

Preliminary Studies on Water Quality Assessment of Pedda Cheruvu, Manakondur, Karimnagar District, Telangana State, India.

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Abstract:

The present study is an investigation that was carried on the physico-chemical parameters of Pedda Cheruvu located at Manakondur village, Karimnagar District. The study has been carried out for a period of one year i.e., from June, 2020 to May, 2021. The Water Temperature was ranging from 19.0°C to 31.0°C, Transparency was ranging from 18.50cm to 44.30cm, Total Dissolved Solids was ranging from 200(mg/l) to 350(mg/l), PH ranges from 7.5 to 8.3, Dissolved Solids was ranges from 5.2(mg/l) to 12.0(mg/l), Carbon di Oxide ranges from 3.0(mg/l) to 9.2(mg/l), Total Hardness ranges from 110(mg/l) to 210(mg/l), Total Alkalinity was ranging from 165(mg/l) to 300(mg/l), Chlorides was ranging from 35.00(mg/l) to 50.20(mg/l), Phosphates was ranging from 0.02(mg/l) to 0.16(mg/l), Nitrates was ranging from 0.02(mg/l) to 0.14(mg/l) and Biological Oxygen Demand from 2.5(mg/l) to 7.0(mg/l) were analyzed. These parameters vary from month to month and in three different seasons. The results showed that the variation in these results parameters in four at the different sampling stations. The results indicated that physico-chemical parameters of the water were used for drinking, domestic use, irrigation and pisciculture.

Keywords: Physic-Chemical parameters, Pedda Cheruvu (Manakondur)

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I. Introduction:

Water has been one of the most critical strategic natural sources for mankind for the duration of the history. In developing international locations like India, wherein get right of entry to secure drinking water isn't assured for a majority of the populace. It is of incredible importance to hold the quality of surface water resources (Banu et al., 2007). Water used for drinking ought to be potable which means that that it may be ate up in any favored amount with damaging effect on health and that this crucial fluid need to be unfastened from turbidity, color and objectionable flavor (Jayalaxmi Devi and Belagadi 2005). The fresh water must be recognized because the "Blood of Society" (Wetzel, 2000). Today true nice water has turn out to be a precious commodity. The excellent of water getting vasty deteriorated because of unscientific waste disposal, mistaken water control and carelessness in the direction of surroundings. This has led to shortage of potable water affecting the human health (Agarkar, 2003). The excellent of water have to be assessed on the basis of physico-chemical and biological parameters for you to provide the entire spectrum of facts for the cause of fisheries management. Several studies workers achieved studies on water first-class parameters of water impoundments in India like Yadav (2002), Fokmore and Musaddiq (2005), and Patil and Dongare (2006).

II. Materials&Methods:

STUDY AREA:

Pedda cheruvu is located in Manakondur village, Karimnagar district, Telangana. This lake is located in longitude 79°13'30"E and latitude 18°23'53"N. Physical and chemical parameters had been expected within the laboratory by means of preferred techniques prescribed by using APHA (1985), Trivedy & Goel (1984). During the study period of one year from June 2020 to May 2021. Water Temperature, Transparency, Total Dissolved Solids, PH, Dissolved Solids, Carbon Di Oxide, Total Hardness, Total Alkalinity, Chlorides, Phosphates and Nitrates were determined.



Fig: Satilite image of Pedda Cheruvu (Manakondur)

III. Results And Discussion:

The Physico-Chemical Parameters of the Pedda Cheruvu(Manakondur) water samples of investigated area from June 2020 to May 2021 are listed in Table-1.

