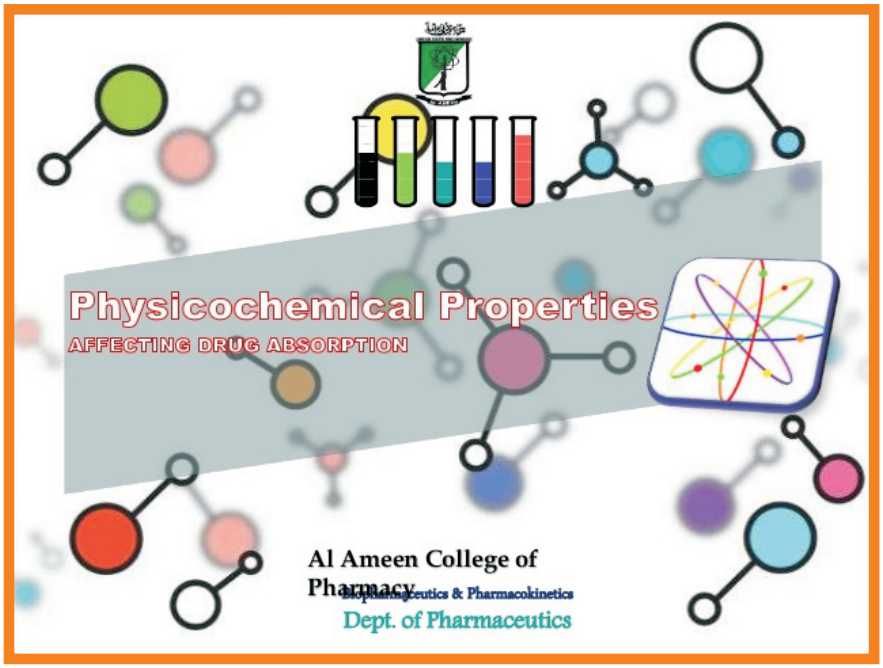
ISSN:- 2230-7850 VOLUME-5 | ISSUE-2 | MARCH -2015

INDIAN STREAMS RESEARCH JOURNAL

ANALYTICAL MONITORING OF SOME PHYSICO-CHEMICAL PARAMETERS OF OPEN AQUATIC SYSTEM IN TAKHATPUR TOWN"



Rakesh Kumar Yadav[1] and M. R. Augar [2]

[1]Dept. Of Chemistry, Dr C.V.Raman University, Bilaspur.
[2]Dept.Of Chemistry, Govt. Agrasen College, Bilha.

Abstract :

People on globe are under tremendous threat due to undesired change in the physical, chemical and biological characteristics of water. Due to increased human population, use of fertilizers and man-made activity water is highly polluted with different harmful contaminants. Natural water contaminants due to weathering of rocks and leaching of soil etc. it necessary that the quality of drinking of water should be checked of regular time interval, because due to use of contaminated drinking water. human population suffers from varied of water borne disease. The availability of good quality water is an indispensable feature for preventing disease and improving quality of life. it is to know details about different physic-chemical such as color, Temperature, hardness, pH, Chloride, DO, BOD, COD, Sulphate, used for testing of water quality.

Key Words:- Analytical Monitoring , Physico-Chemical Parameters , Aquatic System ..

ANALYTICAL MONITORING OF SOME PHYSICO-CHEMICAL PARAMETERS OF OPEN AQUATIC SYSTEM IN TAKHATPUR TOWN"

INTRODUCTION

A hydrosphere word is derived from the two different word Greek-hydor "Water" and sphaira "sphere". In physical geography describes the collective mass at water found on under and over the surface of a earth planet. The earth's hydrosphere consist of in all form's the ocean, other surface water including inland seas, lakes, and rivers, rain, underground water, ice and atmospheric water vapors. Approximately 70.8% of the earth surface is covered by the water bodies while rest 29% is land mass. Only 1% water is fresh occurring in underground ice caps and glaciers. Water is most important resource for flora and fauna system. Among the planets, water is occurs only in earth as solid, liquid and gas. Chemically state from water is compound of hydrogen and oxygen in which two volume of hydrogen and one volume of oxygen. Water has peculiar character due to its high dielectric constant and greater degree of hydrogen bonding, therefore both class of compounds inorganic and organic dissolved in the water and commonly known as universal solvents.

Takhatpur is town place and situated in the bank of Manihari river. The distance from Bilaspur headquarter is 28km. in west direction. The area of the town is around 14,420 square kilometer. Population and density of the city is 1, 19, 325 and 135 people per square kilometer respectively. Topographical it is located 2808'59"N and 81052'12"E with a height of 374.8 meter above mean tea level. The average rainfall and temperature is 1230 mm and 420c. Around the Takhatpur town mostly paddy and wheat are cultivated. The main fruits of this area are gave and jack fruit. The water source of the T'pur city is open ponds Manihari river and bore wells. Municipal wastes and sewage discharge in these water bodies, therefore water system are continually contaminated day to day. Peasant using in proportional ratio of fertilizer, pesticides and insecticide as a result water and soil both system of environment is highly polluted. Therefore we have taken to the assessment of water quality status of Takhatpur town.

