RESEARCH PAPER | Chemistry, | Volume : 4 | Issue : 4 April 2015 | ISSN - 2249-555X

Analysis of Water Quality Using Physico- Chemical Parameters Mazum Canal in Modasa District, Gujarat(India)

KEYWORDS: Mazum Canal; Physico-Chemical Parameters, Monthly variation.

K.P.PATEL

Chemistry Department of Shree P.N.Pandya Arts, M.P.Pandya Science & Smt. D.P.Pandya Commerce College, Lunawada-389230 Dist : Mahisagar (Gujarat) India

ABSTRACT *"This Paper deals with the Physico – chemical Parameters of Mazum Water Canal in Modasa District,Gujarat monthly Changes in Physical and Chemical Dissolved Solids, pH, Dissolved Oxygen, Free Carbon dioxide and Total Hardness, Chlorides, Alkalinity, Phosphate and Nitrates were analyzed for a periods of one year from 1st January 2013 to 31st December 2013. All Parameters were within the permissible limits. The results indicate that the tank is Non-polluted and can be used for Domestic, Irrigation and Fisheries.*

INTRODUCTION

Water described as "hard" contains high amounts of dissolved calcium and magnesium. Hard water is not a health risk but is a nuisance because of mineral buildup on plumbing fixtures' and poor soap and or detergent performance. Canal irrigation is one of the oldest and significant sources of irrigation in India and is particularly in south India (Palanisamy, 1998).The canal occupy vital role in the irrigation as well as local ecosystem in the semi-arid and regions of South India. This perennial tank provides multiple uses like source of drinking water for uncountable rural and urban communities and livestock, fish culture, recharge of ground water, control of floods etc., (Gurunathan, 2006). As water is one of the most important compounds of the ecosystem, but due to increased human population, industrialization, use of fertilizers in the agriculture and man-made activity. The natural aquatic resources are causing heavy and varied pollution in aquatic environment leading to pollute water quality and depletion of aquatic biota. It is therefore necessary that the quality of drinking water should be checked at regular time of interval, because due to use of contaminated drinking water, human population suffers from varied of water borne diseases. It is difficult to understand the biological phenomena fully because the chemistry of water revels much about the metabolism of the ecosystem and explain the general hydro - biological relationship.

II. MATERIALS AND METHODS

The Water Samples from Mazum Canal were collected from two different stations in the morning hours between 10 to 12 am in Polythene bottle regularly for every month. The Water samples were immediately brought in to Laboratory for the Estimation of various Physico -chemical parameters and pH were corded at the time of sample collection by using Thermometer and Pocket Digital pH Meter. While other rameters Such as DO, TDS, Free CO2, Hardness, Alkalinity, Chlorides, Phosphate and Nitrate were estimated in the Laboratory by using Indian Standard Procedures (Titration method, Atomic Absorption Spectrophotometer (AAS) Thermo M5 Model) (Trivedy and Goel,1986, APHA 1985).The Present Study involves the Analysis of water described by its Physical, Water Quality in Terms of Physico-chemical parameters of Mazum System Canal, Modasa Dist., Gujarat. This canal water is basically for agriculture, fisheries and partially domestic activities.

RESULTS AND DISCUSSION

Table : 1 Physical parameters of Mazum Canal, Modasa District

Month	Temperature in0C	Turbidity NTU	TDS mg/l	pH
Jan	20	8.00	168.3	80.6
Feb	22	6.70	210.8	7.90
March	24	3..90	165.0	7.50
April	24	4.00	130.0	7.80
May	23.5	6.10	120.0	7.99
Jun	24	7.80	225.0	8.10
July	26	4.50	256.4	7.90
August	27	8.00	120.0	8.00
September	24	8.50	156.0	8.30
October	26.2	14.25	220.2	8.40
November	24	11.61	215.1	8.02
December	21	10.25	210.0	8.06

a) Climate

The area under the project is in semidry zone,there is a rapid increase in temperature after the month of January, April is the hottest month. The climate of the year is divided into four seasons viz hot season from March to May; South-west monsoon from June to September; Post-monsoon from October to November; winter from December to February with an average wind speed of 4.22 km/hr. The maximum and minimum wind velocity in the tank area was observed in the months of July and May are 7.80 and 0.1 km/hr respectively.