| Season | Rainy Season | | | | | Winter Season | | | | | Summer Season | | | | |
|-----------------|--------------|-------|-------|-------|------------------|---------------|-------|-------|-------|------------------|---------------|-------|-------|-------|------------------|
| MONTHS | JUN | JUL | AUG | SEP | Mean±SD | OCT | NOV | DEC | JAN | Mean±SD | FEB | MAR | APR | MAY | Mean±SD |
| TEM | 27.0 | 26.2 | 25.0 | 26.5 | 26.12 ±0.85 | 27.5 | 26.0 | 19.0 | 22.5 | 23.75 ±3.79 | 26.0 | 28.0 | 29.0 | 31.0 | 28.50 ±2.08 |
| TRS | 20.10 | 19.30 | 18.50 | 21.50 | 19.85 ±1.27 | 25.70 | 35.20 | 40.20 | 44.30 | 36.35 ±8.01 | 32.0 | 30.60 | 29.40 | 27.60 | 29.90 ±1.86 |
| TDS | 280 | 250 | 260 | 242 | 258.00 ±16.41 | 235 | 230 | 220 | 200 | 221.25 ±15.47 | 320 | 350 | 340 | 300 | 327.50 ±22.17 |
| PH | 8.0 | 8.2 | 8.3 | 7.6 | 8.00 ±0.35 | 8.0 | 8.2 | 7.7 | 7.5 | 7.85 ±0.31 | 7.7 | 7.6 | 7.6 | 7.7 | 7.62 ±0.09 |
| DO | 7.9 | 12.0 | 11.0 | 10.0 | 10.22 ±1.75 | 7.5 | 7.8 | 7.5 | 7.6 | 7.60 ±0.14 | 7.0 | 6.2 | 6.0 | 5.2 | 6.10 ±0.73 |
| CO ₂ | 3.5 | 4.0 | 3.5 | 8.5 | 4.87 ±2.42 | 9.2 | 7.5 | 7.9 | 7.2 | 7.95 ±0.88 | 6.0 | 5.5 | 5.3 | 3.0 | 4.95 ±1.33 |
| TH | 210 | 140 | 142 | 150 | 160.50 ±33.28 | 140 | 130 | 121 | 110 | 125.25 ±12.78 | 170 | 180 | 190 | 195 | 183.75 ±11.08 |
| TA | 175 | 180 | 195 | 210 | 190.00 ±15.81 | 300 | 285 | 250 | 232 | 266.75 ±31.23 | 200 | 190 | 165 | 180 | 183.75 ±14.93 |
| CL | 34.00 | 36.10 | 33.00 | 30.00 | 33.27 ±2.53 | 36.20 | 36.50 | 36.70 | 36.80 | 36.55 ±0.26 | 36.00 | 40.00 | 50.20 | 48.10 | 43.57 ±6.69 |
| Po ₄ | 0.07 | 0.03 | 0.04 | 0.06 | 0.050 ±0.18 | 0.02 | 0.03 | 0.04 | 0.05 | 0.035 ±0.012 | 0.05 | 0.03 | 0.15 | 0.16 | 0.097 ±0.06 |
| No ₃ | 0.04 | 0.05 | 0.06 | 0.02 | 0.042 ±0.017 | 0.04 | 0.02 | 0.02 | 0.03 | 0.027 ±0.009 | 0.05 | 0.08 | 0.13 | 0.14 | 0.10 ±0.042 |
| BOD | 2.0 | 3.0 | 2.2 | 3.5 | 2.67 ±0.69 | 3.0 | 4.0 | 3.5 | 3.0 | 3.37 ±0.47 | 6.0 | 4.5 | 7.0 | 4.0 | 5.37 ±1.37 |

Water Temperature:

The temperature performs an vital position for controlling the physic-chemical and organic parameters of water and considered as one of the essential thing surroundings particularly for freshwater (Mathur & Singh 2005).In the present study temperature ranges from 19.0°C to 31.0°C (Fig-2).Mean value of the temperature in Rainy season (26.12±0.85), Winter season (23.75±3.79) and Summer season (28.50±2.08) were recorded (Fig-3). The highest temperature values were recorded in the month of May while, the lowest value were recorded in the month of December. Similar observations are according to David and David 2012 and Rajani.V and G.Benarjee 2018.

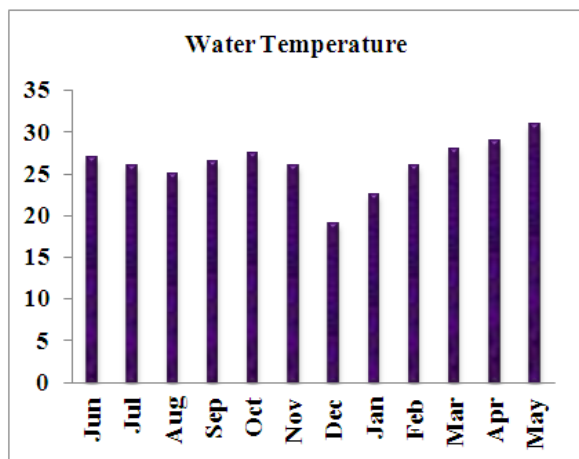


Fig: 2-Water Temperature at Monthly variations

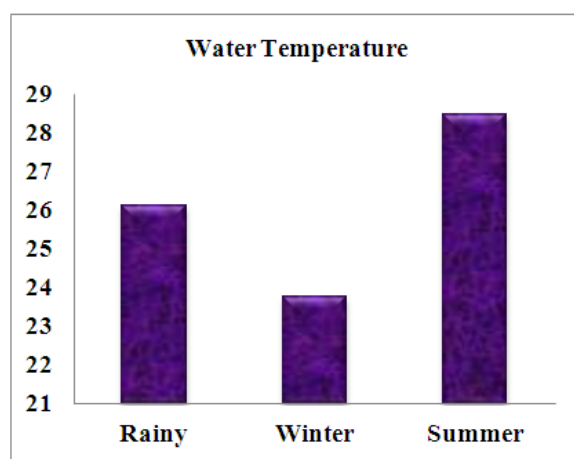


Fig: 3- Water Temperature at Seasonal variations

Transparency:

