

Physico-Chemical Analysis of Soil Samples from Area near Wardha River, Maharashtra, India

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ABSTRACT

An investigation was carried out for characterization of soils of areas near Wardha river. The selected area include villages of Yavatmal, Chandrapur and Wardha district. Standard analytical methods and procedures were followed for analysis of physico-chemical parameters of soils. Total 9 samples of soil from Patala, Kapasi and Pohana were analyzed for pH, Phosphate, hardness, alkalinity, chloride, sulphate, Calcium, Magnesium, and the results were compared with the limits of Indian Standards: 10500.

Keywords : Physico-Chemical, Ph, Phosphate, Potassium, Sulphate, And Chloride, Soil Analysis, Wardha River

I. INTRODUCTION

The soil forms the intermediate zone between the atmosphere and the rock cover of the earth, the lithosphere. It also forms the interface between water bodies (hydrosphere) and the lithosphere and thus forming a part of biosphere¹. The soil may be defined as the uppermost weathered layer of the earth's crust in which are mixed organisms and products of their death and decay. It may also be defined as the part of the earth's crust in which plants are anchored². The soil is a complex organization being made up of some six constituents' namely inorganic matter, organic matter, soil organisms, soil moisture, soil solution and soil air. Roughly, the soil contains 50-60% mineral matter, 25-35% water, 15-25% air and little percentage of organic matter (Chatwal et al, 2005). The soil pollution due to sewage is also very high. Several diseases are inflicted in human beings due to pathogenic forms present in the soil. It is the need of time that we have to study the physico-chemical parameters of soil to know its

quality³. Nine representative samples were collected from various parts of the Patala, Kapasi and Pohana and its physico-chemical analysis have been performed to know its different parameters like pH, Phosphate, Potassium, Total Alkalinity, Total Hardness, Calcium, Magnesium, Sulphate, Chloride, Fluoride.

II. METHODS AND MATERIAL

Nine surface soil samples from 3 different villages besides Wardha River belonging to Yavatmal, Chandrapur and Wardha district of Maharashtra state. All the chemicals used were of GR/AR grade. Standard methods of American Public Health Association (APHA 18th edition) were used for the analysis of samples. Estimation of cations were carried out on Atomic Absorption Spectrometer (Make GBC Australia, Model GBC 932) at RSIC, Nagpur University Nagpur.

III. RESULTS AND DISCUSSION

The values of physicochemical parameters are presented in table 1: -

Table 1 - Soil quality at Kapasi (Ramtirtha) village

Village: Kapasi		Soil Samples			IS: 10500 Limits	
Sr. No.	Parameters	S1	S2	S3	Desirable	Maximum
1	pH	6.8	7.18	7.62	6.5-8.5	6.5-8.5
2	Total Alkalinity	209	374	524	200	600
3	Total Hardness	520.2	559.3	531.2	300	600
4	Potassium	11.8	13.7	18.1	----	----
5	Calcium	183.1	202.2	184.2	75	200
6	Magnesium	14.8	13.2	16.9	30	100
7	Phosphate	74.1	29.3	19.5	----	----
8	Sulphate	47.5	95.1	113.1	200	400
9	Chloride	134.1	123.7	99.5	250	1000
10	Fluoride	3.54	3.24	4.00	0.5-1.5	0.5-1.5

* All parameters in ppm

Table 2 - Soil quality at Pohana village

Village: Pohana		Soil Samples			IS: 10500 Limits	
Sr. No.	Parameters	S1	S2	S3	Desirable	Maximum
1	pH	7.85	7.44	7.45	6.5-8.5	6.5-8.5
2	Total Alkalinity	590	587	585	200	600
3	Total Hardness	95.1	329.3	352.6	300	600
4	Potassium	36.1	23.2	5.1		
5	Calcium	35.5	119.5	125.1	75	200
6	Magnesium	1.2	7.1	9.3	30	100
7	Phosphate	13.9	21.0	23.8		
8	Sulphate	58.1	118.1	77.2	200	400
9	Chloride	82.2	62.4	33.9	250	1000
10	Fluoride	3.22	4.10	3.1	0.5-1.5	0.5-1.5

* All parameters in ppm

Table 3 - Soil quality at Patala village

Village: Patala		Soil Samples			IS: 10500 Limits	
Sr. No.	Parameters	S1	S2	S3	Desirable	Maximum
1	Ph	7.25	7.45	7.50	6.5-8.5	6.5-8.5
2	Total Alkalinity	549	411	464	200	600
3	Total Hardness	391.7	413.4	372.1	300	600
4	Potassium	25.0	7.1	15.1		
5	Calcium	121.3	142.3	125.1	75	200
6	Magnesium	21.1	13.8	14.1	30	100
7	Phosphate	4.2	29.3	60.1		
8	Sulphate	172.1	142.8	113.1	200	400
9	Chloride	162.2	97.1	43.6	250	1000
10	Fluoride	4.33	5.77	5.83	0.5-1.5	0.5-1.5

* All parameters in ppm

Most of the farmers are using excessive chemical fertilizers and the too much dose of such fertilizers in few soils has rendered high values of P and K. The retention of K could also be due the clay minerals formed by chemical weathering of basalts which is the parent material for the soil. Such type of monitoring of soil sample is beneficial to know the concentrations of various parameters present in soil samples. Due to presence of near wardha river suchtypes of soil are superior for the cotton crop. Concentration of sulphate in agriculture soil of different observed area of wardha river less than that of desirable ranges. Due to deficiency of sulphate include yellowing of leaves & stunted growth of crop & delay in crop. From above observation we can suggested that to farmers use desirable amount of sulphate containing fertilizers in their agriculture area.

IV. CONCLUSION

It was observed that different areas of soil had influences on the physicochemical characteristics of the soils. However, application of more labile organic inputs, liming materials and suitable inorganic

fertilizers would be effective for sustainable man-agreement and improving fertility status of the soils.

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