

“Comparison of the Physico-Chemical Parameters of Two Lakes at Lodra and Nardipur under Biotic Stress”

¹A. C. Patel, and ²Dr. R. S. Patel

¹Department of Biology, Sheth L. H. Science College, Mansa-382845

² Department of Biology , KKSJ Science College, Maninagar, Ahmedabad, Gujarat, India

Abstract- Water is essential for living organisms especially like Flora and Fauna. The presented study deals with comparative study of the periodic and aperiodic variations of Physico-chemical status of two lakes belongs of Lodra Lake and Nardipur Lake of Gandhinagar District, Gujarat India. Both lakes having natural freshwater body. Different data are collected and observed through various field trips. A comparative study of the periodic and aperiodic variations of Physico-chemical status of two lakes were studied in year January to June 2011. Both the lakes are biotically affected by various anthropogenic activities. In the present study water characteristics of two lakes have been compared the water quality. Different Parameters like pH, Fluoride, COD, BOD, Chloride, Alkalinity, Total Hardness, Calcium, Calcium Hardness, Magnesium, Magnesium Hardness, DO, EC and TDS analyzed. The result indicates that the both lakes are in polluted condition.

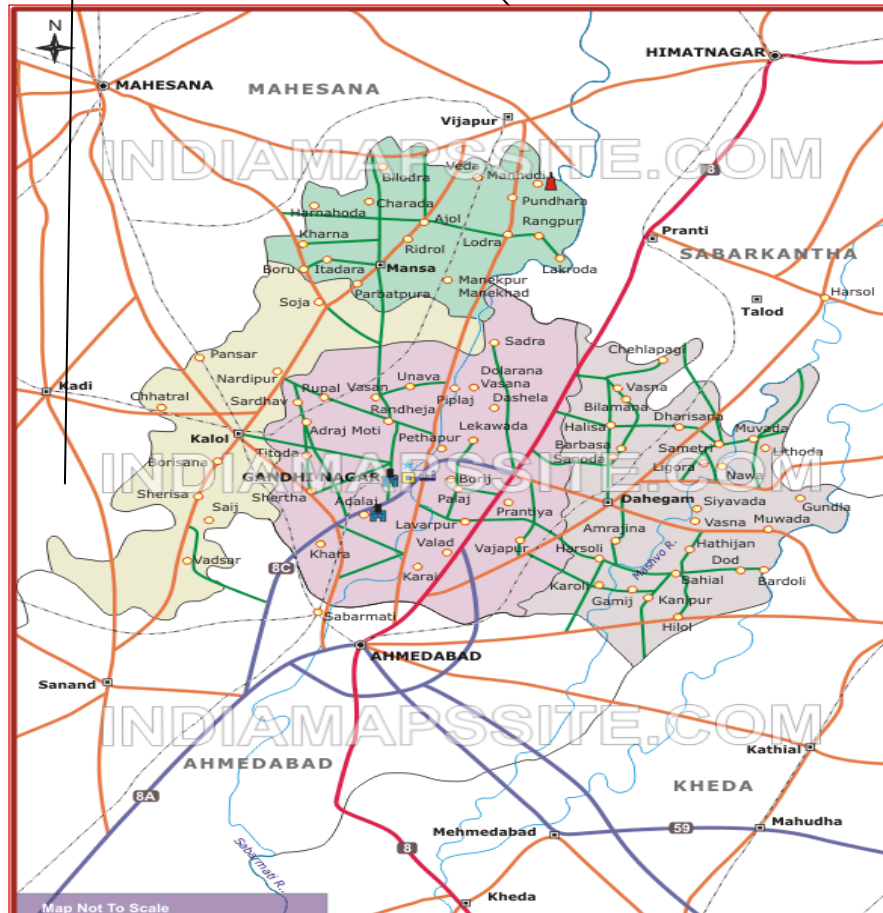
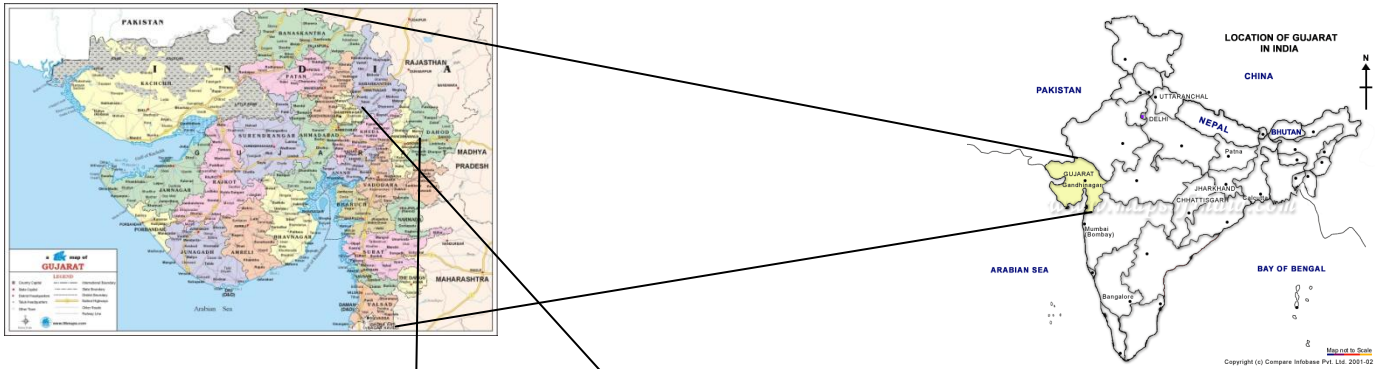
Index Terms- Water characteristics , physico -chemical status, biotic stress.