Transparency suggests the effective nature of this water on the idea of readability values as proposed by way of Sharma and Durve (1991). In the present study transparency ranges from 18.50cm to 44.30cm (Fig-3). Mean value of the transparency in Rainy season (19.85 ± 1.27), Winter season (36.35 ± 8.01) and Summer season (29.90 ± 1.86) were recorded (Fig-4). The highest transparency values were recorded within the month of January whilst the lowest values had been recorded within the month of August. According to V.Rajani (2020) maximum transparency values were recorded in the winter season while the lowest transparency values were recorded in the monsoon season.

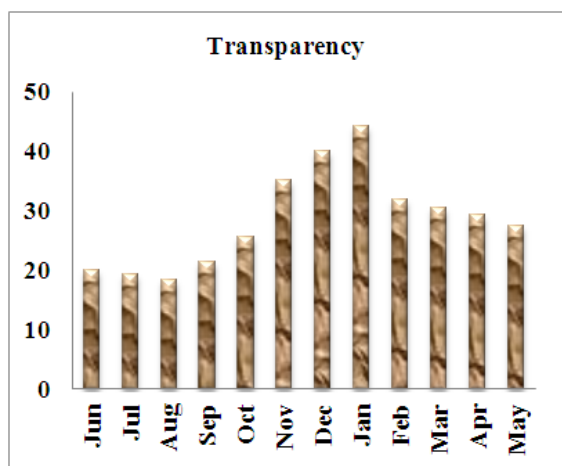


Fig: 3-Transparency at Monthly variations

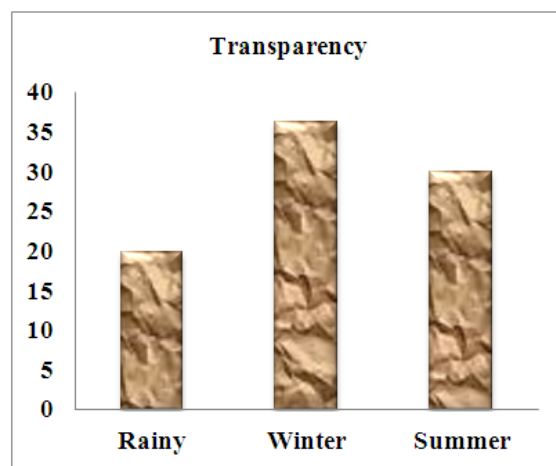


Fig: 4- Transparency at Seasonal variations

Total Dissolved Solids:

Total dissolved solids whilst found in excess inside the water will create an imbalance in aquatic life. According to Reid (1961) Total Dissolved Solids can be playing an crucial position for the productiveness of the aquatic surroundings. Total Dissolved Solids denotes numerous kinds of minerals present in water. It does no longer comprise any gasoline and colloids. In natural water, dissolved solids are composed particularly of carbonates, bicarbonates of calcium, magnesium, sodium, potassium and so on. Apart from portability, turbidity and total dissolved solids play a vital position in community structure due to its limiting effect on primary manufacturing and trophodynamics. In the present study TDS ranges from 200(mg/l) to 350(mg/l) (Fig-5). Mean value of the TDS in Rainy season (258.00 ± 16.41), Winter season (221.25 ± 15.47) and Summer season (327.50 ± 22.17) were recorded (Fig-6). The highest TDS values have been recorded in the month of March whilst the lowest values have been recorded in the month of January. Similar observations are according to Verma et al., 2012.

