

Nutrient Analysis of Soil from Nanded District, Maharashtra

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Abstract: *The analysis of soil nutrient is done in order to measure the nutrient that is present in the soil and it provides all the necessary information that is required in order to set the target of nutrient application. It also allows the detection and monitoring of the changes in the parameters of soil. In the present study it was preferred to investigate the soil samples for its physico-chemical analysis of some parameters; fifteen representative samples were obtained and analyzed for its pH, EC, Nitrogen, Phosphorus, Potassium & Carbon.*

Keywords: Soil analysis, Physico-Chemical, Soil nutrient

1. 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 biosphere. 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 anchored. 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). Soil fertility is one of the important factors controlling yield of the crops soil characterization in relation to evaluation of fertility status of the soil of an area or region is an important aspects in context of sustainable agricultural production because of imbalanced and inadequate fertilizer use couples with low efficiency of other inputs, the production efficiency of chemical fertilizer nutrients has declined tremendously under intensive agriculture in recent years (Yadav and Meena, 2009). Due to these in view and also lack of information on nutrients status to identify the emerging nutrient deficiency and to know the quality of soil, therefore Fifteen representative samples were collected to investigate the soil samples for its physico chemical analysis of some parameters like PH, Electrical conductivity, Nitrogen, Phosphorus, Potassium, Carbon in the soil from Nanded district.

2. Material and Methods

Nanded district lies in the eastern part of Maharashtra state as well as the eastern portion of marathwada region which corresponds to Aurangabad division. Total fifteen representative soil samples were collected in the depth of 0-20 cm from the surface of soil from different villages in Nanded area in the year 2020. The soil samples were preserved in polythene bags for further analysis. The chemicals and reagents used for analysis were of A.R. grade from S.D Fine and Merck. pH values were determined using Equiptronics pH- meter. For this 20 g soil sample was mixed

with 40 ml distilled water in 1: 2 ratio. The suspension was stirred occasionally with glass rod for 30 minutes and left for one hour. The combine electrode was inserted into supernatant and pH was recorded. pH value as a measure of the hydrogen ion activity of the soil water system and The most significant property of soil, Its effects on all other parameters of soil. Therefore, pH is considered while analyzing any kind of soil. If the pH is less than 6 then it is said to be an acidic soil, the pH range from 6-8.5 it's a normal soil and greater than 8.5 then it is said to be alkaline soil. Electrical conductivity is also a very important property of the soil; it is used to check the quality of the soil. It is a measure of ions present in solution The electrical conductivity of a soil solution increases with the increased concentration of ions. Electrical conductivity is a very quick, simple and inexpensive method to check health of soils. The electrical conductivity of a soil samples was determined on an Equiptronics digital electrical conductivity bridge for which 20g soil was added in 40ml distilled water. The suspension was stirred intermittently for half an hour and kept it for 30 minutes without any disturbances for complete dissolution of soluble salts. The soil was allowed to settle down and then conductivity cell was inserted in solution to take the reading to record the EC values.

Organic matter is useful in supplying nutrients and water to the plants and also provides good physical conditions to the plants. The quantity of organic carbon in the soil was estimated by using modified Walkey-black method (Walkey and black, 1934). 1g finely ground dry soil sample was passed through 0.5mm sieve without loss and was taken into 500ml conical flask to this 10ml of 1N $K_2Cr_2O_7$ and 20ml con. H_2SO_4 were added and the contents were shaken for a minute and allowed to set aside for exactly for 30 minutes and then 200ml distilled water, 10ml phosphoric acid and 1ml diphenylamine indicator were added. The solution was titrated against standard ferrous ammonium sulphate (Mohr's salt) till colour changes from blue violet to green. The blank titration was also carried without soil. Nitrogen occurs in several forms: Nitrate(NO_3^-) and nitrite(NO_2^-) anions, ammonium(NH_4^+) and organic compounds. For high production, the application of N fertilizers can be done. This can be determined after the estimation of soil Nitrogen content by Potassium permanganate method (Hussain and Malik, 1985) Phosphorus is a most important element present

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in every living cell. It is one of the most important micronutrient essential for plant growth. Phosphorus most often limits nutrients remains present in plant nuclei and act as an energy storage. Available Phosphorus is estimated by Sodium bicarbonate method which is the best method for acidic, neutral and alkaline soils (Pansu and Gautheyrou, 2006). Potassium plays an important role in different physiological processes of plants, it is one of the important element for the development of the plant the available Potassium is estimated by Flame photometric method (Pansu and Gautheyrou, 2006).

3. Results and Discussion

The results of physic-chemical parameters and available nutrient status of soil samples from Nanded district are presented in table 1. The color of soil sample was observed visually and it was found to be black for all the samples. The pH of soil ranging from 7.2 to 7.90. The values of pH showed that they lie in the alkaline side of the pH scale. The pH range of 6 to 8 is useful for the growth of plants. Electric conductivity of soil ranging from 0.20 to 0.50 dsm-1 with average value of 0.30 dsm-1. The value of conductivity is the measure of ions present in the sample. The conductivity values can vary with the chemical properties of soil, if the soil is contaminated by chemicals.

The soil fertility status exhibits the status of different soils with regard to amount and availability of nutrients essential for plant growth. The available nitrogen content of all the soil samples (Table 1) were very low to low in range varied from 90.20 to 154.40 kg/ha. The available phosphorus content was low to medium ranging from 4.10 to 15.20 kg/ha. The content of available K in all the soil samples were medium to high varied from 183.10 to 488.30 kg/ha. The organic carbon content was ranging from 0.4 to 0.6 %. The high content of organic carbon might be due to addition of organic matter through either artificially or naturally and its subsequent decomposition. These results were in confirmatory with results reported by Waikar et al. (2004).

Table 1: Soil physico-chemical properties and available nutrient status of the study area

Sample no.	pH	EC dSm ⁻¹	Nitrogen Kg/ha	Phosphorus Kg/ha	Potassium Kg/ha	Carbon (%)
1	7.5	0.5	90.2	4.1	185.1	0.4
2	7.2	0.2	100.5	5.0	190.3	0.5
3	7.4	0.3	112.3	8.2	251.3	0.5
4	7.4	0.4	154.4	14.1	430.2	0.4
5	7.3	0.6	125.5	4.0	183.1	0.5
6	7.5	0.2	132.5	5.2	189.3	0.4
7	7.6	0.3	144.3	7.1	224.2	0.4
8	7.5	0.4	111.2	9.0	375.2	0.5
9	7.5	0.5	105.2	11.1	488.3	0.4
10	7.3	0.5	116.3	15.2	356.2	0.3
11	7.8	0.4	109.5	5.4	189.2	0.5
12	7.4	0.5	88.4	4.3	185.2	0.6
13	7.9	0.2	117.2	7.2	210.4	0.4
14	7.5	0.5	124.4	8.2	226.6	0.5
15	7.6	0.4	98.2	10.3	290.4	0.4

4. Conclusion

It was observed that soil samples from different areas of Nanded district had influences on the physicochemical characteristics of the soils. However, application of more labile organic inputs, liming materials and suitable inorganic fertilizers (N-P-K) would be effective for sustainable management and improving fertility status of the soils. Such type of monitoring of soil sample is beneficial to know the concentrations of various parameters present in soil samples.

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