I. INTRODUCTION

Fresh water habitats occupy a relatively small portion of the earth surface as compared to marine and terrestrial habitats, but their importance to man is far greater than their areas. Fresh water are the most suitable and cheapest source for domestic and industrial needs and they provide convenient waste disposal systems. The increased demand of water as a consequence of population growth, agriculture and industrial development building construction has forced environmentalists to determine the chemical, physical and biological characteristics of natural water resources (Regina & Nabi, 2003) Temporary ponds are found throughout the world. Though, there are considerable regional differences in their type and method of formation, many physical, chemical and biological properties are quite similar. The worldwide distribution of water body type leads to a large variety of temporary pond type due to climate and geological differences (Solanki et al., 2007) Stagnant water bodies have

more complex and fragile ecosystems in comparison to running water bodies as they lack self cleaning ability and hence, readily accumulate greater quantities of populations. Increased anthropogenic activities in and around the water bodies damage the aquatic systems and ultimately the physicochemical properties of water. The man is abusing water resources at a large scale. The effort to conserve these resources is present need. Factors that influence the sustainability of such lentic systems are temperature, transparency, salinity, biogenic salts, dissolved gases etc. (Munawar, 1970; Misra and Yadav, 1978) Since, ponds are favourable habitats for a variety of flora-fauna and anthropogenic society, so its regular monitoring is necessary for control. Recently, lot of work has been done on changing ecological behavior of ponds (Mahananda et al., 2005; Kanungo et al., 2006; Gupta et al., 2008; Banerjee and Mandal, 2009) In the present study, two important ponds of different district were chosen for comparing the impact of biotic activities on physico-chemical characteristics of pond's water. The study was performed during Jan,2011 to June,2011. **Study area:** Lodra Lake is located between 72^o42'46''E to 72^o43'23''E latitude and 23^o27'06''N to 23^o28'01''N longitude. and Nardipur lake is located between 72^o33'47''E to 72^o34'03''E Latitude and 23^o20'09''N to 23^o20'11''N longitude. A study of the water quality of the lodra and nardipur Lake, which is man-made water body. The Lodra Lake situated in Mansa taluka and nardipur Lake situated in Kalol taluka, Dist: Gandhinagar, Gujarat, India. The studies on physico-chemical and biological examinations of the water of both Lakes were carried out in Jan to June 2011. Analysis of water chemistry was carried out with changes in water chemistry. Sites were selected for sampling Water samples, were examined for various physico-chemical parameters as pH, Total Hardness, Chloride Content, Carbonates, Bicarbonates, Calcium and Magnesium Content, Calcium and Magnesium Hardness, Alkalinity, Nitrates and Electric Conductivity (EC) etc by standard APHA (2005) methods. Both lakes are having natural freshwater body.