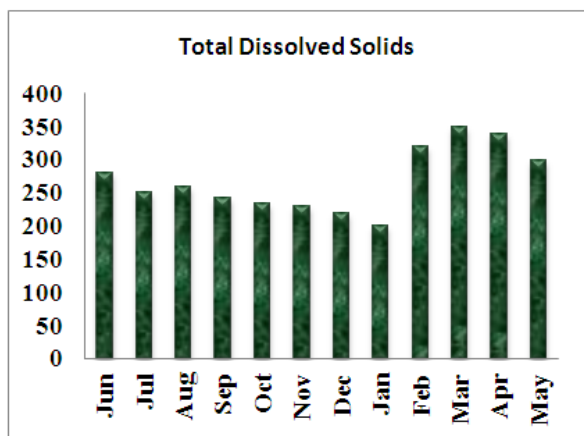


Fig: 5-Total Dissolved Solids at Monthly variations

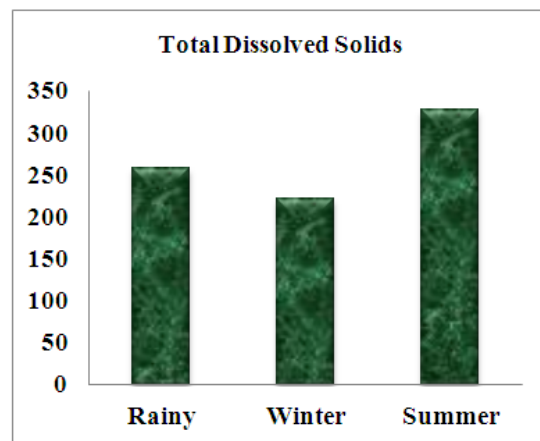


Fig: 6- Total Dissolved Solids at Seasonal variations

PH:

Goldman and Home (1983) Hydrogen ion awareness controls the chemical kingdom of many vitamins consisting of carbon dioxide, phosphate, ammonia and trace factors. It is likewise recognized that adjustments in hydrogen ion awareness of water will bring about suitable changes in the purposeful and structural variant in the organisms of the water body. Measuring the hydrogen ion awareness further profits significance, especially in the areas where the water frame receives raw sewage. In the present study PH ranges from 7.5 to 8.3(Fig-7).Mean value of the PH in Rainy season (8.00 ± 0.35), Winter season (7.85 ± 0.35) and Summer season (7.62 ± 0.09) were recorded(Fig-8). The highest PH values were recorded within the month of August whilst the lowest values had been recorded within the month of January.Christy(2002) PH value is very important for plankton growth. Similar observations are according to Hina kouser and Mokappa Naik (2012).

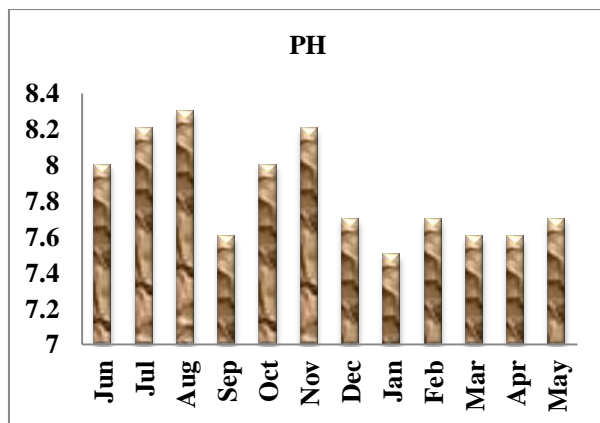


Fig: 7-PH at Monthly variations

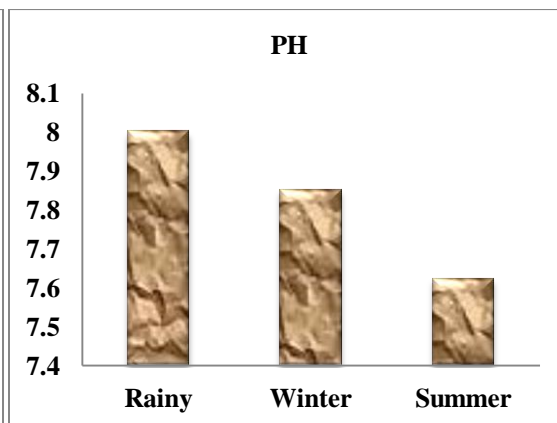


Fig: 8- PH at Seasonal variations

Dissolved Oxygen:

An honest amount of dissolved oxygen is constantly essential to help aquatic life. DO is the only source of oxygen for all of the aerobic aquatic existence and therefore it's miles considered as an important measure of purity for all waters (Panigrahi et al., 2005 and Zutshi et al., 1980).In the present study DO ranges from 5.2(mg/l) to 12.0(mg/l) (Fig-9).Mean value of the DO in Rainy season (10.22 ± 1.75), Winter season (7.60 ± 0.14) and Summer season (6.10 ± 0.73) were recorded (Fig-10). The highest DO values were recorded in the month of July while the lowest values were recorded in the month of May. Similar observations are according to Srikanth 2009; Saloom and Duncan 2005 and V.Rajani 2020.

