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STUDY ON CHEMICAL PARAMETERS OF DIFFERENT FRESHWATER BODIES IN WASHIM TOWN OF MAHARASHTRA.

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ABSTRACT

Water has unique place on the earth as it supports life on the earth. Water is the most common substance on the earth covering the seventeenths of world's surface. Fresh water ecosystems are subset of Earths aquatic system. They include lakes, ponds, rivers, streams, springs and wetland. In aquatic habitats, environmental factors include various physical properties of water such as the solubility of gases and solids, light penetration, temperature and density. Chemical factors such as hardness, phosphate and nitrates are very important for growth of primary productivity. Physical and chemical characteristics of water bodies affect the abundance, species composition, stability, productivity, and physiological condition of aquatic organism populations. A study was conducted on chemical parameters of fresh water resources of Washim region. It includes Ekburji dam, Deo talav, Padmatitrh and rain water harvesting pond of R.A. College, Washim. The various chemical parameters like Dissolved oxygen, CO_2, alkalinity, carbonate, bicarbonate and chloride were analyzed for the period of 8 months that is from August 2015 to January 2016.

KEYWORDS :Chemical parameters, Freshwater, Washim .

INTRODUCTION:

India is a unique country with the great cultural diversity associated with all kinds of climates, rich flora and fauna. In spite of enormous volume of hydrosphere only a small portion of it is actually

available as a resource. More than 97% occurs in the form of sea, whose salinity makes it useless, while fresh water makes up only 2.6%.

Khare and Jadhav (2008) performed the water quality assessment of Katraj Lake, Pune, and Maharashtra. Puri et al., (2010) studied and interpreted the physico-chemical characteristics of lake water quality in Nagpur City, India. Singare et al., (2011) assessed the physico-chemical parameters of Sediment Ecosystem of Vasai Creek at Mumbai, India. Pawar and Vaidya (2012) studied on the physico–chemical characteristics and level of sewage pollution in Krishna River at Wai, Dist-Satara revealing the drastic changes in the physico–chemical characteristics of river water within a span of 2 km down the stream when it passes the rough city area. Vasanth kumar et al., (2012) analyzed the physic-chemical characteristics of Queen Lake in Arasikere Karnataka, India.

Fresh water ecosystems are subset of Earths aquatic system. They include lakes, ponds, rivers, streams, springs and wetland. Limnology deals with the biological productivity of inland water and with all its causal influences which determines its causal influences involve meteorological, physical, chemical and biological factors, "which determine the quality and quantity of biological production. So the present study is undertaken to analyze the various chemical parameters of fresh water bodies in the Washim town, to determine the level of pollution in the water bodies and to interpret the water quality for protecting and improving water quality.

MATERIALS AND METHODS

Sampling Sites: Four different perennial water bodies located in the Washim city were selected for the present study described as:

1 The Ekburji Dam :- Ekburji dam is an earthern fill dam on the Chandrabhaga River near Washim in state of Maharashtra in India. It is used for the irrigation purpose and provides drinking water to the Washim City.

2 The Padmatirth:- It is situated in the northern quarters of the town. The Teertha is also addressed as Shiva temple . It is rainfed rounded man built water body provided with inbuilt inlets.

3 Dev Talav :- A beautiful feature of the Balaji temple Washim is Dev Talav. Also reffered to as the Balaji Talav. This tank has continuous ground water flow and therefore, never dries up.

4 Fish Farm:- R.A Arts, Shri M.K Commerce and Shri S. R Rathi Science College Washim is one of the most oldest educational institutes in Vidharbha region of Maharashtra. It have three tanks in premises-A nursery pond (9mX5mX1.5m),A rearing pond (18mX9mX2m) and a plankton culture tank (5mX3mX1m) are constructed to conduct aqua culture experiment.

Water sample for present study was collected by using plastic bottle, glass bottle and polyethylene bottles. The water sample was collected early in the morning from these four sampling sites and brought to the laboratory and analyzed by following the prescribed Standard methods for the Examination of water, APHA (1998).

RESULT AND DISCUSSION:-

In the present study chemical parameters of Ekburgi Dam, Padmatirth, Deo Talav and Fish farm of R.A College, Washim Maharashtra were analysed. The mean with standard deviation values of all chemical parameters of water samples collected from all four sampling sites are presented in table I.

Table I: Analytical report of water quality characteristics.

