



Analysis of Some Physico-chemical Parameters of Mid Manair Dam in Rajanna Siricilla District, Telangana.

¹G. Mahesh, ² K. Shailaja*

¹Research Scholar Dept of Botany, ^{2*}Associate Professor Dept of Botany

Department of Botany, University College of Science,

Osmania University, Hyderabad, T.S., India.

Abstract: In the present work Mid Manair Dam lake water samples are collected from three different stations and water quality assessment is carried out from January 2020 to December 2020 on monthly basis in order to assess the environmental impact of disposal of domestic, industrial, household and religious waste into the lake. The study is carried out to assess the environmental impact on the water quality, monthly intervals and analyzed for the various physico-chemical factors by following standard methods (APHA, 2017), the study area were calculated, pH, total alkalinity, chlorides, total hardness, calcium, magnesium, nitrates, sulphates, total dissolved solids and dissolved oxygen were the parameters considered for the calculation of Water quality index. The water quality index levels of the lake and all the 3 stations were clearly shows that, the status of the water body is oligotrophic and it is suitable for the human consumption. Based on the results all the selected physico-chemical parameters are within the permissible limits of standard methods of APHA, AWWA.

Key words: Mid Manair Dam, Physico-chemical parameters, Monthly interval.

I. INTRODUCTION

Lakes have always been of great importance to mankind being the valuable natural resources. Lakes are used by humans for many commercial purposes, including fishing, transportation, irrigation, industrial water supplies and receiving waters for waste water effluents. In India, the lake systems are getting polluted day by day. As the water flows downstream, it picks up silt, minerals, and mineral salts from the soil. Many other pollutants enter lake water as it flows downstream, including animal waste, human sewage, agricultural runoff, urban runoff due to which unfortunately, most of the lakes are facing pollution problems. The productivity of the fresh water community that determines the fish growth, algal growth is regulated by the dynamics of its physico-chemical and abiotic environment.(Wetzel, 1983). Water maintains an ecological balance between various groups of living organisms and their environment (Kumar et al., 2004). The present investigation involves the analysis of water quality in relation to physico-chemical parameters.

II. MATERIALS AND METHODS

The water samples were collected at monthly interval, for a period of one year at three sampling stations in the lake.

Study Area: Mid Manair Dam is a major irrigation project across the Manair River, at Manwada Village, Boinpalli Mandal, Rajanna Sircilla district, Telangana It has a capacity of 25.87 tmcft with 25 radial gates. It has a capacity to irrigate 2,00,000 acres. Latitude, longitude coordinates 18.3928° N, 78.9611° E. It is part of the prestigious Kaleshwaram project from which 2-3 tmcft water will be lifted and router to Mid Manair Dam. The surplus water from Sriram Sagar Project flows through the SRSP Flood Flow Canal (SRSP FFC) into the Mid Manair Dam as well as Manair River water. Once the dam reaches full capacity, water is released into the Lower Manair Dam. The Gross Capacity of the reservoir is 25.873 TMC. The Left Bank Canal 22 km to irrigate 9,500 acres. The Right Bank Canal 64 km to irrigate 90,500 acres, the Kaleshwaram project feeds the Mid-Manair Reservoir with the Godavari water and stabilizes the ayacut via existing projects.

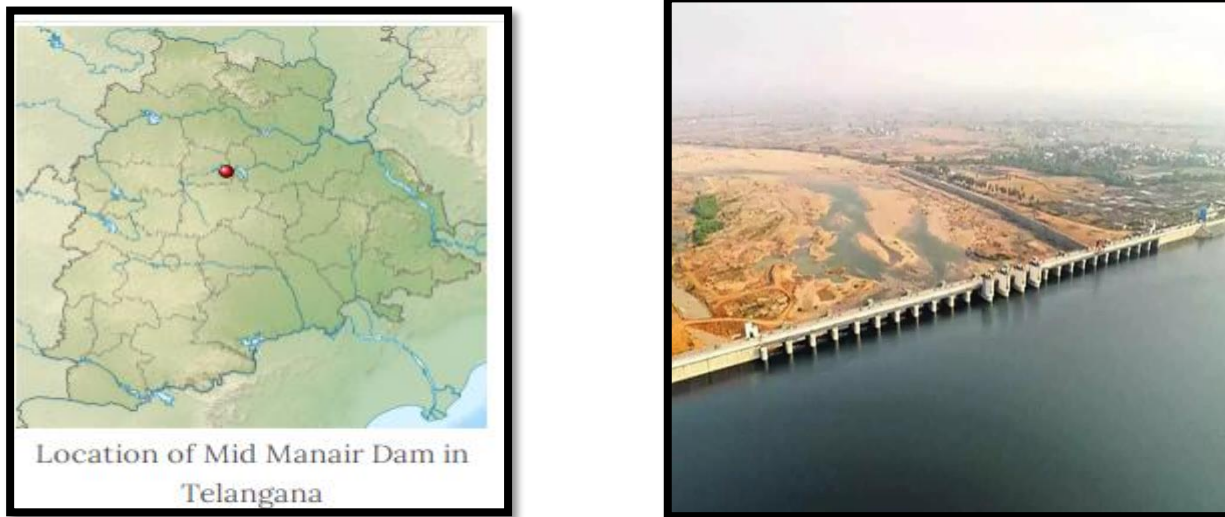


Fig 1: Location and Overview of Mid Manair Dam in Telangana State

Analysis of Water: The surface water samples were collected from 3 sampling stations between 8 to 10 am from January 2020 to December 2020. For the collection of samples 2 liter plastic containers were used. Water samples were tested for different physico-chemical parameters as per APHA method and standard literature (Trivedi, and Goel 1986).



