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STUDIES ON PHYSICO-CHEMICAL ASPECTS OF HINGANGAON BK.WATER RESERVOIR OF KADEGAON TAHSIL, SANGLI DISTRICT (MAHARASHTRA) INDIA

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ABSTRACT

Present paper deals with the study of Physico-chemical parameters of Hingangaon Bk. water reservoir located in Kadegaon Tahsil in Sangli district of Maharashtra. The study was carried out for a period of one year i.e. July 2015to June 2016. Present investigation shows 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 . All parameters were within permissible limits which represents that the Hingangaon Bk. water reservoir is non-polluted and can be used for agriculture, fish culture and domestic use.

KEYWORDS: Physico-chemical, Water reservoir, Kadegaon Tahsil

Water is one of the most important and precious natural resource of the ecosystems.Earth is only the planet having about 70 % of water. But due to increased human populationand numerous anthropogenic activities like disposal of sewage, industrial water, recreational activities, excess use of chemical fertilizers and pesticides directly affects the environmental health of both surface and ground water. The quality of water is monitored by its physical, chemical and biological characteristics. 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 deals with the study of Physico-chemical parameters of Hingangaon Bk.water reservoir of Kadegaon Tahsil, Sangli district of Maharashtra. Present investigation helps to understand the water quality of Hingangaon Bk.water reservoir for sustainlable development.

MATERIALS AND METHODS

Study Area

Hingangaon Bk village is located in Kadegaon Tahsil of Sangli district in Maharashtra, India. It is situated 13km away from sub-district headquarter Kadegaon and 76km away from district headquarter Sangli.The total geographical area of village is 1262 hectares. Hingangaon Bk has a total population of 3,642 peoples. There are about 802 houses in Hingangaon Bk village. Karad is nearest town to Hingangaon Bk which is approximately 31km away.Hingangaon Bk Water reservoir is only a major source of water for agriculture, domestic use as well as for fishery purpose.Hingangaon Bk Water reservoir located at17^0 $24^{'}24.1^{''}$N latitude and 74^0 $20^{'}$ $41.5^{''}$ E longitude of Hingangaon Bk villege. It occupies 45 to 50 hectares of total area of villege. (Fig 1)

Figure 1: Satelite image of study area and photograph of Hingangaon Bk. water reservoir of Kadegaon Tahsil, Sangli District of Maharashtra, India.

Sample Collection

The water samples were collected from Hingangaon Bk. water reservoir from four selected sites

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denoted as Site-A, B, C, and D for a period of twelve months during the year July 2015 to June 2016.Sample collection were done early in the morning and then brought into Research laboratory of Yashwantrao Chavan College of Science, Karad, for further analysis.The physical parameters such as temperature of air and water were recorded by using thermometer and 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 using standard methods (APHA ,1995 Kodarkar, 1992 Trivedi, and Goel ,1986].

RESULTS AND DISCUSSION

The present investigation results intovariations in the Physico-chemical parameters of Hingangaon Bk. water reservoir during the period of July 2015 to June 2016are represented in the table No.1,2 and 3.

Atmospheric Temperature

The atmospheric temperature ranged between 24.7^0C to 38.4^0C.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. (2009) in Sai reservoir, Latur and Manjare et.al. (2010) in Tamdalge tank, Kolhapur.

Water Temperature

Water temperature is an important factor which affects the chemical, biochemical and biological characteristics of water body. Water temperature of Hingangaon Bk.water reservoir ranged between 21.3^0C to 27.3^0C. The minimum water temperature observed in the winter season and maximum in the summer season. Similar results were recorded by Jayabhaye et. al.(2008) and Salve et. al.(2008).