Parameters	Ekburji Dam	Padmatirth	Deo Talav	Fish Farm
DO (mg/L)	3.55 ±0.599	2.066±1.246	1.883±0.594	4.66 ± 0.280
CO2 (mg/L)	0.96±0.622	Absent	Absent	Absent
Carbonate (mg/L)	3.285± 2.041	4.166 ±1.602	4.666±2.422	3.866±1.886
Bicarbonate (mg/L)	51±6.033	51.33±9.933	46±7.483	40.57±10.40
Chloride (mg/L)	30.723±7.322	47.266±11.577	37.979±8.592	24.81±3.883
Salinity (g/L)	56.376±13.436	86.733±21.24	71.555±15.93	45.53±7.125
Total Hardness (mg/L)	320± 28.284	363.33±44.572	330 ±10.954	280±17.88

Dissolved Oxygen (DO):-

The Dissolved oxygen is one of the major parameter of water. The mean value of DO of Ekburgi Dam was 3.55±0.599 mg/L, 2.066±1.246 mg/L of Padmatirth, 1.883±0.594 mg/L of Deo Talav and 4.666±0.2804 mg/L of fish farm. The highest value of DO was recorded in December in Fish farm which was 4.6mg/L and lowest 0.9 mg/L was recorded in the Ekburgi Dam during September. Dissolved oxygen varies greatly from one site to another site. The dissolved oxygen of the water sample was found to be maximum during the winter season where as monsoon exhibits low amount of dissolved oxygen as compared to the winter values. The high DO content might be due the increased photosynthetic activity of the autotrophs while low content might increases respiration of the organisms, low photosynthetic rate and increased organic matter decomposition Similar findings were reported by Vinay Kumar (2013) and Bhandarkar and Bhandarkar (2013).

Carbon dioxide (CO2):

Depending on the pH and other biological conditions carbon dioxide is found in various forms . the carbon dioxide in turn obtained from the conversion of carbonate to bicarbonate with the rise in the PH.. The mean value of CO_2 recorded on Ekburgi Dam was 0.96 ±0.622 mg/L. while it was absent in all remaining three sites viz. Padmatirth, Deo Talav and Pond water. Free CO_2 was absent due to the activity of respiration in water bodies. It indicates that water contains high amounts of zooplanktons and there means respiration was more and less amounts of photosynthesis are there. The maximum value of CO_2 in the Ekburgi Dam was observed during the month of October which is 2mg/L while minimum, value was observed during the January month which is 0.4 mg/L. Similar findings were reported by Dubey et al., (2013)

Total Alkalinity:

Alkalinity represents the buffering capacity for water and its ability to resist a change in pH and is the total measure of the substance in water that has “acid-neutralizing ability”.

CO3 (Carbonate Phenolphthalein alkalinity):

The mean Carbonates values of four different sampling sites during the present study was 3.285 ± 2.041 mg/L on Ekburgi Dam, 4.166±1.602 mg/L on Padmatirth , 4.666±2.422 mg/L on Deo Talav and 3.866±1.886 mg/L on pond water. Alkalinity was found to be increased in winter season and decreased in rainy season and decease in alkalinity during rainy season may be due to dilution ,while increase in

alkalinity in winter might be due associated with values of PH, hardness and high dissolved solids and rate of carbon assimilation in water. The present results agrees with the findings of Indresha et al., (2014).

HCO3 (Bicarbonate or Methyl Orange alkalinity):

The mean Carbonates values of four different sampling sites during the present study are 51± 6.033 mg/L, on Ekburgi Dam, 51.33±9.933 mg/L ,on Padmatirth , 46±7.483 mg/L, on Deo Talav and 40.57± 10.40 mg/L ,on pond water. Similar findings were reported by Gupte and Sheikh (2013).

Chloride:

Chlorides as chloride anions (Cl-) are the major anion in the waste water. The highest value chloride in Ekburji Dam was42.54mg/L and Lowest was 21.27mg/L, in Padmatirth it was 63.81mg/L and 35.36mg/L, 42.54mg/Land 28.36mg/L, of Deo Talav and, 28.36mg/L and 21.27mg/L of Fish farm respectively. The average chloride concentration during the present study was found to be 30.723 ± 7.322 mg/L, in Ekburgi Dam, 47.266±11.57 mg/L in Padmateerth , mg/L 37. 592 mg/L in Deo Talav and 24.81±3.88 mg/L ,in Fish farm. The fluctuation of chloride are governed by dilution due to inflow of eater, concentration by evaporation and input from sewage run off .The increase in chloride concentration shares the impact of sewage mixing in water . Similar findings were reported by Arumugam and Kumar (2014).

Total Hardness:

During present investigation the average concentration of total hardness of Ekburgi Dam was found to be 320±28.284 mg/L, 363.33±44.57 mg/L in Padmateerth, 33±10.954 mg/L in Deo Talav and 280.0±17.88 mg/L in Fish Farm. Similar findings were reported by Indresha et al., (2014), Muralidharan and Waghod (2014) and Shinde et al., (2011) .

