

**WATER QUALITY ASSESSMENT OF YESHWANT SAGER
RESERVOIR INDORE (M.P) INDIA****Dr. L. K. Mudgal and *Archana Sharma**

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Article Received on
04 Aug. 2016,Revised on 25 Aug. 2016,
Accepted on 16 Sep. 2016

DOI: 10.20959/wjpr201610-7098

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College, Moti Tabela, Indore,
MP, India.**ABSTRACT**

Yeshwant Sager Reservoir is a shallow man-made reservoir situated 30 k.m., North-west of Indore (M.P) Indore. The reservoir water is used for fishing purpose. Reservoir is used for domestic, irrigation and domestic purpose. Reservoir contains diversified aquafauna and flora with characteristic features. The study was carried out for a period of twelve months during the year. The parameters such as water temperature, pH, Total alkalinity, Dissolved oxygen, Total hardness, Calcium, Sulphate, chloride, Nitrate and Phosphorus.

KEY WORDS: Yeshwant Sager Reservoir, Quality, Assessment,

Limnology.

INTRODUCTION

Water is the basic and primary need for all vital life processes. It is not only essential to life but is the predominant inorganic constituent of living organisms, in general nearly three quarters of the weight of living cells. 71% of the area of the earth is covered by water to an average depth of 3000 meters in the form of sea water.

Safe drinking water, essential to humans and other life forms even though it provides no calories or organic nutrients. Drinking water, also known as potable water or improved drinking water, is water that is safe to drink or use for food preparation without any measurable risk of either acute or chronic health impact.

Yeshwant Sager Reservoir is located near Indore city (M.P) Indore. It is an important fresh water reservoir of Indore. It is a man-made shallow type reservoir. It was constructed by then

Maharaja Rao Holker Rao Holker states in 1936. Therefore as it is popularly spoken as Yeshwant Sager Reservoir. It is perennial impoundment built on river Gambhir, a tributary of Chambal river. The Reservoir is main function to supply water to Indore city. On the Yeshwant Sager Reservoir one pumping station also situated for cleaning water. The catchment area of Yeshwant Sager Reservoir the reservoir is about 140 square kilometre. Water quality of the reservoir show high correlation among factors. It is suitable for drinking purpose.

MATERIAL AND METHODS

Yeshwant Sager Reservoir is an drinking water body having total length of about 14.04 (km) a catchment area 140 square kilometre, grass storage capacity 500 million cube feet. It is located 30 kilometer, Indore – Depalpur road. For the purpose of study, the water samples were collected from the reservoir in the morning hours (from 7 am to 12 am) on monthly basis. Four study site namely study site 1,2,3 and 4 are selected for study. The temperature were recorted at the time of sampling, on the spot using centigrate thermometer, turbidity by secchi disc methods, pH was measured with standers pH meter. Other parameter were estimated by the procedure given by APHA (1989).

RESULT AND DISCUSSION

The water quality assessment of Reservoir are great related with the life condition of Reservoir there goes on in indicate pattern of environmental factors themselves interact in varing manner from season to season to season. Therefore, it is necessary to study the quality assessment of reservoir water for a better understanding of the relationship between the fishes and water quality.

Water Temperature: Water temperature play an important role in thermal stratification which have some effect on chemical and Biological activities of aquatic media like dissolved oxygen, Carbon oxide, water and air temperature go more or less hand inhand. It ranged from 19.20 c to 38.20 c. The minimum value was recorded during the month of January and the maximum during June.

Turbidity: Turbidity of natural water is due to suspended inorganic and organic substance such as slit, clay, planktonic organism etc. Penetration of sunlight and reduces photosynthesis activity of pond depend upon it. The Turbidity of water is mainly depend upon the particulate matter in the water it was observed.

The turbidity of water is mainly depend upon the particulate matter in the water it was observed minimum 23 NTU monthly of May and Maximum 55 NTU was recorded in month of July.

pH: pH is the scales of intensity of acidity of acidity of the alkalinity of water and measures the concentration of H^+ ions, most of the biological process and biological reactions as pH dependent. Swingle (1967) states that water having a pH range of 6.5 to 9.0 as recorded before day break are most suitable for reservoir culture and those having pH values of more than 9.5 (alkaline) as unsuitable. The pH recorded ranged in Yeshwant Sager Reservoir from 7.2 to month of June and July.

Total Alkalinity: The total alkalinity of water is significant for biological activity of water is the capacity to neutralize a strong acid and is characterized by the presence of hydroxyl ion. Acid water is danger for fish growth, the reservoir should have alkalinity so that the acids can be neutralized and fish production possible. The alkalinity might be due to the high pH or it may be caused by cations of Ca, Mg, Na, K, NH and Fe combined either as CO_3 or bicarbonate as hydroxide. Alikunhi (1957) in the highly productive water alkalinity reach to over 100 ppm and according Schaperlaus (1933) most productive water is that which titrates 200 to 500 ppm equivalent calcium carbonate. The total alkalinity values at Yeshwant Sager Reservoir were found to be in the range of 91 mg/l to 251 mg/l. Ganeshan (1989) observed total alkalinity ranged between 72.00 to 360 mg/l in Khan and Kshipra river.

Dissolved oxygen: Do is one of the important parameter in water quality assessment. Its presence is essential to maintain the higher form of biological life in the water. There are two main source of Do in water is diffusion from air and photosynthesis activity is biological function brought about by autotrophs.