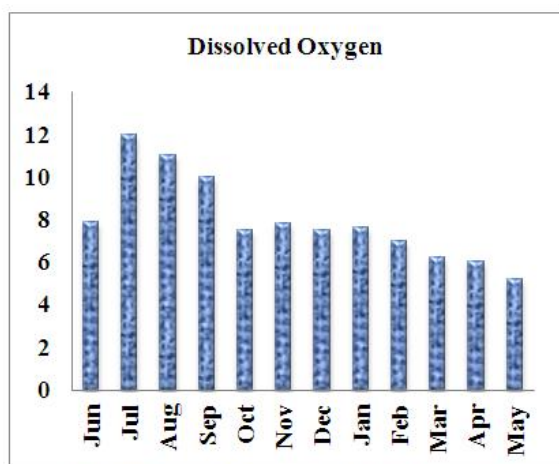


Fig: 9- Dissolved Oxygen at Monthly variations

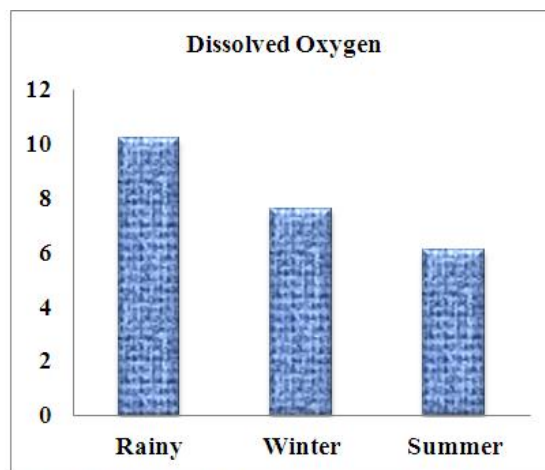


Fig: 10- Dissolved Oxygen at Seasonal variations

Carbon Di Oxide:

The carbon dioxide content of water relies upon the water temperature, depth, rate of respiratory, decomposition of natural depend, chemical nature of the bottom and geographical features of the terrain surrounding the water frame (Sakhare and Joshi, 2002). In the present study CO₂ ranges from 3.0(mg/l) to 9.2(mg/l)(Fig-11). Mean value of the CO₂ in Rainy season (4.87 ± 2.42), Winter season (7.95 ± 0.88) and Summer season (4.95 ± 1.33) were recorded(Fig-12). The highest CO₂ values were recorded in the month of October while the lowest values were recorded in the month of May. Similar observations are according to Hina kouser and Mokappa Naik(2012) and V.Rajani 2020.

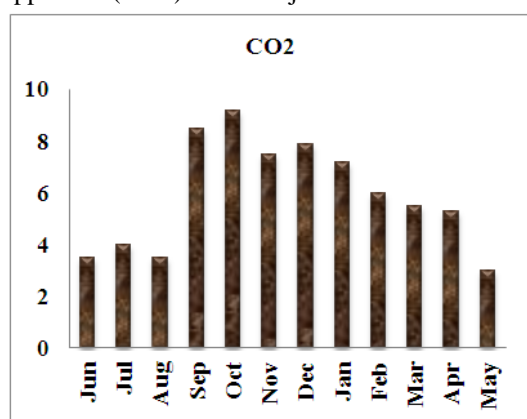


Fig: 11- CO2 at Monthly variations

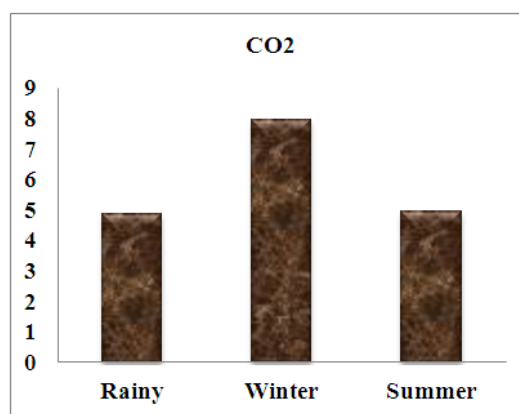


Fig: 12- CO2 at Seasonal variations

Total Hardness:

Hardness is the assets of water, which prevents the lather formation with cleaning soap and will increase the boiling points of water (Patiland Patil, 2010). In the present study Total Hardness ranges from 110(mg/l) to 210(mg/l)(Fig-13). Mean value of the Total Hardness in Rainy season (160.50 ± 33.28), Winter season (125.25 ± 12.78) and Summer season (183.75 ± 11.08) were recorded(Fig-14). The highest Total Hardness values were recorded in the month of June while the lowest values were recorded in the month of January. Similar observations are according to Kataria et al., (1996), Hujare(2008) and Rumysa Kaliq *et al.*,(2013).

