Methods

The present study deals with the assessment of water quality of pedda canal at selected sites. Water samples were collected from four locations of Gurvindapalli, from upstream and downstream of pedda canal, Gurvindapalli, Krishna district, Andhra Pradesh, India. In view of limited resources and time frame available, collected samples were analyzed only for pH, total dissolved solids (TDS), alkalinity and Acidity according to standard methods. Water samples were collected for a period of post Monson October and winter season February, from the study area and the physicochemical parameters were analyzed using standard methods described in American Public Health Association (APHA) (APHA, 2005).

PH: The pH is a measure of hydrogen ion concentration, a measure of the acidity or alkalinity of a solution. The pH scale usually ranges from 0 to 14. Aqueous solutions at 25°C with a pH less than 7 are acidic, while those with a pH greater than 7 are basic or alkaline. pH equal to negative logarithm of H^+ ions Or The pH is a measure of the intensity of acidity or alkalinity in the water and reflects the hydrogen ions concentration in the water. The permissible limit of pH is 6.2 to 8.2

TDS: The TDS refers to the amount of dissolved material present in the water body and serves as a parameter for pollution indicator Total dissolved solids (TDS) is a measure of the dissolved combined content of all inorganic and organic substances present in a liquid in molecular, ionized, or micro-granular (colloidal sol) suspended form. ... The principal application of TDS is in the study of water quality for streams**,** rivers, and lakes Permissible limit of total dissolved solids (TDS) is 500 mg/l

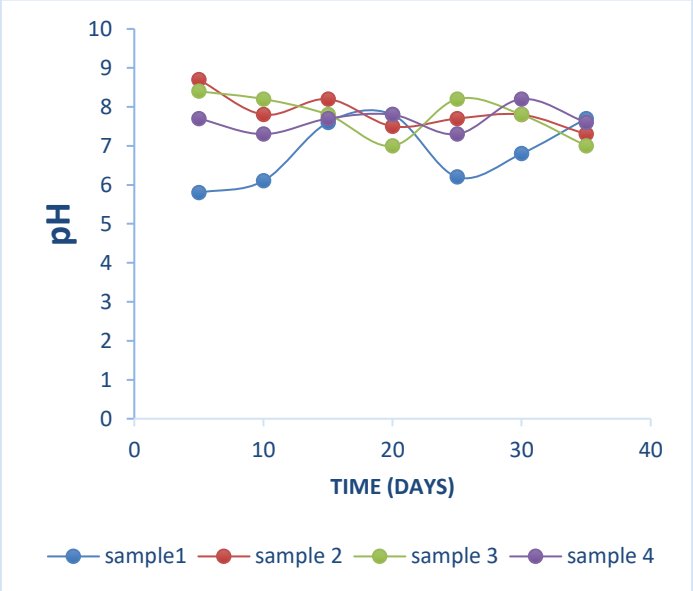
Alkalinity: Alkalinity is an aggregate property of the water sample which measures the acid-neutralizing capacity of a water sample. This is really an expression of buffering capacity. A buffer is a solution to which an acid can be added without changing the concentration of available H^+ ions (without changing the pH) appreciably. It essentially absorbs the excess H^+ions and protects the water body from fluctuations in pH. The main sources for natural alkalinity are rocks which contain carbonate, bicarbonate, and hydroxide compounds. Borates, silicates, and phosphates also may contribute to alkalinity. Limestone is rich in carbonates, so waters flowing through limestone regions or bedrock containing carbonates generally have high alkalinity, hence good buffering capacity. The alkalinity of surface water is due to the carbonate, bicarbonate and hydroxide content and is often interpreted in terms of the concentrations of these constituents

Acidity: Acidity is a measure of the capacity of water to neutralize bases. Acidity is the sum of all titrable acid present in the water sample Strong mineral acids, weak acids such as carbonic acid, acetic acid present in water sample contributes to acidity of the water The volume of standard alkali to titrate a specific volume of the sample to titrate a specific volume of the sample pH 8.3 is called phenolphthalein acidity. Water acidity is defined as the capacity to react with a strong base up to a given pH value. Total acidity is determined by titration with NaOH up to the color change in phenolphthalein (pH 8–9) while mineral acidity is obtained by titration in the presence of Methyl Orange as indicator (pH 5).

4.RESULTS

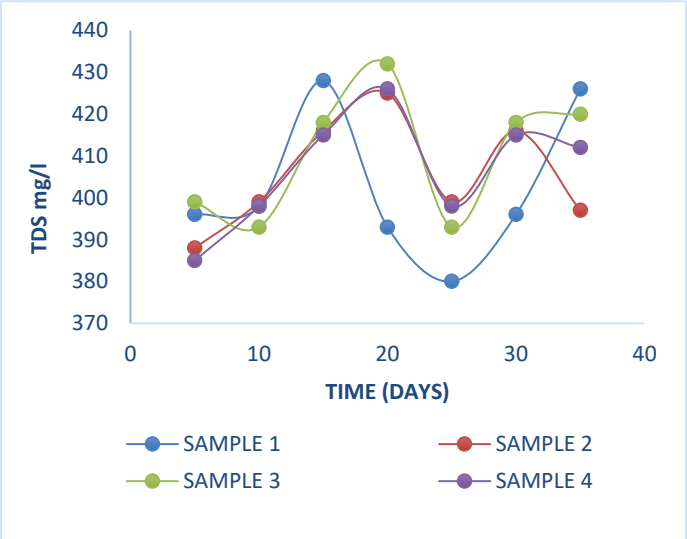
pH

In this chapter, we shall see that all the tested sample results are shown in form of graph. The pH is a measure of the intensity of acidity or alkalinity in the water and reflects the hydrogen ions concentration in the water shows the range of pH pertaining to the samples collected from four different locations of Gurvindapalli. During the period of investigation, pH was in the range of 5.8 -8.7 in samples, which is within the permissible limit.