Location Map of Different Lakes Belongs To Mansa and Kalol Taluka and Surrounding Area



II. MATERIALS AND METHODS

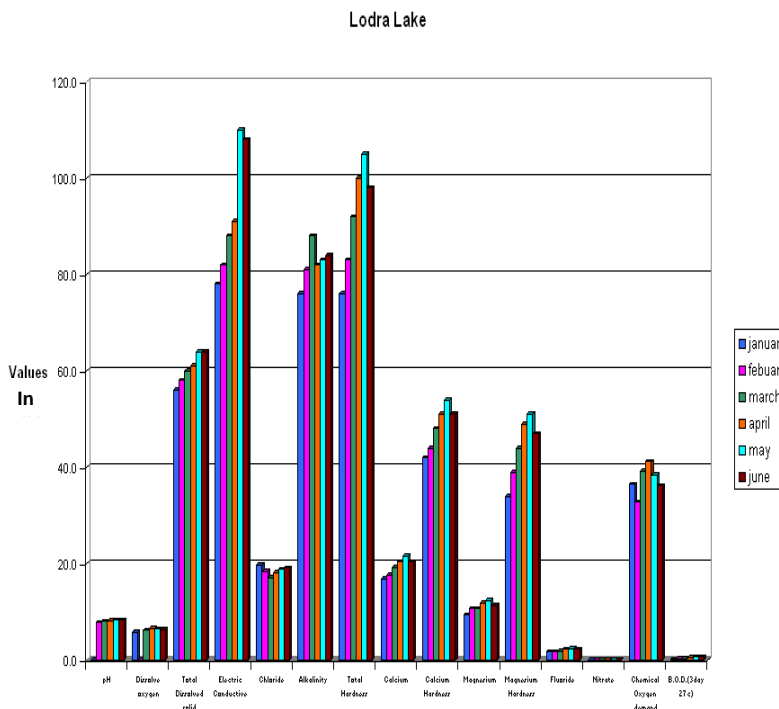
Frequent field trips were carried out during January to June 2011. In Lodra and Nardipur lakes were selected because they are affected by domestic purposes, sewage, cleaning clothes by local people, bathing of cattles by rural communities, small scale industrial effluents and worshipping activities. The water sample

were collected from surface near the margins of the pond between 9-00 A.M. to 11-00 AM. The analysis of physico-chemical parameters was done by following the standard methods (APHA,2005). **The plate 1** shows Lodra lake in different views, **Plate 2** shows Nardipur lake in different views. Table 1, is shown various parameters of Lodra lake and Table 2, is shown various parameters of Nardipur lake.

Table-1:

sr.nos	test parameter	Yera-2011						unit
		january	february	march	april	may	june	
1	pH	.7.6	7.8	8	8.2	8.3	8.3	---
2	Dissolve oxygen	5.8	.6.0	6.2	6.6	6.4	6.3	mg/l
3	Total Dissolved solid	56	58	60	61	64	64	mg/l
4	Electric Conductive	78	82	88	91	110	108	mg/l
5	Chloride	19.8	18.4	17.04	18.2	18.8	19.1	mg/l
6	Alkalinity	76	81	88	82	83	84	mg/l
7	Total Hardness	76	83	92	100	105	98	mg/l
8	Calcium	16.8	17.6	19.2	20.4	21.6	20.4	mg/l
9	Calcium Hardness	42	44	48	51	54	51	mg/l
10	Magnesium	9.3	10.7	10.7	11.9	12.3	11.3	mg/l
11	Magnesium Hardness	34	39	44	49	51	47	mg/l
12	Fluoride	1.68	1.71	1.84	2.2	2.42	2.21	mg/l
13	Nitrate	nd	nd	nd	nd	nd	nd	mg/l
14	Chemical Oxygen demand	36.4	32.8	39.2	41.2	38.4	36.2	mg/l
15	B.O.D.(3day 27 c)	0.17	0.19	0.25	0.58	0.67	0.71	mg/l

