



A STUDY ON PHYSICO-CHEMICAL PARAMETERS OF CANAL WATER AT RANGAMPALAYAM, ERODE DISTRICT, TAMILNADU

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ABSTRACT The present study deals with the assessment of physico chemical parameters of samples from canal water at Rangampalayam, Erode District. This during the period of June 2015 to July 2016. The observed values of various physico-chemical parameters pH (6.3 to 6.8) Dissolved oxygen (6.198 to 7.864mg/lit), BOD (11.235 to 16.855 mg/lit), COD (33.27 to 39.06 mg/lit), CO₂ (33.27 to 39.06mg/lit), Calcium (72.00 to 112.00 mg/lit), Salinity (18.00 to 23.00 mg/lit), Total Hardness (240.00 to 288.00 mg/lit) Alkalinity (176.50-214.00 mg/lit), Nitrate (32.56-44.12 mg/lit), Sulphate (26.15-33.54 mg/lit) and Phosphate(0.98-1.85 mg/lit). The finding of the study revealed that the canal water is polluted not advisable for human usage without any treatment. This study concluded that the seriousness and responsibility of public to conserve our water resources for healthy living.

KEYWORDS : Canal water, Physico-chemical, Water quality

INTRODUCTION

Water is an elixir of our life. It is the important in shaping the land and regulating the climate. It is one of the most important and abundant compounds of ecosystem. All living organisms on the earth need water for their survival and planet having about 70% of water but most of the earth covers salt water. Only small amount is present in the form of fresh water. The fresh water is occurred in the form of lactic and lentic in nature. The lakes and surface water reservoirs are the planets most important fresh water resources and provide innumerable benefits.

All life on earth depends on water. Natural resources are the important wealth of our country, water is one of them. Water is a wonder of the nature. No life without water is a common saying depending upon the fact that water is the naturally occurring essential requirement of all life supporting activities (Simpi *et al.*, 2011). Health and wellbeing of the human race is closely tied up with the quality of water used. Water has become an essential commodity for the development of industries and agriculture.

They are used for domestic and irrigation purpose and provide ecosystem for aquatic life especially fish, there by functioning as sources of essential protein and for significant elements of the world biological diversity. They have important social and economic benefit, as a result of tourism and recreation and are culturally and aesthetically important for people throughout the world. They also play an equally important role in flood control. Freshwater ecosystem cover 0.80% of the Earth surface and inhabit 0.009% of its total water. They generate nearly 3% of its net primary production.

Water quality refers to the chemical, physical and biological characteristics of water is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose (Johnson *et al.*, 1997). It is most frequently used by reference to a set of standards against which compliance can be assessed. Water quality monitoring has a high priority for the determination of current conditions and long terms trend for effective management. The supply of safe water has significant impact on the anticipation of water transmissible disease. The abundance of organic compounds, toxic chemicals and nitrates in water may cause unfavourable effects on the human health especially cancer, other human body malfunctions and chronic illness therefore, it is necessary to frequency monitor water quality. Hence the present study was aimed to analyse water quality of physico-chemical parameters of canal situated at Erode Arts and Science College, Erode District, Tamilnadu.

STUDY AREA:

In this present study, the selected area located at behind 200 meters

from Erode Arts and Science College, at Rangampalayam Erode district, Tamilnadu (India). This canal occur more or less around 5 km length, 5 meters in wide and 2 meters in depth. The water runoff from south to north direction. The main source of water is harvesting of rain water, agricultural runoff from the nearby fields and continuous discharge of sewage water. This canal is regularly used mainly for agriculture and fishing by the local peoples besides the idol immersion.

Satellite map of the canal



PHYSICAL PARAMETERS

Colour

The colour of the canal water was determined visually on the spot.

Temperature

The temperature of the canal water was measured with the help of a thermistor thermometer calibrated from 0°C to 100°C is used for temperature measurements.