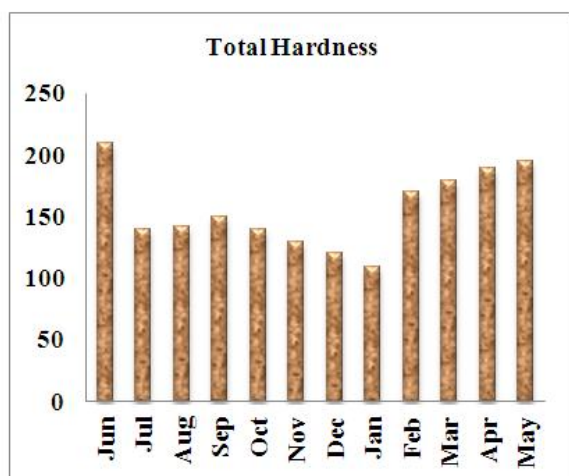


Fig: 13- Total Hardness at Monthly variations

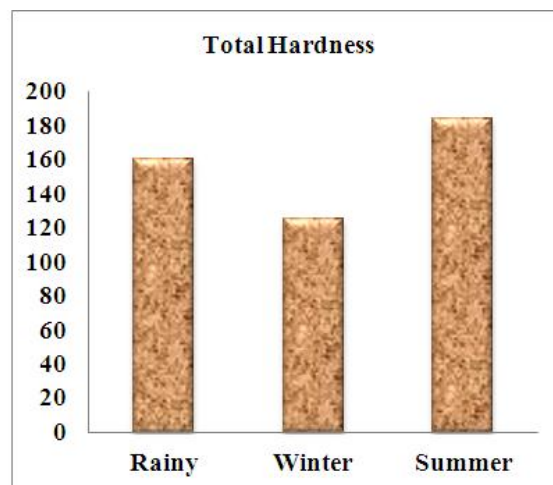


Fig: 14- Total Hardness at Seasonal variations

Total Alkalinity:

Alkalinity of lake water depend upon many elements among them the provision of carbonate and bicarbonate is one of the essential thing alkalinity affords idea of herbal salts present in water Gawas et.al(2006).In the present study Total Alkalinity ranges from 165(mg/l) to 300(mg/l)(Fig-15).Mean value of the Total Alkalinity in Rainy season (190.00±15.81), Winter season (266.75±31.23) and Summer season (183.75±14.93) were recorded(Fig-16).The highest Total Alkalinity values were recorded in the month of October while the lowest values were recorded in the month of April. Similar observations are according to Abdar 2013 and V.Rajani 2020.

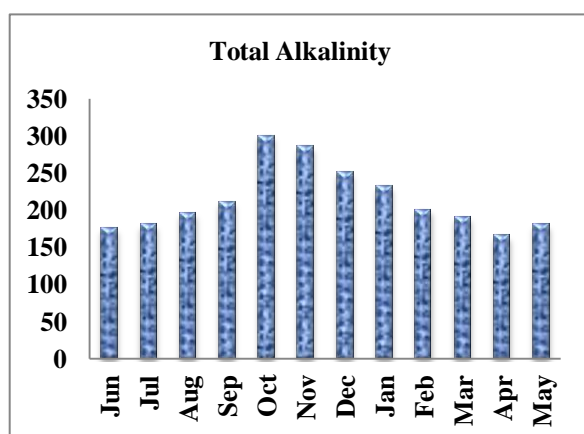


Fig: 15- Total Alkalinity at Monthly variations

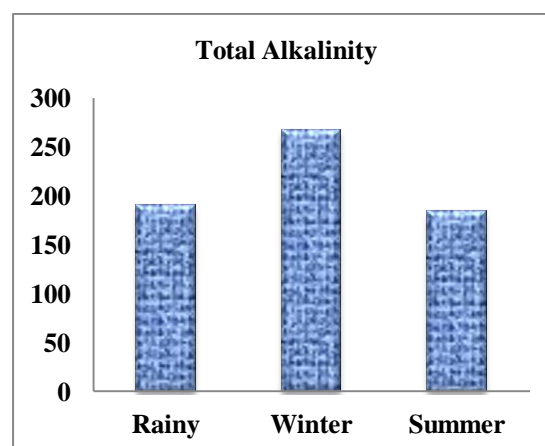


Fig: 16- Total Alkalinity at Seasonal variations

Chlorides:

The salt flavor produced by using chlorides relies upon at the chemical composition of the water. High chloride content material also has deleterious effect on steel pipes and systems in addition to in agriculture plant life (NEERI, 1988).Higher concentration of chloride within the water may be due to discharge of home sewage and also extra of chlorine in water, it serves as a trademark of water pollutants.In the present study Chlorides ranges from 35.00(mg/l) to 50.20(mg/l)(Fig-17).Mean value of the Chlorides in Rainy season (35.42±0.53), Winter season (36.55±0.26) and Summer season (44.07±7.20) were recorded(Fig-18).The highest Chlorides values were recorded in the month of April while the lowest values were recorded in the month of September. Similar observations are according to Pejavar et al., 2004 and Sharma and Chouhan 2007.

