

ASSESSMENT OF SOIL NUTRIENTS AND PHYSICO-CHEMICAL PARAMETERS IN THE REGION OF HIWARKHED VILLAGE OF AMRAVATI DISTRICT (MAHARASHTRA STATE), INDIA

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ABSTRACT

Soil sampling is perhaps the most vital step for any analysis since a very small fraction of the huge soil mass of field is used to analysis. Five samples were collected from the study area. (Farmers field). Hiwarkhed village of Amravati District (Maharashtra State), India was selected for the present investigation. The nutrients and physicochemical parameters of the soil like soil moisture, pH, Organic Carbon, Nitrogen, Phosphorous, Potassium, Copper, Magnesium, Electric Conductivity, Calcium, Alkalinity, CaCO₃ and Zinc were analyzed in the month of February 2016. It was found that there was a marked variation in physicochemical parameters of various soil samples in different farmer's field.

Keywords: Soil testing, Parameters, Hiwarkhed Village, Nutrients.

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INTRODUCTION

The quality and health of soil determine agricultural sustainability and environmental quality which jointly determines plant, animal and human health. The status of available micronutrients in soils and their relationship with various physico-chemical properties have been attempted by several investigators^{1,2}. Khadke *et.al.* Reported soil analysis and its environmental impact on Nanded city of Maharashtra State.³The impacts of industrial pollution on the ground water soil and plant have also been reported in our country and abroad⁴. Perveen *et al.*⁵ have studied micronutrient status of soils and their relationship with various physico-chemical properties. Soil testing must provide sufficient information on trace elements available in the virgin soil there by lead to a strategy of maintaining the health of the soil over many years, and making up the depletion by adding micro nutrient, to the soil by biological or mineral application Ca and Mg are very important elements for plants life. It is the most abundant mineral in soil. These are, however, required in comparatively small amount and are known as secondary nutrients⁶.

Soil Testing is well recognized as a sound scientific tool to assess inherent power of soil to supply plant nutrients. Five samples were collected from the Khedi village (Farmers Field) of Wraud Taluka in Amravati district belongs to (Maharashtra State),⁷Mehraj A. Sheikh and Munesh Kumar studied the soils of two forest types i.e., oak (*Quercusleucotrichophora* A. Camus) and pine (*Pinusroxburghii* Sargent) were analyzed for physico-chemical properties and economic analysis⁸. Studies on soils location Rajura Bazar, in Warud Tehsil in Amravati parameters like soil moisture, pH, EC, Carbon, Calcium carbonate, TDS, Magnesium, Calcium, Nitrogen, Copper, Potassium and Phosphorous content, were analyzed. The values of pH indicated that all samples of the soils are alkaline, all samples were containing moderate amount of available micronutrients.⁹Physico-Chemical characteristic is based on various parameter like pH, Conductivity, Total Organic carbon available, available Phosphorus (P₂O₅) and available Potassium (K₂O). This study lead us to the conclusion of the nutrient's quantity of soil of Shehra Taluka, Dist.

Panchmahals, Gujarat State. Soil sampling is the most vital step for anisole analysis. Results show that overage all the villages of this Shehra Taluka have various parameters like EC, PH, OC, P, K.¹⁰Nutrients Characteristics and Physico-Chemical Assessment of soil In Zataziri Village of Warud Tehsil, Amravati District¹¹. Soil physico-chemical assessment and the influence of capacity of cation exchange of the soil in and around Chennai.¹²

Considerable research work has been done regarding the study of Nutrients and Physico-Chemical assessment of various types of soil in Maharashtra as well as in India¹³⁻¹⁵but the investigation of nutrients and parameters of Soil of Hiwarkhed village in Amravati district in Maharashtra was still lacking.