Fig 2: Showing Sample collection in Midmanair Dam

III .RESULTS & DISCUSSION

In the present study the physico-chemical parameters such as Temperature, pH, Carbonates, Bicarbonates, Dissolved oxygen, biological oxygen demand, Chemical oxygen demand, Organic matter, Total hardness, Calcium, Magnesium, Chlorides, Phosphates, Sulphates, Nitrates, Nitrites, Silicates, Total dissolved solids, of water samples taken from Mid Manair Dam. These parameters were taken at monthly intervals from 3 stations of the lake.

Temperature: The measurement of temperature is one of the most primary factors, which plays an important role in the metabolic activities of the organism. The temperature was ranging from 21.7⁰ C to 38.34⁰ C during the period from January 2020 to December 2020. The maximum temperature was recorded in the month of May and lowest in December month. Water temperature influenced aquatic weeds and algal blooms [Zafar 1968].

pH: pH of water is an important environmental factor which effects the biology and the life cycle of the biotic life. It is recorded in the range of 7.1 to 8.6 at all stations. pH was estimated by using pocket pH meter at the spot in lake. pH is ranged 5 to 8.5 is best for plankton growth.

Carbonates: Carbonate is the prime contributor for maintaining pH of a water body and ends its role is of vital importance [Hegdae et al., 2005]. The highest amount of carbonates found to be 51.62 mg/l in January and the lowest value was recorded as 24.22 mg/l in June.

Bicarbonates: Bicarbonate serves an important role in water biota. Higher value of bicarbonate leads to alkaline pH. The greater amounts of bicarbonates were identified as 249.79 mg/l in July and lowest value is 142.52 mg/l in October.

Dissolved Oxygen: Dissolve oxygen is an important parameter in water quality assessment as it regulates many metabolic and physiological processes of biotic components. It indicates the pollution in water bodies. The DO values varied from 4.1 to 12.3 mg/l Highest DO observed in during winter season and lowest was observed during summer season. Lower DO indicate organic pollution in lake as DO levels in water drop below 5.0 mg/l, many life forms are put under pressure. (Bowman e al., 2008).

Biological Oxygen Demand: The highest concentration of BOD 11 mg/l recorded in summer season, lowest value 2.6 mg/L recorded during winter season. High amount of waste along with rain water from the surrounding and addition of organic waste in lake. High biological oxygen in summer was several microbes in water accelerated their metabolic activities (Solanki H.A 2007).

Chemical Oxygen Demand: The highest value 33.00 mg/L lowest values 8.00 mg /l were recorded. Highest values observed in summer and lowest values were recorded during rainy season. High COD value may be due to addition of organic matter with waste discharge into lake. The estimation of COD along with BOD is helpful in indicating toxic conditions and the presence of non biodegradable substances in the water.(Sawyer. et al.,2002). The high COD values indicates non-biodegradable oxygen demanding pollutants were present in the water.

Total Hardness: The maximum values 245.00 mg/L is recorded during summer season. Lowe values 109.00mg/L were recorded during rainy season High range organic components, detergents, chlorides, high temperature are influence to decrease in water volume and they increase the hardness.

Calcium: Calcium is an important nutrient for aquatic organism. Sewage waste might also be responsible for the increase in amount of calcium . (Udhaya kumar,et al., 2006). The maximum value of calcium 59.49 mg/l were noticed in August and minimum 34.16 mg/l January.

Chlorides: The higher concentration of chloride 190.5 mg/l estimated in April and lower concentration 120.25mg/l recorded in July. The higher concentration of chloride is considered to be an indicator of higher pollution due to higher organic waste of animal origin (Mishra, et al.,2007). .The lowest value of chloride recorded during monsoon season due to the dilution of lake water by rain .(Shastry C.A, 1970)

Phosphates: Phosphates were recorded very low concentration in Medchal lake and the concentrations are influenced by domestic sewage, agricultural drainage, and the release of laundry detergents into the aquatic system. The phosphate - phosphorus was recorded in range of 0.34 to 0.96 mg/l of observations.

