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Assessment of potable characteristics of Kolar dam

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Abstract
Water is our most essential part of life, but due to growing urbanization and anthropogenic activities, our water bodies are being polluted day by day. Kolar reservoir is the most important sources of potable water supply for Bhopal city. To assess its suitability for drinking purpose, the Physico–chemical characteristics were studied on monthly basis from January to December (2016). The Physico-chemical parameters such as pH, TDS, Conductivity, DO, Chloride, Total hardens, Total alkalinity, Nitrate, Phosphate, Sodium, Potassium, Calcium and MPN were analyzed. All Physico-chemical parameters were observed to be below the standard limits of WHO and BIS (2012).

Keywords: water quality, physico-chemical parameters, monthly analysis, Kolar dam

Introduction
Bhopal is the capital of the Indian state of Madhya Pradesh. Bhopal is known as the City of Lakes. The current population of the city is approx 24 lakhs. Bhopal receives 177.5 million liters per water per day (MLD) from BMC. Out of the 177.5 MLD, 45 MLD comes from Narmada water, 85 MLD water from the kolar dam and 47.5 MLD from the upper lake. The shortage of water in the country is slowly disturbing the lives of people as well as the environment around them. About 60 percent population of Bhopal and nearby cities depends upon kolar dam water. In Bhopal, the Kolar dam is one of the important sources of potable water.

Study area
Kolar dam (latitude 22° 57' 37" and longitude 77° 20' 24") is a major masonry dam which is located about 35 km from Bhopal near Lawakhedi village in Sehore District. It is constructed across the Kolar River near Birpur, a tributary of Narmada. The dam is about 45 m high. This reservoir has a catchment area of 508 km^2. The gross storage capacity is 270 Mcm and live storage capacity is 265 Mcm.
Kolar one of the most essential sources of water supply is precious for the city. Therefore it is essential to keep a regular watch on the quality of its water.

Fig 1: Map of Kolar dam showing sampling sites.

Material and Method

Standard procedures on given as APHA, ADONI, WHO (1984) [6] and BIS (2012) [3] have been followed to analyze various physico-chemical and microbiological parameters.

Results and Discussion

Table 1: Physico-chemical and microbiological parameters of Kolar dam

S. No.	Parameters	Units	(Jain *et al.*, 2012) [5] Avg (2007-10)	Present study Avg (2016-17)
			Min-Max	Min-Max
1.	pH	(Unit)	7.4 - 7.7	6.2 - 8.8
2.	Conductivity	(µS)	248 - 344	100 -210
3.	TDS	(mg/l)	78 - 398	60-137
4.	Chloride	(mg/l)	12.2 - 20.3	6-29
5.	DO	(mg/l)	7.4 - 7.9	4.3-8.6
6.	Hardness	(mg/l)	99 - 138	34-84
7.	Alkalinity	(mg/l)	105 - 184	100 – 182
8.	Nitrate	(mg/l)	0.057 - 0.713	0.0089 -0.5377
9.	Phosphate	(mg/l)	0.194 - 2.244	0.0003 -0.194
10.	Sodium	(mg/l)	5-140	4.31 -7.84
11.	Potassium	(mg/l)	1-9	0.12-2.52
12.	Calcium	(mg/l)		26.02 -29.65
13.	MPN	(MPN/100ml)	4-2400	20 -460

The observations on physico-chemical parameters of water of Kolar dam has been summarized in Table1. A similarity of the variations in physico-chemical parameters from year (2012) to year (2016).

pH

During present study pH value of the water ranged from (6.2-8.8unit). Maximum value (8.8 Unit) of pH was recorded during July whereas, minimum (6.2 unit) was recorded during January. However, the pH value recorded by (Jain *et al* 2012) [5] was found between (7.4-7.7 unit) whereas, pH value revealed by (Choudhary *et al* 2010) [4] was found between (7.4-7.8 unit).The permissible limit of pH (6.5 to 8.5 Units) for drinking purpose has been documented by BIS (2012) [3].

Conductivity

During present study the value of Conductivity ranged from (100-210 µS), which is below the standard level (1400 µS) as per WHO. A maximum value of (210 µS) was recorded during January whereas minimum value of (100 µS) was recorded during July or August. However the earlier study by (Jain *et al* 2012) [5] recorded higher conductivity values (248 to 344 µS).

Total Dissolved Solids (TDS)

The TDS of water sample ranged from (60 -137 mg/l). Maximum value of (137 mg/l) recorded during January whereas minimum (60 mg/l) was recorded during July. The values recorded during present investigation are below the limits as prescribed by BIS (2012) [3]. However the TDS value recorded by (Jain *et al* 2012) [5] recorded higher values (78-398 mg/l).

Chloride

Chloride during current investigation ranged from (6-29 mg/l). Maximum value of chloride (29 mg/l) was recorded during January while the minimum value of (6 mg/1) was observed during November. However the chloride value reported by (Jain *et al* 2012) [5] ranged between 12.2-20.3 mg/l. The permissible limit of chloride (250 mg/l) for drinking purpose has been regarded by BIS (2012) [3].

