



Received: 27th April-2012

Revised: 30th April-2012

Accepted: 03rd May-2012

Research Article

STUDIES ON PHYSICO-CHEMICAL ASPECTS OF MHASWAD WATER RESERVOIR OF SATARA DISTRICT (MAHARASHTRA) INDIA

M. J. Lubal^a, A.U.Sutar^{b*} and K.W.Pawar^b

^aDahiwadi College Dahiwadi, Satara 415 508 (M.S.) India.

^bM. J. S. Mahavidyalaya, Shrigonda, Ahmednagar 413 701 (M.S.) India.

* Corresponding author, e-mail: ausutar@gmail.com

ABSTRACT: Present paper deals with the study of Physico-chemical parameters of Mhaswad water reservoir in Satara district of Maharashtra. Monthly variations in the physical and chemical parameters such as atmospheric temperature, water temperature, transparency, pH, dissolved oxygen, total alkalinity, total hardness, chlorides, sulphates, total dissolved solids were investigated for a period of one year (October 2007 to September 2008). All parameters were within permissible limits. This represents that the reservoir is non-polluted and can be used for agriculture, fish culture and domestic use.

Keywords: Physico-chemical, Mhaswad, Water reservoir.

INTRODUCTION

Water is said as the liquid of life and is the essence of all living processes. Water is the unique component of nature and play an important role in the life from molecules to man. Hence the great human civilization has originated, evolved and flourished around water resources. The quality of water is described by its physical, chemical and biological characteristics. Numerous anthropogenic activities like disposal of sewage, industrial water, recreational activities, excess use of chemical fertilizers and pesticides has threatened environmental health of both surface and ground water. It is therefore necessary that the quality of drinking water should be checked at regular time interval because use of contaminated water, human population suffers from a variety of water borne diseases.

Present study aims at investigating the Physico-chemical parameters in Mhaswad water reservoir of Satara district of Maharashtra. Mhaswad water reservoir is located in 17° 35' 0" N latitude and 74° 53' 0" E longitude. Water of this reservoir is basically utilized for domestic, agriculture and fisheries purpose. Many researchers have done studies on Physico – chemical properties of dam, reservoir and river water [3, 5, 6, 7, 8,11and14].However no work has been carried out on water quality of Mhaswad water reservoir, hence present study was carried out.

MATERIALS AND METHODS

The water samples were collected from Mhaswad reservoir from four selected sites (A- Hingani village, B- Devapur, C- Palsawade, D- Centre of reservoir) for a period of twelve months during the year Oct. 2007 to Sept. 2008. The physical parameters such as temperature of air and water were recorded by using thermometer. The transparency of water to light was measured by using Secchi disc. The pH was determined by using Hanna pH meter. The chemical parameters of water such as dissolved oxygen, total alkalinity, hardness, chlorides, sulphates and total dissolved solids etc. were determined by standard methods [2, 10, 15].

RESULTS AND DISCUSSION

The variations in the Physico-chemical parameters of Mhaswad water reservoir during the period of Oct.2007 to Sept.2008 are represented in the table 1 to 3.

Atmospheric temperature

The atmospheric temperature was found to be in the range between 24.7°C to 38.2°C. It was minimum during December and maximum in the month of May. It was higher during summer months and lower during winter months. Similar observations were recorded by Bade et.al. [3] in Sai reservoir, Latur and Manjare et. al. [11] in Tamdale tank, Kolhapur.

Water temperature

Water temperature is an important factor which influences the chemical, biochemical and biological characteristics of water body. Water temperature of Mhaswad reservoir ranged between 21.7 °C to 27.0 °C. The minimum water temperature recorded in the winter season and maximum in the summer months. Similar results were reported by Jayabhaye et. al. [6] and Salve et. al.[14].

