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RESEARCH PAPER

Assessment of physico chemical characteristics and plankton diversity of Anchuthengu lake ecosystem, Thiruvananthapuram district – South India

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Abstract : Water is the most widespread substance found in the natural environment; liquid, solid and invisible vapour. Fresh water is a crucial resource for human life and natural systems. The quality of water is usually described according to its physical, chemical and biological characteristics. Rapid industrialization and use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environments leading to the deterioration in water quality and aquatic biota. Planktons are taxonomically diverse, composed of plants, animals, bacteria and viruses. Globally the biomasses of phytoplankton and zooplankton are about equal, although the doubling time of zooplankton is considerably longer than for phytoplankton. The present investigation was carried out to assess the water quality and plankton diversity in Anchuthengu lake, Thiruvananthapuram, Kerala, India. Analysis of water quality was done with respect to eleven important physicochemical parameters like air and surface water temperature, pH, TDS, salinity, electrical conductivity, alkalinity, hardness, free CO2, DO and BOD. Conductivity shows high positive correlation with alkalinity and hardness. Alkalinity is positively correlated with hardness. The aquatic flora and fauna in the lake may grow well because the DO value in the current study was over 5 mg/L, and the BOD value also indicates that the lake is less contaminated.. The dominated plankton species identified in the present study were *Spirogyra, Chlorella, Navicula, Pinnularia, Oscillatoria, Closterium, Cosmerium.*

Key Words : Water quality, Plankton diversity

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INTRODUCTION

All types of natural waters are renewed annually, but the rates of renewal differ sharply. Water present in rivers is completely renewed every 16 days on average and water in the atmosphere is renewed every 8 days, but the renewable period of glaciers, groundwater, ocean water and the largest lakes runs to hundreds or thousands of years. When slowly renewed resources are used by humans at a rapid rate, they effectively become non-renewable resources with subsequent disruptions of the

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natural cycle (Gleick, 1993). Freshwater availability changed during human history because of increasing drainage and diversions for agriculture as well as impoundments and other constructions for hydropower use and flood control. Despite its scarcity, it is of fundamental importance for every form of life and its availability is threatened by climate change and other human pressures. It is now recognized that measures to globally protect freshwater ecosystems and the services they provide are needed (Petersen *et al.,* 2016).

Water resources in India include information on precipitation, surface and groundwater storage and hydropower potential. India experiences an average precipitation of 1170 millimeters (46in) per year, or about 4000 cubic kilometers (960cu mi) of rain annually or about 1720 cubic meters (61000 cu ft) of fresh water per person every year. India accounts for 18% of the world's population and about 4% of the world's water resources. One of the solutions to solve the country's water woes is to create Indian Rivers inter-link. Some 80 per cent of its area experiences rains of 750 millimeters (30 in) or more a year. However, this rain is not uniform in time or geography. Most of the rains occur during its monsoon season (June to December), with the northeast and north receiving far more rain than India's west and south. Despite extensive river systems, safe clean drinking water, as well as irrigation water supplies for sustainable agriculture, are in shortage across India, in part because it has, as yet harnessed a small fraction of its available and recoverable surface water resource. India harnessed 761 cubic kilometers (183 cu mi) (20 %) of its water resources in 2010, part of which came from unsustainable use of groundwater. Of the water it withdrew from its river and groundwater wells, India dedicated about 688 cubic kilometers (165 cu mi) to irrigation, 56 cubic kilometers (13 cu mi) to municipal and drinking water applications and 17 cubic kilometers (4.1 cu mi) for industry (*https://lotusarise.com*).

Agricultural production consumes more freshwater than any other human activity (Falkenmark, 1989). Different crops and regions vary in their water requirements. Rainfall patterns, temperature, soil quality and vegetative cover all influence soil moisture levels. For ideal growing conditions, soil moisture should not fall below 50% in the root zone (Blackshaw, 1990). Good vegetative cover, high level of soil organic matter, active soil biota and slow water runoff increase the percolation of rainfall into the soil for use by growing crops (Pimental *et al.,* 1997). Water is not only important for human beings but also it is very essential for balancing the ecosystem. A range of important ecosystem services are explicitly linked to the water cycle; from providing clean drinking water to regulating the flow of flood events and creating opportunities for water-based recreation and cultural practices (Martin Ortega *et al.,* 2015). Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life. India is facing a serious problem of natural resource scarcity, especially that of water in view of population growth and economic development. Most of the freshwater bodies all over the world are getting polluted, thus decreasing the potability of water. The quality of water is usually described according to its physical, chemical, and biological characteristics. Rapid industrialization and indiscriminate use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environments leading to deterioration of water quality and depletion of aquatic biota. Due to use of contaminated water human beings suffer from water borne diseases (Gorde *et al.,* 2013).

