

# Assessment of physico-chemical parameter in the freshwater bodies of Dharni, Melghat Dist. Amravati.

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## ABSTRACT

The present study the seasonal variation in physico-chemical parameters of freshwater bodies were analyzed during the period of one year from February 2019 to January 2020. Water samples were collected monthly and analyzed for estimation of water temperature, pH, Turbidity, DO, Total Alkalinity, Total Hardness. The overall water quality was studied in the rainy and winter season. An attempt has been made to explain the effect of seasonal range of various Physico-chemical characteristics of water bodies.

**Keywords:** physico-chemical characteristics, seasonal variation, freshwater bodies.

## INTRODUCTION

The quality of water should be assessed on the basis of physico-chemical parameters in order to provide the complete spectrum of information for the purpose of fisheries management. Water is a life of all living being on the earth and totally dominates the chemical composition of all organisms. The water, sea water and fresh water available on earth. The fresh water bodies of India include a large number of rivers, ponds, dams, impoundments and lakes. The riverine system, have different environment compared to dam or reservoirs. Freshwater perhaps most venerable habitats and are most likely to be changed by the activities of man. This essential resource is becoming increasingly scarce in parts of the world due to the severe impairments of water quality.

On the quality of water different things are depends like growth, health, nutrition, purity and productivity. And day by day the quality water i.e. physico-chemical parameters like water temperature, DO, pH, alkalinity, hardness etc. are changed or fluctuate due to the activities of man. This fluctuating change affects the life. The physico-chemical methods give information about the type substances pollutants and its concentration, while biological methods indicate their general effects and give due to the nature and quality of substances. Hence by the study of both physical and chemical data, a better understanding of the effects of pollution is obtained and an integrated picture of water body is furnished.[1, 2] Many authors have brought to the physico-chemical nature of water from various lakes and reservoirs land use practices have an impact quality of ground water. A similar situation encountered in most of the metropolitan with growing urban centers. The Important sources of Nitrate contamination in water are human & animal wastes. In the absence of fertilizer application and geological deposits, the high nitrates in city may be attributed to lack of good sanitary practices and proper drainage systems [3].

## METHODOLOGY

For the present study water samples each from the two areas were collected every month for a period of one year, and analyzed them for temp., DO, turbidity, pH, alkalinity, hardness, nitrate and phosphate levels. The quality of the water was assessed with WHO & BIS standard limits. Nitrates and phosphates was estimated in water by [4]. Nitrites, Diss. Oxygen, Alkalinity and hardness was estimated according to [5].

## RESULTS AND DISCUSSION

In The Present Study of the Water Temperature Ranges From 20°C to 44.3°C. The Maximum (44.3°C) Temperature was recorded in the Month of May (summer) and minimum (20°C) in the month of December (winter). It showed that Higher Temperature in summer and relatively lowers in winter. Similar study,[6] Observed that during Summer, Water Temperature was high due to Low

Water Level, High Temperature and clear atmosphere. Temperature Plays an Important Factor which Influences the chemical, Biochemical and Biological characteristics of water body.

The pH was alkaline values ranges from 7.3 to 8.8. The maximum pH value (8.8) was recorded in the month of May (summer) and minimum (7.3) in the month of December. The factors like air temperature bring about changes the pH of water. 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. Similar trend was reported by Kamble et al. [7].

The turbidity of water fluctuates from 3.4 NTU to 12.6 NTU. The maximum values (12.6 NTU) was recorded in the month of May (summer) It might be due to human activities, decrease in the water level and presence of suspended particulate matter, and minimum value (3.4 NTU) in the month of December.

The value of DO fluctuates from 6.2 mg/l to 7.3 mg/l. The maximum values (7.3 mg/l) was recorded in the month of May (summer) and minimum values (6.2 mg/l) in the month of December (winter). The high DO in summer is due to increase in temperature and duration of bright sunlight has influence on the % of soluble gases (O<sup>2</sup> & Co<sup>2</sup>). The long days and intense sunlight during summer seem to accelerate photosynthesis by phytoplankton, utilizing Co<sub>2</sub> and giving off oxygen. This possibly accounts for the greater qualities of O<sub>2</sub> recorded during summer. The quality is slightly lesser during winter.

