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LIMNOLOGY OF MUL LAKE IN CHANDRAPUR DISTRICT OF MAHARASHTRA, INDIA

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ABSTRACT:
The physico-chemical parameters are important for the determination of suitability of water for irrigation, fishing and drinking purposes. The present study was carried out for the period of three months from January, 2022 to March, 2022 at Mul lake in Chandrapur district. Their values were as depth-5-7 meters, temperature-26 to 35^{0}C, pH-7-8.5, dissolved oxygen-480-645 mg/l, free carbon dioxide-514-691mg/l, total alkalinity-260-309mg/l, electrical conductivity- 889-905 ms, total dissolved solids-170-204 ppm, Calcium hardness-32-36 mg/l and Magnesium hardness-16-20 mg/l. Total 10 parameters were studied. From this study, it may conclude that, the water parameters are within the permissible limit. If the lake is maintained and beautification will done then this will enhance the Mul lakes productivity and aesthetic value. Also, the Mul lake is suitable for the aquaculture practices.

Keywords: - Limnology, Mul lake, Physico-chemical parameters.

INTRODUCTION :

Water is a principle need of every living organism on earth. It is an essential component for all forms of lives from micro-organism to man. Without adequate quality and quantity of water, the sustainable development of organisms is not possible. The unplanned urbanization and industrialization makes effect on the environment and increases the risk of survival of living organisms. The water quality is deterioting day by day due to these anthropogenic activities. Now maintenance of water quality is becoming a global problem. Better quality of water depends upon its different physico-chemical characteristics. The quality of water in any ecosystem provides significant information about the available resources for supporting life in that ecosystem and its suitability for human use. All the living organisms cannot survive without water. This water is exists in nature in many forms like an Ocean, river, lake, clouds, rain, snow, fog, etc. According to Hutchinson *et al* (1967), the lakes maintain ecological balance of flora and fauna and their inter-relationship regulates surrounding climate and recharge ground water but, unfortunately, they are drying. As the lakes are getting polluted due to inflow of domestic effluents, washing of clothes, cattles and immersion of idols during festivals, etc. All these activities deteriotes the quality of lake water which results into the accumulation of the toxic chemicals and other sludge leading to ecological imbalance.

Since the quality of aquatic life depends on water quality (Welch, 1952). We need water every day for domestic, irrigation and drinking purposes. Economy of India is agro based. Most of the people lives in villages and gets their jobs in agriculture field due to the irrigation facilities in that sector. Due to the industrial and agriculture revolution, the water quality gets polluted (Lokhande *et al.*(2009). So, it is not suitable and safe for domestic, drinking and irrigation purpose.

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Anekar and Dongare (2014) had made studies on physico-chemical parameters of Attigre lake in Kolhapur District of Maharashtra. Their results revealed that, different seasons show fluctuations in physico-chemical parameters of lake water. According to Khune *et al.* (2021), physico-chemical parameters are important criteria for determining the suitability of water irrigation, fishing and drinking purpose. Regular monitoring of water quality parameters can help to conserve the freshwater ecosystem. Borkar and Deshmukh (2018) studies shows the annuals variations in physico-chemical parameters of Mul lake. According to him, Mul lake is polluted and it may be classified as mesotrophic or mesophobic. Deshapande (2019) was studied the biodiversity of Lonar lake. It is a unique example of an assemblage of about six different types of ecosystems. The Lonar creator is having huge biodiversity and there is still more scope to researcher to work about hydrobiology and biodiversity. Topale and Jadhav (2018) was analyzed the water of Nagthana dam in Warud Taluka of Amravati District of Maharashtra and concluded that, water of Nagthana dam is useful for irrigation purpose, fish production and drinking purpose. They also reported that, the hydrobiological parameters of the dam are within permissible limit and dam is on the verge of becoming eutrophic. Hujare (2008) had made limnological studies of the perennial water body named 'Attigre' tank in Kolhapur District of Maharashtra. He had analyzed temperature, transparency, pH, electrical conductivity, dissolved oxygen, alkalinity, hardness, chlorides, nitrates and phosphates. Their study shows the seasonal variation in these factors and there exists inter-relationship between them. The aim of present study of Mul lake was to study its limnology for domestic, irrigation and drinking purposes.