Due to the contamination of lake water increasing the risk of eutrophication and loss of biodiversity. Water quality can be assessed by various parameters such as BOD, temperature, electrical conductivity, dissolved oxygen, nitrate, phosphorus etc. Harmful algal blooms are becoming increasingly common in freshwater ecosystems globally (Bhateria *et al.,* 2016). Water bodies have a natural capacity to assimilate contaminants and this capacity is one of the services provided by aquatic ecosystems. However, if the input of contaminants exceeds the assimilative capacity of a water body, there will be ecological damage and loss of ecological services (Boyd 2019).

The productivity of an aquatic environment is directly correlated with density of plankton. The plankton population of any aquatic system is biological wealth of water for fishes and constitutes a vital link in the food chain (Summarwar, 2012). Healthy waterways and oceans are essential for our increasingly urbanized world. Yet monitoring water quality in aquatic environments is a challenge, as it varies from hour to hour due to stormwater and currents. Being at the base of the aquatic food web and present in huge numbers, Planktons are strongly influenced by changes in environment and provide an indication of water quality integrated over days and weeks. Planktons are the aquatic version of a canary in a coal mine. They are also vital for our existence, providing not only food or fish, seabirds, seals and sharks, but producing oxygen, cycling nutrients, processing pollutants and removing carbon dioxide from our atmosphere. (Suthers *et al.,* 2019). Plankton population size was correlated with biotic and abiotic parameters (pH, alkalinity, temperature, dissolved oxygen, transparency, phosphate, chloride and nitrate). The present investigation revealed that the distribution of plankton species depended upon the physicochemical parameters of the environment (Thakur *et al.,* 2013).

Planktons is the most sensitive floating community, which is being the first target of water pollution, thus any undesirable change in aquatic ecosystem affects diversity as well as biomass of this community. The measurement of plankton productivity helps to understand conservation ratio at various trophic levels (Summarwar, 2012). Planktons are the basis of many food webs and are the main food of aquatic trophies. The primary productivity achieved by the phytoplankton depends upon the availability of nutrients (Khellou *et al.,* 2018). Zooplanktons are the major trophic link in the food chain and are heterotrophic organisms playing a major role in cycling of organic materials in the aquatic ecosystem (Patra *et al.,* 2011). Whereas phytoplanktons are the primary producers in freshwater and marine pelagic ecosystems, zooplanktons are the major primary consumers. The marine zooplankton includes members of all animal phyla, but this taxonomic diversity is sometimes collapsed for functional group analyses to a simple dichotomy of gelatinous and non-gelatinous on the basis of body carbon percentage (Brierley, 2017). Planktons are strongly influenced by changes in environment and provide an indication of water quality integrated over days and weeks (Suthers *et al.,* 2019).

Study Area - Anchuthengu Lake :

Lake are inland bodies of water that lack any direct exchange with the ocean. Lake ecosystems are made up of physical, chemical and biological properties contained within these water bodies. Lake may contain Fresh or saltwater (in arid regions) (Bhateria, 2016). Anchuthengu lake is a famous lake situated in Anchuthengu village. Anchuthengu formerly known as Anjengo, Angengo or Anjenga is a coastal panchayat and town in the Thiruvananthapuram district of Kerala. It is situated 9km southwest of Varkala town along Trivandrum-Varkala-Kollam coastal highway (https://en.m.wikipedia.org). The panayil kadavu bridge connects Vakkom to Varkala. It also makes Varkala more accessible to the people in Anchuthengu, Kadakkavoor and the other villages in the surroundings. Vakkom, which lies to the south of the bridge, is like an island placed by the Parvathy Puthanar canal and Anchuthengu lake.

Objectives of the study :

The major objectives of the study are analysis of physico chemical properties of water of Anchuthengu lake, identify the plankton diversity of Anchuthengu and compare the physico chemical properties and plankton diversity in Anchuthengu river.