Salinity:

The average concentration of the salinity during the present study was found to be 56.376±13.43 g/L in Ekburgi Dam , 86.733±21.24 g/L in Padmateerth, 71.555±15.93 g/L in Deo Talav and 45.53±7.11 g/L in Fish farm. . All the four sampling sites namely Ekbuji Dam, Padmatirth , Deo Talav and Fish farm (R.A. College, Washim) shows the slight fluctuations in the salinity during the present study. Similar findings were reported by Dhonde and Kulkarni (2012).

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	3.8	2.3	2.4	3.8
September	2.4	1.1	1.6	4.2
Octomber	3.6	0.9	1.4	4.2
November	4.0	1.2	1.8	4.3
December	4.0	2.8	1.3	4.6
January	3.5	4.1	2.8	4.5

Table II: Comparative analysis of DO from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	1.0	Absent	Absent	Absent
September	Absent	Absent	Absent	Absent
Octomber	2.0	Absent	Absent	Absent
November	0.8	Absent	Absent	Absent
December	0.6	Absent	Absent	Absent
January	0.4	Absent	Absent	Absent

Table III: Comparative analysis of CO_2 from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	2.0	2.0	2.0	4.0
September	6.0	6.0	6.0	4.0
Octomber	6.0	6.0	8.0	3.2
November	5.0	4.0	2.0	4.0
December	2.0	3.0	4.0	2.0
January	2.0	4.0	6.0	6.0

Table IV: Comparative analysis of carbonate from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	56.0	54.0	52.0	54.0
September	56.0	54.0	56.0	56.0
Octomber	50.0	46.0	48.0	46.0
November	54.0	52.0	40.0	46.0
December	50.0	50.0	44.0	44.0
January	40.0	28.0	36.0	28.0

Table V: Comparative analysis of Bicarbonate from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	35.45	56.72	42.54	21.27
September	42.54	63.81	35.35	21.27
Octomber	28.36	49.63	49.63	28.36
November	21.27	35.45	28.36	28.36
December	28.36	42.54	28.36	21.27
January	28.36	35.36	42.54	28.36

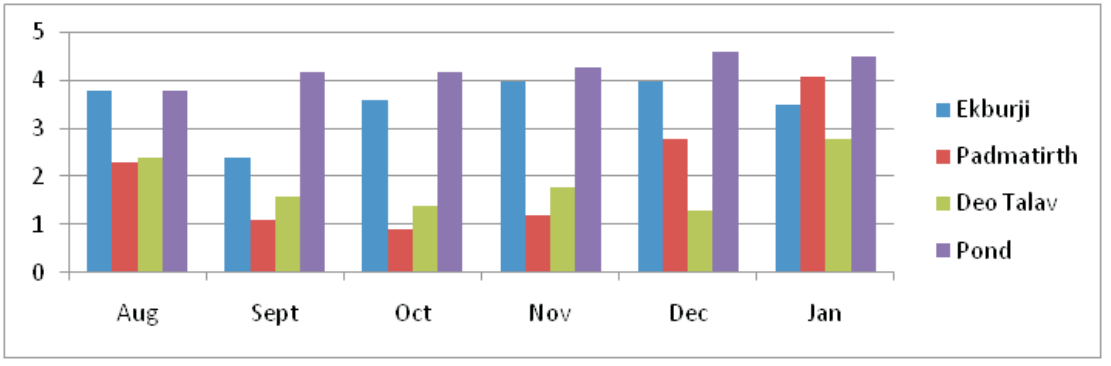
Table VI : Comparative analysis of chloride from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	340	400	320	280
September	360	360	320	300
Octomber	300	280	340	260
November	320	400	340	260
December	280	360	320	280
January	320	380	340	300

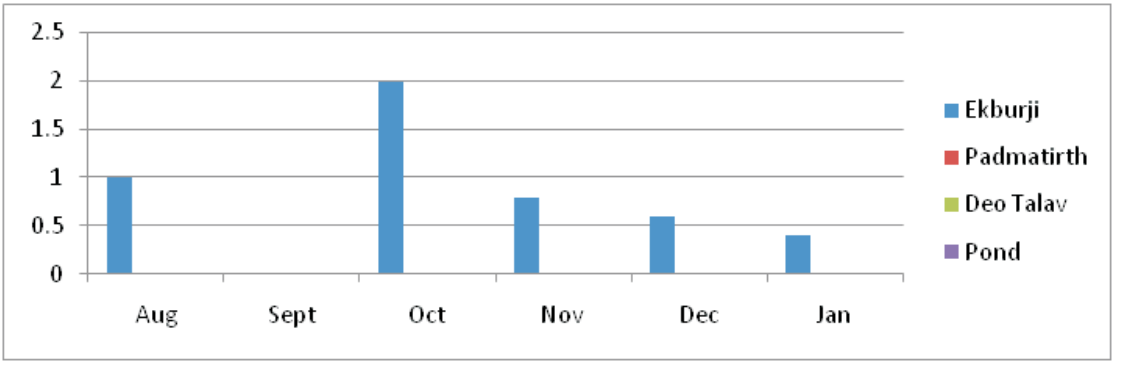
Table VII : Comparative analysis of total hardness from four different sampling sites.