Chemical Parameters

pH

The pH of the samples was determining by using digital pH meter. The pH is most important factor in determining the corrosive nature of water. Lower the pH value higher is the corrosive in nature of water. The pH was positively correlated with electrical conduct ants and total Alkalinity (Gupta in 2009). The higher pH value observed suggests the Carbon dioxide, Carbonate, Bicarbonate equilibrium is affected more due to change in physical-chemical conditions (Karanth, 1987). The pH is measured by portable meter with glass electrode.

Salinity

Salinity is important factor which affect pH of water alkalinity total hardness of water. It determines titration with 0.01N Silver nitrate to Potassium chromate end point.

Dissolved Oxygen (DO)

Dissolved Oxygen is one of the most parameter. It is correlation with water body gives direct and indirect information eg. Photosynthesis

availability of nutrients, stratification etc., (Permalata, Vikal, 2009). Dissolved oxygen measured titrimetrically by wrinkler's method (Titration with 0.25N Sodium thio sulphate to starch end point). Estimation of dissolved oxygen in the water samples was analysed by the wrinkler's method given by (Anon,1965).

Chemical Oxygen Demand (COD)

COD is another measure of organic material contamination in water specified in mg/l. COD is the treatment but rarely in general water treatment (Milacron marketing. co) amount of Dissolved Oxygen required to cause chemical used in waste water. The estimation of chemical oxygen demand was based on the oxidation of the organic content of the sample with potassium dichromate in the presence of silver and sulphuric acid.

Total Alkalinity

It is composed primarily of Carbonates (CO₃²⁻) and (HCO₃⁻). Alkalinity acts as a stabilizer for pH and Hardness of many substances in the water. It is determined by simple dil. HCL titration in presences of Phenolphthalein and Methyl Orange indicators.

Total Hardness

Total hardness in water is the sum of concentration of alkaline earth metal cat ion such as ca²⁺, mg²⁺. The Total Hardness is the total soluble Magnesium and Calcium salts present in the water expressed as its Caco₃ Equivalent. Total Hardness is determined by Titration with EDTA to Erichrome Black -T end point. Total Hardness was calculated following the procedure of (Trivedy and Goel 1984).

Calcium

It is measured by complex matrix Titration with standard solution of EDTA to Muroxide in end point.

Nitrate

Nitrate was estimated by following procedure of (Strickland and Parsons 1972).

Phosphate

Phosphate was estimated by the following procedure of strickland and Parsons (1972).

Sulphate

Sulphate content in the water sample is determined by turbid metric method. Sulphates in the sample were estimated by the Michel (1984).

Table:1 The species composition was maximum the during month of June 2016 and minimum the during month of October -2016.

S.No	Parameters	June	July	Aug	Sep	Oct
1.	pH	6.8	6.4	6.5	6.6	6.3
2.	Salinity	18.00	20.00	22.00	18.00	23.00
3.	Dissolved Oxygen	7.302	7.864	8.638	6.198	8.280
4.	Total Alkalinity	198.53	207.60	214.00	210.67	176.50
5.	Total Hardness	278.00	282.00	288.00	267.00	240.00
6.	BOD	14.045	16.125	11.235	16.855	13.384
7.	COD	38.45	37.92	39.06	38.94	33.27
8.	Calcium	112.00	108.00	98.00	87.00	72.00
9.	Nitrate	36.64	40.42	44.12	40.12	32.56
10.	Sulphate	28.16	26.10	33.54	31.84	26.15
11.	Phosphate	1.85	1.18	1.73	0.98	1.03