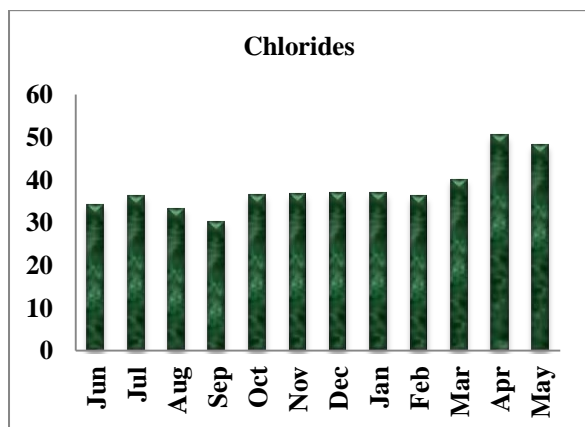


Fig: 17- Chlorides at Monthly variations

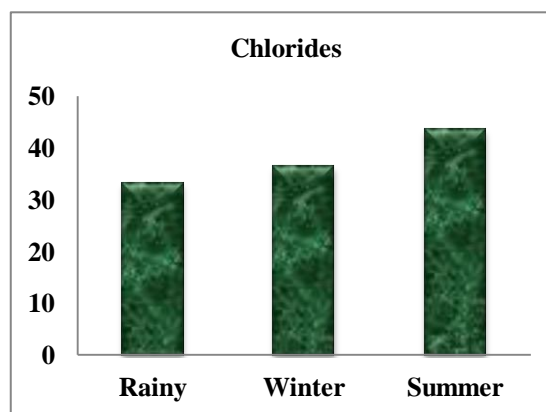


Fig: 18- Chlorides at Seasonal variations

Phosphates:

Phosphates are one of the maximum vital nutrient and a proscribing factor in the renovation of reservoir fertility. The variation may be due to the diverse strategies like adsorption and desorption of phosphates and buffering motion of sediment under varying environmental conditions(Rajasegar, 2003).In the present study Phosphates ranges from 0.02(mg/l) to 0.16(mg/l)(Fig-19).Mean value of the Phosphates in Rainy season (0.050 ± 0.018), Winter season (0.035 ± 0.012) and Summer season (0.097 ± 0.067) were recorded(Fig-20).The highest Phosphates values were recorded in the month of May while the lowest values were recorded in the month of October. Similar observations are according to Patil et al., 2008 and Christy (2002).

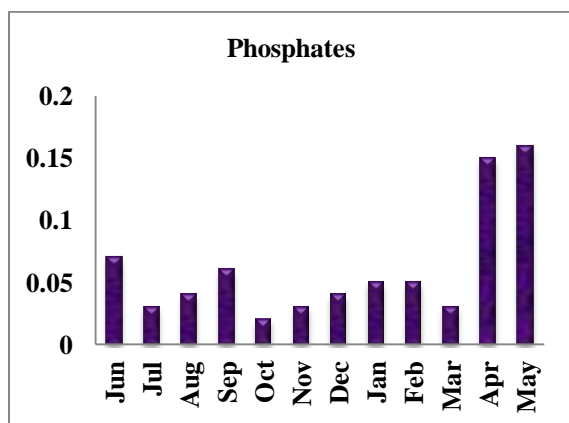


Fig: 19- Phosphates at Monthly variations

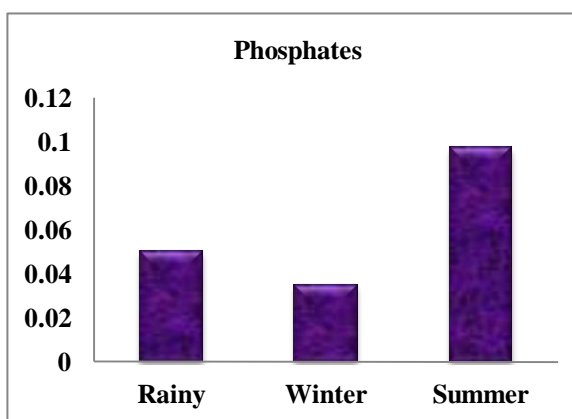


Fig: 20- Phosphates at Seasonal variations

Nitrates:

Nitrate content is most important parameter in studies of pollution. In the present study Nitrates ranges from 0.02(mg/l) to 0.14(mg/l)(Fig-21).Mean value of the Nitrates in Rainy season (0.042 ± 0.017), Winter season (0.027 ± 0.009) and Summer season (0.10 ± 0.042) were recorded(Fig-22).The highest Nitrates values were recorded in the month of May while the lowest values were recorded in the month of November and December.