MATERIAL AND METHODS

Samples are collected from different regions of Anchuthengu lake. 10 samples are collected from Mananakku, Kulamuttom, Panayilkkadav, Sunrise point, Muthalapozhi, Nedunganda, Kayyikara, Kulamuttom-near lake center, Akathumuri and near St. Sebastian church. The Sample waters are collected in January 2022. From each sample station, a small amount of water samples are taken for BOD evaluation in well labeled separate BOD bottles. The temperature of each sample was noted in the field itself and all the s amples were brought to the laboratory and kept in the refrigerator till further analysis. Utmost care was taken during collection and handling to avoid contamination. The collected water samples were analyzed for various physico chemical parameters Such as Temperature, pH, Total dissolved salt, Conductivity, Salinity, Dissolved oxygen, Biological oxygen demand, Alkalinity, Total hardness and Free Carbon dioxide based on standard procedure of water analysis. 6 Plankton samples are collected from different sites of the lake using Plankton net. Planktons were identified and enumerated by Lacky's Drop Method. The parameters like air and water temperature, pH, Total dissolved salt, Conductivity, Salinity, Dissolved oxygen, Biological oxygen demand, Alkalinity,Total hardness and Free carbon dioxide were analyzed by the standard method of APHA (1995) and Triveli and Goel (1986). The collected plankton samples were analyzed.

RESULTS AND DISCUSSION

Water quality was assessed based on eleven important parameters. Random sampling methods was adopted to collect 10 samples from different stations. Plankton diversity of the study area was analyzed by samples taken from five stations. The average air temperature was 31.5 0C. Sample station 6 having lowest air temperature (28.5 0C). The highest air temperature was 34 0C in sample station 9. The water taken from sample station 2 had the lowest water temperature, 29.50C. Sample stations 5, 6 and 7 have the highest water temperature, 30.5 0C. The mean water temperature was 30.5 0C. In the present study air temperature was positively correlated with water temperature. Air temperature and water temperature were negatively correlated with salinity and pH. Temperature is an important factor, which regulates the biochemical activities in the aquatic environment. Generally water temperature corresponds with air temperature (Pradeep *et al.,* 2012). In the present study air temperature was greater than water temperature in most of the sample stations except sample stations 6 and 7 where air temperature is lower than water temperature.

Table 1 : Water quality

Sr. No.	Parameters	Sample locations									
		S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}
1.	Air temp.(^{0}C)	33.5	32	31	32.5	30.5	28.5	29	32	34	32
2.	Water temp.(^{0}C)	30	29.5	30	30	30.5	30.5	30.5	30	30	30
3.	pH	6.99	7.06	7.20	7.02	7.17	6.95	6.96	7.03	6.68	6.94
4.	Salinity (ppm)	4.01	3.58	4.61	3.30	7.64	7.24	10.0	23.7	14.0	10.3
5.	EC(S/CM)	8.08	6.65	8.41	6.19	14.9	14.0	17.6	41.5	25.7	19.4
6.	TDS(Mg/L)	6.46	5.32	6.74	4.88	11.7	11.2	14.1	33.1	20.6	15.5
7.	Alkalinity (Mg/L)	150	130	110	110	165	120	140	235	145	120
8.	Hardness (Mg/L)	8	8	12	8	20	14	16	30	24	22
9.	CO_2 (Mg/L)	11	8.8	6.6	6.6	8.8	13.2	11	8.8	11	15.4
10.	DO (Mg/L)	6.04	9.12	8.33	8.33	7.93	8.72	6.74	7.53	7.93	5.95
11.	BOD (Mg/L)	1.28	3.96	1.58	2.38	1.19	6.74	3.17	1.58	1.1	1.19

Table 2 : Pearson correlation

	Air Temp.	Water Temp.	pH	Salinity	Conductivity	TDS	Alkalinity	Hardness	Free CO2	DO	BOD
Air Temp.	1										
Water Temp.	-.691*	1									
pH	-.352	.025	1								
Salinity	.070	.179	-.468	1							
Conductivity	.086	.120	-.350	.979**	1						
TDS	.088	.118	-.354	.980**	1.000**	1					
Alkalinity	.143	.047	.008	.711*	.809**	.806**	1				
Hardness	.049	.221	-.314	.955**	.938**	.938**	.684*	1			
Free CO2	-.148	.250	-.534	.297	.207	.210	-.095	.286	1		
DO	-.205	-.169	.208	-.250	-.213	-.214	-.168	-.236	-.533	1	
BOD	-.261	.363	.001	.459	.405	.406	.184	.461	.398	-.725*	1