Volume : 4 | Issue : 4 April 2015 | ISSN - 2249-555X

b) Water Temperature

Generally, the weather in study area is quite cool, however the water temperature plays an important factor which influences the chemical, bio-chemical characteristics of water body. The maximum temperature of 270 C was recorded in May and a minimum of 200 C was recorded in month of December in the year 2007. Water Temperature in summer, was high due to low water level, high temperature and clear atmosphere (Salve and Hiware, 2008).

TTable 2 : Chemical parameters of Mazum Canal, Modasa District

Month	Free C02	Dissolved oxygen	Hardness	Alkalinity	Chloride	Phosphate	Nitrate
Jan	18.0	8.90	89.0	130.0	30.0	4.70	2.1
Feb	14.8	7.25	87.0	113.0	23.0	0.16	5.2
March	10.7	7.75	70.0	120.0	21.0	0.90	4.5
April	16.7	8.00	97.0	145.0	29.6	0.71	5.40
May	4.4	8.30	79.0	138.0	27.0	5.75	12.8
Jun	8.8	9.30	105.0	115.0	34.0	3.80	8.2
July	8.1	14.25	128.0	130.0	30.0	2.90	9.7
August	4.5	16.00	136.0	165.0	32.5	1.60	10.5
September	3.7	14.75	142.0	118.0	30.5	2.90	10.1
October	0.9	13.20	94.0	122.0	29.2	1.85	2.80
November	0.5	9.00	81.0	115.0	31.0	1.28	2.31
December	0.7	9.25	78.5	110.0	22.0	0.9	2.20

April is the hottest month. The climate of the year is divided into four seasons viz hot season from March to May; South-west monsoon from June to September; Post-monsoon from October to November; winter from December to February with an average wind speed of 4.22 km/hr. The maximum and minimum wind velocity in the tank area was observed in the months of July and May are 7.80 and 0.1 km/hr respectively.

c)Turbidity

The turbidity of water fluctuates from 3.90 to 14.25 NTU. The maximum value of 14.25 NTU was recorded in the month of March, it may be due to human activities, decrease in the water level and presence of suspended particulate matter and minimum value of 3.90 NTU in the month of October.

d) Total Dissolved Solids

The total dissolved solids fluctuate from 120 mg/l to 256.4 mg/l. the maximum value (256.4 mg/l) was recorded in the month of June. It is due to heavy rainfall and minimum value (120 m/l) in the month of May.

e)pH

pH was alkaline values ranges from 7.5 to 8.4.The maximum pH value (8.4) was recorded in the month of April (summer) and minimum (7.5) in the month of October Most of bio-chemical and chemical reactions are influenced by the pH. The reduced rate of photosynthetic activities reduces the assimilation of carbon dioxide and bicarbonates which are ultimately responsible for increase in pH, the low oxygen values coincided with high temperature during the summer month (Kamble, S. M. et al.,). The factors like temperature bring about changes the pH of water. The higher pH values observed suggests that carbon dioxide, carbonate-bicarbonate equilibrium is affected more due to change in physico-chemical condition

f) Dissolved Oxygen

The value of DO fluctuates from 7.25 mg/l to 16 mg/l. The maximum values (16 mg/l) was recorded in the month of May and minimum values (7.25 mg/l) in the month of November. The high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases (O^2 & CO^2). The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing CO2 and giving off oxygen. This possibly accounts for the greater qualities of O2 recorded during summer. (Krishnamurthy R., et al, 1990)

g) Free Carbon dioxide

The value of free CO2 ranges from 0.5 mg/l to 28.6 mg/l. The maximum value (18 mg/l) was recorded in the month of December (winter) and minimum value (0.5mg/l) in the month of February. This may be epends upon alkalinity and hardness of water body. The value of CO2 was high in December. This could be related to the high rate of decomposition in the warmer months.