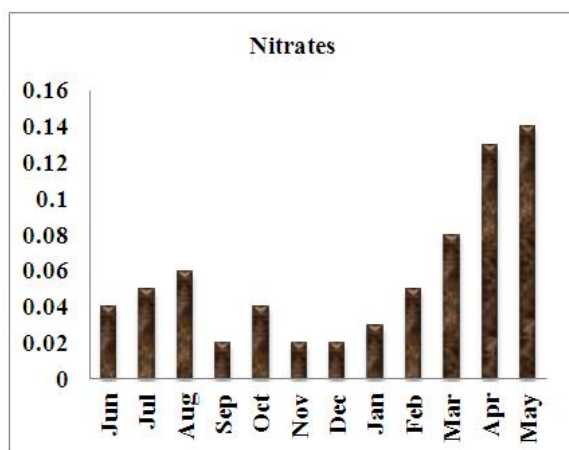


Fig: 21- Nitrates at Monthly variations

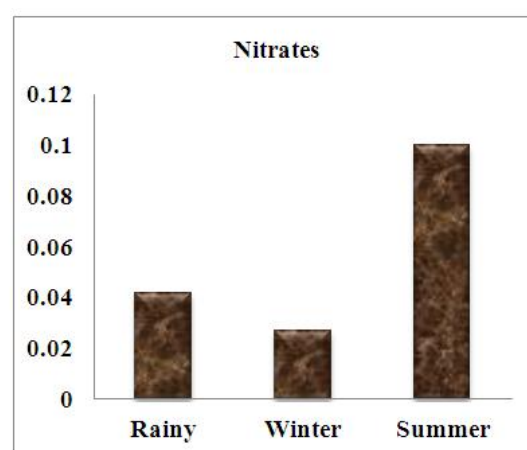


Fig: 22- Nitrates at Seasonal variations

Biological Oxygen Demand:

BOD is dissolved oxygen required by micro organism for cardio decomposition of natural rely found in water. BOD has been considered as an critical parameter in aquatic surroundings to establish the popularity of pollution (Azmi et al., 2015). BOD is important parameter that shows the value of water pollution through the oxidizable organic matter. The most important supply of answerable for organic enrichment of an aquatic environment are home savage, agricultural runoff and industrial effluents and the main components of oxidizable be counted include carbonaceous count, nitrogen compounds and chemically lowering compounds. In the present study BOD ranges from 2.5(mg/l) to 7.0(mg/l) (Fig-23). Mean value of the BOD in Rainy season (2.67 ± 0.69), Winter season (3.37 ± 0.47) and Summer season (5.37 ± 1.37) were recorded (Fig-24). The highest BOD values were recorded in the month of April while the lowest values were recorded in the month of June. Similar observations are according to Bhatt et al., 1999.

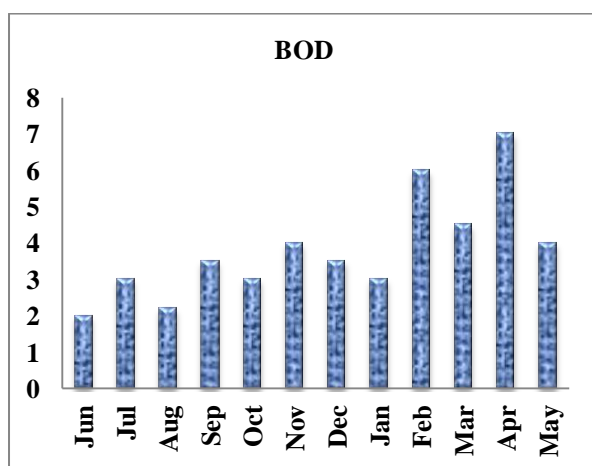


Fig: 23- BOD at Monthly variations

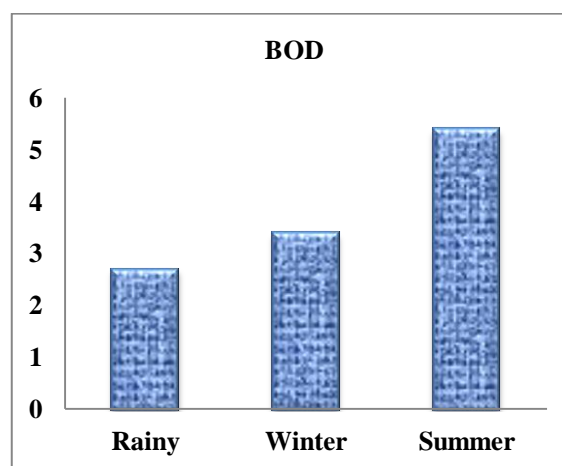


Fig: 24- BOD at Seasonal variations

IV. Conclusion:

All the Physico-chemical parameters of pedda cheruvu fresh water were within permissible limits. The present investigation will be beneficial in future management of the lake. The physico-chemical characteristics of lake water suggested that there was no dangerous to pisciculture, irrigation and drinking water.

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