All the parameters are in mg/lit. except pH



Physico chemical analysis of water sample from Lodra Lake during January to July 2011

LODRA LAKE



Fig. 2



Fig.3

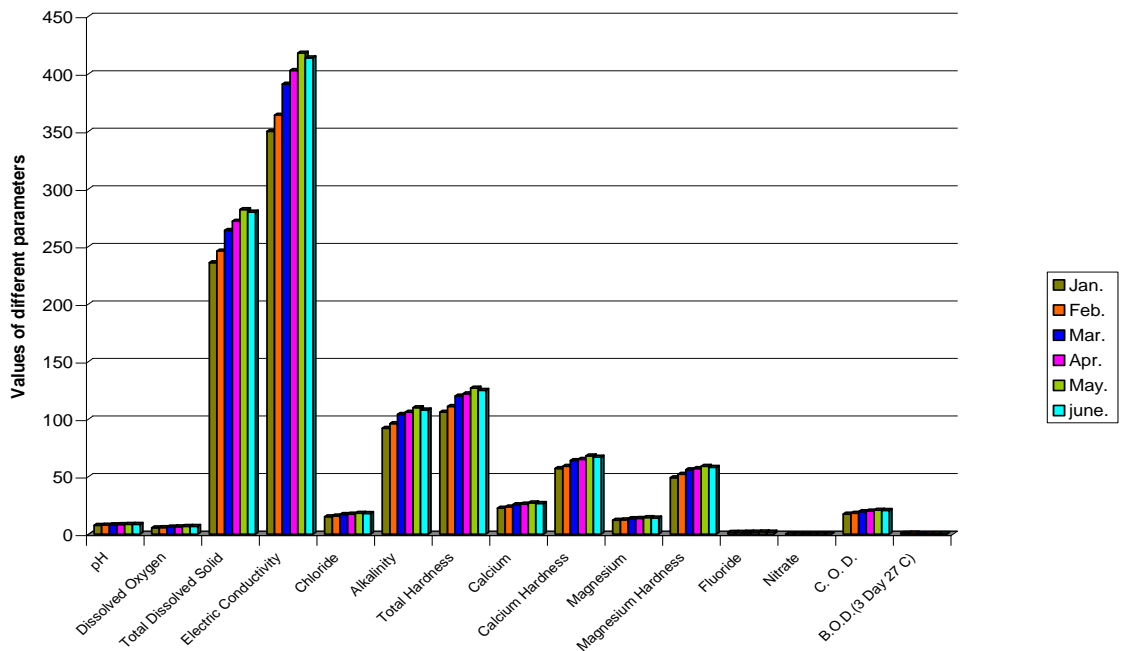


Fig. 4

PLATE 1

Sr. No.	Test Parameters	Year-2011						Unit
		Jan.	Feb.	Mar.	Apr.	May.	june.	
1	pH	7.6	7.8	8.2	8.4	8.6	8.6	
2	Dissolved Oxygen	5.6	5.8	6.2	6.4	6.8	6.8	mg / lit.
3	Total Dissolved Solid	236	246	264	272	282	280	mg / lit.
4	Electric Conductivity	350	364	391	403	418	414	mg / lit.
5	Chloride	15.2	15.8	17.04	17.5	18.2	18.02	mg / lit.
6	Alkalinity	92	96	104	106	110	108	mg / lit.
7	Total Hardness	106	111	120	122	127	125	mg / lit.
8	Calcium	22.6	23.7	25.6	26.2	27.2	26.6	mg / lit.
9	Calcium Hardness	57	59	64	65	68	67	mg / lit.
10	Magnesium	12.2	12.5	13.6	13.8	14.4	14.1	mg / lit.
11	Magnesium Hardness	49	52	56	57	59	58	mg / lit.
12	Fluoride	1.61	1.7	1.84	1.87	1.93	1.91	mg / lit.
13	Nitrate	ND	ND	ND	ND	ND	ND	mg / lit.
14	C. O. D.	17.5	18.2	19.6	20.1	20.9	20.7	mg / lit.
15	B.O.D.(3 Day 27 C)	0.85	0.88	0.62	0.64	0.66	0.65	mg / lit.

Parameters of Nardipur Lake



NARDIPUR LAKE



Fig.1



Fig.2



Fig.3



Fig.4

PLATE 2

III. RESULTS AND DISCUSSION

The physico-chemical parameters of both the lake were analyzed from January to June 2011. And are presented Lodra Lake in table -1 and figure 1 to 4. And NardipurLake in table -2 and figure 1 to 4. The pH of both the ponds indicate the alkaline nature of lake and its various from 7.6 pH to 8.3pH of lodra lake and 7.6 pH to 8.6 pH of nardipur lake. The dissolved Oxygen various from 5.8mg /l. to 6.6mg/l of lodra lake and 5.6 mg/l to 8.6 mg/l of nardipur lake. Low content of dissolved Oxygen assign of organic pollution, its also due to inorganic reductants like Hydrogen sysulphide, Ammonia, Nitrates, Ferrous ions and other such oxidisable substances (Ara et al. , 2003) The alkalinity in the both lake various forms 76mg/l to 88mg/l of lodra lake and 92 mg/l to 110 mg/l of nardipur lake respectively. The high alkalinity