

Airo National Research Journal

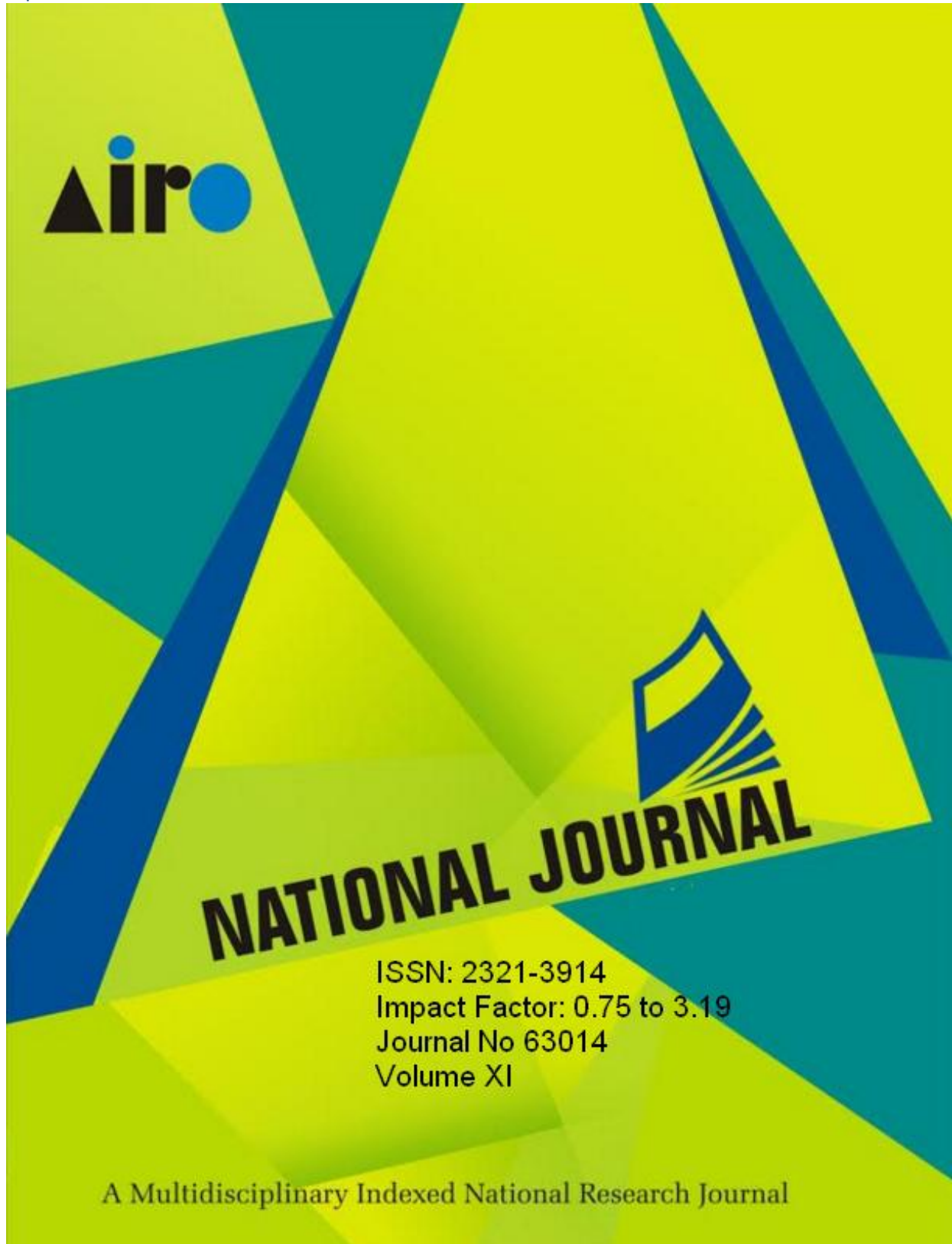
Volume XI, ISSN: 2320-3714

August, 2017

Impact Factor 0.75 to 3.19



UGC Approval Number 63014



## **STUDIES ON SEASONAL VARIATIONS IN PHYSICO-CHEMICAL PARAMETERS OF KHAJA KOTNOOR RESERVOIR, KALABURAGI DISTRICT, KARNATAKA**

### **1) RESHMA PUTGI**

Environmental Biology Research Unit, Department of Zoology, Gulbarga University, Kalaburgi,  
585106, Karnataka.

