

Soil and Water Analysis of Madku Dweep (C. G.): A Report

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Abstract: *The present paper deals with the study of Soil and water analysis of madku dweep. The work has its value because it includes the research area of historical importance. The analysis was gone through a project done by students of M. Sc. Chemistry, during a visit to madku dweep for study tour. The samples were collected as per rules, stored and preserved for testing in the laboratory. The tests for soil and water are done in the lab by various methods like pH meter, turbidimeter, spectrophotometer. The analytical parameter shows that the soil of madku dweep is slightly acidic and water also shows acidic nature, so the vegetation found there is more of acid dwelling plants. The Study is of great importance for botanical and pharmaceutical research.*

Keywords: Acid Dwelling, turbidity, spectrophotometer, analytical parameters, pharmaceutical

1. Introduction

MADKU DWEEP is an island on shivnath River, Pathria Block in Mungeli District of Chhattisgarh. Madku dweep's landscape is lush green with cast eye scenes. It is Located at 15 km from Bhatapara (C. G.). From Ancient time it was originally named as "MADKU DWEEP", because Madku, a Rishi established his ashram here and wrote the legendry 'madku Upanishad. Veteran archaeologist told that there are 19 shiv temples of which 9 are 'Smatak ling' all belonging to Ratanpur Kings of Kalturi period. Madku Dweep is one of the most valuable and religious, historical monument of Chhattisgarh. The physio-chemical parameter of water were analysed by the students of M. Sc. Chemistry in the PG Laboratory of Govt. GNA PG College, Bhatapara (C. G.), following the standard method devised by Trivedi and Goel (1984), Atoni (1985) as follows: - Physical Parameter. The water temperature and atmospheric temperature of the river were recorded with the help of maximum and minimum temperature thermometer water.

Soil is the basic natural resource for agriculture and its proper management is essential to enhance agricultural production and maintain soil productivity. Soil testing is one of the best methods, to fix the physical characteristics of a field, so as to assess the fertilizer requirements for a or for knowing the reclamation requirements if the soil is saline or acidic in nature and further application based on soil tests to approach for harvesting and know the potential yields of crops by increasing input and maintaining soil health.

2. Materials and Methods

The study area Madkudweep distt. Mungeli was visited by the students as a 'STUDY TOUR' in the month January 2018. The water and soil samples was analysed for pH, temperature Conductivity, TDS, Turbidity, Chloride, Iron, Silica, BOD, COD, DO, Total hardness, Calcium hardness, Magnesium hardness, Alkalinity. for Total Alkalinity the samples were collected at the surface of study sites at four stations namely Location - 1 to Location - 4 and sample was collected at 11 A. M. to 01 P. M. For the collection of water

glass bottles are preferred, for soil zip polythene bags. Glass bottles and zip bags are tightly sealed. The bottles & bags were soaked with 10% HCL for 24 hours and then thoroughly clean and rinse with distilled water. Water sample and soil sample were collected from different locations with the help of glass bottles & bags. Samples will be fixed in the field and are later analyzed in the laboratory. Four location sample of 10 ml, 5 gm. The aqueous solution of soil samples are prepared and tested as per –

Table 1

S. No.	Characteristics	Method of Testing	Unit
1	pH	pH Meter	pH Unit
2	Turbidity	Turbidity Meter	NTU
3	Temperature	Temperature sensitive probe	°C
4	Calcium	Titrimetric Method	Mg/L
5	Magnesium	Hy. Calculation [TH-(CaH)]*	Mg/L
6	Total	Alkalinity Titrimetric Method	Mg/L
7	Total Hardness	Titrimetric Method	Mg/L
8	TDS	TDS Meter	Mg/L
9	DO	Winkler's iodometric method	Mg/L
10	BOD	Dilution Method	Mg/L
11	COD	Acidic Oxidation + Potassium dichromate	Mg/L
12	Iron	Spectro-photometric method	Mg/L
13	Chloride	Titration Method	Mg/L
14	Silica	Colorimetric method	Mg/L
15	Conductivity	Multimeter	S/m

3. Results and Discussion:

The Madkudweep dist. Mungeli was visited once and collected sample were tested at the lab. The water sample containing pH, Temperature, Conductivity, TDS, Turbidity, Chloride, Iron, Silica, BOD, COD, DO, Total hardness, Calcium hardness, Magnesium hardness, Alkalinity, Total Alkalinity their location wise graph is shown above. The soil type found in madku is Kanhar (clayey) type - A low - lying deep bluish black soil with high moisture retention capacity, well suited for rabi crops, particularly wheat. The 4 soil samples were collected with different depths (0 - 10cm, 10 - 20 cm, 20 - 30 cm 30 - 40 cm).

