Biological Parameters and Water Quality of Moti Jheel Reserve Wire: Gwalior

Sunil Bansal, Department of Zoology, SunRise University Alwar, Rajasthan
Dr. Arvind, Assistant Professor, Department of Zoology, SunRise University Alwar, Rajasthan

Abstract

The current study was carried out to analyze and evaluate the drink water samples collected from Moti Jheel areas of Gwalior city. This Paper deals with the Biological Parameters and water quality of selected study area particularly Monthly Changes Such as Water Temperature, Turbidity, Total Dissolved Solids, pH, Dissolved Oxygen, Free Carbon dioxide and Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates were analyzed for a decided study period. the level of TDS, alkalinity, Ca, Mg, Hardness, Electrical Conductivity, pH, and selected heavy metals (Fe, Cr, Cd & Zn) were determined. The results showed that all water samples have vary pH. All these water samples have very low concentration of Fe and Zn. The concentration of Cr and Cd was observed higher than the prescribed limit of WHO and ISI. In the light of this analysis we can conclude that all these water samples require some treatment before their use for drinking as well as domestic purposes.

Keywords - Analyze, concentration, samples, parameter, accuracy, suitability

Introduction - Water is the most vital element among the natural resources, and is critical for the survival of all living organisms including human, food production, and economic development. Good quality of water resources depends on a large number of physico-chemical parameters and biological characteristics. Many researches are being carried out till present Anilakurmary etal., 2007; Prabuet al., 2008; Raja et al., 2008; Prasanna and Ranjan, **2010.** In order to assess water quality index we have carried out the physicochemical analysis of water in study area. The aim of the study is too revelled out the pollution status of sampling stations in terms of physico-chemical characteristics of water.

Study Area - Present study area carved out of Gwalior district in 1956. Gwalior is the Historical Place of Madhya Pradesh this is situated on 26°21'24" N Latitude and 78°17'72" Longitude. Gwalior was the capital of the state of Madhya Bharat from 1948 till 1956 which later became a part of the larger state of Madhya Pradesh. Prior to Indian independence on 15 August 1947, Gwalior remained a princely state of the British Raj with the Scindia as the local rulers. High rocky hills surround the city from all sides, on the north it just forms the border of the Ganga- Yamuna Drainage Basin. The city however is situated in the valley between the hills.

Material and Method - The Water Samples from Moti Jheel Reserve Wire area and surroundings were collected from different stations in the morning hours between 10 to 12 am in Polythene jerry cane regularly for every month. The Water samples were immediately brought in to Laboratory for the Estimation of various physico - chemical parameters, like water temperature and pH were recorded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other Parameters Such as DO, TDS, Free $C0_2$, Hardness, Alkalinity, Chlorides, Phosphate and Nitrate were estimated in the Laboratory by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5Model).

Results and **discussion** - Mean values of biological parameters are presented in Table-1 and correlation coefficients are shown in Table2

Water temperature - The ambient water temperature measure by good grade mercury Thermometer having the accuracy of 0.2°C and a range of 0 to 50°C.ln this study temperature ranges from 17-20°c at various stations. pH - During present study water pH values were found 4.52 to 6.1 throughout the study period The high values may be due to attributed sewage discharged by surrounding city and agricultural fields. The pH value note at the sampling station by the Lovibond pH comparator using universal pH indicator and later confirmed by PC-DPL-Kota made digital pH meter in the laboratory .

Total Hardness - In the present study total hardness ranged from 210 to 440 ppm in different sampling stations .These high values may be due to the addition of calcium and magnesium salts. The increase in hardness can be attributed to the decrease in water volume and increase

in the rate of evaporation at high temperature. Hujare (2008) reported total hardness was high during summer than rainy season and winter season.

Dissolved Oxygen - In the present study the DO values found from 5.60 to 8.395 mg/l .Dissolved oxygen concentrate was 5mg/l throughout the year the reservoir is productive for fish culture Benerjee (1967) Torzwall (1957); Rani et al, (2004) also reported lower values of Dissolved oxygen in summer season due to higher rate of decomposition of organic matter and limited flow of water in low holding environment due to high temperature. **Biochemical Oxygen Demand (BOD)** - Biological oxygen Demand (BOD) is an important parameter to the oxygen required to degradation of organic matter. During the study period BOD recorded from 1.62 to 4.82 ppm which is within the permissible range. Devaraju et al (2005) and Maddur Lake and Garg et al., 2010 has also made similar observations .

COD (Chemical Oxygen Demand) - Take 20ml water sample in a 200 ml flask. Then 10 ml of 0.25N $K_2Cr_20_7$ solution, 30 ml of concentrated H_2S0_4, a pinch of Ag_2S0_4 and mercuric sulphate added and refluxed for 2 hours in a water bath. After two hours, it is cooled down and distilled water add to make its volume 140 ml. 2 to 3 drops ferroin indicator added to refluxed sample. Mixed thoroughly and titrated with 0.1 N ferrous ammonium sulphate to brick red colour end point. A blank done with distilled water; chemical oxygen demand varies with the ranges of 12.10-52.00 ppm in selected study period.

