PHYSICOCHEMICAL PARAMETER AND STATISTICAL STUDIES OF AGRICULTURE SOIL FROM EASTERN REGION OF YAVATMAL DISTRICT

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ABSTRACT:

Quality of soil is an important component of our agriculture farming. The physico-chemical study of soil is very significant because both physical and chemical properties which bear upon the soil productivity. The quality of soil and availability of water are essential factor for the good yield of the crop. Hence it is necessary to analyze some quality parameters of the soil to determine the quality of soil. The present work has been carried out to study some parameters of soil samples collected from eastern region of Yavatmal District. 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 observed in the different parameters due to the soil quality in different agriculture farm.

Keywords:

Parameters, Conductivity, TDS, Organic carbon.

INTRODUCTION:

Soil is a material composition of five ingredients minerals, soil organic matter, living organisms, gas, and water. Assessment of Soil Physico-chemical Propertiesin Sugarcane Cultivation Areas of Navsari District, Gujarat[1]. Assessment of Physico-chemical Properties of Soil from Different Blocks of West Godavari District, Andhra Pradesh[2]. The difficulties and potential open doors that the local area faces, adding to a nuanced viewpoint on the district's general improvement[3]. Commonsense applications across different spaces, including geological examinations, verifiable exploration, metropolitan preparation, rural turn of events, and local area Physicochemical soil investigation includes a scope of techniques pointed toward evaluating the physical and compound properties of soil[4]. The review starts by gathering soil tests from different ranches across the locale, taking into account factors, for example, geology, land use, and yield types. Micronutrients, including iron (Fe), zinc (Zn), and manganese (Mn), are fundamental in more modest amounts yet are similarly basic for compound capabilities, chlorophyll amalgamation, and in general plant[5]. Evaluating microbial action is fundamental for understanding supplement cycling, decay cycles, and in general soil organic wellbeing[6]. In this reseach paper the used soil is in Eastern Yavatmal region, this soil is not getting polluted due to no industrial waste problem in this region. All samples were collected in summer season. Analysis of soil in carried out for the studies of various parameters like pH. Conductivity, TDS, Organic Carbon, Available Nitrate Nitrogen, Calcium and Magnesium.

MATERIAL AND METHODOLOGY: The soil samples were collected from different village of Eastern Yavatmal region in state Maharashtra at the time of month Jane-Feb 2024 from different sampling stations. Soil samples V_1, V_2, V_3 and V_4 were collected in the depth of 0-30 cm from the surface of soil from Akoli, Borgaon, Tatapur, Belori villages were collected for analysis[7] The soil samples were preserved in polythene bags for further analysis[8]. The chemicals and reagents used for analysis were of A. R. grade. as shown in the Table 1.

Table 1: Soil samples from different sampling stations

Name of Village	Akoli	Borgaon	Tatapur	Belori
Sample Site	V_1	V_2	V_3	V_4

Method used for Estimation of parameters physicochemical analysis were carried out in the laboratory of department of chemistry, collage of Engineering & Technology District, Akola, (M.S), India, are shown in the Table 2

Table 2: Method used 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
8	Organic Carbon	Titration
9	Calcium	Titration
10	Magnesium	Titration

RESULT AND DISCUSSION:

In this agriculture soil the Physicochemical parameters just like a Colour, Moisture, pH, Conductivity, Alkality, Total Dissolved Solid, Organic Carbon, Calcium and Magnesium of soil samples[9,10] are presented in Table 3.

Colour: In the earth soil there is lot of colour soil sample but some presented Soil samples are V_1, V_2, V_3 and V_4 are Brown in colour.

Moisture: The moisture content value ranges from 17.73% to 20.10% It is clear from result sample V_3 have highest moisture content than samples V_1, V_2, V_3, V_4 and V_5.

Table 3: Physicochemical parameters of Soil sample

S.N.	Soil Parameters	V_1	V_2	V_3	V_4	IAS Soil Analysis
1	Colour	Black	Black	Black	Black	Visual Assessment
2	Moisture (%)	18.8	18.03	19.86	19.02	17-30% Per Crop
3	pH	7.74	7.92	7.51	7.22	7.0 -8
4	Conductivity	0.48	0.33	0.17	0.35	< 0.8 Ds/M
5	ANN (kg/ha)	390	402	292	412	Variable
6	Alkalinity (%)	215	193	364	565	Variable
7	TDS	209	274	245	289	< 1000 PPM
8	Organic Carbon (%)	0.15	0.12	0.13	0.28	0.1-3%
9	Calcium (ml/100gm)	415	419	407	422	Variable
10	Magnesium (mg/100gm)	08	07	06	09	Variable

[IAS- Agriculture Standard, ANN-Available Nitrate Nitrofen, TDS-Total Dissolve Solid.]

pH: The pH of soil is one of the most important physicochemical Parameter. It affects minerals nutrient soil quality and much microorganism activity. The pH was observed in the ranges from 6.9 to 8.2 The samples V_1 and V_3 are very slightly alkaline and samples V_2 and V_4 are medium alkaline.

Conductivity: The measurement of conductivity is for measure the current that given a clear idea of soluble salt present in the soil. conductivity depends upon the dilution of soil suspension. The

conductivity vales range from 0.18 μS to 0.46 μS. Conductivity of sample V_3 is less as compared to samples V_1, V_2 and V_4.

Available Nitrate Nitrogen: Available nitrate nitrogen in the soil from 290 to 410 kg/hectare. The soil sample V_4 has high nitrate nitrogen as compared to samples V_1, V_2, V_3.

Alkalinity: Alkalinity was observed in the ranges from 198% to 561% Alkalinity of sample V_2 is less as compare to samples V_1, V_3 and V_4.

Total Dissolved Solid (TDS): TDS values for soll sample ranges from 209 to 376 Soil sample V_1 has lowest TDS as compared to V_2, V_3, and V_4.

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 range from 0.16% to 0.28% Organic carbon of sample V_4, is high as compared to samples V_1, V_2, and V_3.

Calcium: Calcium ranges from 400ml/100gm to 420ml/100gm Soil sample V_4 have high calcium content as compared to samples V_1, V_2, and V_3.

Magnesium: Magnesium available to plants as the ions Mg^{2+} it content in the soil samples ranges from 8ml/100gm to 42ml/100gm. Sample V_1, contains less amount of magnesium

CONCLUSION:

This soil is better for some plant. It is important to agricultural chemists for plant growth and soil management. Magnesium and calcium content in the soil sample are in lower amount so fertilizers containing magnesium and calcium are added for the proper growth and development of the crop. On the basis of this study farmers can be get various idea about the fertilizers and nutrients needed to soil for increase the percentage yield of crops. From all conclusion physicochemical analysis of soil different values for various farms.

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