Water transparency

Water transparency depends upon the suspended organic and inorganic matter as well as micro-organisms present in the water bodies. In present investigation it was ranged between 21 cm to 39cm. The transparency of water was minimum in rainy season and maximum in winter season. The water was more turbid in rainy season. Khan and Choudhary [9] (1994) reported higher transparency during winter and summer season. Kadam et.al. [7] also reported similar observations from Masoli reservoir of Parbhani district of Maharashtra.

pH

The pH of water ranged between 7.2 to 8.6. The minimum pH was recorded in the month of October and it was highest in the month of May. Bade et.al. [3] and Jayabhaye et.al.[6] reported similar observations.

Table 1: Monthly variations of Physico-chemical parameters of Mhaswad water reservoir at four sampling sites during the year October 2007 to September 2008

Months	Atmospheric Temperature				Water Temperature				Transparency				pH			
	Spot	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C
October2007	27.5	27.2	27.2	27.3	23.8	24.2	23.9	24.1	30	30	30	30	7.2	7.2	7.3	7.3
November	26.5	26.7	25.9	26.8	22.8	22.9	22.8	22.7	31	31	30	30	7.5	7.7	7.6	7.6
December	25.0	24.7	25.2	25.3	22.0	22.0	21.7	21.9	33	32	33	32	8.2	8.2	8.2	8.3
January2008	26.0	26.1	26.1	26.1	22.6	22.6	22.5	22.5	33	33	33	33	8.2	8.2	8.3	8.3
February	32.0	31.9	31.9	32.0	24.3	24.5	24.4	24.5	35	34	34	34	8.3	8.3	8.4	8.3
March	33.0	33.2	33.1	33.2	25.3	25.4	25.3	25.3	35	36	36	36	8.3	8.4	8.4	8.3
April	37.5	37.5	37.5	37.5	26.3	26.2	26.1	26.1	36	36	37	39	8.4	8.4	8.4	8.4
May	38.0	38.2	38.1	38.1	27.0	27.0	27.0	27.0	36	38	36	36	8.4	8.4	8.5	8.6
June	30.0	30.0	30.9	29.9	26.0	26.1	26.1	26.0	30	30	30	30	8.4	8.4	8.4	8.4
July	25.0	25.1	25.2	25.1	24.8	24.8	24.7	24.7	23	23	22	23	8.4	8.3	8.4	8.3
August	25.4	25.4	25.4	25.3	23.6	23.8	23.8	23.7	22	22	21	21	8.3	8.2	8.2	8.0
September	25.5	25.2	25.8	25.2	23.8	23.8	23.8	23.8	22	21	21	21	7.6	7.7	7.6	7.5

Dissolved Oxygen

It is an important factor in water as it regulates many metabolic processes of aquatic organisms. The dissolved oxygen almost all plants and animals need for respiration. The values of dissolved oxygen ranged between 7.7 mg/L to 12.5 mg/L. The minimum dissolved oxygen was recorded in the month of May (summer) and maximum in the month of August (monsoon). Similar trends were reported by Deshmukh and Ambore. [4], Ahamed and Krishnamurthy [1].

Total alkalinity

Alkalinity is the measure of the capacity of water that neutralizes the acids. In present study the total alkalinity ranged between 182 mg/L to 270 mg/L. Total alkalinity found minimum in monsoon and maximum in summer during the study. Similar observations made by Bade et.al. [3], Nair [13] and Mane et.al.[12].

Total hardness

The values of hardness ranged between 119 mg/L to 167 mg/L. The maximum value (167 mg/L.) was recorded in the month of July and minimum value (119 mg/L) in the month of November. Hujare [5] reported the total hardness high during summer than monsoon and winter.