MATERIAL AND METHODS :

Mul lake is situated near S.T. stand of Mul. Mul is a Tahsil place of Chandrapur District in Maharashtra, India. It is situated at 20.09^{O}N and 79.67^{O}E. The area of Mul lake is spread in around 25 hectare (Figure 1).

Water samples were collected in sampling bottles in the morning hours from the lake for a period of three months (January, 2022 to March, 2022) and analyzed them in the laboratory. The water parameters included depth, temperature, pH, dissolved oxygen, free carbon dioxide, alkalinity, electrical conductivity, total dissolved solids, Calcium hardness and Magnesium hardness. Total 10 parameters were analyzed in the laboratory by following the Standard methods (APHA, AWWA and WEF, 2005).

RESULT AND DISCUSSION :

The physico-chemical parameters of Mul lake in Chandrapur district of Maharashtra are shown in Table 1.

The maintenance of a healthy aquatic ecosystem is depends upon the physico-chemical parameters of water and its biological productivity of the water body. According to Davis (1955), a number of physico-chemical and biological factors acts simultaneously. Anekar and Dongare (2021) was studied the fluctuation in physico-chemical parameters of Shiroli lake of Kolhapur. Their results was indicated that, the seasonal variation in these physico-chemical parameters of lake water. Borkar and Deshmukh (2018) was studied the physico-chemical parameters of Mul lake including temperature, pH, DO, CO_2, alkalinity, hardness, etc. Their results shows that, temperature was ranged between 22 to 32^{0}C, pH was ranged between 7.2 to 8.5, DO was found 5.2 to 12.3 mg/l, CO_2 was 3.2 to 7.52 mg/l, TDS was 180 to 750 ppm, EC was 500 to 815 ms, alkalinity was 108 to 245 mg/l, Ca hardness was 48 to 266 mg/l and Mg was 36 to 144 mg/l. These parameters show variation. They reported that

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Mul lake is polluted and may be classified as mesotrophic or mesosaprobic. Khune *et al.* (2021) was studied the water parameters of Malijunga lake in Gondia district of Maharashtra. In the present study, water parameters are reported as depth was 5-7 meters, temperature 26-35^{0}C, pH was 7.0-8.5, DO 480-645mg/l, CO_2 was 514-691 mg/l, alkalinity was 260-309 mg/l, EC was 889-905, TDS was 170-204 ppm, Ca 32-36 mg/l and Mg was 16-20 mg/l.

CONCLUSION :

From this study, it may be concluded that-

1. All the physico-chemical parameters was found to be within expectable limit when compared with Indian Standard values.
2. If the lake is maintained and beautification can be done, then this will enhance the lake's aesthetic value.
3. The water of Mul lake is suitable for the aquaculture practices. Indian major carps like Catla, Rohu, Mrigal can be culture along with other fishes like *Clarius batrachus* and prawns like *Macrobrachium rosenbergii*.

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Conflict of interest :

The authors stated that no conflict of interest.

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Table 1: Physico-chemical parameters of Mul lake.

Sr. No.	Parameters	Measured values
1	Depth (Meters)	5-7
2	Temperature (^{O}C)	26-35
3	pH	7-8.5
4	Dissolved oxygen (mg/l)	480-645
5	Free carbon dioxide (mg/l)	514-691
6	Total alkalinity (mg/l)	260-309
7	Electrical conductivity (ms)	889-905
8	Total dissolved solids (ppm)	170-204
9	Calcium hardness (mg/l)	32-36
10	Magnesium hardness (mg/l)	16-20

Figure 1. A view of Mule lake.

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