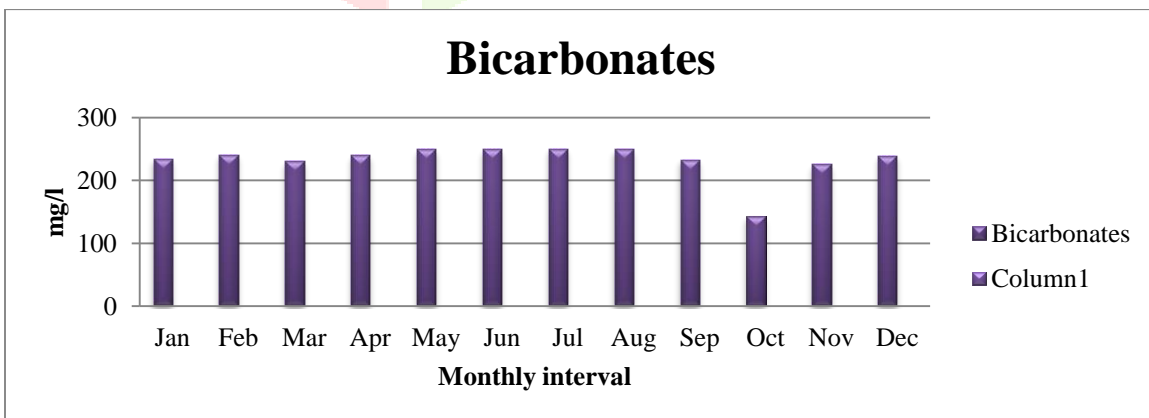
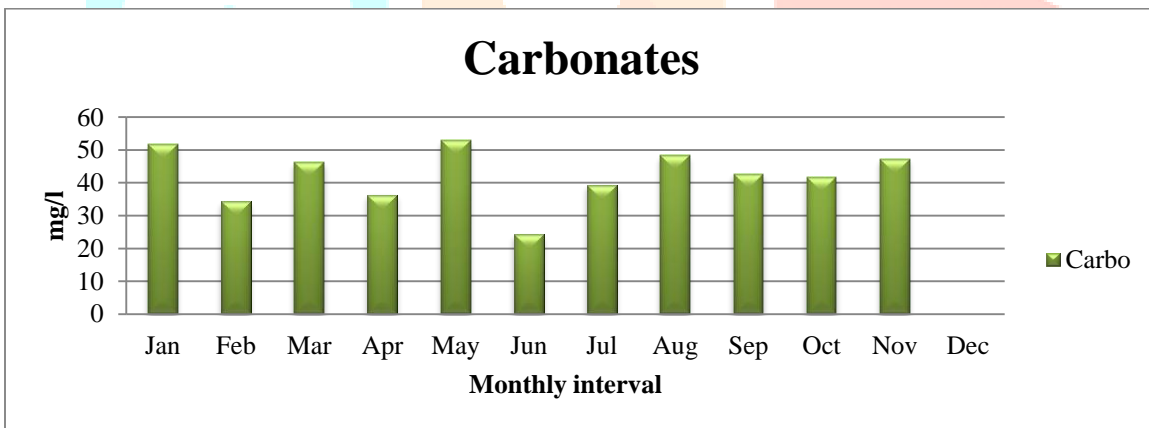
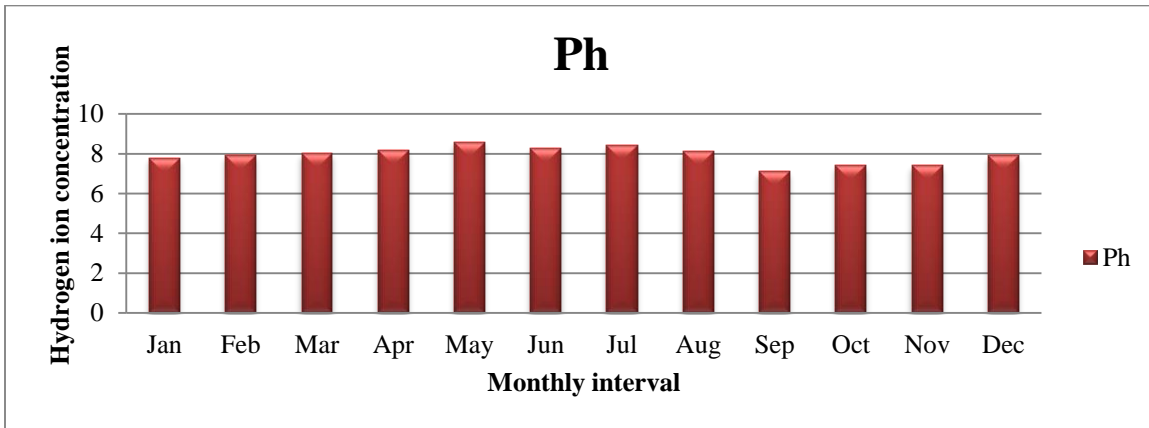
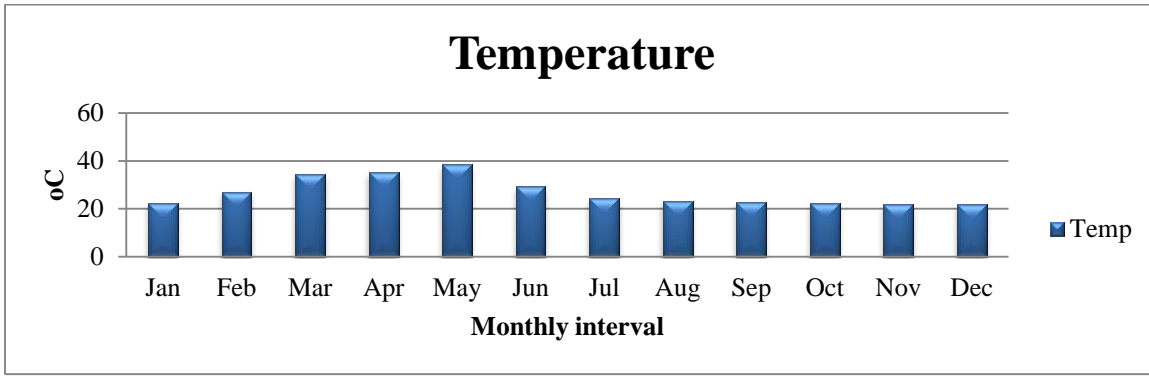
Nitrates: The estimated maximum amount of nitrates in june 1.19 mg/l and minimum amount in march 0.60 mg/l were recorded Similar observations found in (Raju Potharaju 2021). Nitrogen is component in nitrate, nitrite, ammonia, urea, and dissolved organic compounds in an aquatic environment. The highest amount of nitrate concentration was known to support the formation of blooms.(Udama, A.U 2014).

