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RESEARCH ARTICLE

STUDIES ON PHYSICO-CHEMICAL PARAMETERS OF POCHAMPAD DAM IN TELANGANA STATE, INDIA

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ABSTRACT

In present work an attempt has been made to assess the physico-chemical parameters of pochampad dam. The Study was carried out for a period of one year from June -2013 to May-2014. Different physico-chemical parameters like Temp, pH, Calcium, Magnesium, BOD, DO, COD, Total Solids, Total Dissolved solids, chlorides, phosphates, Sulphates were analyzed. The dam water is used for drinking and domestic purposes.

Key words: Pochampad dam, Godavari river, Physico-Chemical parameters, Oligotrophic.

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INTRODUCTION

Water is one of the most valuable asset of nature given to man and has been exploited at the higher level than any other resource for survival. Over 97% of the water on this planet is stored in oceans and icecaps. Nearly 97.3% is available in Oceans and is salty in nature. Huge amount of water is stored as polar icecaps and glaciers. Only 0.02% fresh water to satisfy our diverse needs comes from lakes, rivers and ponds. The sur face fresh water in the form of lakes and rivers is hardly 0.01% of total water available on the earth. Demand for fresh water has increased markedly in recent years. It is estimated that nearly one third of the world's inhabitants live in countries with severe water problems (Kumar *et al*., 2005). Physico-che mical factors play an important role in analysis of pollutant or contaminant. The chemical and biological factors are interrelated and interdependent. The main objective of the experimental work undertaken is to analyze different chemical constituents present in the natural and disturbed aquatic ecosystem, where ponds and lakes have been profoundly altered and have lost much of their value, the scientific understanding of these water bodies is being used in prescribing restoration methods (Lewis, 2000). Water quality deterioration in reservoirs usually comes from excessive nutrient inputs, eutrophication, acidification, heavy metal contamination, organic pollution and obnoxious fishing practices. The effects of these "imports" in to the reservoir (Djukic *et al*., 1994 and Dumont, 1999) have used the physico-chemical properties of water to assess water quality. The changes in physical characteristics like temperature, and chemical elements of water such as dissolved oxygen, chemical oxygen demand, phosphate provide valuable information on the quality of the water, the source of the variations and their impacts on the functions and biodiversity of the reservoir.

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MATERIALS AND METHODS

Study area: Nizamabad is located at 18.6725" Northern latitude\. 78.0941" East longitude and spread over an area 4153 km. This Pocahmpad project on the Godavari river has been described by The Hindu as a life line for a large part of Telangana (Figure-1). It is an irrigation project across the Godavari in Telangana to serve irrigation needs in Karimnagar, Warangal, Adilabad, Nalgonda and Khammam Districts. It provides drinking water to Warangal city.

Sampling collection and analysis: The sampling stations were selected on the basis of nature. The water samples for the present study were collected at monthly interval from three stations (Station-I, II, III) for a period of 1 year from June-2013 to May-2014. Samples were collected every month from the surface of the pond at 8.00am -10.00pm in order to maintain uniformity. The analysis was carried out as per APHA method (APHA 1995).

RESULTS AND DISCUSSION

The physico-chemical parameters such as Temperature, pH, Dissolved oxygen, Biological oxygen demand, Chemical

