

STUDIES ON THE WATER QUALITY OF ANTHROPOGENIC POND RAMSAGRA OF KHAIRA REWA (M.P.)

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ABSTRACT: In the present study water quality and assessment of pollution of Ramsagra pond in district Rewa (M.P.) India were determined during year 2017. The Ramsagra pond is situated in village Khaira, tehsil Mauganj, district Rewa (M.P.). Ramsagra pond is manmade small sized perennial and spread in about 10 acres area. The pond water use is domestic purposes, irrigation, aquaculture etc. The surrounding area of pond semi urban semi agricultural. The monthly intervals during 2017 with an objective to estimate the water quality of the dam on various physico-chemical parameters Total solids and turbidity values were maximum on all the sites in rainy months, which may be due to the gradual disturbances in sedimentation of solids as well as dust particles deposited along with runoff rainwater. The alkalinity varied during different months. The values of pH, total hardness, dissolved oxygen phosphate and nitrate was higher during summer months.

Keywords: Ramsagra pond, water quality.

INTRODUCTION:-

Fresh water is a critical, finite, vulnerable, renewable natural resource on the earth, and plays an important role in our living environment, without it, life is impossible. Since the beginning of the industrial revolution, increasing human population, economic activities as well as shortcomings in their management have resulted in more pollutants being introduced into watercourses. An increasing number of surface water bodies have come under serious threat of degradation. The global freshwater resources are under increasing pressure (GWP Technical Advisory Committee, 2000). The anthropogenic impact on aquatic ecosystems has become a crucial topic of increasing concern. These problems have led to the adoption of an integrated approach to the management of water resources, which is called Integrated Water Resources Management (IWRM).

“We the human being have been generously gifted with the brilliance of natural diversity and we do possess the distinguished capacity of intellectual expression. Hence

we must come together to join hands of begin the big endeavor” to save our ecosystems.

During the recent time, mismanagement of surrounding areas of water body has resulted into unprecedented nutrient enrichment of water bodies causing cultural eutrophication, the nature of eutrophication is variable into lotic to lentic ecosystem, which is manifested by raised trophic status, increased rate of sedimentation, loss of water storage capacity, lowered retention period and deteriorated water quality.

The importance of fresh water bodies for human habitation is well known. Man’s greed for luxury and comforts has resulted in rapid deterioration of environment. The water bodies from the immemorial had an aesthetic look, quenching the thirst of millions of people have today been loaded with toxic materials and chemical which have rendered them almost useless.

Utilization of chemical fertilizers, insecticides, pesticides, herbicides and other agricultural, domestic, industrialization, urbanization, deforestation are the factors to create the pollution in water bodies, therefore; eutrophication takes place in the water body, due to eutrophication the algal bloom are formed, which damage the organisms life.

During the study of earth watch program, the ecologists and hydro-biologist have observed that there are several natural and man engineered resources, which are still lacking of research studies therefore a gap have been formed (Williams & Feltmate,1992).

Today, the water, which is an essential components for all of the living beings for their metabolic activities. The main cause of surface water pollution are discharged of industrial, domestic, municipal wastes and agriculture water like irrigation return flow, animal wastes fertilizers, crop residue, dead animal, pesticides residues, disposal of municipal and industrial wastes, sewage leakage, septic tank ,cesspools and urbanization .

In the present study is going to centralize on Ramsagra anthropogenic pond of Rewa district in central India. The Ramsagra pond is situated in village Khaira, tehsil Mauganj, district Rewa (M.P.). Ramsagra pond is manmade small sized perennial and spread in about 10 acres area. The pond water use is domestic purposes,

irrigation, aquaculture etc. The surrounding area of pond semi urban semi agricultural.

MATERIAL AND METHODS:-

Samples were collected monthly for one year (January 2017 to December 2017). The samples were collected at 9 am -1pm during first week of each month. Some of the physicochemical characteristics of water were analyzed at the spot such as water temperature, colour, transparency, pH which were determined by thermometer, visual sechi disc, and digital pH meter respectively. While, others like D.O., Total alkalinity, T.D.S., Total hardness and contents were analyzed by titric method in laboratory and other parameters like C.O.D. and B.O.D., were analyzed within 24 hrs. as per the procedure given in APHA (1995), and Trivedy and Goel (1986).

RESULTS AND DISCUSSION

The data on physico-chemical analysis of Ramsagra pond has been given in table no. 1

Water temperature ($^{\circ}$ C):-

The mean monthly variation in the surface water temperature of the is presented in table no. 1. The temperature ranged between the lowest values of $18.37 \pm 0.52^{\circ}$ C obtained from mean values in January 2017 and the highest of $32.69 \pm 0.95^{\circ}$ C obtained from mean values of June, 2017. The minimum temperature recorded during winter due to short photoperiod and cold low. The maximum temperature recorded during summer was due to greater solar radiation, low water level, and clear atmosphere and higher atmospheric temperature. *Jayabhaye et. al;* (2006), *Salve and Hiware* (2006), observed that during summer, water temperature was high due to low water level and clear atmosphere. Similar results were obtained in the present study.

pH:-

The pH is determined by the pH meter it's depends upon the CO_3 and HCO_3 ions present in the water. The Hydrogen ion concentration fluctuated between the lowest monthly mean of sampling sites 7.20 ± 0.05 mg/L obtained in September 2017 and the highest monthly mean of sampling sites 8.50 ± 0.11 mg/L recorded in March 2017 from (Table -1). There was no significant difference in the concentration of hydrogen ions between sampling site and months of year. pH was alkaline throughout study period.