Total alkalinity ranges from 146 mg/l to 221 mg/l. The maximum value (225 mg/l) was recorded in the month of May (summer) and minimum value (146 mg/l) in the month of December (winter). Alkalinity was maximum value in May (summer) due to increase in bicarbonates in the water. Hujare , 2008 [8] also reported similar results that it was maximum in summer and minimum in winter due to high photosynthetic rate.

**Table** showing different parameters of collected from sampling stations during February 2019 to January 2020.

Months	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Temperature	25	36	40	44.3	42	38	32	30	25	23	20	22
pH	8	8.1	8.1	8.8	8.1	7.9	7.6	7.6	7.5	7.4	7.3	7.5
Turbidity	8.5	10.3	11.8	12.6	7.9	6.3	5.8	4.9	4.1	3.8	3.4	6.4
DO	6.8	6.9	7.1	7.3	7.1	7.1	6.9	6.5	6.4	6.3	6.2	6.4
Alkalinity	188	201	217	225	207	193	184	172	164	159	146	172
Hardness	94	115	127	138	130	122	114	97	84	71	65	72
Nitrates	43.1	51.7	54.2	55.8	53.2	52.7	47.6	41.8	37.5	31.3	27.3	36.7
Phosphates	5.3	6.7	7.4	8.2	9.6	10.7	12.6	9.9	6.1	4.2	1.2	3.8

Samples were collected from following sampling stations thought the year.



The value of hardness fluctuates from 65 mg/l to 138 mg/l. The maximum value (138 mg/l) was recorded in the month of May (summer) and minimum value (65 mg/l) in the month of December. Hujare [8] 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 evaporation of water. Similar results were obtained in the present study.

The results indicate Nitrite & Phosphate content in the ground water of the two areas to be in traces all through one year of quality analysis. The nitrate content ranges from 27.3 mg/l to 55.8 mg/l with an average value of 36.55. The high levels of nitrates observed can be attributed to the cultivation around & application of Nitrogenous fertilizers to these lands in the past, which have subsequently been converted into residential colonies. (Lakshman et al. 1986) It is

significant to note that the study area is thickly populated with residential colonies. The nitrate concentrations in the study area can also be attributed to the anthropogenic sources like leakages of septic tanks, sewer pipes and improper disposal of domestic and industrial wastes [9].

Duration of inhabitation and density of population could also significantly affect the nitrate concentration. Seasonal variations were observed during pre-monsoon and post-monsoon seasons. It was seen that, increase in nitrate level during post monsoon season could be due to the leachate from the soils as a source [10]. Nitrate level fluctuations were observed during the year of study. It was observed that there is a increase in the nitrate concentration in the ground water samples of the second area. Most of the soil samples in the study area show

high values which could be due to deposition of pollutants on the soil over a period of time. It was observed that these pollutants migrate underground from to some nearby areas as the ground water samples from these areas show high levels of pollutions [11].

## CONCLUSION

From the above studies it can be concluded that the environmental factors and season are responsible for the variation of Physico-chemical parameters. It can be well concluded that the maximum temperature, alkalinity was more in summer season while dissolved oxygen was less. pH was generally alkaline in all the three sites of dam, the study reveals that water is suitable and useful for irrigation and fish production, drinking purpose as all the hydro biological parameters of water were within the permissible limits. The study indicates high levels of nitrate in the ground water in residential colonies. The ground water is not suitable for drinking purposes as the value are exceeding the permissible limit of drinking water recommended by WHO [12].

The quality of the ground water is degrading day by day. The increase in Nitrate levels in the year confirms the observation. Once the ground water sources get polluted, the effect may persist for decades or longer. The reclamation of surface water is easier than reclamation of ground water; hence prevention of ground water pollution due to any cause is very important. Fertilizer use, domestic effluents, sewage sludge disposal to land, industrial discharges, and leachate from refuse dumps and changes in land use all contribute to increase in nitrate levels. It can be concluded that the degradation of quality of ground water could be controlled by improving the sanitary and drainage systems and optimizing the application of fertilizers and water management practices on scientific lines.

**Conflicts of interest:** The authors stated that no conflicts of interest.

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