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Innovation The Research Concept

Study of Physico-Chemical Characteristics of a fresh water body Indra Gandhi Nahar in Kharakhera Villege, District Hanumangarh, Rajasthan

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Abstract

The Present work deals with the study of fresh water quality of Indra Gandhi Nahar in Kharakhera Hanumangarh District with regards to physico chemical parameters like water Temperature, pH, Turbidity, Dissolved oxygen (DO), Total alkalinity (TA), Electrical conductivity (EC), Chloride and phosphate ($PO4^{3-}$). The physico chemical characteristic of Indra Gandhi Nahar in Kharakhera villege is found to be highly fluctuated with seasonal variations during the present investigation. High value of dissolved oxygen obtained during winter months and shows inverse relation with water Temperature, pH, EC have had maximum concentrations in summer. The study revealed that the water quality is rich above fresh water limits and highly polluted.

Keywords: Physico- Chemical Parameters, Water Quality, Pollution.

Introduction

Water of adequate purity which is the life blood of our species is of vital importance in the existence of life[1]. Fresh water is one of the most important natural resources crucial for the survival of all living beings. It is even more important for human beings as they depend on it for food production, industrial and waste disposal, as well as cultural requirements[2]. The quality of irrigation water is a crucial factor for long term soil productivity. Use of Poor quality water for a long time can make the soil less productive or even barren depending on the amount and type of constituents present in canal water. Many areas in the country are facing a serious problem of not only scarcity of water, but also of its poor quality and polluted level high.

Aim of the Study

The main aim of this study is find out physio chemical properties of Indra Gandhi Nahar in Kharakhera villege in Hanumangarh District and search the level of pollution.

Review of Literature

Study of Seasonal variation with Special Reference to Physico-chemical parameters in Tulshi Reservoir of Kolhapur District (M.S.), India (Koli and Muley, 2012). Physico-chemical parameters like atmospheric and water temperature, turbidity, pH, dissolved oxygen, salinity, total dissolved solids, chlorides, hardness, BOD and Nutrient were analyzed.

A.D. Smitha, P. Shivashankar (2013) observed that Temperature, turbidity, nutrients, hardness, alkalinity and dissolved oxygen are some of the important factors that play a vital role for the growth of living organisms in the water body. V.Sajitha , Ashok, Vijayamma Smitha (2016) reported that physico-chemical parameters including Temperature, pH, EC (Electrical Conductivity), TDS (Total Dissolved Solids), TA (Total Alkalinity), DO (Dissolved oxygen), TH (Total Hardness), NaCl (Salinity), Ca (Calcium), Mg (Magnesium), Cl (Chloride), Na (Sodium) and K (Potassium). The quality of pond water in Athiyannoor panchayath, Thiruvananthapuram District, Kerala,

Material and Methods

The fresh water body Indra Gandhi Nahar Located near Kharakhera villege. Khara Khera is a Village located in Tibbi Tehsil in Hanumangarh District Rajasthan, India. In this research work Climate is divided into three seasons, summer, rainy and winter. The present study

was conducted on the physico-chemical parameters such as Temperature, pH, Turbidity, Dissolved oxygen (DO), Total Alkalinity (TA), Electrical Conductivity (EC), Chloride and phosphate ($PO4^{3}$). The present work was carried out during the year 2016-2017. The water samples were collected from Kharakhera at monthly intervals from April 2016 to March 2017 during 8.00 – 10.00 am in fresh unsullied plastic bottles. Temperature and pH were recorded on site. Dissolved oxygen was analyzed by using Winkler's modification method

Analysis of Water Quality Parameters

Water temperature is measured *in situ* by using hand mercury thermometer, pH was estimated by Digital pH –meter (Systronics Type-335). Turbidity was measured by Water Analyzer, Turbidity meter; Electrical conductivity was measured by conductivity meter. For the estimation of other parameters and water sample is brought to the laboratory. The analysis of various physico-chemical characteristics of water were done as per the standard methods given by APHA (1998) and Trivedi and Goel (1984)

Results and Discussion

Physico-chemical parameter of fresh water obtained during the present investigation (during April 2016 – March 2017), is presented in table.

Parameter	Summer	Winter	Rainy
Temperature (^{o}c)	25.5	18.5	23.5
pH	7.8	8.3	7.7
Electronic Conductivity (µm $cm^{-1)}$	560	475	380
Turbidity (NTU)	19.5	14.7	15.8
Dissolved Oxygen (mg/l)	4.5	7.8	5.3
Total Alkalinity (mg/l)	224	210	194
Chloride (mg/l)	108	94.84	78.05
Phosphate (mg/l)	5.2	4.7	6.1

The data on water quality reveals water temperature was ranged from 18.5^{o}C to 25.5^{o}C. During winter season the water temperature was found to be minimum, whereas the summer season exhibited the maximum water temperature. The pH was ranged from 7.8 to 8.3. The pH of water was relatively high in the winter season and low in the rainy and summers. This Variation in pH might be due to industrial waste coming into Indra Gandhi Nahr from nearby industries. The higher range of pH indicates the higher productivity of water.[3]pH expresses the intensity of acidity or alkalinity of an aquatic environment. No significantly variations were observed in duration of experimental period. The Electronic Conductivity of water was relatively high in summer season and low in rainy season. Electrical Conductivity is a measure capacity to conduct electrical current; it signifies the amount of total dissolved solid.Similar result was given by Narayana *et. al.,*[4] Kedar *et.al*.,[5.] The Turbidity ranged from 14.7 mg/l to 19.5 mg/l. Turbidity in water is due to colloidal and extremely fine dispersions, suspended matter such as clay, silt, finally divided organic and inorganic matter plankton and other micro-organism also contribute to turbidity. The dissolved oxygen (DO) ranged from 4.5 mg/l to 7.8 mg/l. The dissolved oxygen of water sample was found maximum during the winter season whereas the monsoon season exhibits least amount of dissolved oxygen. High D.O. content might be due to increased photosynthetic activity of autotrophs while low content might be due to increase respiration of organisms. The alkalinity values were maximum during summer and minimum during Rainy. The increased alkalinity during summer and winter was due to the concentration of nutrients in water. The decrease was due to dilution caused by the rainwater during monsoon. The result is also in close conformity with the finding of Mishra *et. al.,*[6] and Arya et.al.,[7]. Chloride content was ranged from 78.05 mg/l to 108 mg/l. Chloride content was high in summer season and less during winter season. The origin of chloride in surface water is from weathering and leaching of sedimentary rocks, domestic and industrials wastes discharge municipal influence etc. The value of phosphate ranged from 4.7 mg/l to 6.1 mg/l. Studies of physico-chemical characteristics have been supported by many workers[8-12].

Conclusion

It was studied the effect of seasonal variations on water qualities of Indra Gandhi Nahar in Kharakhera villege of Hanumangarh District. The investigations show that water of these sampling stations is polluted due to industrial waste from various industries of Punjab. In the Present study provides a base line data for the conservation and monitoring of the Indra Gandhi Nahar water quality. It was found that the Indra Gandhi Nahar water was low suitable for drinking, irrigation purpose and low useful for human and animal health.

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