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Physicochemical Composition Of Harsholaav And Devikund Sagar Village Pond Of Bikaner, Rajasthan

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ABSTRACT: Water is the basic unit of life and it is essential element for all living beings and the environmental health. Water is elixir of life; it governs the evolution and functions of universe all the earth hence water is mother of all living world. Determination of physical and chemical parameters were done to determine to the surface water quality. Ponds are important wetlands located in on around human habitation as they generally semi natural ecosystem constructed by men in landscape suitable for water stagnation. Besides acting is they source of fresh water, the lower ambient temp, rise the water table, increase the diversity of flora and fauna and provide aesthetic ambience. The water bodies studied are situated in desert area Bikaner (in dry and harsh climatic condition), used for domestic and drinking as well as commercial purpose.

KEYWORDS: Water, Desert, Fresh water ecosystem.

INTRODUCTION: Water is one of the most abundant compounds in earth approximately covering three Fourth of the earth's surface. Majority of water available on the earth is saline in nature, only a small quantity exists as fresh water. Fresh water has become a scare commodity due to over exploitation and pollution (Ghose and Basu, 1968; Gupta and Shukla 2006; Patil and Tijare 2001; Singh and Mathur, 2005) The ground and surface water are the most significant fresh water reservoirs. Fresh water is a vulnerable resource that quenches the needs of end users with good quality and quantity.

Uncontrolled waste water discharge into the pond have resulted in eutrophication of ponds as evidence by substantial algal bloom, dissolved oxygen depletion in the subsurface water, large fish kill and malodor generation (Pandey and Pandey, 2003).

Some important local factors influencing zooplankton species richness and abundance have been identified; local area and primary productivity (Dodson, 1991, 1992; Dodson et at., 2000), water quality (jeeppesen et al., 2000; cottenie et at., 2001), lake depth (keller and conlon, 1994), latitude (Hebert and Hann, 1986), acidity (Brezonik et al. 1984; locke, 1992), nutrients (Leibold, 1999; jappesen et al., 2000), toxins (Yan et al., 1996), elimate (stemberger et al., 1996), predation and competition (Brooks and Dodson, 1965; Shurin, 2000; Fermandez-Rosado and lucena, 2001; Isari et al., 2007 Larson et al., 2009).

Due to uncontrolled increase in human population and development of township at large, these freshwater bodies are under tremendous pressure owing to their overuse on one hand and enrichment due to nutrients and organic matter on the other, leading to the cultural eutrophication. Erosion of catchment and direct pouring of domestic effluents along with sewage are threatening these wetlands all over the world. In view of the above, the present study deals with the assessment of physicochemical characteristics of a freshwater pond located outside of city Bikaner, Rajasthan, India.

Physico-chemical properties (pH, conductivity, free CO_2, COD, alkalinity, chlorinity-salinity, ions such as Na+ and K+) of water in any aquatic system are largely governed by the existing meteorological condition, and are essential for determining the structural and functional status of natural water. Hydrological condition of water affects the aquaculture activities, fish productivity and species composition of aqua fauna, eutrophication and overall loss of biodiversity that results in degradation of pond ecosystem. The magnitude and dynamics of oxidation- reeducation reaction by various elements present in water plays an important role in governing most of the chemical, biochemical and microbial behaviors in the pond water, and also maintaining congenial environmental condition. The major changes associated with electro-chemical properties of pond water are reflected by the Ph and electrical conductivity. Neutral to slightly alkaline pH ranges for water are considered to be congenial for aquatic production owing to greater availability of most of nutrient elements and also due to increased biological activities under this pH range. Apart from providing nutrients, potassium along with sodium serves as important components of base saturation of the pond soil and maintains alkaline pH in the pond environment. Bicarbonate (HCO_3^-) and carbonate (CO_2^{-3}) constitute major anions in fish pond ecosystem and provide CO_2 in water which are required for photosynthesis. Hydroxyl (OH^-) is occasionally present especially under highly alkaline condition. A wide range of organic substances occur in pond water. The study of different physico-chemical parameters is very important for understanding the metabolic events in aquatic ecosystem. The parameters influence each other and govern the distribution and abundance of flora and fauna (Shinde et al, 2011).