h) Hardness

The value of hardness fluctuates from 70 mg/l to 142 mg/l. The maximum value (142 mg/l) was recorded in the month of April (summer) and minimum value (70 mg/l) in the month of October. (Hujare, M. S, 2008): was reported total hardness was high during summer than monsoon and winter. High value of hardness during summer can be attributed to decrease in water volume and increase of rate of oration of water.

i)Alkalinity

Total alkalinity ranges from 110 mg/l to 165 mg/l the maximum value (165 mg/l) was recorded in the month of May (summer) and minimum value (110 mg/l) in the month of January (winter). The alkalinity was maximum value in April (summer) due to increase in bicarbonates in the water. Hujare, M. S. 2008) also reported similar results that it was maximum in summer and minimum in winter due to high photosynthetic rate.

j) Chlorides

The values of chlorides range from 22 mg/l to 32.5 mg/l. The maximum value (32.5 mg/l) was recorded in the month of May (summer) and minimum value (22 mg/l) in the month of January.

Volume : 4 | Issue : 4 April 2015 | ISSN - 2249-555X

In the present study maximum value of chloride reaches in summer (Swarnalatha and Narsing rao, 1990).

k) Phosphate

The value of phosphate fluctuates from 0.71 mg/l to 5.75 mg/l. the maximum value (5.75mg/l) was recorded in the month of August (monsoon) and minimum value in the month of September (winter). The high values of phosphate in August (monsoon) months are mainly due to rain, surface water runoff, agriculture run off; washer man activity could have also contributed to the inorganic phosphate content.

l)Nitrates

The values of nitrate ranges from 2.1 mg/l to 12.8 mg/l. the maximum value (12.8mg/l) was observed in the month of August and minimum (2.10 mg/l) in the month of December.

REFERENCE

APHA (1985): Standard Methods for Examination of Water and Wastewater, 20th Edition, American Public Health Association, Washington D. C.|2) Gurunathan, A. Shanmugam, C.R, (2006): Customary Rights and their Relevance in Modern Tank Management: Select Cases in Tamil Nadu, Paper prepared for the workshop entitled 'Water, Law and the Commons' organized in Delhi from 8 to 10 December 2006 by the International Environmental Law Research Centre (ILERC).|3) Hujare, M. S. (2008): Seasonal variation of physico-chemical parameters in the perennialtank of Talsande, Maharashtra. Ecotoxicol.Environ. Monitor. 18(3): 233-242.|4) Karanth, K.R (1987): Groundwater Assessment Development and Management Tata McGraw Hill publishing company Ltd., New Delhi, 725p.|5) Krishnamurthy R.(1990): Hydro-biological studies of Wohar reservoir Aurangabad (Maharashtra State) India. J. Environ. Biol.11(3), 335-343.|6) Palanisamy, K. and R. Balasubramaniyan (1998): Common Property and Private Prosperity: Tank vs. Private Wells in Tamil Nadu,Indian Journal of Agricultural Economics,vol.53,No.4, Oct –December.|7) 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.|8) Swaranlatha, S. and A. Narsingrao (1998): Ecological studies of Banjara lake with reference to water pollution. J. Envi. Biol. 19(2): 179-186. 13. Arvindkumar, (1995): Some Immunological Aspects of the Fresh water Tropical Wetland of Santhal. Pargana (Bihar) India, J. Envi. Poll.2 (3): 137-141|9) Trivedi, R.N.Dubey,D.P and Bharti,S.L.(2009):Hydro-geochemistry and groundwater quality in Beehar River Basin, Rewa District, Madhya Prakesh,India,Proc.International conference on Hydrology and Watershed, JN & T Hyderbad,pp.49-59|10) Trivedy, R. K. and Goel P. K. (1986): Chemical and biological methods for water pollution studies, Environmental Publication, Karad,Maharashtra.