### **2) SYEDA KAHKASHAN TANVEER FATIMA**

Environmental Biology Research Unit, Department of Zoology, Gulbarga University, Kalaburgi,  
585106, Karnataka.

### **3) K. VIJAYKUMA, (Research Guide)**

Environmental Biology Research Unit, Department of Zoology, Gulbarga University, Kalaburgi,  
585106, Karnataka.

### ***ABSTRACT***

*This study was aimed to estimate current status of physico-chemical characteristic of Khaja Kotnoor reservoir of kalaburagi district, Karnataka. Monthly changes in physico-chemical parameters such as water temperature, pH, total dissolved solids, total hardness, dissolved oxygen and biological oxygen demand were analyzed for a period of one year from February 2013 to January 2014. The results indicated that physico-chemical parameters of the water were within the permissible limits and can be used for domestic, irrigation and pisciculture.*

**Keywords:** *Khaja Kotnoor Reservoir, Physico-chemical parameters, Monthly variation, DO, BOD, irrigation.*

### **INTRODUCTION**

Water resources are of critical importance to both natural ecosystem and human development. It is essential for agriculture, industry and human existence. The healthy aquatic ecosystem is depended on the physico-chemical and biological

characteristics (Venkatesharaju et al 2010). The quality of water in any ecosystem provides significant information about the available resources for supporting life in that ecosystem. Good quality of water resources depends on a large number of physico-chemical parameters and biological

characteristics. To assess that monitoring of these parameters is essential to identify magnitude and source of any pollution load. These characteristics can identify certain condition for the ecology of living organisms and suggest appropriate conservation and management strategies. Many researches are being carried out till present (Rajesh et al 2002, Jayaraman et al 2003, Sharma & Gupta 2004; Rajasekar et al., 2005; Sridhar et al., 2006; Anilakurmary et al., 2007; Prabu et al., 2008; Raja et al., 2008; Pradhan et al., 2009; Srivastava et., 2009; Damotharan et al., 2010; Prasanna and Ranjan, 2010).

In India there are enormous number of natural and manmade water bodies used for various purposes, mainly for drinking and agriculture. However, in recent years due to rapid urbanization industrialization and modern agricultural activities, the quality of water bodies deteriorated causing environmental hazards [Bhadja, P., and Vaghela, A., 2013]. Due to the growth of population, and man-made activities, the quality of water is deteriorating everywhere [Bhadja, P., and Vaghela, A., 2013]. One of the most severe problems in arid and semi-



arid regions is high concentration of salts in soils and water resources [Dutta, S., and Chowhan, P., 2009]. Thus, water quality and its management have received much attention in developing countries.

The aim of the study is too revealed out the pollution status of Reservoir in terms of physico-chemical characteristics of water. However, very little information is available in relation to physico-chemical characteristics of water in the study area. Hence, the preset study was conducted to study the physico-chemical properties of water in the Khaja Kotnoor reservoir for a period of one year from **February 2013 to January 2014**

## **MATERIALS AND METHODS:**

Kalburagi is the Divisional headquarter of five revenue districts. It is situated in the northern part of Karnataka State  $76^{\circ}-04'$  to  $77^{\circ}-42'$  longitudes and  $16^{\circ}-12'$  to  $17^{\circ}-46'$  latitude located 454 meters above MSL. The climatic condition of Kalaburagi region can be analyzed in the three seasons i.e. usually from June to September will be southwest monsoon season, from October to January will be northeast season, while

summer season starts from February to May if every year.

The Kaji-Kotnoor reservoir was selected for the present investigation, which is situated about 15 km distance from the Kalaburagi city. Water samples were collected randomly in different locations of the reservoir during an early hours of the day (7.30am to 10.30am) for a period of one year (February 2013 to January 2014) and such samples were pooled together to consider a final sample for analysis. Different parameters namely water temperature, hydrogen-ion, concentration, dissolved oxygen, total hardness, total alkalinity, Calcium, Magnesium, Chloride, Sulphate, Phosphate, were carried Out in the Khaji Kotnoor reservoirs. The physico-chemical parameters estimation was analyzed followings standard methods APHA, AWWA (2005) (Table-1).

