



EVALUATION OF PHYSIC-CHEMICAL PARAMETERS OF BLACK AND WHITE SOIL SAMPLES COLLECTED FROM SOME TAHSILS OF BULDANA DISTRICT

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ABSTRACT

Crop productivity is a main concern in the agriculture field of Vidarbha region. In order to enhance the crop yield it is very important to have awareness about the presence of various nutrients in the soil. The present study deals with the analysis of black and white samples from same area collected from some villages of Malkapur, Nandura and Motala Tahsils. Comparison of different soil samples revealed that white soil is not suitable for the crop.

KEYWORDS: White and black soil, Physico-chemical parameters.

INTRODUCTION

Soil analysis is very important to predict the quality of soil for agriculture. Soil sampling is perhaps the most vital step for any soil analysis.^[1] Soil is an unconsolidated material of the earth's crust in which terrestrial plants grow if water and temperature are adequate with minimum available nutrients.^[2] The heavy metal contents of soil depends on various physico-chemical parameters of soil like P^H , Conductivity, Hardness etc.^[3] In India plant growth in these highly saline-sodic soil is directly affected by high levels of salts mostly sodium chloride. One of the major causes of soil salinisation is evaporation of salty ground water due to shallow water tables.^[4] The soil have organic and inorganic materials which are intimately mixed together by natural processes.^[5] Soil consists of variable layer of mineral and organic material usually biologically active that covers rest of the earth land surface.^[6] The physical and chemical properties of the solid phase result in both marked variability of water contents and a varying degree of resistance to the elimination of moisture,^[7] Soil pollution also leads to deterioration of soil structure, fluctuation of chemical parameters, loss of organic matter contents, loss of soil minerals nutrients such as potassium, sodium, sulphate, phosphate, and nitrate, etc.^[8] The soil condition is an universal medium for plant growth, which supplies essential nutrients to the plants.^[9] The physicochemical properties such as moisture content, Nitrogen as a fertilizer required for the growth of plant.^[10]

The soil pollution due to sewage is a major concern because various diseases are inflicted in human beings due to pathogenic forms present in the soil. So it is very necessary to have study the physico-chemical parameters of soil time to time to know its quality.^[11] Twenty four representative samples of black and white soil were collected from various villages of Nandura, Malkapur and Motala tahsils and its physico-chemical analysis have been performed to know its different parameters.

METHODS AND MATERIALS

The physico-chemical parameters of different soil samples were determined by using standard literature methods. The methods used for analysis shown in table no-1.

Table 1: Methods used for analysis.

Sr.No	Parameter	Method	Instrument
1	colour	Visual detection	-----
2	P ^H	P ^H Metry	Equip-Tronics Digital P ^H Meter Model EQ-610
3	Conductivity	Conductometry	Equip-Tronics Digital conductivity Meter Model EQ-660A
4	Turbidity	Turbidimetry	Equip-Tronic Digital Turbidimeter Model EQ-811
5	Total Hardness	EDTA Titrimetric	Titration assembly
6	Chlorides	AgNO ₃ Titration	Titration assembly
7	Alkalinity	H ₂ SO ₄ Titrimetric	Titration assembly
8	Water holding capacity	Manually	manually and place
9	Sulphate	Titrimetric	Titration assembly
10	Total Dissolve Solids (TDS)		Equip-Tronics Digital TDS Meter
11	Organic Carbon	Gravimetry	Gravimetry by titrimetric

Table 2: Area of Sampling.

Sr. No	Sample	Malkapur Tahsil	Nandura Tahsil	Motala Tahsil
1	S ₁	Datala-B	Chandur-B	Pimpri-B
2	S ₂	Datala-W	Chandur-W	impri-W
3	S ₃	Nimbhari-B	Nandura-B	Adwihir-B
4	S ₄	Nimbhari-W	Nandur-W	Adwihir-W
5	S ₅	Kund-B	Wadner-B	Nipana-B
6	S ₆	Kund-W	Wadner-W	Nipana-W
7	S ₇	Wakodi-B	Khumgaon-B	Shelgaon-B
8	S ₈	Wakodi-W	Khumgaon-W	Shelgaon-W

B = Black W = White

RESULT AND DISCUSSION

The results of physico-chemical analysis of soil from some tahsils of Buldana districts was shown in table no-3,4 and 5.

- Color:** The color of all the soil samples associated with, black, brown, dark and light black and yellowish.
- P^H:** The P^H of the selected soil samples ranges from 5.4 -7.31. The sample S₈ of Motala tahsil was most basic (7.31) and that of sample S₇ of Malkapur tahsil was most acidic (5.4).
- Conductivity:** The conductivity values of all samples were observed between 0.138- 1.03 (mhos/cm).