METHODS AND MATERIAL:

Water samples from the selected spots were collected and analysed by the standard protocol method mention below.

Selection of the sampling spots: Sampling spots for analysis mentioned in the location map. The selected sampling spots are there- Kotla maidan (TK). Dewan Talab (TD) Nigarbandh (TN), Tikripara (TT) Tonhi Dabri (TTN), Near Tikripara School (TNT), Near Kotla maidan (TNK).

Sample Collection: Water samples were collected in one liter polythene bottle previously soaked with nitric acid and then cleaned with detergent followed by rinsing with distilled water.

Sample Preservation: Collected water sample, was brought in laboratory and stored in lie-cold chamber, them this chamber was kept in dark place.

PHYSICO-CHEMICAL PARAMETER ANALYSIS:

Temperature: Temp was analyzed on the sampling spot by the calibrated mercury thermometer.

pH: For the measurement of pH of selected water sample pencil pH meter was used.

Electrical conductance: This parameter is analyzed in chemical lab. Digital bridge conductivity meter was used for the measurement of collected various water sample.

Total Solids (TS): Total Solids was determined on the laboratory method.

Total dissolved Solid: For the measurement of TDS gravimetric method.

Total suspended Solids (TSS): It can't determined by the experimental method. It was calculated by the different between Total Solid and Total dissolved Solids.

Alkalinity: Water sample was determined by the titrimetric method.

Total Hardness: It was also measured on the lab by the titrimetric method

Dissolved Oxygen:- This parameter was estimated by the titrimetric method,

Chemical Oxygen Demand:- Water sample was determined by the titrimetric method.

Biological Oxygen Demand (BOD):- Water sample was determined by the titrimetric method.

Chloride:- Chloride was measured by titrimetric method.

Fluoride:- SPADNS method was used for the estimation of fluoride in contaminated water sample.

Sulphate:-Turbido metric method was used for the analysis of sulphate ion.

RESULT AND DISCUSSION

After analysis of all selected parameters results were obtained. In this project we have taken surface and ground water for the monitoring and determined the extent of Pollutant. The selected spots are Kotla Maidan well (TK), Dewan Talab (TD), Nigarbandh Pond (TN), Tirkripara School well (TT), Tonhi dabri Pond (TTN). Near Tikripara School well (TNT), Neal Kotla maidan well (TNK). In this chapter only discussed the value of temp., pH, EC, TDS, TS, TSS, acidity, alkalinity, total, permanent, temporary hardness, demand analysis, DO, BOD, COD and same selected anions such as fluoride, chloride sulphate etc. and the results were compared with the desirable and permissible limit recommended by 15:10500 units.

Temperature, PH & EC:- Temperature of the various water were found in the range from 280C to 300C. The maximum temp. was recorded at sampling point TNK i 300C pH was obtained from 7.32 to 9.70 as low and high value, The data of pH of different sampling stations clear indicated the mostly water sources were alkaline in nature. This value was above the permissible limit. Electrical conductivity of different water systems were noted from 365 □mhos/cm to 571□mhos/cm. as the minimum and maximum value. The large value of EC value was due to dissolved of high magnitude of organic and inorganic salts.

TS, TDS, TSS:- There parameters of water quality were determined the soluble ions; cations and anions and also confirmed the extent of their ions. Gravimetric method was used for the calculation of these parameters. Total solids was obtained in the range of 2160 mg/L to 2471 mg/L as the minimum and maximum value, TK spot was showed low value while TT sampling point was noted high value, both datas were exceed the permissible limit 2000 mg/L recommended by the 10:10500. Total dissolved solids are another parameters, which is also used for the determination of soluble ions. The result of the parameter was obtained from 2021 mg/L to 2269 mg/L in the from of min. and max. value. Sampling spot TK was responsible for the low value while TT water sample was got high value of TDS, TSS, was calculated out by the theoretical with using formula TSS = TS – TDS. Almost all water solids of the T'pur were affected by the high value of TDS and TS than desirable and permissible limitation.

Demand analysis:- In this analysis we have taken three different water quality-dissolved oxygen (DO), Biology Oxygen demand (BOD), Chemical Oxygen Demand (COD). There parameters were determined the amount and extent of dissolved oxygen DO was found 2.21 mg/L to 4.00 mg/L as the min, and maximum value for the sampling spot TTN and TK respectively.

The low value of DO showed high degree of pollutant. Were present 5.97 and 11.51 mg/L of BOD was detected in two sampling location TD and TTN. Rest water samples were also expressed the amount of BOD in high amount which were above the permissible value; 5.0 mg/L recommended by the 10:10500 The COD was observed by the titrimetric method from 9.59 mg/L to 14.11 mg/L on the spot TK as well TT as low and high value then there datas were compared with the standard datas 15:10500.