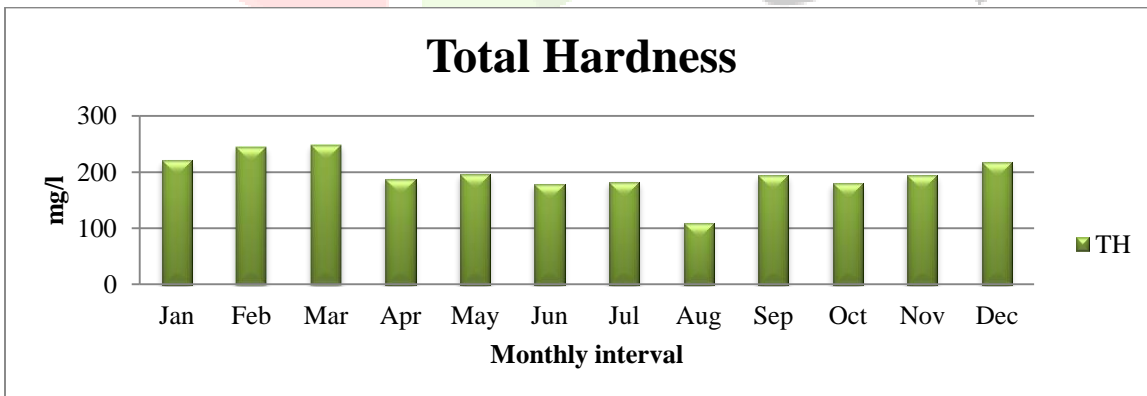
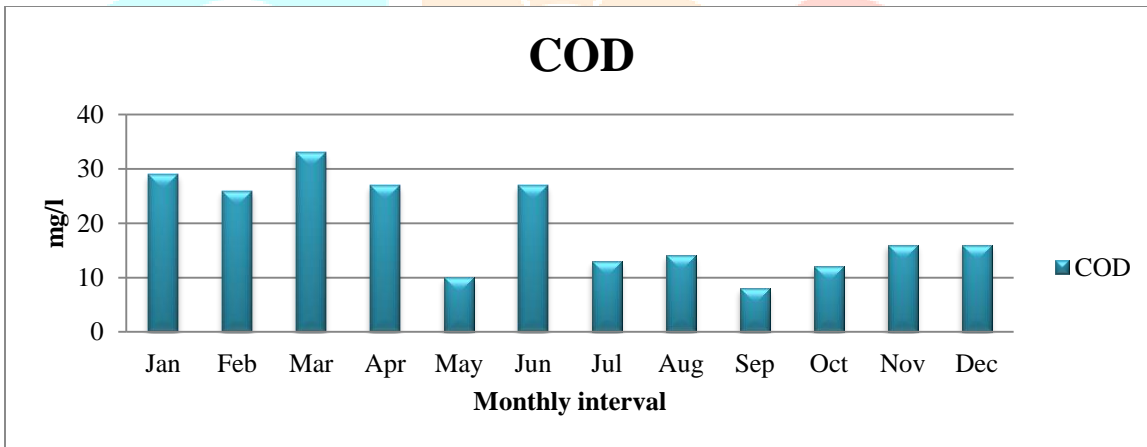
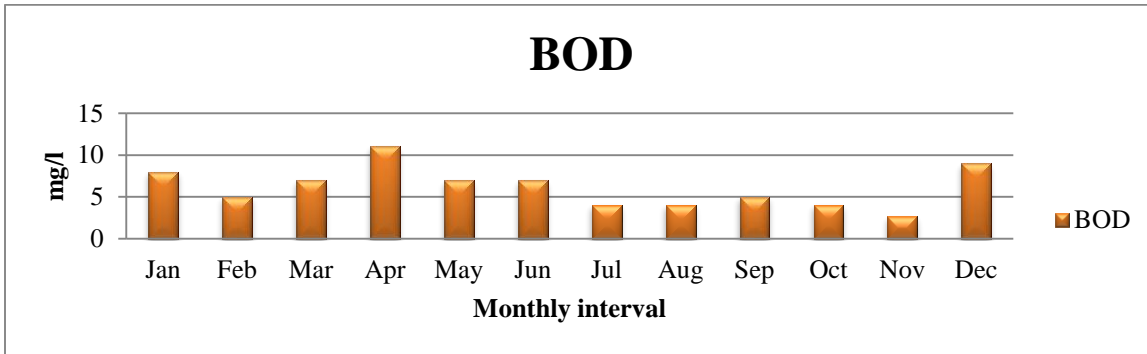
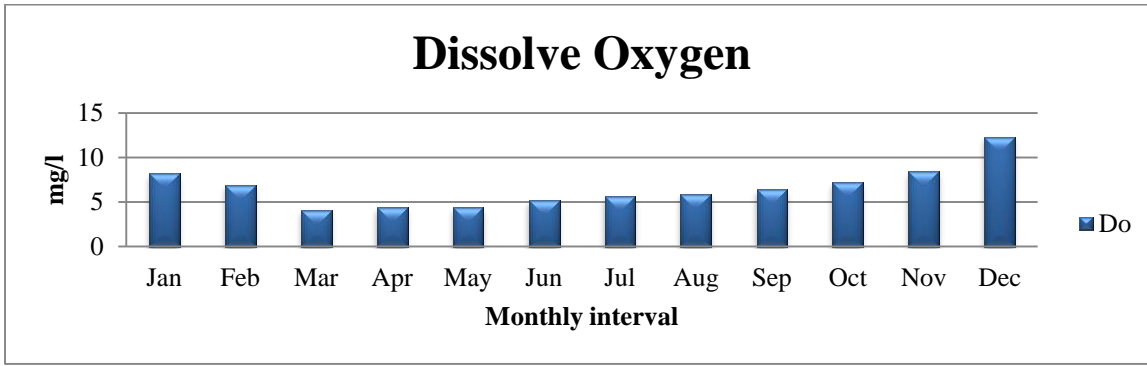
Nitrites: Nitrites are increase with nitrogen rich flood water into the Lake .The maximum value 0.08 mg/l and the lowest value was 0.02 mg/l were recorded. The lowest amount nitrite was recorded during the summer and monsoon may due to the utilization by eutrophication.(Abdar. M.R., 2013).