**Table-1 physico chemical parameters of Khaji Kotnoor reservoirs**

Month /Year	A to m s. T e m p	W a t e r T e m p	p H	D O m g /l	T o t a l h a r d e n e s s	C a +	M g	C l	N a	K	T A
-------------	-------------------	-------------------	-----	------------	-----------------------------	-------	-----	-----	-----	---	-----

	O	C									
Feb rua ry 201 3	3 0. 9	2 5. 9	7 . . 9 9	4 . . 1 5	2 7 8.	6 0 5	3 0 4	1 2 5	5 0 6	4 . . 5 6	1 7 0 . . 6 6
Ma rch	3 0. 7	2 4. 7	7 . . 8 5	3 . . 6 6	2 7 5.	6 3 8	3 4 5	1 3 0	5 2 4	4 . . 9 4	1 8 0 . . 5 5
Ap ril	3 2. 8	2 5. 5	7 . . 8 8	3 . . 8 7	2 8 0.	5 3 6	3 8 3	1 2 5	4 8 2	5 . . 2 2	1 7 5 . . 4 4
Ma y	3 3. 6	2 6. 5	7 . . 7 1	3 . . 6 4	2 7 5.	5 5 1	3 7 1	1 2 0	4 7 2	5 . . 3 2	1 6 5 . . 3 3
Jun e	3 2. 5	2 8. 5	7 . . 8 5	4 . . 2 6	2 8 0.	5 8 9	3 5 2	1 2 0	4 9 4	5 . . 1 4	1 6 8 . . 2 2
Jul y	3 4. 1	2 9. 6	7 . . 9 6	3 . . 2 2	2 8 5.	6 8 4	4 5 2	1 2 8	8 2 9	5 . . 2 9	1 7 5 . . 1 1
Au gus t	3 3. 3	2 5. 5	7 . . 8 5	3 . . 6 3	2 7 8.	7 2 2	3 8 3	1 8 9	8 1 6	4 . . 3 6	1 9 0 . . 2 2
Sep tem ber	3 4. 1	2 8. 3	7 . . 8 3	3 . . 2 8	2 5 0.	6 5 3	3 2 2	1 2 0	8 2 3	5 . . 5 3	1 8 1 . . 3 3
Oct obe	3 2. 2	2 6. 2	7 . . 3 3	3 . . 2 6	2 6 6	6 4 4	5 5 1	1 1 1	3 8 8	5 . . 5 6	1 6 6 . . 6 6

r	2	3	6	8	4.	.	.	5	.	6	0
			1	9	1	1	4	1	1		9
No	3	2	7	4	2	6	4	1	6	4	1
ve	0.	5.	.	.	8	6	0	1	5	.	8
mb	9	2	8	9	0.	.	.	0	.	1	5
er			2	8	3	5	5	.	2		5
De	2	2	7	4	2	5	2	1	3	3	1
ce	9.	4.	.	.	5	8	8	1	0	.	9
mb	9	2	8	1	0.	.	.	8	.	3	0
er			1	6	4	2	9	.	3		6
Jan	2	2	7	4	2	6	3	1	5	4	1
uar	9.	4.	.	.	5	2	2	2	0	.	7
y	1	2	8	4	0.	.	.	0	.	3	5
201			9	2	5	3	3	.	3		8
4								4			

## RESULT AND DISCUSSION

The results obtained from analysis of water samples are given in Table 1. pH: pH is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkaline. The measurement of alkalinity and acidity of pH is required to determine the corrosiveness of the water. The standard values of pH for drinking water by BIS is between 6.5-8.5 while, WHO is between 7.0 - 8.5. pH value for drinking water is limited from 5.5 to 8.5 and for effluent discharge it is between 5.5 and 9 as per IS: 2490 and CPCB. High value of pH may results due to waste discharge, microbial decomposition of organic matter

in the water body (Patil *et al.*, 2012). In the present study all the samples have pH values below the prescribed values .

## TOTAL ALKALINITY

During the study period the total alkalinity during summer season was 165.3 mg/l to 180.5 mg/l, during southwest monsoon season the total alkalinity was noticed between 168.2 mg/l to 190.2 mg/l; The Total alkalinity during northeast monsoon season the total alkalinity was noticed between 160.9 mg/l to 190.6 mg/l.

In the present investigations, it could be observed that the total alkalinity of reservoir varied seasonally. The values tended to increase end of the northeast monsoon season and summer season with distinct peak in the month of May of 2013. While during southwest monsoon season, low total alkalinity may be due to influx of rainwater. Higher values during summer season have been directly correlated with the productivity of the all the water bodies.

## TEMPERATURE

During the study period temperature in summer season of reservoir was 25.5 °C to 27.4 °C , during southwest monsoon season,

the temperature was noticed between 25.5°C to 26.4 °C; The water temperature during northeast monsoon season was noticed between 26.1°C to 28.2 °C.