EXPERIMENTAL

Study Area

Hiwarkhed is a small village in Morshi tehsil of Amravati district in Maharashtra State. This area is known for oranges and Turmeric, The sources of water for this area is of mainly well and it is located at border of Maharashtra and Madhya Pradesh

Collection of Samples

Soil samples were collected randomly at 0 to 15 cm and 15 to 30 cm depths with five plots (field), five samples from each plot (field) respectively, in well sterilized polythene pouches. Soil sample were collected from following Farmers fields.

- i. Sample 1 (HAH-1) was collected from Shri Ajabrao K. Holey field.
- ii. Sample 2 (HAH-2) was collected from Shri Dinesh S. Holey field.
- iii. Sample 3 (HAH-3) was collected from Shri. Kisanrao N. Holey field.
- iv. Sample 4 (HAH-4) was collected from Shri. Kisanrao N. Holey field.
- v. Sample 5 (HAH-5) was collected from Shri. Kisanrao N. Holey field.

Table-1: Nutrients and Physico-Chemical assessment of Soil Samples.

Analysis of Parameters.						
S.No.	Parameters	HAH-1	HAH-2	HAH-3	HAH-4	HAH-5
1	Color	Black	Brownish	Greyish	Black	Black
2	Moisture (%)	2.35	3.00	3.17	3.17	3.35
3	pH	7.71	7.68	7.78	7.58	7.76
4	Organic Carbon (%)	0.77	0.67	0.96	1.19	1.38
5	Nitrogen	539.0	469.0	672.0	812.0	966.0
6	Phosphorous (Kg/ Hect)	65.32	15.99	21.03	10.23	170.11
7	Potassium (Kg/Hect)	728.99	430.89	1052.83	985.08	1371.26
8	Copper (ppm)	4.7	3.98	4.14	8.04	7.0
9	Magnesium (%)	5.12	2.24	7.04	6.72	8.64
10	Electric Conductivity(Ms)	0.18	0.15	0.16	0.23	0.25
11	Calcium (%)	41.2	44.8	42.0	43.6	47.2
12	Alkalinity (mg / l)	150	300	250	200	450
13	CaCO ₃ (%))	12.25	13.25	4.25	2.5	5.0
14	Zinc (ppm)	1.38	0.40	0.68	0.5	4.48

Determination of Physical Parameters

Reagents uses for this research work were AR grade and chemicals other than reagent are LR grade manufactured by S.D. fine, LOBA and Merck. The soil sample were dried for about 24 hr. and grinded more finely. In this work about fourteen physico-chemical parameters and nutrients of five soil samples were determined and results were also recorded. During collection, temperature of the sample was recorded.

Following methods were used for estimation of various parameters are:

- i. Determination of Moisture: by Weighting Method.
- ii. Determination of pH: by Digital pH Meter
- iii. Determination of Electric Conductance: by Conductometer
- iv. Determination of Organic Carbon: by Titration Method
- v. Determination of Magnesium (Mg): by EDTA Titration Method
- vi. Determination of Calcium (Ca): by Titration Method.
- vii. Determination of (Total Dissolved Solid) TDS: by TDS METER.
- viii. Determination of Copper (Cu): by Atomic Adsorption Spectroscopy.
- ix. Determination of Nitrogen (N): by Titration Method
- x. Determination of Phosphorous (P): by Titration Method
- xi. Determination of Potassium (K): by Flame Photometry
- xii. Determination of Calcium Carbonate (CaCO₃): by Titration Method
- xiii. Determination of Color of Soil: by Viewing soil

RESULTS AND DISCUSSION

Color

The soil sample HAH-1, HAH-4 and HAH-5 were black in the color, sample HAH-2 is brownish in color & HAH-3 is greyish in color.

Moisture

Moisture content value ranges from 1% - 7%. It is clear from the result that Soil sample HAH-1, HAH-2, HAH-3, HAH-4, & HAH-5 has only 2 & 3.5% moisture respectively.

pH

pH was observing in the range 7.58 – 7.78. The Soil sample HAH-1, HAH-2, HAH-3, HAH-4 and HAH-5 is slightly alkaline. To dig drains, to make out flows, sowing green crops, cow manure to burry plant wastes, to supply necessary amount of water, use of gypsum is need.