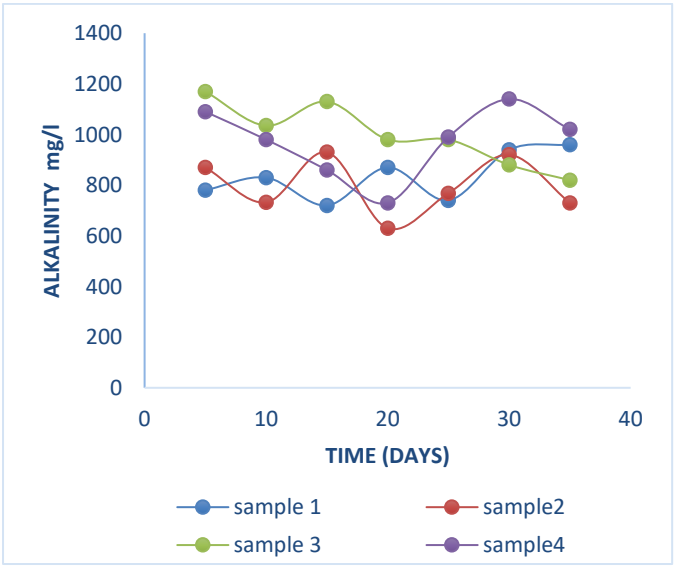
Total dissolved solids (TDS)

The TDS refers to the amount of dissolved material present in the water body and serves as a parameter for pollution indicator. The range of TDS pertaining to the samples collected from four different locations. Maximum TDS was obtained in the sample with a range of 380-426mg/L. The permissible limit of TDS is 500 mg/l.



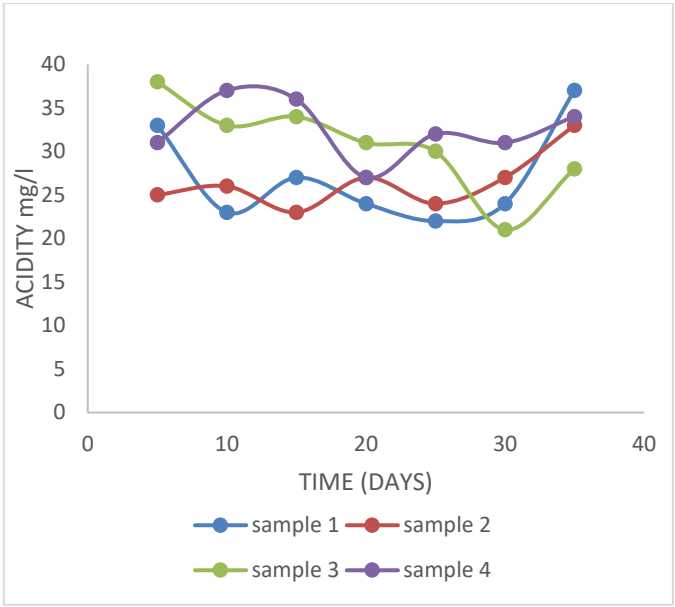
Alkalinity

The acid neutralizing capacity of water is determined by the alkalinity of any aquatic system (Murangan and Prabaharan, 2012). The variation of alkalinity in the samples collected from four different locations. Alkalinity was in the range of 720-1170 in samples. Comparatively high value was obtained in the sample which could be as a result of deposition of sewage in the study region which is also in agreement with results reported by Bhuiyan et al. (2010) and Mushahida and Kamruzzaman (2013) for surface water of Bangladesh. The alkalinity values in all the four locations are above the permissible limit as per the BIS standards, which needs to be treated if it is meant for drinking purpose.



ACIDITY

The variation of Acidity values in the sample collected from four different locations is shown in the figure4.8 The maximum phenolphthalein Acidity range from 21-34. The permissible limit of Acidity is 6.5 – 8.5 Acidity values in the samples collected from four locations and this consisting the high acidity that is beyond the permissible limit.



5. CONCLUSIONS

The present study was aimed at monitoring and evaluating the variation in the physicochemical parameters of water quality at selected sites of the pedda canal Gurvindapalli, Andhra Pradesh, India. The key findings of the study are discussed in this section. Water samples were collected from four locations of Gurvindapalli, Andhra Pradesh, India. Based on the time frame and limited resources available. The water samples collected were analyzed for pH, total hardness, Alkalinity and Acidity according to standard methods.

The present study has been considered for only a stretch of the pedda canal Gurvindapalli, in the state of Andhra Pradesh, India, i.e., length of about 1 to 2 kms as per the sample collection frequency from the vicinity of study area and the available time frame. The aforementioned water quality parameters were examined during the monitoring period to indicate the level of pollution in the study region. As apparent from the water quality parameter analysis, all the tested parameters were within the standards prescribed by Bureau of Indian Standards (BIS) and the Central Pollution Control Board (CPCB). Water quality monitoring and the analysis showed significant variation and having the low and high pH with a slight variation and high acidity and Alkalinity in the samples from Gurvindapalli. Furthermore, the process of self-purification was proved to be true from the water quality analysis as apparent from iron removal via natural aeration in the water. The present study substantiates the need of an action plan to ensure regular monitoring on the pollution status and for maintaining the water quality of the pedda canal.

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