STUDY AREA: Harsholaav Pond - This pond is situated in Nehru nagar of old city of Bikaner. The depth of pond is almost 4 feet. It receives rainwater and appears greenish in colour due to abundance of wolffia. This place has religious value as people perform “Anushthan” here during month of “shravan”. Lord Shiva’s temple is present near pond area. This pond water harbors wide range of living micro biota like paramecium, vorticella, stentor, stenocypris and many more. Frogs can be easily observed during rainy season.

Devikund Sagar Pond: The Devikund Sagar pond is situated about 7 km. in the east of Bikaner city. The maximum depth of the pond is 5 feet and the surface water spread is about sq/km^2 It has stone & brick walls of on the eastern and southern banks. The pond has a muddy basin and has much disturbance due to human and cattle activities in littoral region. The pond is used for washing & bathing by villagers and frilly a number of tanks on bullock & camel Earps are filled and transported from here. It causes great disturbance in shallow water region of the pond. The clay from the bottom of the pond is used from brick making on the bank's sides. The color of the water is sandy and hydrilla is the only macrophyte recorded. Some birds including Dabchicks and black-winged stits are also seen.

MATERIAL AND METHODS:

Material - Plastic bucket, polythene bags, Secchi disc, BOD Bottles, Laboratory glass ware, Digital thermometer, pH meter, EC meter.

In present study research work carried out in two village pond that is Harsholaav and Devikund Sagar. During this study estimation and calculation of air temp., Water temp., Electrical conductivity (EC), pH, Dissolved oxygen (DO), Alkalinity, Hardness, Total dissolved solids (TDS), Transparency, depth was carried out. The sampling was taken during the day time from two sites of each. The depth and transparency were carried out through secchidise. For dissolved oxygen water sample was taken in BOD bottle of 150 ml. To calculate the dissolved oxygen in BOD bottle, water sample get fixed through

Winkler A and B. For the remaining calculation and observation water sample carried in water bottle to the laboratory, observation, restoration and calculation carried out by following volumetric method of APHA – AAWWA – WPCF (1981).

Physical-chemical parameter of water –

S. N.	Water Parmeter	Methods
1.	Alkalinity	By titration with H2SO4 using phenolphthalein and methyl orang indicator
2.	pH	Using digital PH meter
3.	Hardness of water	Using potassium. Chromate indicator by titration with EDTA SALn using Eriochrome black T- indicator
4.	Air temperature	Digital thermometer
5.	Water temperature	Digital thermometer
6.	Electrical conductivity	Using digital E.C. meter
7.	Dissolved oxygen	By Winkler method using
8.	Depth	Using Secchi disc

Result & Discussion: It is a baseline study completed in a particular season; the parameters considered also varied in both the ponds. During the present course of study (observation), moderate temp. of air and water was found, 23 & 24^{o} c of air and 16.1 and 16.3^{o} c of Devikund sagar and Harsholaav, respectively as temp. play an important role for the different abiotic and biotic factors present in the any aquatic ecosystem.

S. N.	Parameter	Harsholaav	Devikund Sagar
1.	Air Temp.	24	23
2.	Water Temp.	22	21
3.	Electrical Conductivity	0.45	0.36
4.	pH	8.5	8.4
5.	Dissolved Oxygen	2.6 ml	3 ml
6.	Alkalinity	0.6 ml	2 ml
7.	Hardness	8 ml	9.5 ml
8.	TDS	196	333
9.	Transparency	3 feet	3.2 feet
10.	Depth	1.5 meter	3 meters

From the present analysis of water sample of both aquatic ecosystem reveals that the dissolve oxygen was higher in devikundsagar pond in compare to harsholaav pond. Similar pattern was also observed in alkalinity, hardness and TDS as these were noted low in harsholaav and high in devikund sagar. In earlier study similar trends were also observed in the same pond.

Local environmental factors, such as water temperature, PH, salinity, trophic state or combinations of these factors are responsible for shaping the local community structure, more ever nutrients are major environmental factors affecting zooplanktons near Bikaner, in 2011, Hemant and Anand also noted three important groups of zooplanktons namely protozoa, rotifer and crustacean in sewage treatment plant. A different observation comes out in the savage water during their study.

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