is a function of ions exchange, that is calcium ions are replaced by Sodium ions and later contributed to alkalinity (Sharma and John 2009). Alkalinity may also cause due to evolution of Co2 during decomposition of organic matter. The Chloride contents in lake-1 and lake-2 various from 17.04 mg/l to 19.8mg/l of lodra lake and 15.2 mg/l to 18.2 mg/l of nardipur lake respectively. The chloride is one of the important indicators of pollution (Khare et al, . 2007) The Nitrate in a both lake is not indicate. The main source of Nitrate is the run-off and decomposition of Organic matter. The higher inflow of water and consequent land drainage cause high value of Nitrate. (Thilanga et al . 2005). The variation in Calcium was found to be 16.8 mg/l to 21.6 mg/l of lodra lake and 22.2 mg/l to 27.6 mg/l of nardipur lake respectively. Calcium is linked with the Carbon dioxide and is an important constituent of the skeletal structure of organisms. Calcium forms the most abundant ions in fresh water. (Thilaga et al. 2005). the variation in total dissolved solid was found to be 56 mg/l to 64 mg/l of lodra lake and 5.6 mg/l to 6.8 mg/l of nardipur lake. The variation in Electric conductivity was found to be 78 mg/l to 110 mg/l of lodra lake and 350 mg/l to 418 mg/l of nardipur.

From the result obtained it can be concluded that both lake are polluted. Fresh water bodied due to the continuous discharge

of domestic used like sewage, drainage, cleaning clothes, cattle and vehicle washing and run-off high amount of nutrients lead to eutrophication. The result also indicate that the lodra lake is a comparatively more polluted due to greater biotic stress.

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AUTHORS

First Author – A. C. Patel, Department of Biology, Sheth L. H. Science College, Mansa-382845, E. mail: acpatel111@gmail

Second Author – Dr. R. S. Patel, Department of Biology , KKSJ Rspce College, Maninagar, Ahmedabad, Gujarat, India., Email: rspbotany72@yahoo.co.in