



Studies on Some Physicochemical Parameters of Soil Samples in Katol Taluka District Nagpur (MS), India

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Abstract

Soil is a vital component, medium of unconsolidated nutrients and materials, forms the life layer of plants. It is a basic life support components of biosphere. The physicochemical parameters of soil determine their adaptability to cultivation and the level of biological activity that can be supported by the soil. The present work has been carried out to study some parameters of soil samples collected from Katol Taluka District Nagpur. The soil characterization was carried out for the parameters like pH, conductivity, TDS, organic carbon, available nitrate nitrogen, calcium and magnesium. The variation of values were observed in the different parameters due to the soil quality in different places.

Keywords: Parameters, conductivity, tds, organic carbon.

Introduction

Soil is mixture of minerals, organic matter gases, liquids and myriad of micro and macro organisms, that can support plant life. Soil as a general term usually denotes the unconsolidated thin, variable layer of mineral and organic material usually biologically active that covers rest of the earth land surface. Soil properties that are sensitive to changes in the management can be used as indicators.

In India, now a day's large numbers of fertilizers are used instead of manures. Due to this the crop productivity is increases speedily but the quality of soil support decreases. So it becomes essential to analysis the soil parameters. It is a real time to carry out the physicochemical analysis of soil because as with the increasing use of chemical fertilizer to the soil, it is difficult to control the adverse effects of the chemicals fertilizer to the soil, plants, animals and human being^{1,2}.

The status of available micronutrients in the soil and their relationship with various physicochemical properties have been attempted by several investigators. The impacts of industrial pollution on the ground water of Katol Taluka District Nagpur. All samples were collected in summer season. Analysis of soil is carried out for the studies of various parameters like pH, Conductivity, TDS, Organic Carbon, Available Nitrate Nitrogen, Calcium and Magnesium.

Material and Methods

Soil samples S1,S2,S3,S4 and S5 were collected in the depth of 0-30. cm from the surface of soil from Khandala, Ambala, Ladgaon, Fetri and Zunewani villages, which were taken in polythene bag³. All the chemicals and reagents used for

analysis were A.R. grade from S.D Fine and Merck. Methods use for estimation of some parameters^{4,5} are shown in table-1.

Table-1
Methods Use for Estimation of Some Parameters

S.N.	Parameter	Method
1	Colour	By Viewing Soil
2	Moisture	By Weighing
3	pH	pH metry
4	Conductivity	Conductometry
5	Available Nitrate Nitrogen	Titration
6	Alkalinity	Titration
7	Total Dissolved Solid	TDS metry
s8	Organic Carbon	Titration
9	Calcium	Titration
10	Magnesium	Titration

Physicochemical analyses were carried out in the Laboratory of Department of Chemistry, Nabira Mahavidyalaya, Katol District Nagpur, MS, India.

Results and Discussion

Physicochemical parameters of soil samples are presented in table-2.

Colour: Soil samples S1, S2 and S3 are faint black and S4 and S5 are dark black in colour.

Moisture: The moisture content value ranges from 5.80% to 10.25%. It is clear from result sample S4 have highest moisture content than samples S1, S2, S3 and S5.

Table-2
Physicochemical Parameters of Soil Samples

S.N	Soil Parameters	S1	S2	S3	S4	S5	IAS for Soil Analysis ⁶
1	Colour	Faint Black	Faint Black	Faint Black	Dark Black	Dark Black	----
2	Moisture(%)	9.44	8.40	6.52	10.25	5.80	----
3	pH	7.73	7.84	7.90	7.57	7.77	5.8-8.3
4	Conductivity(0.17	0.23	0.21	0.15	0.14	----
5	ANN(Kg/ha)	247.5	257.2	215.04	220.10	235.20	217.6-272
6	Alkalinity(%)	20	25	15	10	30	----
7	TDS	0.36	0.52	0.56	0.50	0.47	<1
8	Organic Carbon(%)	0.75	0.60	0.30	1.20	1.50	----
9	Calcium(ml/100gm)	8.0	6.0	8.0	7.0	9.0	10-30
10	Magnesium(ml/100gm)	6.0	5.0	4.0	3.0	4.0	5-10

(IAS- International Agriculture Standard , ANN- Available Nitrate Nitrogen, TDS- Total Dissolved Solid)

pH: The pH of soil is one of the most important physicochemical parameter. It affects mineral nutrient soil quality and much microorganism activity. The pH was observed in the ranges from 7.5 to 7.9. The samples S1, S4 and S5 are very slightly alkaline and samples S2 and S3 are medium alkaline.

Conductivity: The measurement of conductivity is for measure the current that gives a clear idea of soluble salt present in the soil. Conductivity depends upon the dilution of soil suspension. The conductivity values ranges from 0.14 μ S to 0.23 μ S . Conductivity of sample S5 is less as compared to samples S1, S2, S3 and S4.

Available Nitrate Nitrogen: Available nitrate nitrogen in the soil from 215.04 Kg/hectare to 257.2 Kg/hectare. The soil sample S2 has high nitrate nitrogen as compared to samples S1, S3, S4 and S5.

Alkalinity: Alkalinity was observed in the ranges from 10% to 30%. Alkalinity of sample S4 is less as compared to samples S1, S2, S3 and S5.

Total Dissolved Solid (TDS): TDS values for soil samples ranges from 0.36 to 0.56. Soil sample S1 has lowest TDS as compared to S2, S3, S4 and S5.

Organic Carbon: Organic carbon is the index for nitrogen content in the soil. The source of organic carbon in the cultivated soil included crop residue, animal manure, cover crops ,green manure and organic fertilizer etc. Organic carbon values ranges from 0.3% to 1.5%. Organic carbon of sample S5 is high as compared to samples S1,S2,S3and S4.

Calcium: Calcium ranges from 6 ml/100gm to 9 ml/100gm. Soil sample S5 have high calcium content as compared to samples S1, S2, S3 and S4.

Magnesium: Magnesium available to plants as the ions Mg^{2+} . Magnesium content in the soil samples ranges from 3 ml/100gm to 6 ml/100gm. Sample S4 contains less amount of magnesium.

Conclusion

Study of physicochemical parameters is important to agricultural chemists for plants growth and soil management. It is concluded from the data, conductivity of all soil samples is found to be very less. Magnesium and calcium content in all soil samples are in lower amount so fertilizers containing magnesium and calcium are added for proper growth and development of the crops.

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