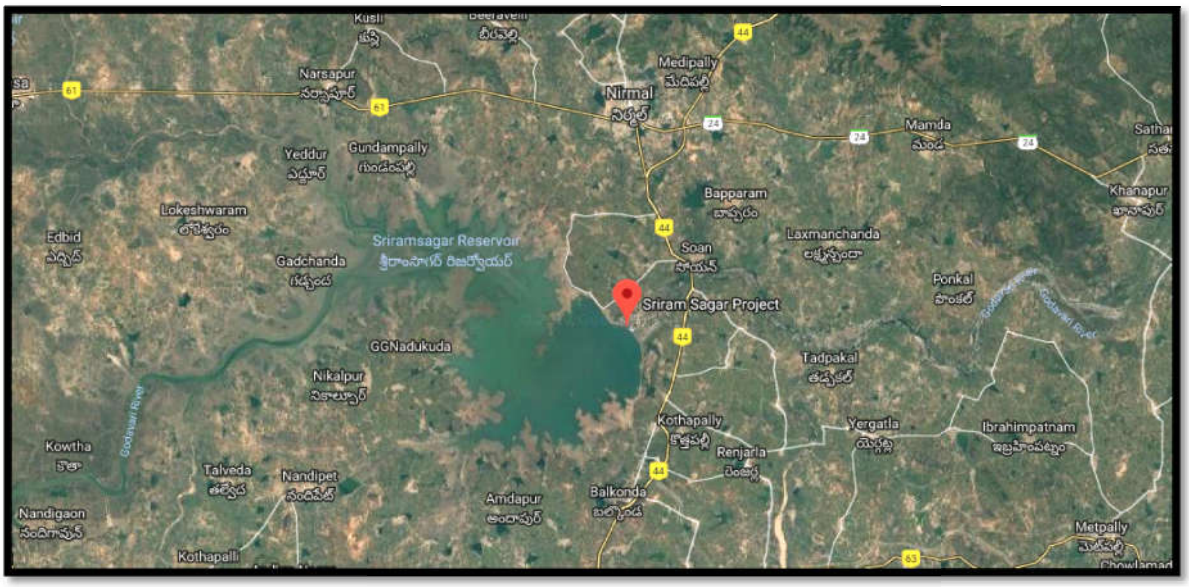
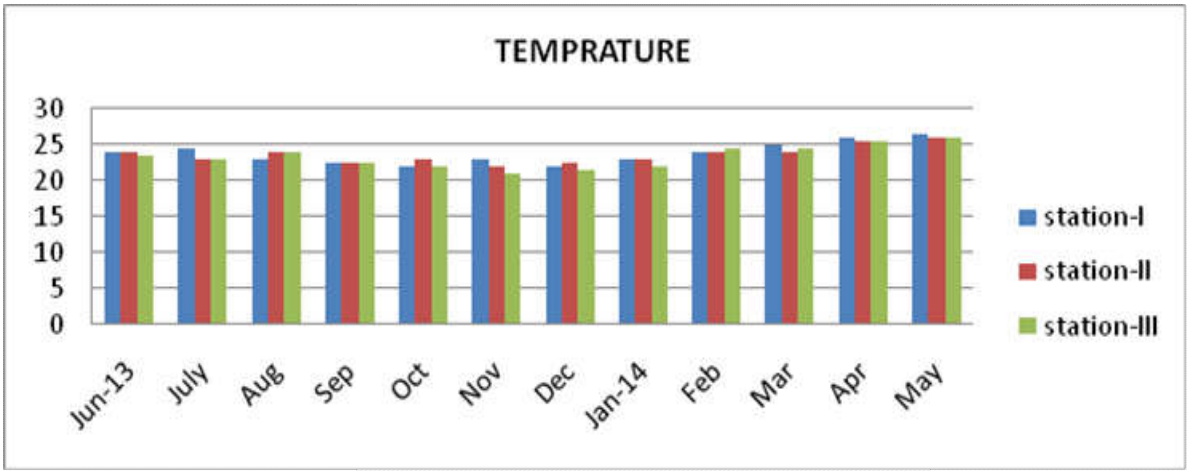


Figure 1. Satellite map of pochampad dam, Nizamabad Dist. (T.S)



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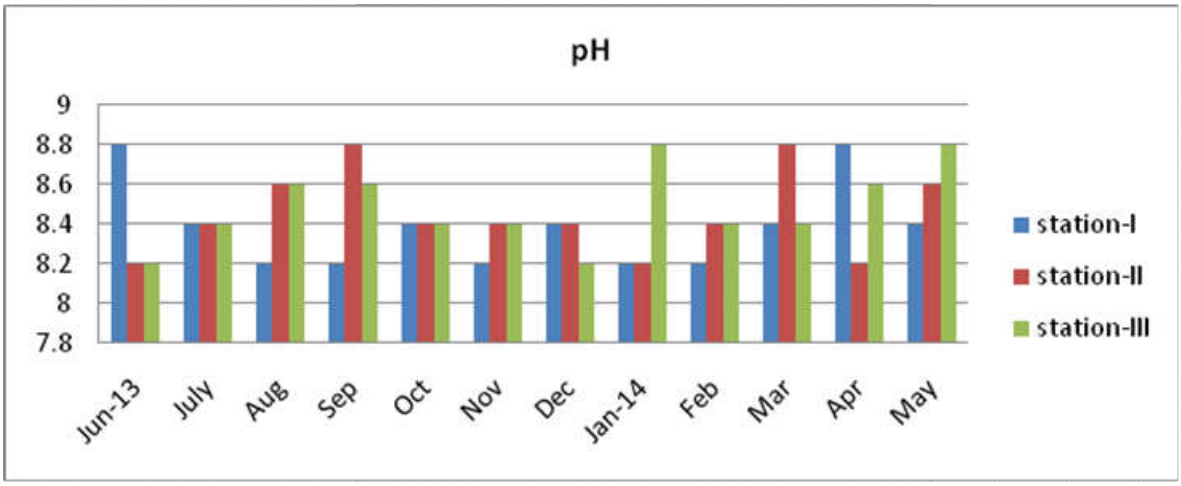
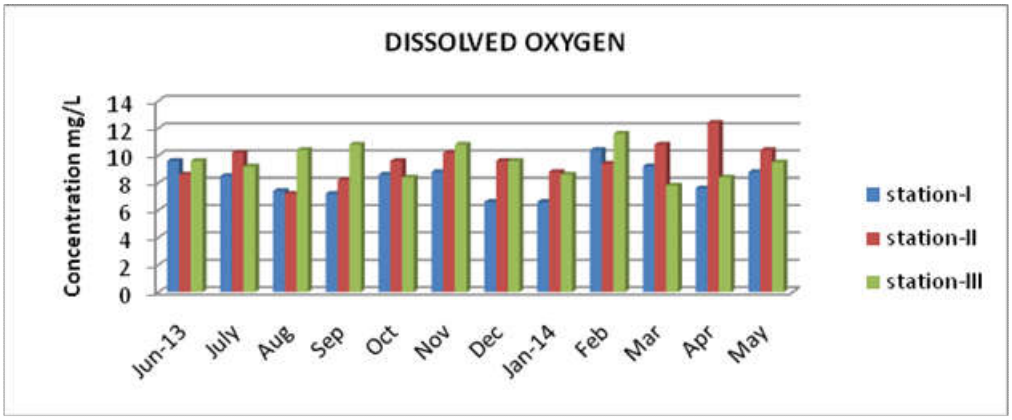