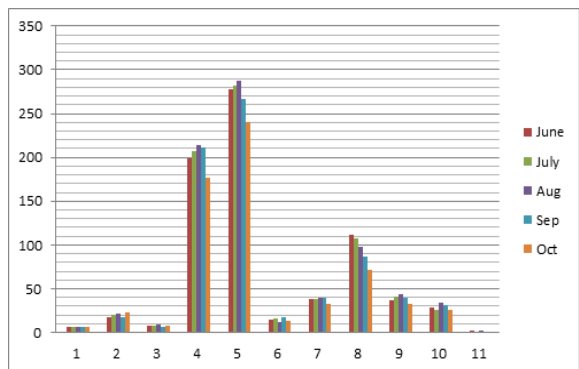


Fig-1: Physico-chemical parameters of canal water

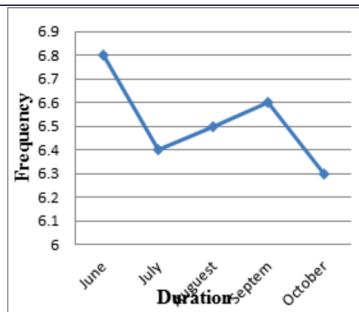


Fig-2:pH

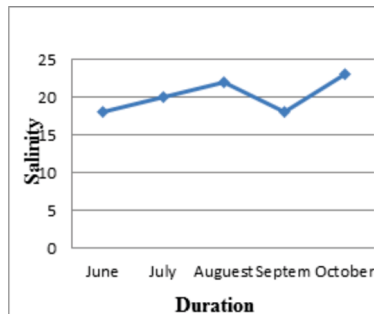


Fig-3: Salinity

RESULT AND DISCUSSION

The table-1 shows that pH values ranged from 6.3 to 6.8 .The average pH 6.5 was observed in August (Fig- 3). The Salinity values ranged from 18.0 to 23.0mg/lit. The maximum value 23.0mg/lit was recorded in October and minimum value 18.0mg/lit was recorded in September (Table-1). The average Salinity was recorded as 20.20mg/lit (Table-1, Fig-3). Singh and Singh (1995) reported that the higher of salinity was due to increase in decomposition of organic matter. The Dissolved Oxygen values ranged from 6.198 to 8.638mg/lit. The maximum value was 8.638mg/lit noticed in August and minimum value 6.198mg/lit was noticed in September (Fig-1). The similar trend was also recorded in water by Singh and Singh (1995). The Total Alkalinity values ranged from 176.50 to 214.00 mg/lit. The maximum value 214.00 mg/lit was noticed in August and minimum value 176.50mg/lit was noticed in October (Table-1).The average Total Alkalinity was 201.46mg/lit noticed.

The BOD values ranged from 11.235 to 16.855mg/lit. The maximum value 16.855mg/lit was recorded in September and the minimum value 11.235mg/lit was recorded in August (Table-1).The average BOD 14.323mg/lit was recorded Fig-1).The Table -1 shows the COD values ranged from 33.27 to 39.06mg/lit. The maximum value 39.06mg/lit was found in August and minimum value 33.27mg/lit was found in October (Fig-1).The average COD was 37.636 mg/lit found (Fig-1).

The Total Hardness ranged from 240.00 to 288.00mg/lit. Sarma *et al.*(2002) reported and variations in the total alkalinity from season to season with a tendency to have maximum values during winter season and lowest values in conformity with its low of pH value. The maximum value 288.00mg/lit was observed in August and minimum value 240.00mg/lit was observed in October (Table-1). The average Total Hardness 271.00mg/lit was observed (Fig-1).The Calcium values ranged from 72.00 to 112.00mg/lit. The maximum value 112.00mg/lit was found in June and minimum value 72.00mg/lit was found in October (Table-1).The average Calcium 95.40mg/lit was found (Fig- 1).The Nitrate values ranged from 32.56 to 44.12mg/lit. The maximum value 44.12mg/lit was found in August and minimum value 32.56mg/lit was found in October. The average Nitrate 38.77mg/lit was found (Fig-1).High concentration of nitrate is drinking water is change toxic nature (U mavathi *et al* 2007)

The Sulphate values ranged from 26.10 to 33.54mg/lit. The maximum value 33.54mg/lit was found in August and minimum value 26.10mg/lit was found in July .The average sulphate 29.158mg/lit was found (Table-1, Fig-1). The Phosphate value ranged from 0.98 to 1.73mg/lit. The maximum value 1.73mg/lit was found in month August and minimum 0.98mg/lit was found in month of September. The average value 1.354mg/lit phosphate were found (Table-1, Fig-1).

CONCLUSION

This evaluation was carried to be conducted for proper environment management plan may be adopted and control the release of domestic waste. Hence it is suggested to all the necessary precaution before the water is used for irrigation and domestic purpose. The results obtained from the present investigation shall be useful in future management of the canal.

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