Physico-Chemical Analysis of Soil of Phaltan Tahsil In Satara District From Maharashtra(India)

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ABSTRACT: *Soil is natural body of mineral and organic material. It serves as more reliable index for productivity. In the present study, ten samples are collected from different places of Phaltan Tahasil and physico-chemical parameters like pH, electrical conductance, organic carbon, nitrogen, phosphorous and potassium were analyzed in the month of January 2017. pH indicates that almost all the sample soil are alkaline. The concentration of organic carbon and nitrogen are below the moderate limit. While concentration of phosphorous and potassium is found to be moderate and greater than moderate limit.*
Keywords: physico - chemical analysis of soil of Phaltan Tahasil.

I.   INTRODUCTION

The soil texture plays an important role in productivity. The soil texture depends upon constructive and destructive process of soil. In the destructive process, there is loss of more soluble and volatile compounds. While in the constructive process a new chemical compounds are formed between the mineral and organic matter. Therefore it is necessary to carry out the soil analysis. Also in Indian agriculture, there is cultivation of rice, wheat, sugarcane, pulses and vegetables. Therefore soil analysis is the way to determine the available nutrient status. In the soil and from that we can develop specific fertilizer recommendation.

Bell and Dell [1] have showed that deficiency of nutrients has become measure constraint to productivity and stability of soil. In the Phaltan Tahasil main crops are sugarcane, wheat, Jawar, Bajara and different types of vegetables. The certain external factures control plant growth, air temperature, light, mechanical support nutrients and water. Plants have elements for their growth and completion of life cycle. These elements includes carbon, hydrogen, oxygen, nitrogen, Phosphorous, potassium etc. [2] The fertility of the soil depends upon concentration of N, P, K, organic and inorganic material.

II.   MATERIAL AND METHODS

The soil samples from different villages of Phaltan Tahasil were collected at surface level – 0 to 15 cm in depth. The collected samples were air dried and sieved into course and fine fractions. The parameter like pH, electrical conductance, organic carbon, nitrogen, phosphorous and potassium were analyzed. The pH meter of model L/11/L 1610, Elicomake was used for the determination of pH the conductivity meter model CM 180, Elicomake was used to measure the electrical conductance. Soil organic carbon was measured by wet digestion method (Walkley, 1947) [3] Nitrogen was measured by method stipulated by APHA (1995) and alkaline kmno4 method [4] The available phosphorous was determined by Olsen's method described as in which the 2.5 gm soil sample is taken into 100 ml conical flask and 50 ml bicarbonate extractant was added into it. The 1 gm activated carbon was added and sample was shaken for 30 minutes. Then it is filtered blue color was observed after 10 minutes on the spectrophotometer at 660 nm wavelength, after setting the instrument to zero with blank prepared similarly without soil. [11] Available potassium was determined by flame photometer in which 5.0 gm of soil sample was taken into conical flask and 25 ml of ammonium acetate extractant was added into it. The mixture was shaken and filtered. The filtrate was used to determine the potassium by flame photometer. [10]

III.   RESULT AND DISCUSSION

Physico-chemical soil analysis data of various soil samples of Phaltan Tahasil is shown in table number 1
pH: The pH values vary in the range of 6.7 to 9.2. It indicates that measure samples are alkaline and a few are highly alkaline. In case of high alkalinity the solubility of minerals decreases, which creates nutrient deficiencies in the soil. [5][6].

Electrical conductivity: EC gives concentration of soluble salts These values ranges 0.1 to 0.23 mmhos/cm. All these values below the 0.4 m.mhos/cm. Hence, soil is less saline [5]

Table No-1

Sample no.	Name of village	pH	EC in m mhos/cm	OC in %	N Kg/hect	P Kg/hect	K Kg/hect
1	sakharwadi	6.7	0.23	0.395	255	49.3	435
2	Nandal	6.9	0.14	0.595	195	58	360
3	Kalaj	6.8	0.22	0.49	302	28	503
4	Chaudharwadi	7.2	0.26	0.33	355	73	322
5	Tardagaon	8.7	0.12	0.535	167	44	137
6	Rajale	9.2	0.07	0.3	170	60	242
7	Barad	8.9	0.08	0.38	135	81	132
8	Takalwadi	8.6	0.1	0.26	180	33	538
9	Saswad	8.2	0.09	0.20	151	22	204
10	Vidany	8.7	0.12	0.23	217	18	178

Organic carbon: The OC values ranges from 0.20 % to 0.595 %. The organic soil matter includes all the dead plant material and dead animals. The observed OC values are in moderate limit. The values higher than 0.6 damages to the sensitive plants. [7]

Nitrogen : The available Nitrogen was found to be in the range 135 Kg/hect to 355 Kg/hect. The medium range was 281 Kg/hect to 420 Kg/hect. In many of the samples it has been found that available Nitrogen values below the 281 Kg/hect. This might be due to higher range of mineralization. It is because of high temperature zone and loss of Nitrogen in the form of ammonia as as the soils are calcareous. [8]

Phosphorous : The available phosphorous values ranges in between 18 Kg/hect to 81 Kg/hect. It indicates that a few samples have value below the moderate range but measure samples shows high values. The high values might be due to excessive use of Phosphorous fertilizers. [8]

Potassium : Available potassium values ranges in between 132 Kg/hect to 558 Kg/hect. It also indicates that majority of these values higher than moderate limit. It might be due to excessive use of Potash fertilizer. The higher values causes' neutral to acidic soil and it leads to water pollution, even though plant Nitrogen is adequate. It is due to anthropogenic activities. [10]

IV.   CONCLUSION

It can be concluded from present study that the soil is deficient with EC, OC and N values and soil is enriched with pH, P and K values. To overcome the Nitrogen deficiency it is suggested to use the Nitrogenous fertilizer in the proper proportion. In order to increase the percentage of OC, it is suggested to use the compost. While to decrease the concentration of P and K, it is suggested to avoid the excessive use of Phosphorous and Potassic fertilizer.

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