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ANALYSIS OF PHYSICO – CHEMICAL PARAMETERS OF SOIL AND SOME WATER BODIES OF KHERALU TALUKA (NORTH GUJARAT)

PATEL MAHESHBHAI G.
Assistant Professor,
Department of Biology, M.N.College, Visnagar, Dist. Mehsana.
Email: mgpmnc@gmail.com

ABSTRACT

Six different sites were selected for study. Different parameters relating to water and soil were considered. Method prescribed by M.M Saxena (1998) was adopted for analyzing the data. The quality of water and soil was considerably good, which support healthy aquatic life as well as other surrounding fauna and flora. At some site due to anthropogenic pressure the quality of water deteriorates. To maintain aquatic biodiversity it is essential to concentrate our mind that such water bodies should be protected.
Key words- DO, TDS, pH, Conductivity.

INTRODUCTION

Water is the medium for the animals which live an aquatic life. The aquatic animals are exposed to abundance of water. But water becomes scarce for terrestrial animal and they are exposed to a different set of problems. Soil is an abiotic factor. It acts as a suitable substratum and medium for plants and animals. Soil is a complex physical-biological system providing support, water, nutrient and oxygen for the plants. For the control of pollution necessarily requires quality measurements of water and soil.

STUDY AREA

Study on water and soil condition was conducted at Kheralu it is one of the taluka in Mehsana district. Total six water body was selected for study. They are Motihirvani lake (site-I), Savadu lake(II), Chimanabai sarovar(III), Thangna lake(IV), Gathaman(V), and Chansol lake(VI). This all sites is well scattered around the Kheralu city.

MATERIALS AND METHOD

For the analysis of water and soil the samples were collected from all selected sites by scientific method. For qualitative assessment following parameters were selected and method prescribed by M.M. Saxena (1998) was followed.

Parameters of water- Electrical Conductivity, Turbidity, Dissolved Oxygen, Chloride, Total Dissolve Solids, Alkalinity, Fluoride, Total Hardness, Calcium Hardness, Magnesium Hardness, Ammonia and Nitrite

Parameters of soil- Conductivity, Bulk Density, Moisture content, pH and Chloride

RESULTS AND DISCUSSSION

There are different types of water body located at out skirts of Kheralu, mostly covered by farmland. Observation shows that all are polluted by different types of pollutants, such as deposition of excreta, detergents, chemical effluents, and other human activities. Survey is essential for conservation of biodiversity.

Water- Oxygen dissolved in water often referred to as DO. Organisms have specific requirement of oxygen e.g. Game fish requires at least 5mg/l and coarse fish about 9mg/l. Among the selected sites, site III has high concentration (5.9 mg/l) where as site II contain low concentration (3.8 mg/l) of oxygen. Large amounts of salts are dissolved in water gives TDS. All the sites have TDS above the desirable limit. Site I, III, IV,V and VI has permissible value of TDS (1500-3000mg/l) as prescribed by ICMR. The industries are main source of chloride. Range of chloride at all selected sites is 130 to 240 mg/l. site I, III,IV and VI has less than 200 mg/l chloride which is desirable limits (ICMR). Total hardness of water is the sum of concentration of alkaline earth mater. Highest value observed at site VI (210 mg/l). It is below permissible level and above desirable level. Calcium is found in great abundance in all natural water. Its source lies in the rocks from which it is leached. Except one site (site II) the level of calcium found below desirable limit (ICMR). The level of magnesium remains same as calcium. Suspended maters like clay, silt, organic mater, phytoplanktons and other microscopic organism causes turbidity in natural water. Site III,IV and V is found high turbid which shows little variation from remaining sites, which is less turbid. Pure water is poor conductor of electricity, but acid, bases and salts in water make it relatively good conductor of electricity. In most of case the conductivity of water is observed high. Nitrogen occurs in small amount in water as bound form like Ammonia and Nitrite. Highest amount of nitrogenous compound found respectively at site I,III, and VI. Fluoride is more common in ground water than surface water. The level of fluoride observed below desirable limit (1 mg/l) prescribed by ICMR (Table- 1).

Soil – pH of soil is very important for living beings. Soil of all selected site are alkaline in nature (7.3 to 8.0). Generally the pH value below 4.5 and above 8.5 is unusual. The bulk density of soil is defined as the dry weight of a unit volume of it, and it is expressed as g/cm^3. The range of it remains between 0.93 to 1.32 g/cm^3. It is good for root penetration. Highest moisture found at site II (25%) and lowest at site III (7 %). The range of conductivity of soil remains 190 to 422, due to heterogeneous condition of soil. Highest chloride found at site VI (82.15 mg/l) and lowest at site V (33.40 mg/l). To maintain aquatic biodiversity it is essential to concentrate our mind that such water bodies should be protected (Table -2).

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Table -1 Quality assessment of water at different sites

Parameters	Sites					
	I	II	III	IV	V	VI
DO	4.1	3.8	5.9	5.3	4.5	5.2
EC	1005	1050	2760	770	2120	2900
Turbidity(NTU)	154.5	110.3	178.4	162.4	177.2	82.6
TDS mg/l	780	1600	880	620	550	900
Fluoride mg/l	0.72	0.65	0.70	0.58	0.61	0.81
Chlorinity mg/l	170	220	130	185	240	180
Total hardness mg/l	85	93	182	180	164	210
Calcium mg/l	41	39	80	85	72	95
Magnesium mg/l	44	54	102	95	92	115
Ammonia mg/l	6.21	5.65	9.20	6.10	5.50	8.10
Nitrite mg/l	0.040	0.035	0.037	0.038	0.030	0.025

Table -2 Analysis of soil at different sites

Site	Bulk density G/CM^3	Moisture content %	pH	Conductivity	Cl
I	1.32	11	7.6	190	51.30
II	0.93	25	7.71	360	82.04
III	1.25	7	7.72	336	42.57
IV	1.21	14	7.35	314	37.20
V	1.32	12	7.65	235	33.40
VI	0.99	17	7.5	422	82.15