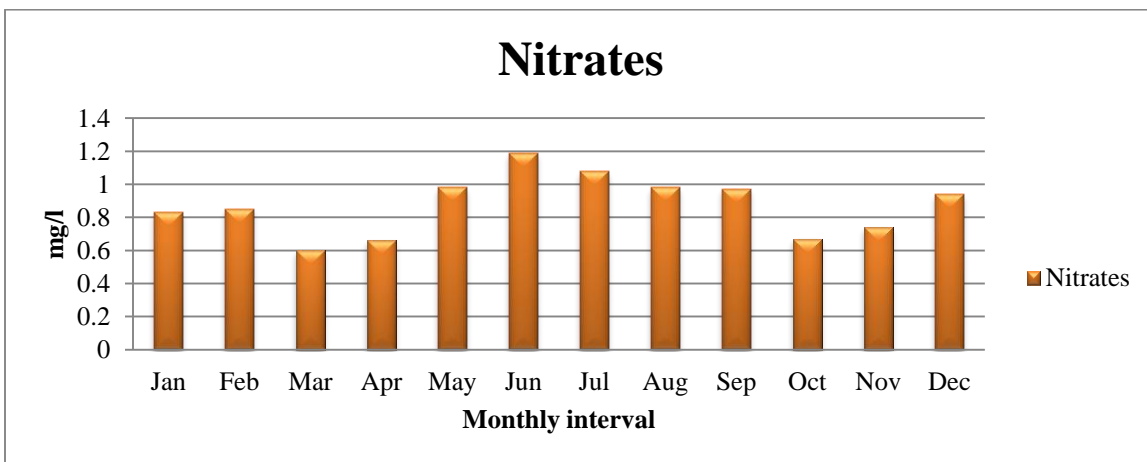
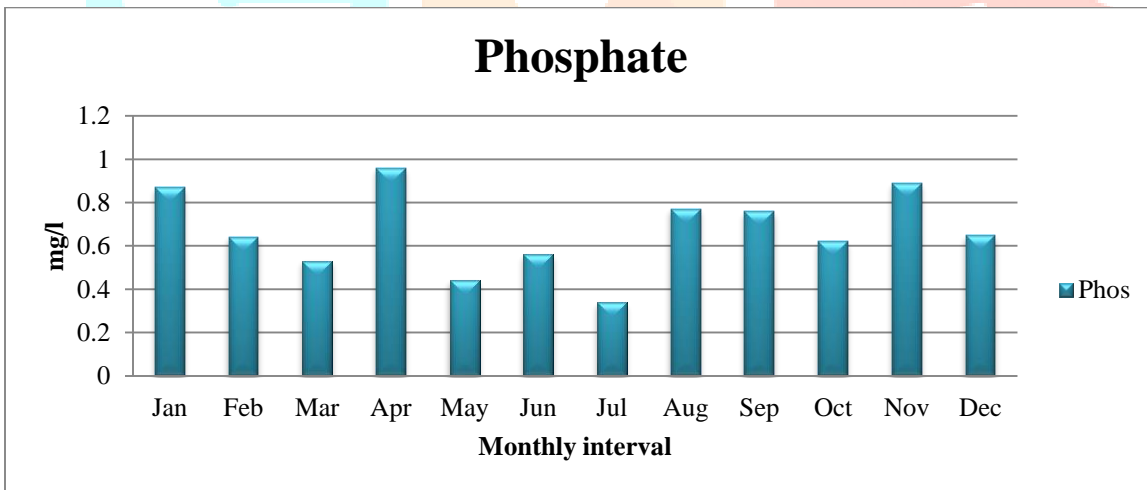
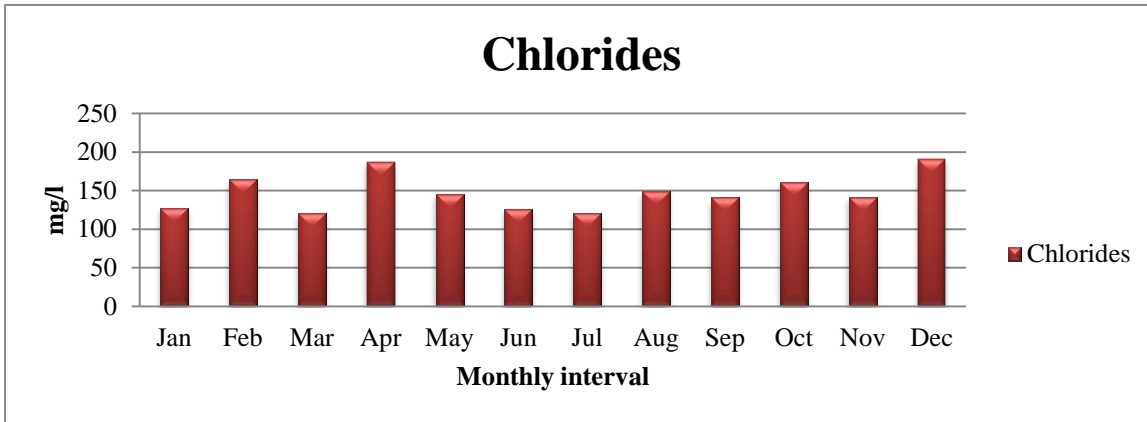
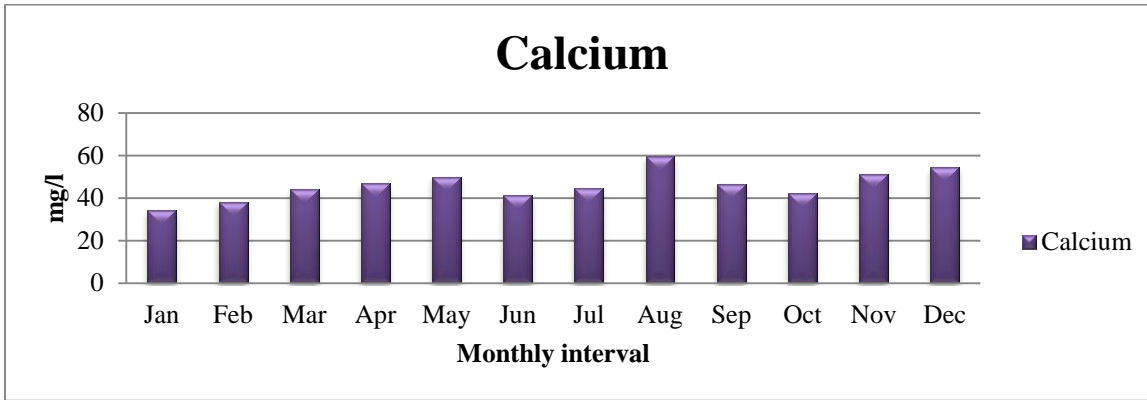
Silicates: This is an important parameter in fresh water ecosystem which regulates the diatoms population. Silicates are play an important role in the production of algal growth is well recognized. In the present investigation value ranged 1.92 to 3.18 mg/l.

