Studies of the physicochemical parameters of soil samples

Kiran G. Chaudhari

Department of Chemistry, Arts and Science College, Bhalod , Tal. Yawal Dist. Jalgaon (MS) India
_____

ABSTRACT

In the present investigation the physicochemical study of soil is based on various parameters like total Organic Carbon, Nitrogen (N), Phosphorus (P_2O_5), Potassium (K_2O), pH and Conductivity. This study leads us to the conclusion of the nutrient's quantity present in soil of Bhusawal, District Jalgaon (Maharashtra). Results show that all the eight selected places of Bhusawal have medium or high minerals content. In order to study the effect of phosphate fertilizer, phosphorus, and application of nitrogen to increase percentage yield of crops. This information will help farmers to solve the problems related to soil nutrients, amount of which fertilizers to be used to increase the yield of crops.

Key words: Physicochemical, Conductivity, Organic Carbon
_____

INTRODUCTION

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 study of parameters is important to agricultural chemists for plants growth and soil management. [1-2]. A collection of soil samples from eight villages of Bhusawal, Jalgaon District,(S_1 Satare,S_2 Duskheda,S_3 Kandari,S_4 Kinhi ,S_5 Fekri,S_6 Sakri, S_7 Sakagaon,S_8 Kaswa), which represent soils of that village. The soil samples were collected by standard procedure and collected in polythene bags. All the samples were collected in summer season. In laboratory these samples were analyzed to measure various chemical parameters by standard methods. Analysis of soil is carried out for the studies of various parameters like total Organic Carbon, Nitrogen (N), Phosphorus (P_2O_5) and Potassium [K_2O]. The pH, conductivity and estimations of Mg^{2+}, Ca^{2+}, K^+ , HCO_3-, PO_4^-, NO_3. % of soil was studied. The fertility of the soil depends on the concentration of N, P, K, organic and inorganic materials, conductivity. The physicochemical properties such as moisture content, specific gravity Nitrogen as a fertilizer required for the growth of plant. Potassium is used for flowering purpose, it is also required for building of protein, photosynthesis, fruit quality and reduction of diseases and phosphate is used for growth of roots in plants. Calcium is an essential part of plant cell wall, which provides normal transport and retention of other elements. [3-6].

MATERIALS AND METHODS

All the chemicals and reagents used for analysis, they are A R grade from S. d. Fine and Sigma chemicals, Mumbai. Analysis of physicochemical parameters of the soil samples were suspended in distilled water (1:4 w/v) and allowed to settle down the particles. The pH of the suspension was determined using pH meter (Equiptronics, India). Electrical conductivity of the soil was determined in the filtrate of the water extract using Conductivity meter. % Organic carbon (OC) content was determined by adopting chromic acid wet digestion method as standard procedure of Walkley and Black method using diphenylamine indicator, available nitrogen was estimated by alkaline

246

_____

permanganate method, available phosphorus determined by volumetric method [7-14]. Available potassium content in the soil was determined by using turbiditimetric methods, calcium can be determined by titration with standard $KMnO_4$ solution, magnesium can be determined by precipitation in alkaline medium as magnesium ammonium phosphate. Carbonate in soil was determined by rapid titration method using bromothymol blue indicator. [15-20].

RESULTS AND DISCUSSION

Physical chemical properties of soil samples was studied, all the samples are black gray in color and have unpleasant smell. The pH of soil is one of the most important physicochemical parameter. It affects mineral nutrient soil quality and much microorganism activity. The pH range of 6.8 to 8.0 has been recommended optimum for plants growth, the pH of soil samples shows variation 6.9 to 8.5, the above 7.5 value of pH shows basic nature. These values are shown in table no 1.