Dissolved Oxygen

The DO of water samples ranged from (4.3-8.6 mg/l). Maximum value of DO (8.6 mg/l) was recorded during January while minimum value (4.3 mg/l) has observed during August and December. Jain *et al* 2012 [5] recorded DO values of 7.4-7.9 mg/l.

Total Hardness

Total Hardness of the water samples ranged from (34-84 mg/l). Maximum value of (84 mg/l) was observed during October whereas minimum value of (34 mg/l) was observed during May. Jain *et al* 2012 [5] recorded higher values ranged between 99-138 mg/l while Choudhary *et al* 2010 [4] recorded (112-124 mg/l). The permissible limit of total hardness is 200 mg/l for drinking purpose BIS (2012) [3].

Total Alkalinity

The Total alkalinity of water sample ranged from (100-182 mg/l) during current study. Maximum value (182 mg/l) was recorded in April where as minimum value of (100 mg/l) was recorded during July. Jain *et al* 2012 [5] reported a ranged of (105-184 mg/l). The permissible limit of total alkalinity is 200 mg/l for drinking purpose ranged by BIS (2012) [3].

Nitrate

Nitrate indicates the pollution in water due to mixing of sewage. The Nitrate value of water sample was ranged between 0.0089 mg/l (august) - 0.5377 mg/l (October). Maximum value of nitrate (0.53 mg/l) was recorded during October while minimum value of (0.008 mg/l) was observed during August. The nitrate value recorded by Jain *et al* (2012) [5] lied between 0.057-0.71 mg/l. The values are found below the standard value of 45 mg/l as per BIS (2012) [3].

Ortho-Phosphate
The phosphate value of water sample ranged between 0.0003-0.194 mg/l. Maximum value of phosphate (0.194 mg/l) was recorded during January while minimum value of 0.0003 mg/l was observed during November. However the phosphate value revealed by (Jain *et al* 2012) [5] recorded higher value found between (0.194-2.24 mg/l).

Sodium
The sodium value of water sample ranged between (4.31-7.84 mg/l) Maximum value of sodium (7.84 mg/l) was recorded during May while minimum value (4.31 mg/l) was recorded during December. However the earlier study by (Jain *et al* 2012) [5] recorded higher sodium values (5-140 mg/l). Whereas, WHO prescribed in limit of 200 mg/l for sodium in potable water.

Potassium
The potassium value of water sample ranged between (0.12-2.52 mg/l) Maximum value of potassium (2.52 mg/l) was recorded June while minimum value (0.12 mg/l) was recorded during August. However the earlier study by (Jain *et al* 2012) [5] recorded higher potassium values (1-9mg/l).

Calcium
The calcium value of water sample ranged between (26.02-29.65 mg/l) Maximum value of calcium (29.65 mg/l) was recorded June while minimum value (26.02 mg/l) was recorded during august. The permissible limit of calcium (75 mg/l) for drinking purpose has been recognizing BIS (2012) [3].

Coliform (MPN)
The MPN value of water sample ranged between (20 -460 MPN/100ml) during present study. Maximum value of MPN 460 (MPN/100ml) was recorded may or June while minimum value 20 (MPN/100ml) was recorded during January or September. However the earlier study by (Jain *et al* 2012) [5] recorded higher coliform MPN values (4-2400 MPN/100ml).

Conclusion
During present study all most all parameters pH, TDS, Conductivity, DO, Chloride, Total hardens, Total alkalinity, Nitrate, Phosphate, Sodium, Potassium, Calcium and MPN were found within the permissible limit as per BIS (2012) [3] and WHO standard. Jain *et al* (2012) [5] also reported that the water of Kolar reservoir is moderately soft with moderate alkalinity. The overall water quality of Kolar reservoir is not much affected by anthropogenic sources as it is surrounded by thick forest and less human activities. Therefore its water can only be used for drinking purposes but only after conventional treatment and disinfection.

References

1. Adoni AD. Work book on Limnology Pratibha Publisers. C - 10, Gour Nagar Sagar, India, 1985.
2. APHA. Standard methods for the examination of water and wastewater, 6th edition. American Public Health Association, Washington DC, 1995.
3. BIS. Bureau of Indian Standards Drinking water specification, IInd revision, IS 10500, 2012.
4. Choudhary R, Rawtani P, Vishwakarma M. Study of physico chemical parameters of kolar dam in different seasons, j. Chem. & cheml. Sci. 2010; 1(**1**)87-92.
5. Jain RK, Jais GK, Saxena A, Upadhyay A, Shukla R, Shrivastava PK. Potentiality of Kolar Dam Water for Drinking Purposes, Food Science and Quality Management, 2012.; 3:18-22.
6. World Health Organization. Guideline for drinking water quality. Geneva: WHO, 1984.