The mean pH was 7. Sample 9 having the lowest pH of 6.68 which is slightly acidic. Sample 3 having the highest pH of 7.20 which is slightly alkaline. pH was negatively correlated with alkalinity and BOD. pH is one of the important parameters for water quality which indicates the hydrogen ion concentration in water (Divya Raj *et al,* 2018). It is considered as an ecological factor and is the result of interaction of various substances in water and also influences numerous biological phenomena (Athira *et al*, 2014). pH is defined as the intensity of the acidic or basic character of a solution at a given temperature (Qureshimatva *et al*, 2015).

Electrical conductivity is a measure of ability of a material to conduct an electric current. The average conductivity was 16. 26S/Cm. The water taken from sample station 8 having highest conductivity, 41.50S/Cm. The lowest conductivity was 6.197S/Cm in sample station 4. Conductivity shows perfect positive correlation with TDS. Conductivity shows high positive correlation with alkalinity and hardness. Conductivity Shows significant correlation with parameters such as temperature, pH, Alkalinity, Total hardness, Calcium, Total dissolved solids, and COD, chloride and ion concentration of water (Bhateria *et al*, 2016). Electrical conductance is a good measure of dissolved solids and excessive presence of Sodium in water is not only unsafe for irrigation but also makes the soil uncultivatable (Wilcox, 1995).

Salinity is the measure of salts dissolved in the water. In this study, highest salinity was obtained in sample 8 with a value of 17.6 ppt. Lowest salinity was obtained in sample station 4 with a value of 3.31ppt. Average salinity is 8.25ppt. Salinity shows strong positive correlation with conductivity, TDS and Hardness. Salinity is a critical factor in deciding about the suitability of water for consumption as well as irrigation. Water containing more salt used for irrigation may eventually lead to secondary salinization (Sujayakumari *et al.*, 2017). The fluctuation in salinity is probably due to fluctuation in total solids in conformity to the dispersed distribution of salts in water (Salam *et al.,* 2000). Total dissolved solids (TDS) are a measure of the combined contents of all inorganic and organic substances present in a liquid in molecular, ionized or micro granular suspended form. The mean value of total dissolved solids is 12.98Mg/L. The highest value of total dissolved salt was observed in sample station 8, value is 33.14Mg/L. The minimum value of TDS was obtained in sample 2. TDS shows perfect correlation with conductivity and high positive correlation with salinity. According to Singare *et al.*, 2011 TDS indicate the nature of water quality for salinity. Water can be classified based on the concentration of TDS (ICMR, 1975 and Wilcox, 1955) as desirable for drinking (up to 500mg/l), permissible for drinking (up to 1000mg/l), use for irrigation. 2000mg/l) and not useful for drinking and irrigation (up to 3000mg/l). Based on the classification the water samples taken from the study area were desirable and permissible for drinking and useful for irrigation.

Total alkalinity is the measure of the capacity of the water to neutralize a strong acid. The average alkalinity observed in this study was 142.5 Mg/L. The lowest alkalinity is obtained in sample stations 3 and 4 with the value of 110 Mg/L. The highest alkalinity was 235 Mg/L is obtained in sample 8. Alkalinity shows negative correlation with conductivity. Measuring alkalinity is important in determining acidic pollution of aquatic ecosystems from rainfall or waste water and is the best measure to analyze the sensitivity of the water course to acid inputs (Network *et al.,*1992 and EPA, 2012). According to Vincy *et al.,* 2012, the alkalinity shows positive correlation with DO of lake systems. But in the present study there was negative correlation between alkalinity and DO of lake water systems. The salt of weak acids and bicarbonate ions are the key reasons for alkalinity in water (Kataria *et al.*, 2006), which is used to accumulate more because of depressed photosynthesis over respiration during post monsoon season (Singh *et al.,* 2016).