- Turbidity:** The turbidity value was observed in the range of 16.8- 382.6 NTU. The turbidity for S₅ of Malkapur tahsil and S₈ of Nandura tahsil were exceptional high.
- Alkalinity:** The highest value observed for for S₃ of Nandura tahsil and lowest value observed S₈ of Motala tahsil.
- Total Hardness:** The hardness of all samples ranges from 100 -325ppm.
- Chlorides:** The lowest chlorides content observed for observed for S₁ of Malkapur tahsil and highest content observed S₈ of Nandura tahsil.
- Water holding capacity:** It was observed in the range of 5.94- 27.2 %.
- Total Dissolved Solids:** TDS of all the soil sample was found to be very high which may due the presence of heavy metal contents. The value obtained in the range of 679- 3879 ppm.
- Organic Carbon:** The organic carbon content for Nandura tahsil was very low (0.27-0.47%) as compare to other tahsils (1.0- 4.2%).
- Sulphate:** The sulphate value for white and black soils from selected areas was in the range of 0.04- 2.714ppm.

Table 3: Physicochemical parameters of soil from Malkapur Tahsil.

Sr.No	Parameters	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈
1	Color	Faint black	whitish	Dark black	whitish	Medium black	whitish	Medium black	whitish
2	P ^H	6.5	6.6	6.1	6.5	6.1	5.7	5.4	5.8
3	Conductivity (mhos/cm)	0.180	0.320	0.200	0.650	1.030	0.950	0.860	0.940
4	Turbidity (NTU)	46.2	38.8	163.4	145.6	382.6	79.9	46.9	86.2
5	Alkalinity (PPM)	263	369	470	342	365	243	339	432
6	Total Hardness (PPM)	172	100	108	104	184	196	180	188
7	Chloride(PPM)	100	170	350	210	240	260	210	233
8	Water holding capacity(%)	8.09	10.08	12.21	14.98	12.87	17.75	13.57	14.68
9	TDS(PPM)	3176	3107	3206	3142	3436	3879	3218	3716
10	Organic Carbon (%)	3.5	3.7	3.2	3.7	4.2	2.5	4.0	3.5
11	Sulphate (PPM)	0.57	0.82	0.65	0.57	1.06	0.41	0.65	0.04

B = Black W = White

Table 4: Physicochemical parameters of soil from Nandura Tahsil.

Sr.No	Parameters	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈
1	Color	Black	whitish	Dark black	whitish	Black	whitish	Light black	whitish
2	P ^H	6.44	6.78	6.26	6.94	6.79	6.70	6.00	6.20
3	Conductivity (mhos/cm)	0.838	0.546	0.439	0.628	0.414	0.485	0.542	0.778
4	Turbidity (NTU)	65.9	182.2	164.4	16.8	163.8	208.2	280.6	378.2
5	Alkalinity (PPM)	300	250	200	375	550	430	340	401
6	Total Hardness (PPM)	315	315	100	136	110	125	325	175
7	Chlorides (PPM)	284	142	106.5	390.5	213	266.2	355	443.7
8	Water holding capacity(%)	5.94	24.14	13.12	27.18	23.54	24.92	16.22	11.46
9	TDS(PPM)	2568	4520	3359	3386	1040	2029	1778	1370
10	Organic Carbon(%)	0.38	0.41	0.36	0.41	0.47	0.27	0.44	0.38
11	Sulphate(PPM)	2.714	0.987	1.924	1.645	0.962	1.974	1.538	0.880

B = Black W = White

Table 5: Physicochemical parameters of soil from Motala Tahsil.

Sr.No	Parameters	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈
1	Color	Black	whitish	Dark black	whitish	Black	whitish	Light black	whitish
2	P ^H	6.32	6.35	6.80	6.45	6.71	6.59	6.54	7.31
3	Conductivity (mhos/cm)	0.250	0.138	0.386	0.227	0.276	0.244	0.405	0.550
4	Turbidity (NTU)	167.4	23.8	107.3	71.4	131.3	99.3	332	201
5	Alkalinity (PPM)	500	450	260	475	150	100	550	700
6	Total Hardness (PPM)	192	160	124	188	140	192	144	136
7	Chlorides (PPM)	240	137	170	260	230	328	280	230
8	Water holding capacity(%)	15.0	14.4	23.1	27.2	23.0	14.9	16.0	21.5
9	TDS(PPM)	878	679	1388	850	1176	868	1561	2228
10	Organic Carbon (%)	1.25	1.5	1.75	1.5	1.0	1.5	1.25	1.5
11	Sulphate(PPM)	1.77	0.65	0.82	0.74	0.90	0.41	0.74	0.82

B = Black W = White

CONCLUSION

The present study reveals that the physico-chemical parameters of soil samples showed dissimilar values at different places. This may be attributed due to the irregular distribution of different parameters present in the soil. It is very important to agriculture chemists to study the physico-chemical parameters of soil for plant growth and soil management.

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