Table 2: Monthly variations of Physico-chemical parameters of Mhaswad water reservoir at four sampling sites during the year October 2007 to September 2008

Months Spot	Dissolved oxygen(mg/L)				Total alkalinity(mg/L)				Total hardness(mg/L)			
	A	B	C	D	A	B	C	D	A	B	C	D
October2007	10.4	10.3	10.5	10.4	190.0	198.0	196.0	202.0	128.0	130.0	135.0	132.0
November	10.3	10.3	10.2	10.2	188.0	192.0	185.0	194.0	132.0	132.0	119.0	120.0
December	10.1	10.2	10.2	10.1	202.0	205.0	200.0	200.0	132.0	137.0	122.0	126.0
January2008	9.8	9.9	9.8	9.9	210.0	216.0	214.0	210.0	134.0	139.0	126.0	132.0
February	9.5	9.3	9.5	9.6	215.0	224.0	218.0	215.0	136.0	142.0	130.0	137.0
March	8.8	8.8	8.8	8.8	222.0	230.0	222.0	226.0	136.0	142.0	134.0	140.0
April	8.1	8.1	8.1	8.2	260.0	270.0	258.0	258.0	137.0	144.0	140.0	145.0
May	8.0	7.9	7.7	7.8	238.0	242.0	241.0	240.0	140.0	145.0	143.0	148.0
June	10.3	10.2	10.2	10.2	248.0	250.0	244.0	245.0	148.0	150.0	155.0	152.0
July	11.8	11.9	12.0	11.8	231.0	238.0	230.0	232.0	155.0	158.0	167.0	160.0
August	12.0	12.2	12.5	12.4	240.0	236.0	236.0	240.0	148.0	150.0	160.0	155.0
September	12.2	12.3	12.4	12.4	182.0	188.0	182.0	190.0	140.0	140.0	148.0	145.0

Chlorides

During the period of investigation chlorides in the water was ranged between 49 mg/L to 80 mg/L. The maximum values of chlorides recorded during monsoon season while in summer less chloride content was detected. Bade et.al. [3] reported maximum values in summer and minimum in winter season.

Sulphates

In present study, the sulphate values ranged between 30 mg/L to 60 mg/L. The minimum sulphate values recorded in winter and maximum during rainy season.

Total dissolved solids

Total dissolved solids means the amount of particles that are dissolved in water. The total dissolved solids fluctuated between 178 mg/L to 290 mg/L. Seasonal variations revealed that total dissolved solids values were maximum during summer and minimum during winter.

Table 3: Monthly variations of Physico-chemical parameters of Mhaswad water reservoir at four sampling sites during the year October 2007 to September 2008

Months Spot	Chloride(mg/L)				Sulphate(mg/L)				Total dissolved solids(mg/L)			
	A	B	C	D	A	B	C	D	A	B	C	D
October2007	73.0	73.0	76.0	76.0	38.0	40.0	40.0	35.0	195.0	196.0	196.0	196.0
November	66.0	66.0	70.0	70.0	30.0	35.0	30.0	32.0	180.0	180.0	178.0	180.0
December	60.0	58.0	58.0	58.0	32.0	36.0	35.0	35.0	200.0	205.0	210.0	200.0
January2008	57.0	57.0	57.0	58.0	45.0	45.0	45.0	44.0	266.0	270.0	270.0	266.0
February	53.0	53.0	54.0	54.0	45.0	45.0	45.0	42.0	275.0	280.0	280.0	278.0
March	53.0	52.0	51.0	51.0	45.0	44.0	45.0	42.0	272.0	272.0	275.0	274.0
April	51.0	51.0	50.0	51.0	42.0	43.0	44.0	40.0	265.0	272.0	272.0	270.0
May	50.0	49.0	49.0	50.0	40.0	41.0	41.0	40.0	280.0	290.0	285.0	280.0
June	52.0	53.0	52.0	52.0	44.0	48.0	50.0	45.0	270.0	277.0	271.0	268.0
July	53.0	53.0	52.0	52.0	50.0	56.0	56.0	52.0	255.0	262.0	260.0	260.0
August	58.0	59.0	62.0	62.0	55.0	58.0	60.0	52.0	230.0	232.0	231.0	232.0
September	70.0	72.0	75.0	80.0	50.0	52.0	48.0	44.0	212.0	202.0	212.0	210.0