Hardness is generally caused by the calcium and magnesium ions present in water. The average hardness of the water sample was 16.2 Mg/L. The highest value of hardness 30 Mg/L was noticed in sample station 8. In sample 1, 2 and 4 having the lowest value of hardness. Hardness was positively correlated with salinity, conductivity and TDS. Hardness of water is not a specific constituent but it is a variable and complex mixture of cations and anions. High values of hardness are probably due to regular addition of detergent into lakes from the nearby residential localities (Pradeep *et al.,* 2012). But in the present study high hardness may be due to the seawater intrusion. High hardness of the water body points towards eutrophication (Pandey, 2008).

Free CO2 is the carbon dioxide that exists in the environment. In the present study sample 10 shows high amounts of free CO2 and sample 3 and 4 shows low value 6.6 Mg/L. Average free CO2 was 10.12 Mg/L.

Free CO2 in water bodies were generally reported when the oxygen remained negligible or absent, mainly due to decomposition of organic matter by microbes in the bottom, resulting in rapid production of free carbon dioxide (Welch, 1952; antwi *et al* 1993). The presence or absence of free carbon dioxide in surface water was mostly governed by its utilization by algae and also through its diffusion of air (Srivastav *et al.*, 2003).

Through the estimation of dissolved oxygen of the very first day of sample collection shows that sample 2 had the maximum dissolved oxygen with a value of 9.13Mg/L. The mean value of dissolved oxygen was 7.67Mg/L. The minimum DO was 5.95 Mg/L observed in sample 10.

As per Das 2000 dissolved oxygen concentration more than 5 mg/l favours good growth of flora and fauna. Lakes with good aquatic life had high dissolved oxygen value (Choudhary *et al.*, 2015). According to Singh *et al.,* 2016, the variation of DO was observed in a range of 2.0 mg/l to 9.8mg/l. In the present study DO is in the range of 5.952 mg/l to 9.126mg/l.

The biological oxygen demand is the amount of dissolved oxygen required by the aerobic biological organisms to decompose organic matter present in the given water samples at a certain temperature over a specific time period (Divya Raj *et al.*, 2018). The mean Biological demand was 1.32 mg/l. The minimum value of BOD was observed in sample 2 and the highest BOD value was 2.1 reported in sample 7. According to Vincy *et al.*, 2012 BOD gives an idea about the extent of pollution. BOD has been a fair measure of cleanliness of any water on the basis that values less than 1-2 mg/l are considered clean, 3mg/l fairly clean, 5mg/l doubtful and 10mg/l definitely. In the present study all samples are in the permissible limit. The higher value of BOD has direct correlation with the increase in nutrient level of the lake due to immersion activity (McCoy *et al.,* 1986).

Planktons:

In the present study 22 Species of planktons were identified. There were 17 species of phytoplanktons included in the classes Chlorophyceae, Bacillariophyceae, Cyanophyceae, Chrysophyceae, Euglenoidea and Charophyceae. 5 Species of zooplanktons were identified which were included in Rotifera, Copepoda, Cladocera and Ciliophora. The highest count of planktons was estimated in sample 9. The phytoplanktons chlorella *Sps* and spirogyra *Sps* which are included in the class of chlorophyceae, pinnularia *Sps* and navicula *Sps* included in bacillariophyceae, oscillatoria *Sps* in the cyanophyceae and cosmarium *Sps* included in charophyceae were present. A rotifer, Branchionus *Sps* and a Copepoda, Diaptomus *Sps* are zooplanktons present in this sample. The total number of planktons present in this sample is 601.1no/l.

Six phytoplanktons of chlorophyceae were present in this sample. They were Ankistrodesmus *Sps*, Oedogonium *Sps*, Chlamydomonas *Sps*, Spirogyra *Sps*, Chlorella *Sps* and Ulothrix *Sps,* Navicula *Sps* in the class bacillariophyceae, Chromulina *Sps* included in chrysophyceae, Euglena *Sps* in euglenoidea class and Closterium *Sps* in charophyceae class were present. Zooplanktons were absent in this sample. 863 no/l planktons are present in this sample.