Water Transparency

Water transparency related the suspended organic and inorganic matter as well as micro-organisms present in the water bodies. In present investigation it was recorded between 21 cm to 38cm. 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 (1994) reported higher transparency during winter and summer season. Kadam et.al. (2007) also reported similar observations from Masoli reservoir of Parbhani district of Maharashtra.

pH

The pH of water recorded between 7.1 to 8.7. The minimum pH was recorded in the month of October and it was highest in the month of May. Similar results were obtained byBade et.al.(2009) and Jayabhaye et.al.(2008)

Table 1: Monthly variations of Physico-chemical parameters of Hingangaon Bk. water reservoir at four sampling sites during the year July 2015 to June 2016

Months	Atmospheric Temperature				Water Temperature				Transparency				pH			
Spot	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
July 2015	25.2	25.2	25.0	25.1	24.5	24.2	24.5	24.5	21	24	23	25	8.3	8.5	8.5	8.1
August	25.5	25.6	25.3	25.2	23.4	23.5	23.6	23.5	22	23	24	22	8.2	8.3	8.2	8.1
September	25.4	25.5	25.3	25.4	23.5	23.7	23.3	23.6	23	23	22	20	7.3	7.5	7.5	7.7
October	27.3	27.3	27.1	27.5	23.4	24.1	23.2	24.2	33	32	31	32	7.1	7.3	7.4	7.4
November	26.2	26.5	25.8	26.4	22.5	22.9	22.7	22.5	32	32	31	32	7.5	7.8	7.7	7.5
December	25.2	24.7	25.1	25.5	22.2	22.1	21.3	21.8	35	33	33	35	8.1	8.3	8.4	8.5
January	26.2	26.2	26.2	26.2	22.7	22.7	22.2	22.2	33	34	35	35	8.3	8.5	8.4	8.3
February	32.2	31.7	31.3	32.2	24.2	24.4	24.2	24.6	35	35	33	33	8.2	8.4	8.5	8.5
March	33.2	33.3	33.2	33.3	25.4	25.6	25.3	25.4	36	37	35	37	8.1	8.2	8.2	8.1
April	37.5	37.4	37.6	37.4	26.5	26.3	26.4	26.2	36	34	38	35	8.3	8.2	8.5	8.6
May	38.2	38.3	38.4	38.2	27.2	27.2	27.3	27.2	37	35	37	37	8.5	8.3	8.4	8.7
June 2016	30.1	30.2	30.8	29.2	26.3	26.2	26.1	26.2	32	33	32	32	8.4	8.5	8.6	8.5

Dissolved Oxygen

It is an important factor which regulates many metabolic processes of aquatic organisms. Almost all aquatic plants and animals requiresdissolved oxygen for respiration. The values of dissolved oxygen were recorded between 7.2 mg/L to 12.8 mg/L. The minimum dissolved oxygen was reported in the month of May (summer) and maximum in the month of August (monsoon). Similar observations were reported by Deshmukh and Ambore (2006), Ahamed and Krishnamurthy (1990).

The total alkalinity ranged between 182 mg/L to 271 mg/L.Alkalinity is the measure of the capacity of water that neutralizes the acids which was found minimum in monsoon and maximum in summer during the study. Similar reports were made by Bade et.al. (2009) , Nair and Rajendran(2000) and Mane and Madlapure (2002).

Total Hardness

The Total hardness were recorded between 120 mg/L to 166 mg/L. The maximum value (167 mg/L.) was observed in the month of July and minimum value (119 mg/L) in the month of November. Similar results were made by Hujare (2008)and reported the total hardness high during summer than monsoon and winter.

Table 2: Monthly variations of Physico-chemical parameters of Hingangaon Bk. water reservoir at four sampling sites during the year July 2015 to June 2016