CONCLUSION

A study of Physico-chemical parameters of Mhaswad water reservoir in Satara district of Maharashtra was carried out by taking certain important parameters like atmospheric temperature, water temperature, transparency, pH, dissolved oxygen, total alkalinity, total hardness, chlorides, sulphates, total dissolved solids etc. for a period of one year (October 2007 to September 2008). In present investigation it was found that all parameters were within permissible limits. This represents that the reservoir is non-polluted and can be used for agriculture, fish culture and domestic use.

ACKNOWLEDGEMENTS

The authors are grateful to the Principal, Dahiwadi College, Dahiwadi for providing necessary laboratory facilities.

REFERENCES

- [1] Ahamed Masood and R. Krishnamurthy. 1990. Hydrobiological studies of Wohar reservoir, Aurangabad (Maharashtra State) India. *J. Environ. Biol.* 11(3):335-345.
- [2] APHA 1995. Standard methods for the examination of water and wastewater, American Public Health Association, 19th Edition, Washington, USA.
- [3] Bade B B, Kulkarni D A and Kumbhar A C. 2009. Studies on physico-chemical parameters in Sai Reservoir, Latur Dist, Maharashtra. *Vol.II(7)*: 31-34.
- [4] Deshmukh and Ambore. 2006. Seasonal variations in physical aspects of pollution in Godavari River at Nanded, Maharashtra, India, *J.Aqua. Biol.* 21(2):93-96.
- [5] Hujare M S. 2008 Seasonal variations of Physico-chemical parameters in the perennial tank of Talsande, Maharashtra. *Ecotoxicol. Environ. Monit.* 18(3): 233-242.
- [6] Jayabhaye U. M, B S Salve and M S Pentewar. 2008. Some Physico-chemical aspects of Kayadhu river, District Hingoli, Maharashtra. *J. Aqua. Biol.* 23(1):64-68.
- [7] Kadam M S, Pampatwar D V and Mali R P. 2007. Seasonal variations in different physico-chemical characteristics in Masoli reservoir of Parbhani district, Maharashtra. *J. Aqua. Biol.* 22(1):110-112.
- [8] Kamble S M, Kamble A H and Narke S Y. 2009. Study of Physico-chemical parameters of Ruti Dam, Tal. Ashti, Dist, Beed, Maharashtra. *J. Aqua. Biol.* 24(2):86-89.
- [9] Khan M A G and Choudhary S H. 1994. Physical and chemical limnology of lake Kaptai, Bangladesh. *Trop. Eco.* 35(1): 35-51.
- [10] Kodarkar M S. 1992. Methodology for water analysis- physicochemical, biological and microbiological. *Indian Association of Aquatic Biologists Hyderabad, Pub. 2*: pp. 50
- [11] Manjare S A, Vhanalakar S A and Muley D V. 2010. Analysis of water quality using Physico-chemical parameters Tamdalge tank in Kolhapur district, Maharashtra. *J. Adv. Biotech. And Research.* 1 (2): 115-119.
- [12] Mane and Madlapure. 2002. The study of hydrobiology of Manar River near Degloor, District Nanded. Ph. D. Thesis, S. R. T. M. University, Nanded.
- [13] Nair M.S. and Rajendran. 2000. Seasonal variations of physico-chemical factors and its impact on the ecology of a village pond at Imala (Vidisha). *J. Ecobiol.* 12(1): 21-27.
- [14] Salve V B and Hiware C J. 2008. Study on water quality of Wanparakalpa reservoir Nagpur, Near Parli Vaijnath, District Beed, Marathwada Region. *J. Aqua. Biol.* 21(2):113-117.
- [15] Trivedi R K and Goel P K. 1986. Chemical and Biological methods for water pollution studies. 209 pp, Enviromedia publications, Karad.