Figure 3.

oxygen demand, Organic matter, Total hardness, Calcium, Magnesium, Chlorides, Phosphates, Sulphates, Total solids, Total dissolved solids of water were analysed in the water samples taken from Pochampad Dam, Nizamabad Dist, Telangana, India. These parameters were taken at monthly intervals from three stations of the Dam. All parameters were discussed seasonally and its variations across the months are graphically presented in Figures 2-15.

Water Temperature: The surface water temperature is generally recorded as one of the most important factor in the aquatic ecology. In the present study the surface water



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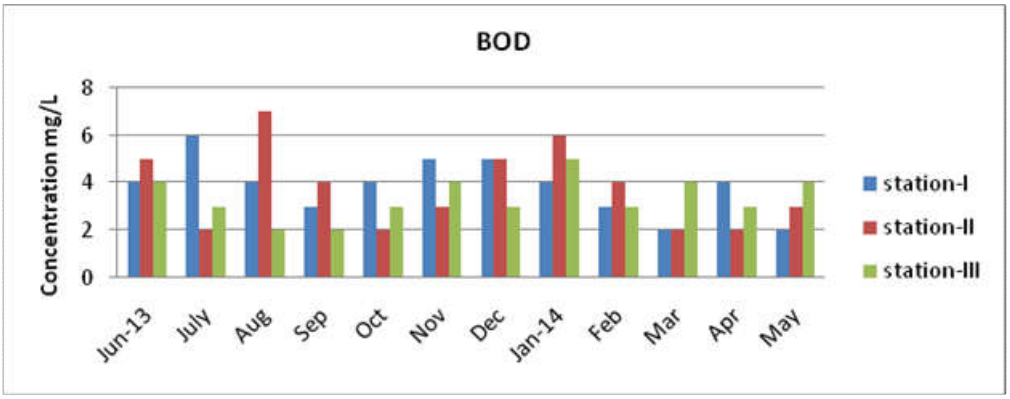

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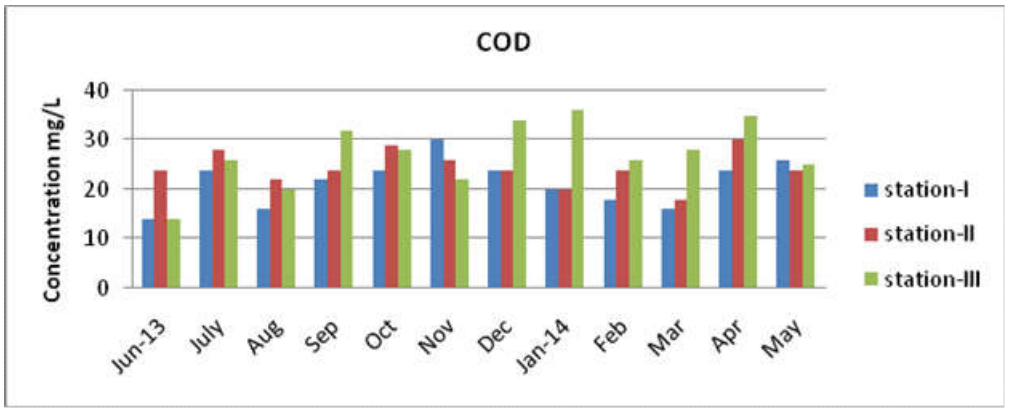