In present study, value of Do ranged from 6.1 mg/l to 9.2 mg/l. Sreenivasan (1964) reported Do range from 9.0 mg/l to 10.00 mg/l in Aliyar and Amaravaty reservoir. 6.00 to 8.2 respectively. Choubey (1990) studies on Gandhi sager reservoir was much favourable for the growth and the maintenance of fish.

Total Hardness: The term hardness is frequently used an assessment of the quality of water supplies. The hardness is governed by the content of calcium and Magnesium salts largely combined with carbonates and bicarbonates led to temporary hardness. The hardness is

accompanied with Sulphates, Chloride and other an -iones of the minerals constitute permanent hardness.

In present study, value of total hardness ranged from 71mg/l to 98 mg/l. Choubey (1990) has reported the total hardness between 70 mg/l to 108 mg/l. Pathak (2004) has reported hardness value from 150 mg/l to 233 mg/l in Virla reservoir (Khargone) mp, India.

Phosphorus: It varied from 0.1 mg/l to 0.9 phosphorus occur in both organic forms and vital role in the aquatic system. natural water, phosphorus occurs mostly as phosphorus. The major sources of phosphorus and other in the aquatic ecosystem are the roces or soil, decomposing organic material and agriculture run -off. Sreenivasion (1970a) reported phosphate in traces in south Indian reservoir Madras. Choubey (1990) reported phosphate range from 0.01 mg/l to 0.18 mg/l at Gandhi sager reservoir.

Calcium: The calcium is an important micronutrient in aquatic environment. Calcium is found in abundance in all natural water and its source lies in the rocks beings in important contributar to hardness in water it reduces the utility of water for domestic uses.

In present study, calcium contents varied from 38 mg/l to 49 mg/l . Reid (1961) asserted that values less than 10.00 mg/l tends to be low productive between 10.00 to 25.00mg/l is medium productive and higher than 25.00 mg/l medium 25.00 mg/l highly productive . Khabade et al (2002)reported . Calcium range of 29.52 mg/l to 68.16 mg/l in Lodhe reservoir at Tasgaon (Maharastra) India. Pathak (2004) observed calcium range from 39.70 mg/l to 55.20 mg/l in Virla reservoir , Khargone (MP) India. Yeshwant sager reservoir is productive water body as per the result of Reid (1961).

Sulphate: The Sulphate is naturally occurring anions in all kind of natural water. High concentrations of sulphate are available in arid and semiarid regions. Biological oxidation of reduced Sulphate increases its concentration rain water, particularly in high atmospheric pollution also, increase sulphate concentration.

In present study sulphate values fluctuated between 5.1 mg/l to 9.3 mg/l. An increased concentration of sulphate during post monsoon period is attributed to influx of run off. An increased concentration of sulphate was recorded in the addition to domestic wastes by Dad (1981). Trivedi et al (1983) has reported high values of Sulphate ranging 24.7 mg/l to 47.7 mg/l from five lakes of Kolhapur, India.

Chloride

Chloride is found naturally in all types of water. High concentration of chloride is considered to be the indicator very closely to the total amount of soluble salts present in aquatic ecosystem. The most important source of chloride in water is the discharge of domestic sewage.

The range of chloride in Yeshwant sager reservoir was observed between 21 mg/l to 56 mg/l. Choubey (1990) reported chloride range of chloride 15.80 mg/l to 22.20 mg/l at Gandhi sager reservoir. Khabade et al (2002) reported chloride range of 20.86 mg/l to 71.00 mg/l in Lodhe reservoir at Tasgaon (Maharashtra) Pathak (2004) observed chloride from 19.40 mg/l to 53.80 mg/l in Virla reservoir (Khargone) MP, India.

Present findings about chloride values having resemblance with of Choubey (1990), Khabade et al (2002) and Patha (2004).

Nitrate

Nitrate is a highest oxidized form of Nitrogen it is an important plant nutrient. Normally the surface water is deficient in nitrate, but when available in sufficient quantity, then, it is responsible for eutrophication. Most important source of nitrate is biological oxidation of organic nitrogenous compounds. Atmospheric nitrogenous compounds. Atmospheric nitrogen is fixed into nitrates in water. In present study, nitrate values fluctuated in between 0.1 mg/l to 2.0 mg/l. Choubey (1990) recorded Nitrate values in a range of 0.04 mg/l to 0.29 mg/l in Gandhi Sager reservoir.

CONCLUSION

The water of Yeshwant Sager Reservoir is found to be more suitable for fish culture and as well as drinking purpose. The water is productive, having maximum alkalinity 91 mg/l to 250 mg/l also, less than 8 pH, DO and hardness of water also in 6.1 mg/l to 9.2 mg/l and 71 mg/l to 98 mg/l, Sulphate range between 5.1 mg/l to 9.3 mg/l. Calcium content varied from 38 mg/l to 49 mg/l. Phosphorus ranged observed 0.1 mg/l to 0.9 mg/l. Chloride range between 21 mg/l to 56 mg/l. Nitrate value fluctuated in between 0.1 mg/l to 2.0 mg/l. Total hardness ranged from 71 mg/l to 98 mg/l. It is suitable condition for fish growth and drinking water. Hence Yeshwant sager reservoir having large area for catchment can be utilized for the production of fishes and drinking water supply.

ACKNOWLEDGEMENT

The author thankful to the Dr. L.K .Mudgal, retd. Professor, Govt .P.G. College. Moti Tabela, Indore, MP, India for his invaluable guidance, constant encouragement and inspiration though the study period.

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