Alkalinity (mg/l):-

Alkalinity is defined as a measure of the buffering capacity of water to neutralize strong acid. This capacity is attributed to bases that are present in natural waters including OH^- , HCO_3^- , and CO_3^{2-} . Total alkalinity ranges

from 155.20 ± 4.15 mg/l to 205.80 ± 3.19 mg/l. The maximum value was recorded in the month of August (monsoon) and minimum value in the month of February (winter).

Total Dissolve Solids:-

Total dissolved solids represented by the various kinds of ions present in the water. The TDS ranges recorded between 587.00 ± 4.12 to 679.00 ± 5.83 mg/l. The high TDS reduces the solubility of gases like oxygen and as a result such water is not suitable for domestic, industrial uses and drinking purpose. The high value of TDS recorded during rainy season and lowest value recorded during winter.

Total Hardness (mg/l)

The measure of the capacity of water to react with soap is called hardness of water (Kumar and Ravindranath, 1998). The value of hardness fluctuates from 126.40 ± 3.05 to 216.00 ± 5.87 mg/l. The maximum value was recorded in the month of June (summer) and minimum in the month of December (winter).

Dissolved Oxygen(mg/l):-

Determination of dissolved oxygen is primary factor of all pollution studies. High value of DO is good for aquatic life. The value of DO fluctuate from 5.90 ± 0.32 to 8.90 ± 0.16 mg/l. The maximum values were recorded in the month of December (Winter) and minimum value in the month of May (Summer). The high DO in summer is attributed to increase in temperature and duration of bright sunlight. The long days and intense sunlight during summer seems to accelerate photosynthesis by phytoplankton's, utilizing CO_2 and giving off oxygen. This accounts for the greater quality of O_2 recorded during summer. The quantity is slightly less during winter as reported by *Masood Ahmed and Krishnamurthy* (1990).

Chemical Oxygen Demand:-

COD values are particularly important in the surveys designed to determine and control the losses to sewer systems. The ratio of BOD to COD is useful to assess the amenability of waste for biological treatment. The value of COD was recorded between 13.80 ± 2.39 to 43.20 ± 2.39 mg/l. The maximum values were recorded in the month of August (Manson) and minimum value in the month of January (winter).

Biological Oxygen Demand:-

BOD referred to as a requirement of oxygen needed for biochemical degradation of organic material Vasumathi Reddy *et. al.*, (2009). BOD depends on aquatic life; variation in BOD indicates vitality in aquatic life present in the pond. The value of DO fluctuate from 4.64 ± 0.42 to 7.34 ± 0.23 mg/l. The maximum values were recorded in the month of June (Summer) and minimum value in the month of January (winter).

Table No. 1- Monthly Variation of Physico-chemical parameters of water samples of Ramsagra pond Rewa (M.P.)

Months 2017	Temp °C	pH	Alkalinity (mg/l)	T. D. S. (mg/l)	Tot. Hard. (mg/l)	Diss. Oxy. (mg/l)	C.O.D. (mg/l)	B.O.D. (mg/l)	
January	18.37±0.51	8.09±0.17	195.80±3.77	587.00±4.12	157.60±4.83	7.58±0.32	13.80±2.39	4.64±0.42	
February	20.11±0.35	8.31±0.11	205.80±3.19	605.40±4.77	170.40±3.21	8.34±0.21	19.00±1.58	5.28±0.19	
March	24.35±0.57	8.20±0.11	194.40±2.88	630.20±3.70	182.60±3.97	7.28±0.19	19.80±2.59	6.12±0.24	
April	27.29±0.69	7.64±0.12	179.20±4.21	627.60±4.28	190.20±3.49	7.22±0.30	26.40±2.07	6.50±0.25	
May	28.94±0.54	8.50±0.11	181.80±5.31	636.40±5.32	198.00±3.16	5.90±0.32	25.00±1.58	6.64±0.35	
June	32.69±0.95	7.33±0.14	180.80±5.93	644.60±3.85	216.00±5.87	6.48±0.19	29.00±1.58	7.34±0.23	
July	29.70±0.62	7.34±0.06	169.40±4.88	655.00±3.61	203.80±3.03	7.28±0.15	35.00±2.55	6.50±0.27	
August	28.29±0.80	7.32±0.04	155.20±4.15	679.00±5.83	179.80±3.49	7.40±0.24	43.20±2.39	5.66±0.29	
September	27.43±0.45	7.20±0.05	166.20±2.77	668.00±4.95	169.80±3.49	7.24±0.21	37.60±2.07	5.70±0.25	
October	26.91±0.59	7.59±0.20	185.00±4.12	642.40±3.85	155.20±3.83	8.08±0.19	28.20±2.39	5.52±0.26	
November	21.73±0.71	7.57±0.29	188.60±5.13	611.80±5.07	140.00±3.54	8.32±0.24	24.20±2.39	5.34±0.27	
December	19.38±0.45	7.94±0.10	194.40±4.34	602.00±2.55	126.40±3.05	8.90±0.16	20.20±1.92	5.38±0.26	
Range	Min	18.37±0.52	7.20±0.05	155.20±4.15	587.00±4.12	126.40±3.05	5.90±0.32	13.80±2.39	4.64±0.42
	Max	32.69±0.95	8.50±0.11	205.80±3.19	679.00±5.83	216.00±5.87	8.90±0.16	43.20±2.39	7.34±0.23

CONCLUSION:-

The result of present study was compared with standards. It was found that maximum no of parameters were desirable limit in all the three season. This result shows that the pond is slightly polluted due to contamination. By avoiding the domestic activity, sewage etc. maintain the quality of lake water. Due to the increase in environmental temperature and accumulation of sewage these are two main factors which are responsible for creation and problem of eutrophic condition of pond.

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