Anion parameter:- Fluoride, chloride and sulphate ion was consideration as the anion parameters. F- ion was detected by spectrophotometric method and its range was recorded 0.98 mg/L to 1.89 mg/L as the low and high value on sampling spot TK and TT respectively. Chloride ion was absorbed in the range of 341 mg/L to 1121 mg/L as minimum and maximum value. Except sample of TK, TD, TN, TT, TTN, TNT and TNK were showed the amount of chloride ion high the permissible value prescribed by the 15:10500 sulphate ion was determined by the instrumental method 221 mg/L was reported as the low value while 461 mg/L was calculated as high value on sampling spots TK and TD. Sampling spots TD were found below the permissible level but TN, TT, TTN, TNT and TNK were gave this parameter above the permissible limit recommended by 15:10500.

ANALYTICAL MONITORING OF SOME PHYSICO-CHEMICAL PARAMETERS OF OPEN AQUATIC SYSTEM IN TAKHATPUR TOWN"

Hardness parameter:- These parameter contain, we was determined the permanent, temporary and total hardness was detected from 597 mg/L to 803 mg/L as low and high value on sampling spot TK and TT. Permanent hardness was observed in the range of 4.17 mg/L to 497 mg/L as the minimum and maximum value. The maximum value was compared to the standard value. Temporary hardness are generally measured of fresh collected water. Its value was found from 506 mg/L to 778 mg/L as low and high value n the water collection spot TK and TTN.

Observation Table-I

			Sampling Spot						
S.No.	Parameter's	Unit	TK	TD	TN	TT	TTN	TNT	TNK
1	TEMPERATURE	0°C	26	28	29	25	28	26	30
2	pH		7.32	8.5	7.6	9.7	9.5	9.6	7.42
3	ELECTRICAL CONDUCTIVITY	µs/cm	365	501	551	571	370	521	519
4	TOTAL SOLID	mg/L	2021	2171	1991	2269	2151	2171	1969
5	TOTAL DISSOLVED SOLID	mg/L	45.2	24.3	48.3	43.3	55.2	74.3	62.4
6	TOTAL HARDNESS	mg/L	497	609	771	803	779	739	651
7	PERMANENT HARDNESS	mg/L	597	604	641	697	703	597	617
8	TEMPORARY HARDNESS	mg/L	506	521	641	671	778	669	713
9	ALKALINITY	mg/L	547	661	639	641	629	621	619
10	CHLORIDS	mg/L	341	871	1009	1041	1121	1008	1007
11	FLUORIDS	mg/L	0.98	1.41	1.51	1.69	1.61	1.39	1.31
12	SULPHATE	mg/L	221	309	402	441	461	419	411
13	DISSOLVED OXIGEN	mg/L	4	3.29	2.91	2.29	2.21	3.1	3.91
14	BIOLOGICAL OXYGEN DEMAND	mg/L	6.1	5.97	7.71	8.41	11.51	9.91	9.09
15	CHEMICAL OXYGEN DEMAND	mg/L	9.59	10.11	12.13	14.11	13.97	12.12	11.51
16	TOTAL SUSPENDED SOLID	mg/L	2160	2202	2360	2471	2360	2391	2171

REFERENCE:

1.APHA, Standard methods for examination of water and waste water. American Public Health Association, Washington, D.C. (1989).
2.Manivaskn, N., physico-chemical examination of water sewage and industrial effluents. Pragati Prakashan, Meerut (1986).
3.Trivedi, P. K. and Goel, P. K., chemical and biological method for water pollution studies. Env. Publication, Karad (1986).
4.Manual on water and waste water analysis. NEEI publications (1988).
5.Robrt, M., "water" the Wave of Life (1972).
6.Joshi, B. D., Pathak, J. K., Singh, Y. N., Bist, R. C. S. and Joshi, P. C., on the physico-chemical characteristics of rever Bhagirathi in the uplands of Garhwal Himalayas. Himalayan J. Env. Zool. 4(1), 64-75 (1983).
7.ABCM-SAC joint committee, Analyst., 81: 721 (1956).
8.Approved method for the physical and chemical examination of water 2nd Edn. Institute of water Engineers, London (1953).
9.Vogel, A. I., A Text book of quantitative inorganic analysis including elementary instrumental analysis. 5th Edn. ELBS publication (1991).
10.American society for Testing and Materials, "Annual Book of ASTM Standards", part 23, ASTM Philadelphia (1972).
11.James, Mc-Coy W., chemical analysis of industrial water. Chemical Publishing Company, New Yoark (1669).
12.Meites, L., Hand book of analytical chemistry. Mc. Graw Hill book company, New York (1963).
13.Tiwari, T. N. and Patel, M. K., physico-chemical parameters of ground water of Dharward district: some correlations, Ind. J. Envir. Prot., 10(5), 330-332 (1990).
14.Garg, D. K., Goel, R. N. and Agrawal, V. P., correlation among water quality parameter of ground water, Roorkee City. Ind. J. Envir. Prot., 10(5), 355-359 (1990).