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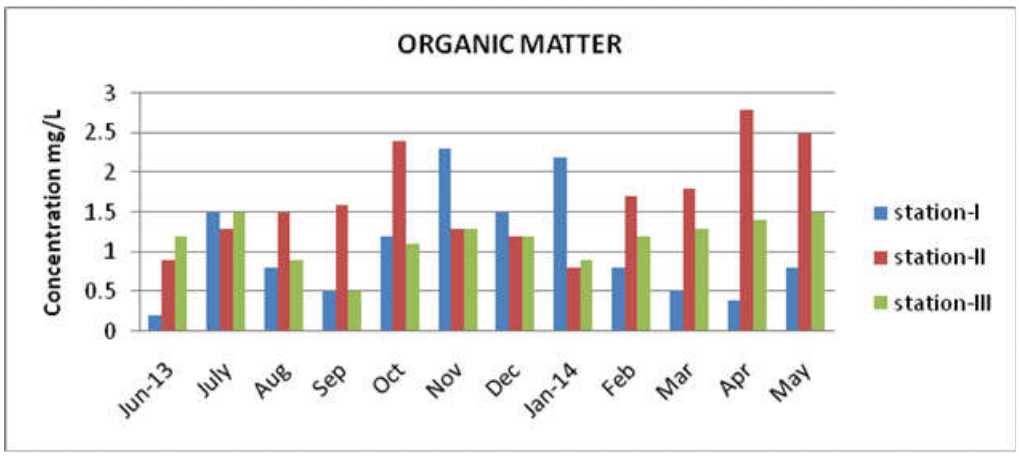

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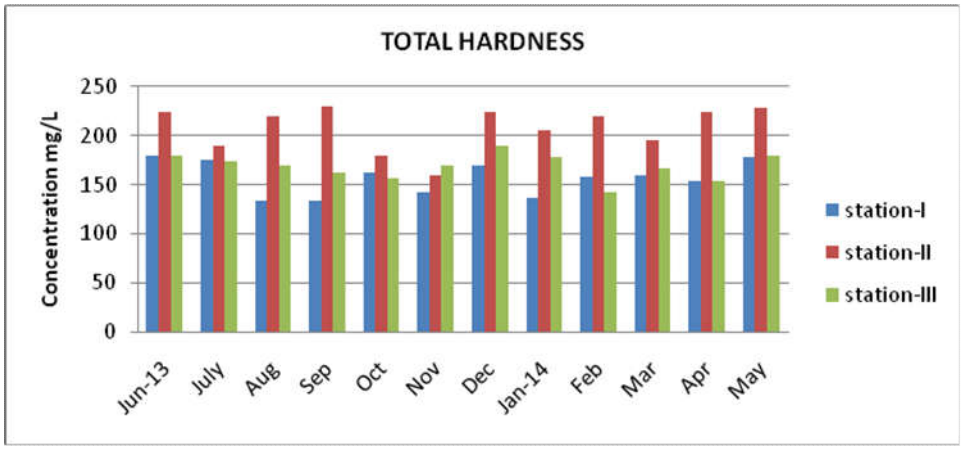

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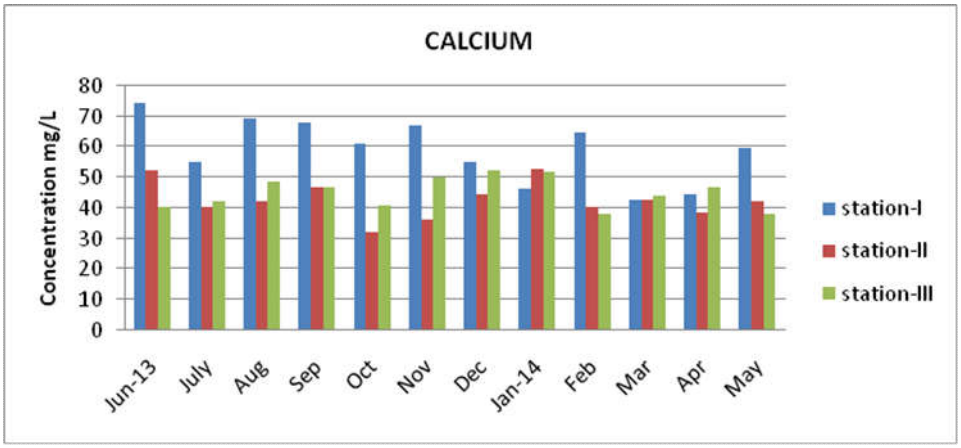