The total number of planktons present in this sample is 971 no/ml. The phytoplanktons Spirogyra *Sps* Chlorella *Sps* (Chlorophyceae), Navicula *Sps* (Bacillariophyceae), Cosmarium *Sps* and Closterium *Sps* (Charophyceae) were present. Zooplanktons Branchionus *Sps* (Rotifer), Cyclops *Sps* (Copepoda), Daphnia *Sps* (Cladocera) and Paramecium *Sps* (Ciliophora) were present. The zooplanktons Branchionus *Sps* (Rotifera) and Paramecium *Sps* (Ciliophora) were present. The phytoplanktons Ulothrix *Sps* (Chlorophyceae), Navicula *Sps*, Fragilaria *Sps* and Pinnularia *Sps* (Bacillariophyceae), Oscillatoria *Sps* and Cylindrospermum *Sps* (Cyanophyceae), Chromulina *Sps* (Chrysophyceae) were present. 1387 no/ml planktons were present in this sample. 755.2 no/ml planktons were present in this sample. Phytoplanktons Spirogyra *Sps* Volvox *Sps* (Chlorophyceae), Navicula *Sps* (Bacillariophyceae), Anabaena *Sps* (Cyanophyceae), Chromulina *Sps* (Chrysophyceae), Euglena *Sps* (Euglenoidea) and Closterium *Sps* (Charophyceae). Zooplankton Daphnia *Sps* (Cladocera) and Paramecium *Sps* (Ciliophora) were present. 35 | P a g e .

According to karatayev *et al.,* 2008 there was a weak but significant correlation between Zooplankton, Phytoplankton and Macrophytes diversity with pH. Physicochemical parameters of the water were important factors for the development of phytoplankton communities (Tavernini *et al.,* 2009). Seasonal variations of phytoplankton density and diversity were caused by water chemical and physical variables of each reservoir (Kozak, 2005). Low value of DO can be attributed to low population of planktons (Soni *et al.*, 2011). Changes in dissolved oxygen concentration at surface water were directly related to the changes in phytoplankton number (Khan, 2011). According to Jha *et al.,* 2003, Cyclops *Sps* and Daphnia *Sps* show polluted water bodies. In the present study Sample 7 contains both Cyclops and Daphnia and sample 10 contains Daphnia which indicates that the water is polluted. As per Hulyal *et al.,* 2009 the phytoplankton Closterium *Sps* indicate pollution. Samples 6, 7 and 10 contain Closterium which means the water is polluted. The presence of Chlamydomonas *Sps,* Chlorella *Sps,* Closterium *Sp*s and Euglena *Sps* indicates the water body was poly saprobic (Jindal and Sharma, 2011). In the present study these species of phytoplanktons were observed. So the lake water may be poly saprobic. According to Jindal and Vatsal 2005 the Cylindrospermum *Sps* and Navicula Species shows sewage pollution. The various species of Anabaena, Oscillatoria, Fragilaria, Navicula and chlorella indicate sewage or organic pollution (Ahmad, 1996). These planktons were present in the Anchuthengu lake water which means that the water shows sewage pollution. The presence of Chlorella vulgaris and Ankistrodesmus indicate the presence of paper or sewage wastes (Paramasivam, 1981). This is significant in the present study due to the presence of these planktons. Planktons that respond rapidly to environmental change have been very useful and with the identification of particular indicator species being widely used in assessing water quality. Planktons serve as early warning signals that reflect the health status of an aquatic system (Singh *et al.,* 2013).

Conclusion :

In the present study 22 species of planktons were identified. There were 17 species of phytoplanktons included in the classes Chlorophyceae, Bacillariophyceae, Cyanophyceae, Chrysophyceae, Euglenoidea and Charophyceae. 5 Species of zooplanktons were identified which were included in Rotifera, Copepoda, Cladocera and Ciliophora. The highest count of planktons is estimated in sample 9. In the present study Sample 7 contains both Cyclops and Daphnia and sample 10 contains Daphnia which indicates that the water is polluted. Phytoplankton Closterium *Sps* indicate pollution. Samples 6, 7 and 10 contain Closterium which means the water is polluted. The presence of Chlamydomonas *Sps,* Chlorella *Sps,* Closterium *Sp*s and Euglena *Sps* indicates the water body was poly saprobic which are present in the sample. Cylindrospermum *Sps* and Navicula Species shows sewage pollution. The various species of Anabaena, Oscillatoria, Fragilaria, Navicula and chlorella indicate sewage or organic pollution. These planktons were observed in the lake water. The presence of Chlorella vulgaris and Ankistrodesmus indicate the presence of paper or sewage wastes. Thus, the study examined Physico chemical parameters of lake water, plankton diversity and the correlation between the water quality parameters.

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