The water samples containing pH, Temperature, Conductivity, TDS, Turbidity, Chloride, Iron, Silica, BOD, COD, DO, Total hardness, Calcium hardness, Magnesium hardness, Alkalinity, Total Alkalinity were collected at the surface of study sites at four stations namely Location - 1 to Location - 4 and sample was collected between 11 A. M. to 1.00 P. M. In these all locations some of them are too much polluted and that locations of water are not suitable for use as drinking or household purposes also, because that location of water containing heavily exceeds of pH, TDS, turbidity, BOD, COD, Mg, Ca, Iron and Chloride that locations are –

Table 2

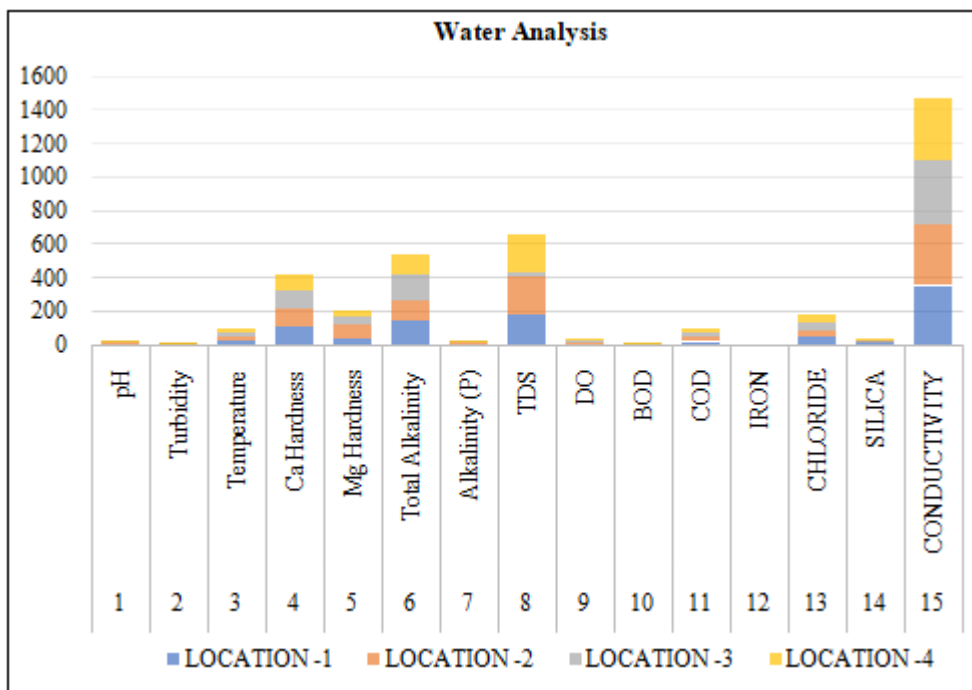
1. Temperature	Highest (40°C) loc.4 Lowest (21 °C) loc.1&4
2. pH	Highest (9.05) loc.2 Lowest (6.54) loc.1&4
3. Conductivity	Highest (481) loc.4 Lowest (205) loc.3
4. Total Hardness	Highest (330) loc.3 Lowest (92) loc.2
5. Calcium Hardness	Highest (110) loc.1 Lowest (63) loc.4
6. Magnesium Hardness	Highest (45) loc.2 Lowest (16) loc.4
7. TDS	Highest (321) loc.4 Lowest (123) loc.1
8. Turbidity	Highest (12.6) loc.1 Lowest (0.9) loc.2
9. Alkalinity (P)	highest (10) loc.1 Lowest (6) loc.2
10. Total Alkalinity	Highest (160) loc.1 Lowest (115) loc.2
11. Chloride	Highest (56) loc.1 Lowest (39.7) loc.2
12. Iron	Highest (0.0148) loc.3 Lowest (0.0017) loc.4
13. Silica	Highest (9.5) loc.1 Lowest (3.94) loc.3
14. BOD	Highest (6.9) loc.3 Lowest (2.1) loc.1
15. COD	highest (35.25) loc.4 Lowest (20) loc.1
16. DO	Highest (8.9) loc.4 Lowest (6.2) loc.1

Table 3

Soil property	Unit	Range		
Soil pH	pH unit	< 6.0 (Acidic)	6.1 - 8.0 (Neutral)	>8.0 (Alkaline)
Electrical conductivity	dSm -	1	2.0 (Injurious)	-
Organic carbon	Percent	0.75	(High)	-
Available nitrogen (N)	kg ha -	1 560	(High)	-
Available phosphorus (P2O5)	kg ha -	1 25	(High)	-
Available potassium (K2O)	kg ha -	1 280	(High)	-
Available sulphur (S)	ppm	30	(High)	-
Available zinc (Zn)	ppm	1.0	(High)	-

Table 4

S. No.	Parameter	Location - 1	Location - 1	Location - 1	Location - 1
1.	pH	6.55	7.50	7.00	6.53
2.	Turbidity	3.88	3.42	3.53	3.7
3.	Temperature	25	24	23	25
4.	Ca Hardness	112	98	108	96
5.	Mg Hardness	39	86	38	42
6.	Total Alkalinity	143	125	146	126
7.	Alkalinity (P)	0	12	8	7
8.	TDS	183	224	23	227
9.	DO	7.5	7.8	8.6	8.7
10.	BOD	2.3	2.4	3.0	3.3
11.	COD	20	24	23	25
12.	IRON	0	0.0098	0.0099	0.0085
13.	Chloride	45.55	39.6	44.64	45.66
14.	Silica	9.4	9.5	8.50	8.86
15.	Conductivity	354	367	373	380



Graph: Showing Results

4. Conclusion

In above study it was found that maximum parameters of water were not under allowable BIS limits. pH, temperature, TDS, turbidity, BOD, COD, DO, Conductivity, Mg, Ca, Ir, Chloride, Alkalinity, total Alkalinity exceeded the BIS limits. The amount of pH, TDS, turbidity, BOD, COD, Mg, Ca, Ir and Chloride was very high and sometimes very low which makes the water unsuitable for use. These all show that the quality of the river water is below the prescribed standards and it is unsuitable for drinking or household purposes without any disinfection process. The soil found here is not too good for agriculture purposes, it needs to be treated with fertilizer application along with disinfectants.

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