Organic Matter: The highest value recorded 2.9 mg/l is recorded in September and lowest value was recorded of 0.5 mg/l in August. Organic matter infusion into the lake as outside the basin water inflowing.

Parameters	JAN 2020	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC 2020	Avg
Temp(°C)	22.4	27.11	34.46	35.17	38.34	29.2	24.26	23.29	22.9	22.41	21.80	21.76	25.58
pH	7.8	7.9	8.0	8.2	8.6	8.3	8.4	8.1	7.1	7.4	7.4	7.9	7.91
Carbonates	51.62	34.25	46.31	36.28	52.90	24.22	39.34	48.40	42.68	41.56	47.26	27.44	41.22
Bicarbonates	234.24	240.26	229.76	239.56	249.24	248.65	249.79	248.64	232.68	142.52	225.34	238.61	232.58
DO	8.2	6.9	4.1	4.4	4.4	5.2	5.6	5.9	6.4	7.2	8.4	12.3	6.26
BOD	8	5	7	11	7	7	4	4	5	4	2.6	10	7.41
COD	29	26	33	27	10	27	13	14	8	12	16	16	19.66
TH	221	245	248	188	196	178	182	109	194	180	194	218	198.08
Calcium	34.16	38.28	44.29	46.96	49.92	41.34	44.66	59.49	46.74	42.12	51.39	54.58	46.33
Chlorides	127.26	164.28	120.6	186.96	145.56	126.25	120.25	148.6	140.6	160.5	140.6	190.5	152.1
Phosphates	0.87	0.64	0.53	0.96	0.44	0.56	0.34s	0.77	0.76	0.62	0.89	0.65	0.68
Nitrates	0.83	0.85	0.60	0.66	0.98	1.19	1.08	0.98	0.97	0.67	0.74	0.94	0.87
Silicates	2.24	2.44	2.26	1.92	2.75	3.18	1.93	1.99	2.18	1.96	2.66	1.96	2.25
Organic matter	1.8	0.9	1.4	1.8	1.8	0.6	0.5	0.6	2.9	1.9	1.6	1.8	1.37
Nitrites	0.04	0.06	0.02	0.06	0.03	0.04	0.08	0.02	0.04	0.04	0.02	0.05	0.04







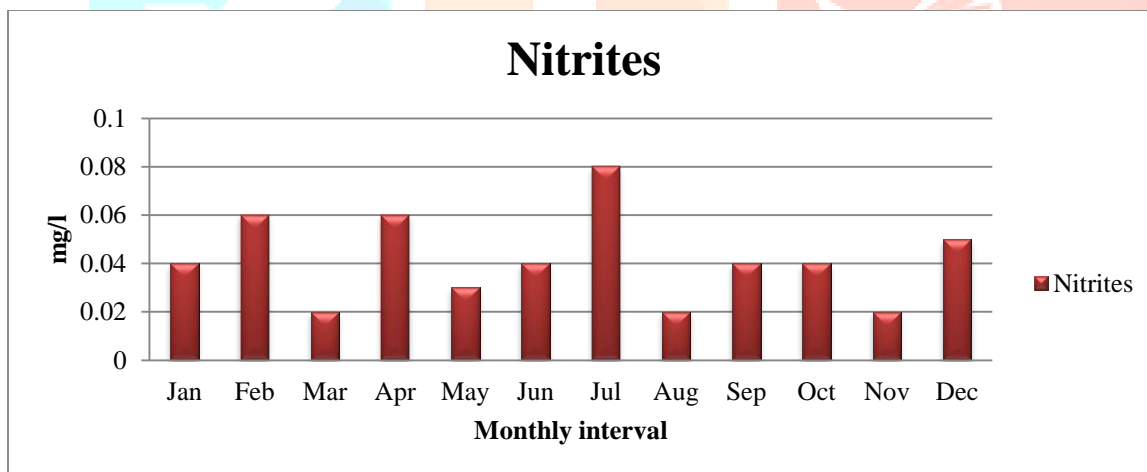
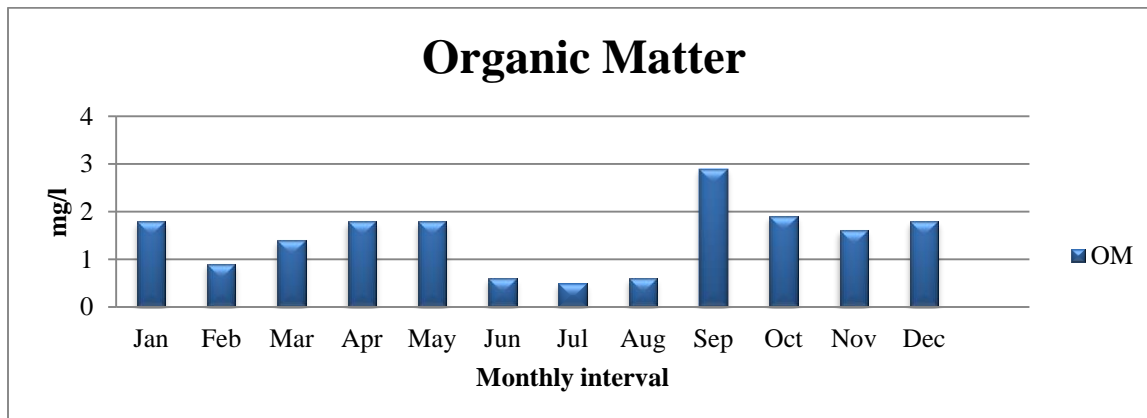
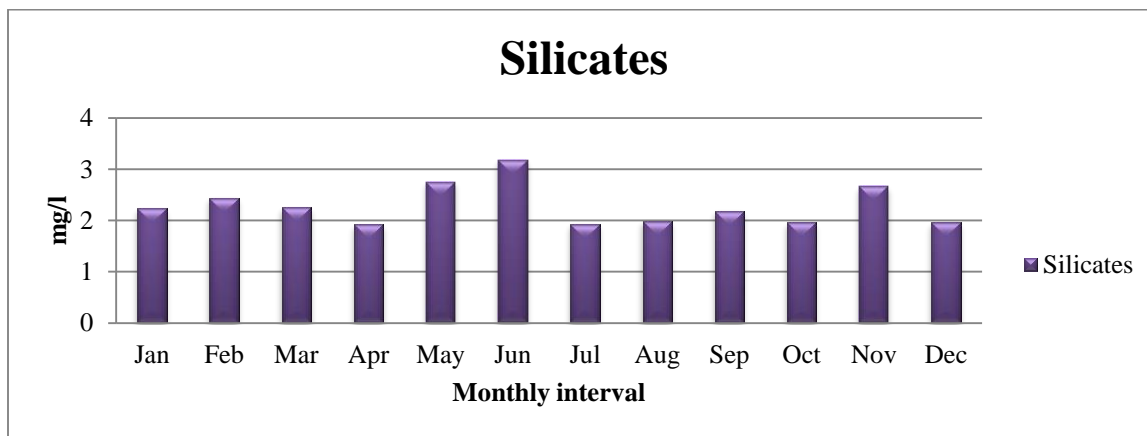