Table 1. Show physicochemical parameter of soil samples from villages of Bhusawal

Sr. No	Samples	S_1	S_2	S_3	S4	S_5	S_6	S_7	S_8
1	pH	7.1	6.9	7.6	7.2	7.8	7.7	8.2	8.5
2	Conductivity (M mhos)	0.89	0.08	1.09	1.15	1.11	1.13	1.06	1.05
3	%C(OC)	0.43	0.49	0.47	0.51	0.59	0.58	0.41	0.59
4	%N	0.038	0.036	0.048	0.046	0.049	0.043	0.040	0.046
5	%P	0.026	0.034	0.028	0.023	0.036	0.033	0.029	0.035
6	%K	0.89	0.93	0.87	1.11	1.17	1.23	1.39	1.23
7	%Ca	1.14	0.94	1.32	1.12	1.35	3.38	1.78	1.45
8	%Mg	1.12	1.34	1.08	1.23	0.91	1.39	1.24	2.65

The Conductivity study of soil samples shows variation in conductivity values between 0.08 mhos to 1.15 mhos this value suggest normal soil. Percentage of carbon varies from 0.43 to 0.59 also shows normal soil. Percentage of N, P and K are also in normal range. The percentage of Calcium varies from 0.94 to 3.38 (normal range of calcium is 0.98-2.45% by weight) in sample S_6 the percentage of Ca is (3.38% by weight) abnormal. The percentage of magnesium varies from 0.91 to 2.65% by weight, the normal percentage of magnesium was 1.20 to 2.00% by weight, and in sample S_8 we observed 2.65% of Mg by weight which is abnormal.

CONCLUSION

The physicochemical study of parameters is important to agricultural chemists for plants growth and soil management. A physicochemical studies of soil samples from eight places of Bhusawal, shows that all the soil parameters conductivity, pH %Ca, % Mg, %N, %P, %K and % carbon are normal range. These studies give information about nature of soil, present nutrient in soil, according to this information farmer arrange the amount of which fertilizers and nutrients needed to soil for increase the percentage yield of crops.

REFERENCES

[1] L Jaishree; Somwanshi; SK Akuskarint; Int.J.chem.Sci.**2008**, 6(1), 255-261.
[2] K Kanimozhi; A Panneerselvam; *Archives of Applied Science Research.* **2011**, 3 (2), 525-536.
[3]AK Gupta; MLVarshaney; Practical *Manual for Agricultural Chemistry. Kalyani Publisher,* **1994,** 3-26.
[4]NN Garba; A.Isma'lla; UK Asma; ZN Garba; B.I Tijjni,; *European Journal of Applied Engineering and Scientific Research.*, **2013**, 2 (2), 23-27.
[5]KP Kordlaghari; SN Sisakht; A. Saleh; *Annals of Biological Research.*, **2013,** 4 (3), 105-108.
[6]KK Borah;, B.Bhuyan; HP Sharma*; Archives of Applied Science Research.*, **2009**, 1 (2), 159-164.
[7]I.Ifenna; LC.Osuji; *Archives of Applied Science Research.*,**2013**, 5 (3), 184-192.
[8]AF Aiyesanmi; AE Okoronkwo,; OM Sunday; *Archives of Applied Science Research,*, **2012**, 4 (1), 360-371.
[9]M C Onojake; LC Osuji; *Archives of Applied Science Research.* **2012**, 4 (1), 8-58.
[10]CC Trasar; MC Leiros; S Seoane; F. Gilsotres; *Soil Biol. Biochem.*, **2008**, 1, 301-307.

_____

[11] K Rajendren; R Veeraputhiran; *Agric. Rev.*, **2001**, 22(l), 68-70.

[12]MM Lakdawala; D H Patel; *Der Chemica Sinica,*, **2013**, 4(4), 73-77.

[13]NS Sonawane; CP Sawant;, RV Patil; *Archives of Applied Science Research.*, **2013**, 5 (2), 294-298.

[14] S Jain; A Singh; *Int.J.chem.Sci.***2008**, 6(1), 80-86.

[15]S.Velmurugan; R.Govindaraj; B.Gokulakumar; S Ravi1; *Asian Journal of Plant Science and Research*, **2012**, 2 (4), 473-477.

[16]PK. Borah; S Chetry; D K. Sharma; P M. Saikia; *Der Chemica Sinica, 2012*, 3(4),834-840.

[19]NL Edwin-Wosu; *European Journal of Experimental Biology*, **2013**, 3(3), 11-17.

[20] P Prabhu; U Balasubramnian; *Advances in Applied Science Research, 2012*, 3 (4), 2103-2107.