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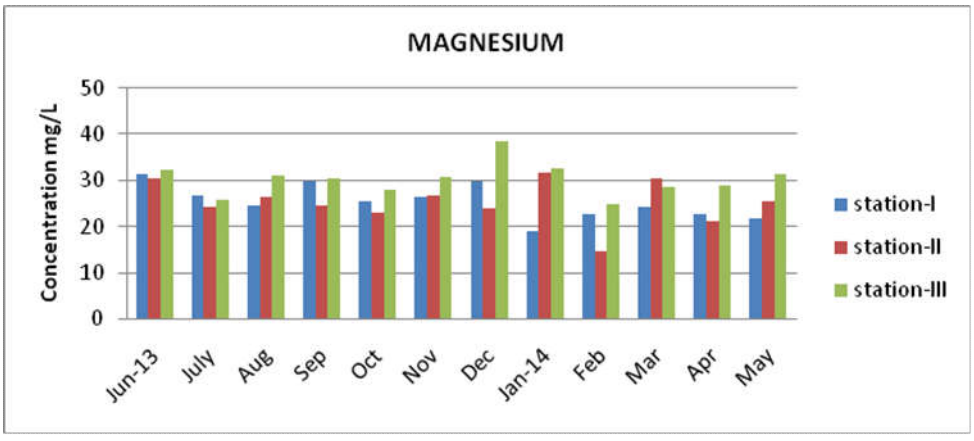

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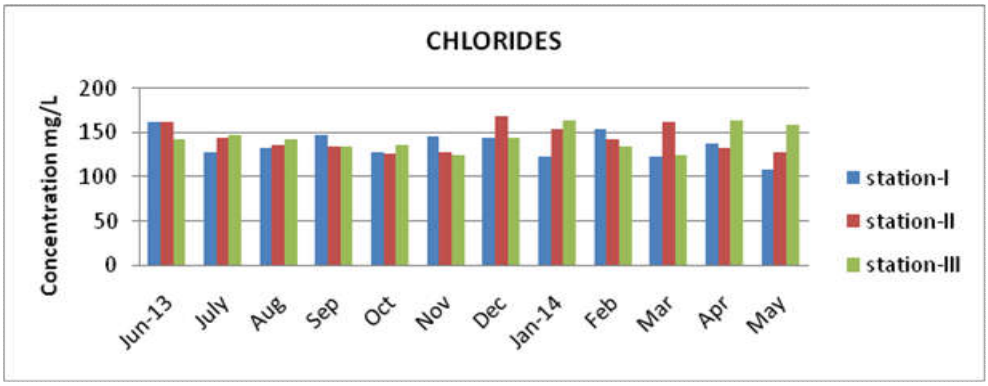

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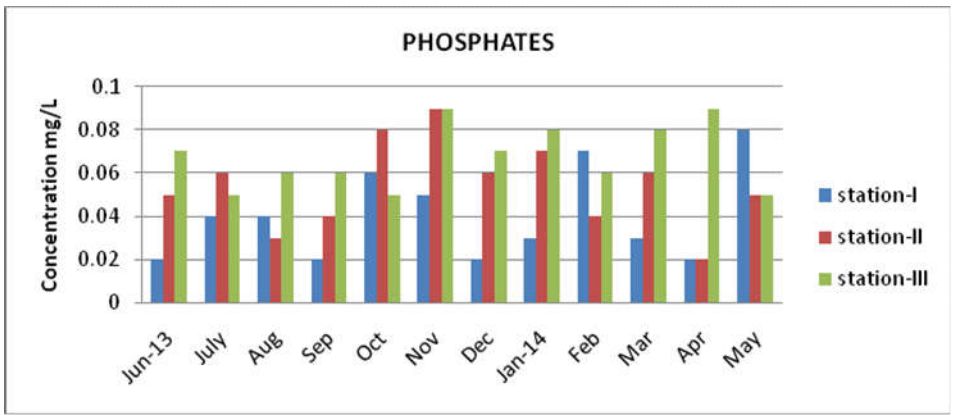