Electric conductivity

Electric conductance values ranged from less than 1.00 ms. It is seen that soil sample HAH-1, HAH-2, HAH-3, HAH-4 and HAH-5 has approximate of electric conductance. Use organic manure as per recommendation.

Organic carbon

Organic carbon contents were recorded in the range 0.67 – 1.38 %. The soil sample HAH-1, HAH-2, has less Organic carbon as compare to HAH-3 and HAH-4, HAH-5 percentage of organic carbon.

Nitrogen

Nitrogen content in the soil sample ranged from 469.0 to 966.0 kg/hect. The soil sample HAH-1 and HAH-2 has approximate less content of Nitrogen as compare to HAH-3 has high content and HAH-4, HAH-5 has extreme high content of nitrogen.

Phosphorous

Available phosphorous content in the soil sample ranged from 10.23 – 170.11kg/hect. The soil sample HAH-2, HAH-3 and HAH-4 has less phosphorous and HAH -1 has approximate high phosphorous & HAH-5 has extreme high phosphorous.

Potassium

Available potassium content in the soil sample ranged from 430.89 – 1371.26 kg/hect. The soil sample HAH-1, HAH-2 has less potassium content as compare to HAH-3, HAH-4 and HAH-5 has extreme high potassium content.

CaCO₃

Calcium carbonate (CaCO₃) content in the soil samples ranges from 2.5-13.25 % It is seen that HAH-1, HAH-2 have high amount of calcium carbonate as compare to HAH-4, HAH-3 and HAH-5 have approximate amount of calcium carbonate. To make drains, use of ironpyrroid, use of ferrous, sulphate, phosphoric acid, ammonium sulphate.

Zinc

Zinc content in soil sample ranges from 0.4 – 4.48ppm. It is seen that HAH-1, HAH-5 have high amount of zinc and HAH-2 have less amount of zinc and HAH-3, HAH-4 have middle amount of zinc.

Copper

Copper content is soil sample ranges from 3.98 – 8.04 It is seen that HAH-1, HAH-2, HAH-3, HAH-4, HAH-5, have high amount of copper.

Calcium

Calcium content in soil sample ranges from 41.2-47.2% It is seen that HAH-1, HAH-2, HAH-3, HAH-4, HAH-5 have less amount of calcium. To supply 10 tons of gypsum per hectare by mixing with cattle manure.

Magnesium

Magnesium content in soil sample ranges from 2.24-8.64% . It is seen that HAH-1, HAH-2, HAH-3, HAH-4, & HAH-5 have less amount of magnesium. To magnesium sulphate 500 gm hectare.

Alkalinity

Alkalinity was observed in the range between 200– 450. It is seen that soil sample HAH-1, HAH-2, HAH-3, HAH-4 has less alkalinity as compared to HAH-5.

CONCLUSION

The soil samples HAH-1, HAH-2, HAH-3, HAH-4 and HAH-5 become middle alkali and to the pH of this soil is increasing order. Suggested the use of compost manure. The recommendation of to dig drains, to make out flows, sowing green crop, cow manure, to busy plant wastes to supply necessary amount of water use to gypsum. In the soil sample HAH-1, HAH-2, HAH-3, HAH-4 and HAH-5 the calcium become less then the recommendation of supply 10 tons of gypsum per hectare by mixing with cattle manure. In the soil sample HAH-1, HAH-2, HAH-3, HAH-4 & HAH-5 the magnesium become less. Then recommendation of magnesium sulphate 500 gm./ hectare. In the soil sample HAH-3 & HAH-4 phosphorous is less to increase the crop quality phosphorus will be given through fertilizers. In the soil sample HAH-1 and HAH-2 the organic carbon is approximate high and nitrogen is approximate high, so there is no need to use organic carbon and nitrogen for this soil. But to increase more yield of crop by using carbon and nitrogen for this soil.

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