Fig 4: Showing Graphical data of Physico-chemical parameters

IV. CONCLUSION

In my present investigation the analysis of Physico-chemical parameters are assed within the permissible limit prescribed by WHO for drinking water. Seasonal fluctuations are showing assed by physico-chemical parameters. The water of present Mid Manair Dam is useful for fish culture, irrigation, as well as drinking.

REFERENCES

- [1] APHA (2017), Standard Methods for the Examination of Water and Wastewater, 23rd ed. Washington DC: American Public Health Association.
- [2] Wetzel, R. G. (1983). Attached algal-substrata interactions: fact or myth, and when and how?. *Periphyton of freshwater ecosystems*, 207-215.
- [3] Kumar, S Sarangi, S., & Gopalan, K., (2004). Pb–Pb age of earliest megascopic, eukaryotic alga bearing Rohtas Formation, Vindhyan Supergroup, India: implications for Precambrian atmospheric oxygen evolution. *Precambrian Research*, 132(1-2), 107-121.
- [4] Trivedi RK, Goel PK (1986). Chemical and Biological Methods for Water Pollution Studies. India: Env. Pub. Karad; 1986; 215p.
- [5] Zafar. (1968). Certain aspects of distribution pattern of phytoplankton in the lake of Hyderabad. In: Mishra, R. and Gopa(eds.) Proc. Symp, on *Recent Advances in Tropical Ecology*, Varanasi, India. Pp. 368-375.
- [6] Hegdae, B,A, Sureka, G, Ramadas, K, Yashovarma, B., (2005). Studies on the limnological characteristics of guruvayankara pond near Belthangady of Karnataka, India. *Indian.J.Envir.and Ecoplanning*. 10(1): 165-8.
- [7] Bowman, B.J., Wilson, P.C., and Ontemaa, E.A., (2008). Understanding water quality parameters for citrus irrigation and drainage systems, circular 1406, *University of Florida, IFAS*.
- [8] Solanki H.A (2007) Ecological studies of phytoplankton of Mini Mahi River,Gujarat,India. *Vidya* 2: 47-57.
- [9] Sawyer. C.N, McCarty, P.L., and Parkin, G.F., (2002).*Chemistry for environmental engineering science*, 5ed. Newyork city; McGraw-Hill.
- [10] Udhaya kumar, J.D. Natarajan, k. Srinivasan, C.Mohansundari and Balasurami,M.(2006). Physicochemical and Bacteriological Analysis of water from Namakkal and Erode Districts,Tamilnadu, India. *Poll Res.*, 25(3); 495-498.
- [11] Mishra, K.N. Siyaram and Singa, D.P.(2007).The seasonal variation in phytoplankton compositionof Dhesura tal Lawain in Jaunpur district, U.P.J Indian Bot Soc., 86(34):151-155.
- [12] Shastry C.A, Aboo K.M, Bhatia H.L, Rao A.V (1970) Pollution of upper lake and its effect on Bhopal water supply.*Journal of Environmental Health* 12: 218-238.
- [13] Raju Potharaju, M. Aruna (2021). Analysis of Physico Chemical Parameters of Medchal Lake in Telangana State. *IJSRST* Vol 8 pp369-381.
- [14] Udama, A.U (2014) Physico-chemical analysis of the quality of sachet water consumed in kano metro.*American Journal of Environment,Energy and Power Research* 2;1-10.
- [15] Abdar. M.R., (2013). Physico chemical characteristics and phytoplankton of Moma Lake,Shirala (M.S) India.*An International quarterly journal of biology and life sciences*. 1(2) ;1-7.