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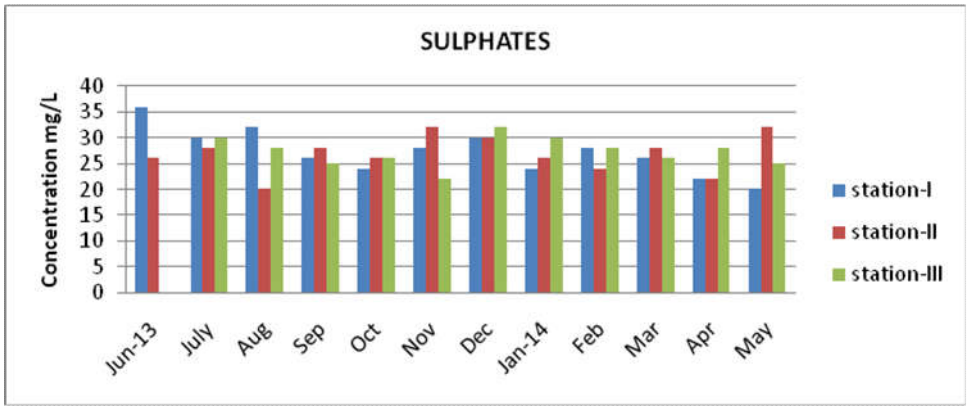

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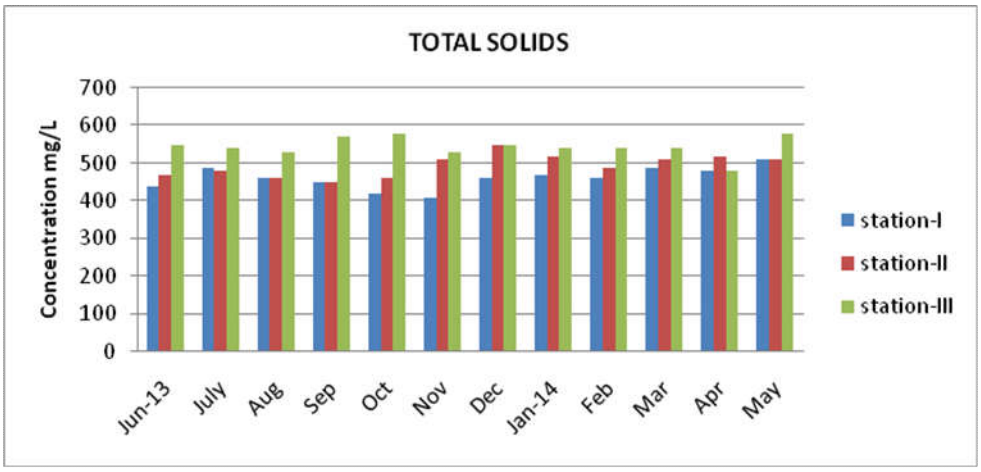

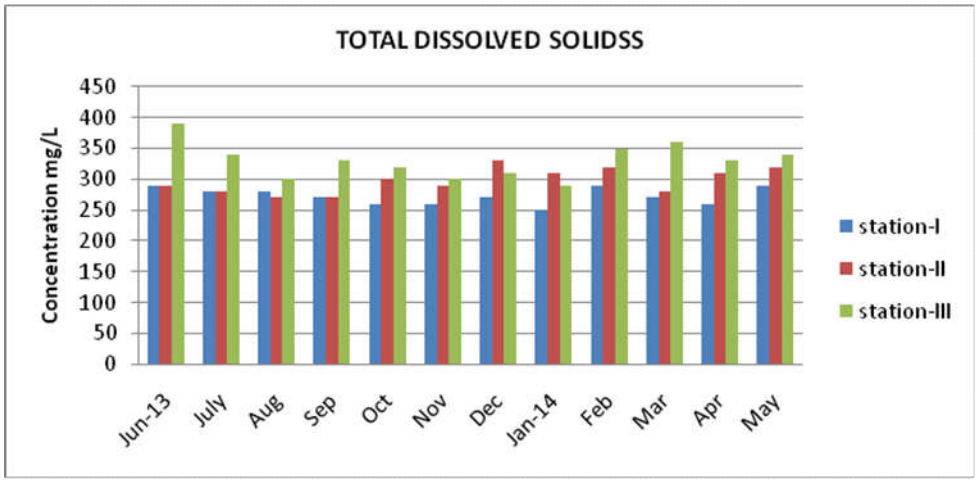

Figure 15.

temperature recorded is highest in summer season and lowest in winter season (Figure 2). Temperature plays on important role, which governs the seasonal succession of the biota. Temprature was high in the months of May and June which is associated with decreased solubility of gases in the Dam.

pH: It is recorded in the range of 8.2-8.8 at all the stations (Figure 3). Higher pH value was normally associated with the high photosynthetic activity in water. (Mishra *et al*., 2007) also found the pH in alkaline trend throughout the study period. The pH constantly remains above 7 which indicate high buffering capacity of the system (Nagraj and Goudappa Patil, 2008).