	Ekburji Dam	Padmatirth	Deo Talav	Fish farm
August	65.05	104.08	78.06	39.03
September	78.06	117.09	78.06	39.03
Octomber	52.04	91.07	91.07	52.04
November	39.03	65.05	52.04	52.04
December	52.04	78.06	52.04	39.03
January	52.04	65.05	78.06	52.04

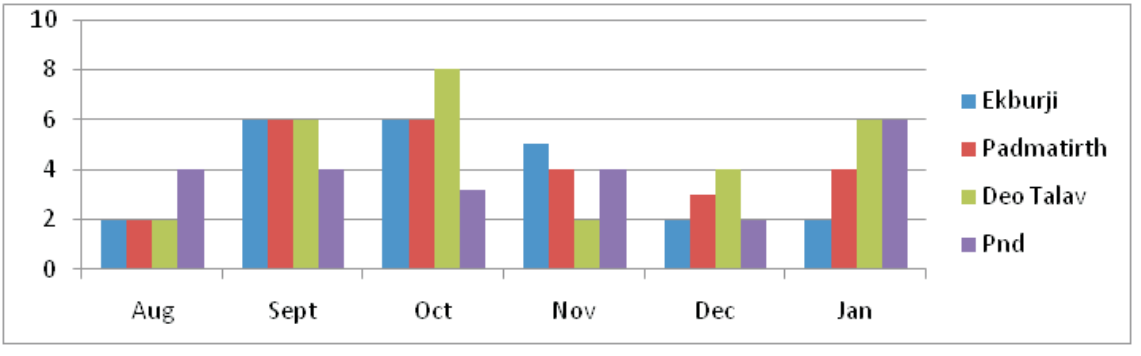
Table VIII : Comparative analysis of salinity from four different sampling sites



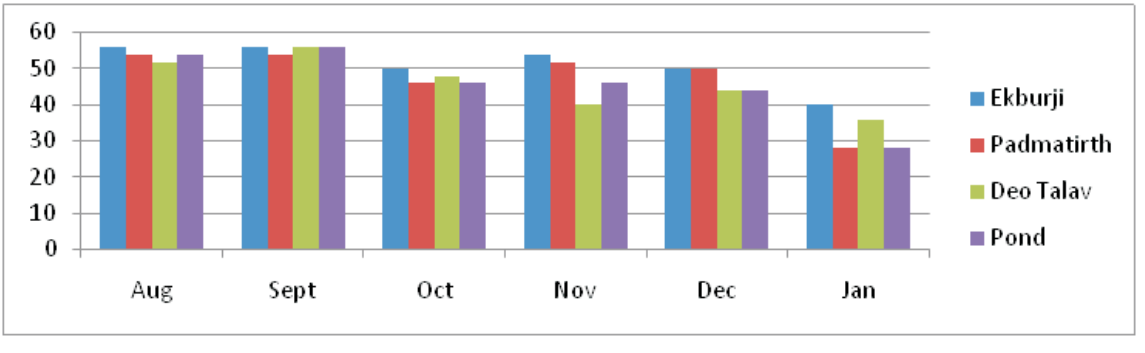
Graph plate I- Seasonal Changes in the DO of four ponds in Washim city



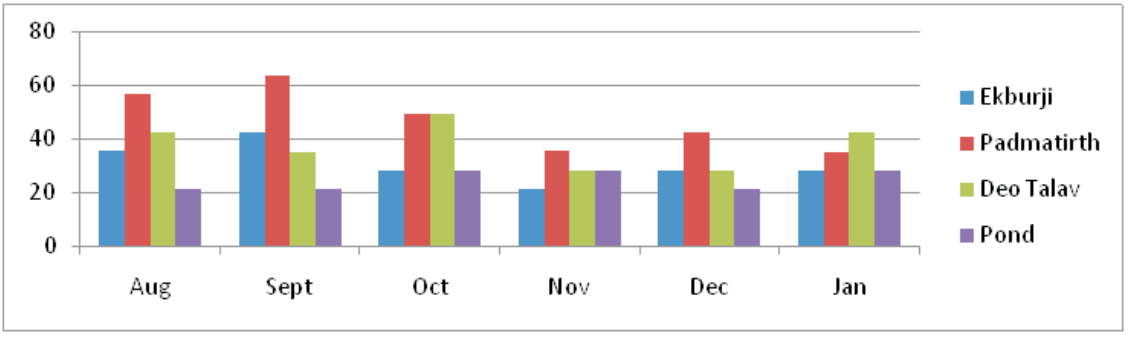
Graph plate II -Seasonal changes in the CO_2 of four ponds in the Washim city