OBSERVATION - After getting all statistical analysis reveals the present status of drinking water quality of Moti Jheel Reserve Wire locality of Gwalior is suitable for drinking purposes except in unprocessed water, sewage mixed drinking water and turbid drinking water due to industrial pollutants as well as waste. (See table 1 and 2)

TABLE -1
OBSERVATION

parameter	**Unit**	ss,	**SS_2**	ss_3	ss_4	**SS_5**
Temperature	0°C	18	17*	20**	19	17
pH	-	4.52*	5.4	6.1**	5.7	6.0
Elect. Cond.	p mhos/cm*[1]	218*	270	382	402**	374
Free $C0_2$	ppm	6.10*	7.24	8.72	11.47**	10.44
T-H	ppm	320	440**	400	210*	280
Ca-H	ppm	215	290**	240	104*	134
Mg-H	ppm	105*	150	160**	106	146
D.O.	ppm	1.12	1.10*	1.82	2.12	2.42**
B.O.D.	ppm	1.62*	1.84	2.84	3.92	4.82**
C.O.D.	ppm	12.42	12.10*	30.24	52.00**	40.84

**= maximum value * = minimum value

TABLE-2
CORRELATION

	1	2	3	4	5	6	7	8	9	10	11
1	1										
2	0.64478	1									
3	0.24127	-0.8725	1								
4	0.09269	0.52447	0.78305	1							
5	0.70850	0.51898	-0.2535	-0.0876	1						
6	0.70700	0.49924	-0.2481	-0.0798	0.9164	1					
7	0.59697	0.82794	-0.7109	0.5737	0.4383	0.4029	1				
8	0.63442	0.22154	0.0470	-0.2824	0.3971	0.5558	0.2074	1			
9	0.18218	-0.4985	0.5401	-0.5096	-0.064	-0.1642	-0.4079	-0.4418	1		
10	0.32729	0.02882	-0.2892	0.1271	-0.2018	-0.415	0.11947	-0.2992	-0.006	1	
11	0.56319	0.599107	-0.5057	0.489062	0.297495	0.444357	0.705021	0.196479	-0.10	-0.3	1

The quality of physicochemical falls within the standard limits of WHO standards. (WHO, Guidelines for drinking water quality Vol.1 1984, NEERI (1986), APHA (1992), BIS (1991); Periodic monitoring and continuous disinfection of drinking water at the site

of each storage tank during supply is necessary. This indicates that the water of selected study area is suitable for drinking purposes if processed water sources are protected hygienically and after proper required treatment Kataria, H.C. and Ambhore Santosh (2009). Vol. 4(2), 433-434, Theotia, SPS and Teotia, Enderic Current World Environment, 3,209-210 (2008), Iqbal, S.A.

References

1 Anilakumary KS, Abdul Aziz PK, Natrajan P., (2007), Water quality of the Adimalathma estuary southwest coast of India, Journal of Marine biological association of India, 49, pp 1-6.

2. Banerjea S. M., (1967), Water quality and soil condition of fishponds in states of India in relation to fish production, Indian journal of Fisheries, 14(1 &2), pp 115-144.

3. Devaraju TM, Venkatesha MG. Singh S., (2005), Studies on physic-chemical parameters of Muddur lake with reference to suitability for aquaculture. Nat. Environment and pollution technology, 4, pp 287-290.

4. Hujare, M.S., (2008), Seasonal variation of physicochemical parameters in the perennial tank of Talsande, Maharashtra, Ecotoxicology and Environmental Monitoring, 18(3), pp 233-242

5. ICMR:(1975) Manual of standard of quality for drinking water supplies special report series series no.44 2™* edition.

6. Kataria, H.C. and Ambhore Santosh : Assessment of water quality of Gandhinagar area of Bhopal city, M.P. (India), current world Environment, Vol. 4(2), 433-434 (2009).

7. NEERI(1986) manual on water and waste water analysis National Environmental Engineering Research Institute, Nagpur.

8. Prabu VA, Rajkumar M, Perumal P., (2008), Seasonal variations in physicochemical characteristics of Pichavaram mangroves, southeast coast of India, Journal of Environmental Biology, 29(6), pp 945-950.

9. Rani, R., Gupta, B.K and Srivastava, K.B.L., (2004), Studies on water quality assessment in Satna city (M.P): Seasonal parametric variations, Nature environment and pollution technology, 3(4), pp 563- 56

10. Theotia, SPS and Teotia, Enderic: Fluoride Bones and Teeth update, J. Thombal, D.U. et al. : Fluorides in some groundwater samples of Sailu Tehsil, Current World Environment, 3,209-210 (2008).