Dissolved Oxygen: It is an important indicator of water quality which also determines the distribution and abundance of algal populations. The maintenance of dissolved oxygen levels depends mainly on oxygen content of water which is of great limnological significance. The highest dissolved oxygen is observed during winter season and lowest was observed during summer season (Figure 4). Dissolved oxygen (DO) is one of the important parameters in water quality assessment. During summer low value of DO was recorded which may be due to increase values of phytoplankton or decrease of photosynthetic activity.

Biological Oxygen Demand: The highest concentrations 6.0 mg/L recorded in summer season, lowest value 2.0 mg/L recorded during winter season (Figure 5). The reason for high BOD in summer was several microbes present in the water bodies which might have accelerated their metabolic activities with concentrated amount of organic matter in the form of municipal and domestic wastes discharge into water bodies and hence required more amount of oxygen and so the demand of o_2 increased (Anitha *et al*., 2005). Verma *et al*., (2012) also noted that the chandola lake is surrounded by industrial and slum areas and wastage from both of these places are deposited here. During winter total dissolved solids, electrical conductivity, turbidity, and chlorides, sodium, nitrate ions and biological oxygen demand are high according to Chandola lake statistics. The estimation of physico-chemical parameters as per the W.H.O guidelines. May guide the civic authorities to modify the sustainable techniques to enhance the water quality.

Chemical oxygen demand: The highest value 32.00 mg/L values were observed in summer and lowest values 10.00 mg/L were recorded during rainy season (Figure 6). During course of the study the value of COD were found to be higher than BOD values. The high COD values indicates that some degree of non- biodegradable oxygen demanding pollutants were present in the water. The values of COD in conjugation with BOD are helpful in knowing the toxic conditions and presence of biologically resist organic substances. These observations support the findings of (Sharma *et al*., (2010).

Organic Matter: The highest value recorded 2.20 mg/L is recorded in winter season. Lowest value 0.2 mg/L recorded in rainy season (Figure 7). The values obtained during winter season were less than the values of summer season.

Total hardness: The maximum values 182.00 mg/L were noticed during summer season. Lowest values 118.00 mg/L were recorded during rainy season (Figure 8). The increase in hardness. They increase in hardness can be attributed to the decrease in water volume and increase in threat of evaporation at high temperature, high loading organic substance, detergents, chlorides and other pollutants.

Calcium: Maximum values were noticed during rainy season 74.49 mg/L, The lowest value 32.28 mg/L recorded in the winter season (Figure 9). It is an important nutrient for aquatic organism and it is commonly present in all water bodies. Calcium is present in water naturally, but the addition of sewage waste might also be responsible for the increase in amount of calcium. (Udhaya kumar *et al.,* 2006). The decrease in amount of calcium may be due to its absorption by living organisms.

Magnesium: The maximum value 36.95 mg/L was recorded in summer season and lowest value recorded in winter season (Figure 10). Magnesium is found in various salt and minerals, frequently in association with iron compound. Magnesium is vital micro nutrient for both plant and animal. Magnesium is often associated with calcium in all kind of water, but its concentration remains generally lower than the calcium (Venkatasubramani *et al*., 2007). Decrease in level of magnesium reduces the phytoplankton population (Govindan, 1991) suggested that the considerable amount of magnesium influence water quality.

Chlorides: Chloride is one of the major inorganic anions in water and waste water. The maximum value of 164.22 mg/L was recorded in summer season and minimum values of 108.26 mg/L was recorded during winter season (Figure 11). 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) also reported similar results. The desirable limit for chloride is 250 mg/L and in our study it ranged from 100-170mg/L. The concentration of chloride is directly correlated to the pollution level (Munnavar, 1970). In Pochampad dam water it is within the permissible limit.

Phosphates: The phosphates in the present dam were recorded in very low concentrations. Phosphate has a few sources in nature and also acts as a regulating factor for productivity of water body (Figure 12). Hastler (1947) observed that the constant addition of even low levels of nitrogen and phoshporous to an aquatic environment could greatly stimulate algal growth.

Sulphates: The maximum value of 36.00 mg/L was recorded in summer season, lowest values were recorded in winter season (Figure 13). Sulphates are always present in adequate quantities in water to meet the high requirement for protein synthesis. Sulphur deficiency can inhibit algal growth indirectly by hindering chlorophyll synthesis (Cole, 1979).

Total Solids: The maximum value of 510.00 mg/L was recorded in summer season, lowest value of 410.00 mg/L was recorded in winter season (Figure 14). Solids may affect the water quality in a number of ways. Water with high dissolved solids generally is of inferior palatability and water high in suspended solids may be aesthetically satisfactory for several purposes. Thus the quality of solids is proportional to the degree of pollution.

