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Study of Water Sample: Lonar Lake

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Abstract:

The study different Physico-chemical Parameter of Lonar Lake were studied such as temperature, pH, TDS (Total Dissolved Solid), DO (Dissolved oxygen), Hardness, Chlorides, Salinity, Calcium and Magnesium Hardness. The crater physical setup, its relative Geographical and Ecological isolation evolve Limnological status in a unique way. Its highlights the ecosystem as an ecological wonder. Present work deals with analysis of Physico chemical parameters Lonar Crater Lake.

Key Word: Physicao Chemical Parameter, pH, DO, Salinity, Calsium, Magnesium Hardness

Intrduction:

Soda lakes are considered exceptional to all other aquatic ecosystems in simultaneously exhibiting high productivity rates (410 g cm^{-2} per day), and high pH (9.0–12.0) and salinity [1]. Although they are widely distributed across the globe [2], only a few have been studied. Many soda lakes experience massive seasonal or permanent microbial blooms often resulting in distinct coloration of the lake water [3]. Soda lakes harbor considerably diverse microbial populations [4]. Lonar crater is believed to be originated due to meteoritic impact and is the third biggest in the world. Lonar crater the only such in the great basaltic province of India. The remarkable shape, size and uniqueness of crater lake at crater basin being saline has attracted the attention of geologist, ecologists, archaeologists, naturalists and astronomists and has been the subject of several studies on various aspects of crater cosystem. [5]

The Lonar crater has attracted the attention of world geologists for investigation of its origin and the source of salinity of lake water; it is ecological wonder [6]. The time of excavation of material from the crater may last for several minutes following the impact, while the amount of impact melt produced is dependent on the abundance of water in the target rocks [7]. Target material below the excavation depth is pushed downwards, whereas the strata above this depth may be pushed upwards [8] as seen in the Lonar crater. Lonar Crater Lake consist of various eco-tones inhabited a wide range of plant and animals' life.

a. Geological origin: Impact crater

Lonar Lake lies within the only known extraterrestrial impact crater found within the great Deccan Traps, a huge basaltic formation in India. The lake was initially believed to be of volcanic origin, but now it is recognized as an impact crater. Lonar Lake was created by the impact of either a comet or of an asteroid. The presence of plagioclase that has been either converted into maskelynite or contains planar deformation features has confirmed the impact origin of this crater. It is believed that only shock metamorphism caused by a hypervelocity impact can transform plagioclase into maskelynite, or create planar deformation features. The presence of impact deformation of basalt layers comprising the rim, of shocked breccia inside the crater, of shatter cones, and of the non-volcanic ejecta blanket surrounding the crater all support the impact origin of Lonar Lake.[9]

2.1. Materials and Method: Experimental

Four sampling station selected For the Present work these are S1, S2, S3, S4and S5 East, south, west and north. Water sample were collected from five different sampling sites in the period of one year. Water Temperature analyzed by simple thermometer, Total Hardness, Chloride, Salinity, Calcium, Calcium Hardness, and Magnesium Hardness analyzed by Titrometric method with the help of EDTA standard method for water analysis

2.2. Result and Discussion

In this study total 05 water samples were analyzed for the in physicochemical quality of Lonar Lake water. The number of physicochemical parameters in those physical parameters like pH, temperature, colour, odour, total solid and total dissolved solids (TDS). And the chemical parameter like total alkalinity, total hardness, calcium hardness, magnesium hardness, dissolved oxygen, BOD (biochemical oxygen demand), COD (Chemical oxygen demand), chloride, salinity, dissolved sulphate, and phosphate were performed. In the present study the data revealed that there were considerable variations in the quality with respect to their physicochemical characteristics. It is also observed from the present study that, the colour of the lake water is also light green to dark green because of the dense algal population with predominating spirullina. Lonar Lake is famous for its alkalinity but now a day it was observed that its pH value goes on changing. The pH value of all four sampling sites was 10.0 to 10.4 though out the study periods and temperature 24^0C to 27^0C. The total dissolved solid is in the range of 13600 mg/L to 19200 mg/L and alkalinity in the range of 4800 mg/L to 5423 mg/L. The total hardness was in the range of 472 mg/L to 430 mg/L; calcium hardness 320 mg/L to 280 mg/L and magnesium hardness between 160 mg/L to 148 mg/L. The dissolved oxygen content was 0.8 mg/L to 1.4 mg/L, the low rate of primary production in aquatic ecosystem of lonar lake is also indicated that the low values of BOD & COD that ranged from 0.2 to 0.8 mg /L and 0.01to 0.06 mg /L respectively, the chloride 3420 mg/L to 6589 mg/L, salinity from 7000 mg/L to 10100 mg/L was recorded. The sulphate was recorded as 120 mg/L to 188 mg/L, and phosphate was 0.85 mg/L to 0.52 mg/L. The Lonar Lake is always alkaline and maximum pH 10.5, A.L.Pawar [10] noted that maximum pH 10.5 in the pre-monsoon, minimum 10.2 in post-monsoon and 10.3 in monsoon[11]. The decrease pH during rainy season may be due to dilution of alkaline substances in rainy season, and resulting in increase in turbidity of the water due to decrease photosynthetic activity of algae.

Table -1-Physical parameters of water samples from selected sites of Lonar Crater

Sample and Parameters	1	2	3	4	5
Colour (Visible)	Dark green	Dark green	Dark green	Dark green	Dark green
Odour	Strong				
Temp. in ^{0}C	25	23	25	25	24
pH	10.0	10.2	10.2	10.1	10.4
TDS (Total Dissolved Solids) mg/L	13600	15006	16007	14490	19200

Table –II- Chemical parameters of water samples from selected sites of Lonar crater

Sample Parameters (mg/litr)	1	2	3	4	5
Total Alkalinity	5423	4800	5200	5196	4982
Total Hardness	450	438	430	472	470
Calcium Hardness	300	290	280	320	310

Magnesium Hardness	150	148	150	152	160
Dissolved Oxygen	0.8	1.02	0.09	1.4	1.09
BOD	0.2	0.8	0.4	0.7	0.8
COD	0.02	0.01	0.04	0.04	0.06
Chloride	3420	5640	5980	6589	6120
Salinity	9320	10100	7000	7500	7200
Sulphate	150	188	120	150	130
Phosphate	0.52	0.50	0.55	0.80	0.85

Conclusion:

In Conclusion of the, Lonar Meteorite Lake appear to be a unique aquatic ecosystem among the saline lakes characterized by hypersaline, hyper alkaline, poor range in DO but all physic-chemical parameters in this region was beyond the permissible limit.[12] The blue green algae constitute the major among phytoplankton community particularly *Spirulina* is the dominant and Zooplankton, Rotifera is in general *Brachionus* species in particular are dominant over all other types of zooplanktons.

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