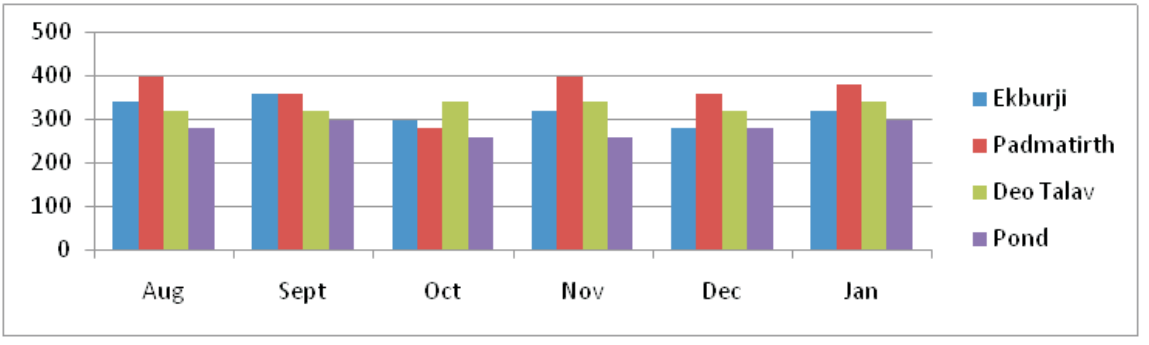
Graph plate III -Seasonal changes in the Co_3 of four ponds in the Washim city



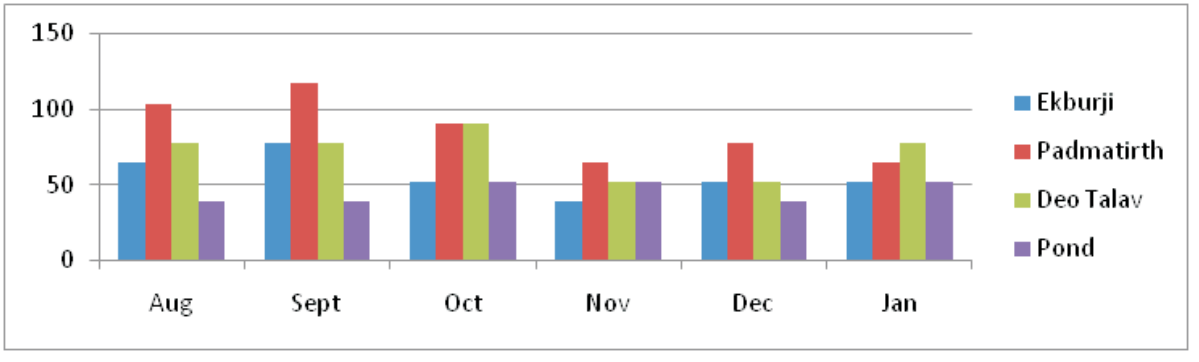
Graph plate IV -Seasonal changes in the HCO_3 of four ponds in the Washim city



Graph plate V -Seasonal changes in the chlorinity of the four ponds in the Washim city



Graph plate VI-Seasonal changes in the total hardness of the four ponds in the Washim city



Graph plate VII - Seasonal changes in the salinity of the four ponds in the Washim city

SUMMARY AND CONCLUSION

During the present study, chemical parameters analyzed were viz. DO, CO_2, CO_3, HCO_3, Chloride, salinity, Total hardness of four fresh water bodies viz. Ekburgi Dam, Padmatirth, Deo Talav and Fish farm (R.A. College). The monsoon and winter seasons shows different seasonal fluctuations in various chemical parameters. The observed chemical status of these water bodies are reported to be suitable for the development on planktonic organisms and fishes. The water of present reservoirs is useful for irrigation as well as fish culture. The water parameters indicate that the Padmatith , Deo Talav and Fish farm (R.A college) are rich in nutrients. The life in the aquatic ecosystem is directly or indirectly depends on water quality.

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