Total Dissolved Solids: The maximum value of 290.00 mg/L was recorded in summer season. Lowest value was recorded in winter season (Figure 15). Seasonal variations among different

classes of algae were found to be closely related to the change in physic-chemical conditions of the water. Thus, the change in water chemistry makes the water environment conductive for some species while for some others, it becomes nonconductive. The maximum limit for TDS as suggested by W.H.O is 500mg/L (W.H.O. 1998) which indicated that the recorded TDS signifies the polluted lake water. The contamination of domestic waste water, garbage and other related wastes in the surface water body can be one among the reasons for increasing in TDS measure (Reasoner, 2004; Swarnalathav *et al.,* 1998).

Conclusion

In my present investigation the critical parameters like TS, TDS, TSS, Total hardness, BOD and COD were found to be within prescribed limits. Both physcio- chemical and biological data analyzed in the pochampad dam indicates that the dam is at present free from pollution. The dam water falls under Oligotrophic nature, hence it could be used for different purpose such as drinking, agriculture and other domestic purposes. The results of various physicochemical factors were compared with the standards stipulated for drinking purposes by various National and international organizations. (WHO&ISI).

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REFERENCES

Anitha, G. S. Chandrashekar, V. and Kodarkar, M.S. 2005. Limnological studies on MIR Alam Lake Hyderabad. *Poll. Res.,* 24: 681-687.

APHA, 1985. American public Health Association, standard methods for the examination of water and waste water, 16th edition, Washington.

APHA, AWWA and WPCF, (American Public Health Association, American Water Works Association and Water Pollution Control Federation). 1995. Standard methods for the examination of water and waste water 19th ed. Published by APHA, AWWA and WPCF, Washington, USA.

Cole, G.A. 1979. Text Book of Limnology. The C.V. Mosby company. St.Louis. Toronto- London.

Djukic, N., Maletin, S., Pujin, V., Ivanc, A. and Milajonovic, B. 1994. Ecological assessment of water quality of Tisze by physico-chemical and biological parameters. Tisca Szeged 28: 37-40.

Dumont, HJ. 1999. The species richness of reservoir plankton and the effect of reservoirs on plankton dispersal (with particular emphasis on rotifers and cladocerans). In: J.G. Tundisi and M. Straskraba edn. Theoretical Reservoir Ecology and its Applications. IIE, Backhuys Publishers, *Brazilian Academy of sciences*, 477-491.

Govindan.V.S. and Devika, R.1991. Studies on Heavy metal profiles of Adyer River and waste stabilization pond *J.Ecotoxial Environ Monit.,*1(1) 53-58.

Hastler, AD. 1947. Eutrophication of lakes by domestic drainage. *Journal of ecology*, 28: 383-395.

Kumar, R., Singh, R. D. and Sharma, K.D. 2005. Water resources of India, *Current Science*, 89(5): PP. 794-811.

Lewis, W. M. 2000. Basis for the protection and management of trophicl lakes. Lakes Reserv. Res. Manage. 5 35-48.

Mishra, K.N., Siyaram and Singa, D.P. 2007. The seasonal variation in phytoplankton composition of Dhesura tal Lawain in Jaunpur district, U.P. *J Indian Bot Soc*., 86(34): 151 - 155.

Munnavar, M. 1970. " Limnological studies on fresh water ponds of Hyderabad , I. biotype . Hydrobiologia, 35:12,

Nagraj, K.M. and Goudappa M Patil, 2008. "study of physico-chemical parameters of Killa lake Water of Belgam, Karnat aka, India" *J. Consr. & Resto. Of lakes*., Vol (1), 179-187.

Reasoner, D J. 2004. Heterotrophic plate count methodology in the united states. *Int J Food Microbial.,* 92: 307-315.

Sharma, R. and Capoor, A. 2010. seasonal variations in physical, chemical and biological parameters of Lake water of patna Bird sanctuary in Relation to Fish productivity *World applied sciences Journal*, 8(1); 129-132.

Swarnalatha, N. and Narsingrao, A. 1998. Ecological studies of Banjaralake with reference to water pollution. *Journal of Environmental Biology*, 19: 179-186.

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.

Venkatasubramani, R. and Meenambal, T. 2007. study of subsurface water quality in Mattupalayam Taluk of Coimb atore district Tamilnadu. *Nat. Environ. Poll.,* Tech. 6 307-310.

Verma, P., Chandawat, D., Gupta, U. and Solanki, HA. 2012. water quality analysis of an organically polluted lake by investing different physical and chemical parameters. *International journal of Research in chemistry and Environment,* 2: 105-112.

World Health Organization (W.H.O) (1998) Guideline for drinking water quality. Health criteria and other supporting information (2nd edn) Generva, 2: 231-270.

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