### **TOTAL DISSOLVED SOLIDS**

Water portability depends on the total dissolved solids higher concentration of dissolved solid processes distress in cattle and plants, which are also adversely effected. It results in increase in salinity of soil and also difficulties in industrial application. The Total dissolved solids during summer season of reservoir was 510.6 mg/l to 550.9 mg/l, during southwest monsoon season of was noticed between 520.1 mg/l to 530.3 mg/l;

### **DISSOLVED OXYGEN**

The Dissolved oxygen during summer season of reservoir was 3.66 mg/l to 4.15 mg/l. During southwest monsoon season, the Dissolved oxygen was noticed between 49.4 mg/l to 89.6 mg/l. The Dissolved oxygen during northeast monsoon season of reservoir was noticed between 30.3 mg/l to 65.2 mg/l.

The observations in the present work, on the whole lead to understanding perhaps, the



levels of oxygen in lentic environments of smaller dimensions are not governed by a single parameter individually but by the combined influence of several parameters which viz., temperature. More over it is also worthwhile to mention that during summer season gusts of wind occurring rather frequently in this area, which enhances the scope of air–water interaction, thus increasing the dissolved oxygen level. In the present study it is opined that this also contributes to increase oxygen levels apart from the other factors.

### **TOTAL HARDNES**

The Total hardness during summer season of reservoir was 275.1 mg/l to 280.4 mg/l. The Total hardness during southwest monsoon season was noticed between 250.9 mg/l to 285.7 mg/l. The Total hardness during northeast monsoon season of reservoir was noticed between 250.5 mg/l to 280.3 mg/l.

In the present study all the seasonal falls under the moderately hard water condition. According to Brindha et al., (2011) and Reservoirrotharan et al., (2010), suggests that moderate hard water is more productive than the soft water. In the present investigation a similar observations has been observed



where the productive of the reservoir is on the higher level.

## **CALCIUM**

The Calcium during summer season of reservoir was 55.5 mg/l to 60.5 mg/l. The Calcium during southwest monsoon season of was noticed between 58.9 mg/l to 72.2 mg/l. The Calcium during northeast monsoon season was noticed between 58.6 mg/l to 65.3 mg/l.

The calcium values during study period fluctuated to high level and same was observed in the one year period. The calcium content was high during October to January and followed by southwest monsoon. Low calcium was noticed in summer.

## **MAGNESIUM**

The Magnesium during summer season of reservoir was 30.4 mg/l to 38.3 mg/l. The Magnesium during southwest monsoon season was noticed between 32.2 mg/l to 45.2 mg/l. The Magnesium during northeast monsoon season was noticed between 28.9 mg/l to 55.4 mg/l.

## **CHLORIDE**



The Chloride during summer season of reservoir was 120.2 mg/l to 130.3 mg/l. The Chloride during southwest monsoon season was noticed between 118.9 mg/l to 128.8 mg/l. The Chloride during northeast monsoon season was noticed between 110.2 mg/l to 120.4 mg/l.

Most of these observations noted that maximum values of below 150 mg/l. during summer season and minimum in southwest monsoon and northeast monsoon season. The present data confirms such as increase in summer and decrease in other seasons. In the present investigation to the chloride level showed the greater periodicity being higher in summer where there is high rate of evaporation.

## **SODIUM**

The Sodium during summer season reservoir was 47.2 mg/l to 50.6 mg/l. The Sodium during southwest monsoon season was noticed between 49.4 mg/l to 89.6 mg/l.

## **POTASSIUM**

The Potassium during summer season reservoir was 4.5 mg/l to 5.3 mg/l. The Potassium during southwest monsoon season was noticed between 4.3 mg/l to 5.5

mg/l. The Potassium during southwest monsoon season was noticed between 4.3 mg/l to 5.5 mg/l.

### CONCLUSION:

The present study was undertaken with an aim to analyze certain physico - chemical parameters in the reservoir. The parameters analyzed have shown that they are all within the permissible limits for drinking.

It may be concluded that there is definite impact of industrial waste on the quality of ground water in near future.