Months	Dissolved oxygen(mg/L)				Total alkalinity(mg/L)				Total hardness(mg/L)			
Spot	A	B	C	D	A	B	C	D	A	B	C	D
July 2015	11.5	11.5	12.1	11.5	232.0	237.0	232.0	231.0	154.0	157.0	166.0	161.0
August	12.2	12.5	12.3	12.3	245.0	232.0	235.0	242.0	150.0	152.0	161.0	157.0
September	12.3	12.5	12.6	12.8	183.0	187.0	184.0	195.0	145.0	142.0	145.0	144.0
October	10.4	10.2	10.3	10.2	192.0	195.0	194.0	203.0	125.0	132.0	134.0	135.0
November	10.2	10.4	10.0	10.1	185.0	193.0	182.0	192.0	132.0	135.0	120.0	121.0
December	10.2	10.4	10.3	10.2	201.0	204.0	201.0	201.0	135.0	135.0	123.0	125.0
January	9.7	9.7	9.6	9.8	212.0	215.0	213.0	212.0	136.0	137.0	129.0	138.0
Febuary	9.3	9.3	9.4	9.6	214.0	225.0	219.0	217.0	136.0	145.0	132.0	139.0
March	8.7	8.5	8.5	8.7	226.0	231.0	225.0	223.0	140.0	145.0	136.0	142.0
April	8.0	8.2	8.2	8.3	262.0	271.0	257.0	258.0	135.0	146.0	141.0	144.0
May	8.2	7.7	7.2	7.5	237.0	244.0	244.0	240.0	140.0	146.0	144.0	148.0
June 2016	10.4	10.2	10.3	10.1	244.0	251.0	243.0	245.0	147.0	153.0	152.0	155.0

Chlorides

Present investigation reveals that chlorides in the water was ranged between 48 mg/L to 81 mg/L. The maximum values of chlorides reported during monsoon season while in summer less chloride content was recorded. Bade et.al. (2009)observe maximum values in summer and minimum in winter season.

Sulphates

The sulphate values were ranged between 31 mg/L to 61 mg/L during investigation. The minimum sulphate values reported in winter and maximum during rainy season.

Total Dissolved Solids

The amount of particles that are dissolved in water determines the total dissolved solids. The total dissolved solids fluctuated between 177 mg/L to 290 mg/L and shows seasonal variations in total dissolved solids values but they were maximum during summer and minimum during winter.

Table 3: Monthly variations of Physico-chemical parameters of Hingangaon Bk. water reservoir at four sampling sites during the year July 2015 to June 2016

Months	Chloride(mg/L) Total				Sulphate(mg/L)				Dissolved solids(mg/L)			
Spot	A	B	C	D	A	B	C	D	A	B	C	D
July 2015	52.0	50.0	50.0	53.0	51.0	53.0	52.0	55.0	254.0	265.0	262.0	265.0
August	57.0	60.0	62.0	61.0	55.0	57.0	61.0	53.0	234.0	234.0	231.0	231.0
September	71.0	73.0	74.0	81.0	52.0	51.0	50.0	46.0	211.0	203.0	210.0	212.0
October	73.0	75.0	76.0	75.0	36.0	41.0	41.0	34.0	196.0	197.0	195.0	194.0
November	62.0	65.0	71.0	73.0	31.0	34.0	31.0	31.0	185.0	182.0	177.0	184.0
December	62.0	59.0	53.0	59.0	31.0	34.0	32.0	34.0	202.0	204.0	212.0	202.0
January	56.0	56.0	56.0	57.0	45.0	45.0	45.0	42.0	265.0	271.0	272.0	265.0
February	54.0	55.0	56.0	55.0	43.0	42.0	41.0	41.0	272.0	281.0	281.0	275.0
March	52.0	53.0	54.0	53.0	43.0	42.0	42.0	44.0	272.0	272.0	274.0	273.0
April	50.0	50.0	52.0	52.0	41.0	42.0	43.0	42.0	265.0	272.0	272.0	274.0
May	52.0	48.0	48.0	51.0	42.0	42.0	43.0	44.0	280.0	290.0	282.0	284.0
June 2016	53.0	52.0	51.0	52.0	44.0	46.0	52.0	46.0	270.0	277.0	274.0	269.0

CONCLUSION

The present investigation reveales that the study of Physico-chemical parameters of Hingangaon Bk.water reservoir in Sangli 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 July 2015 to June 2016. In present study 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.

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