### REFERENCE

1. Ajagekar, V.V., K.N. Nikam and C.V. Pawar (2011). Physico-chemical limnology of Chitri reservoir, Ajara, Maharashtra. Nat. Envi. and Poll. Tech. 10 (1): 145-146.
2. Barbeau B, Carrière A and Maryse F. Bouchard, (2010): Spatial and temporal variations of manganese concentrations in drinking water, Journal of Environmental Science and Health, Part A 46, (6), pp 608-616.
3. Bhadja P (2013): Assessment of physico-chemical parameters and



- water quality index of reservoir water. *Intr. J.Pnt Anim and Envi Sci* 3(3):89–95.
4. Das R N and Kim J ,(2012): GLM and joint GLM techniques in hydrogeology: an illustration, *Int. J. of Hydrology Science and Technology* Vol. 2, No.2 pp. 185 - 201.
  5. Ganapathi, RN. & A.V. Raman (1973). Pollution in the Visakhapatnam Harbour. *Current Science* 42: 490—492.
  6. Gawrońska H, Łopata M, Jaworska B. (2007) The effectiveness of the phosphorus inactivation method in reducing the trophy of lakes of different morphometric and hydrological features *Limnol. Rev.* 7(1): 27–34..
  7. Janeshwar Y (2012): Analysis of water quality using physicochemical parameters, satak reservoir in Khargone district MP, India. *Int Res J Environ Sci* 2(1):9–11.
  8. Janeshwar Y, Pathak R.K. and Khan Eliya (2013): Analysis of Water Quality using Physico-Chemical Parameters, Satak Reservoir in





- Khargone District, MP, India, Int. Res. J. Environment Sci., 2(1), 9-11
9. Kadhem M A and Praveen R S (2015): Evaluation of Physico-Chemical Parameters to Assess the Water Quality of Fox Sagar Lake, Jeedimetla, Hyderabad, India. Int. J. Adv. Res. Sci. Technol. (4), 5, 441-444.
10. Manjare, S A., Vhanalkar, S A. and Muley, D V. (2013): Analysis of water quality using physico-chemical parameters, Tamdalge tank in Kolhapur District. Int. J. Advanc. Biotech. and research. 1 (2): 115-119.
11. Nabila B (2014) An assessment of the physico-chemical parameters of Oran sebkha basin. Appl Water Sci 4:351–356
12. Nagaraju A (2014) Assessment of ground water quality for irrigation: a case study from Bandalamottu lead mining area, Guntur district, Andhra Pradesh. Appl Water Sci 4:385–396.
13. Nikam, K.N., V.V. Ajagekar and C.V. Pawar (2011). Study of physicochemical nature of water from Jangamhatti Reservoir, Chandgad, Dist. Kolhapur Maharashtra. Nat.Envi. and Poll. Tech. 10 (4): 655-656.
14. Pradeep V, Deepika C, Urvi G and Hitesh S. (2012): Water quality analysis of an organically polluted lake by investigating different physical and chemical parameters. International J of Research in Chemistry and Environment, 2 (1):105- 111.
15. Pradhananga A R, Ramesh K S, Pawan R S., (2013): Assessment of physicochemical parameters of surface water quality of Taudaha lake of Kathmandu and their comparison with other global published values.
16. Bibechana 9 (2013) 141-150: BMHSS, p.141 (Online Publication: Nov., 2012).
17. Prasanna, M., Ranjan, P.C., (2010). Physico- chemical properties of water collected from Dharma estuary, International Journal of Environmental Science, 1(3): 334-342.
18. Rani M and Mandhanya S (2012.): Analysis of various physico-chemical parameters for the water



- quality assessment of central region,  
J.of Eng and management. 1 (1).
19. Reservoirrotharan P, Permal NV,  
Perumal P., (2010:, Seasonal  
variation of physicochemical  
characteristics of Point Calimere  
coastal waters (South east coast of  
India). Middle-East Journal of  
scientific research, 6(4),.
20. K. VIJAYKUMAR,  
M.RAJASHEKAR,  
SHASHIKANTH.M AND B.  
VASANTHKUMAR., WATER  
QUALITY OF BENNITHORA
- RIVER IN KARNATAKA., Dept. of  
Zoology,Gulbarga University,  
Gulbarga, Karnataka, India.
21. Ibrahim, B.U., Auta, J. and Balogun,  
J.K. AN ASSESSMENT OF THE  
PHYSICO-CHEMICAL  
PARAMETERS OF KONTAGORA  
RESERVOIR, NIGER STATE,  
NIGERIA., Department of  
Biological Sciences, Faculty of  
Science, Ahmadu Bello University,  
Zaria – Nigeria., Bayero Journal of  
Pure and Applied Sciences, 2(1): 64  
- 69