

Physico Chemical Assessment of Soil Samples from Rama (Sahur) Region, Amravati District, Maharashtra (India)

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ABSTRACT

The present study, deals with physico chemical assessment of soil samples from field which were collected from Rama village (Sahur). the study was primarily focused on testing of soil quality from various sampling stations. eleven representative samples were analyzed for its WHC, CaCO₃, pH, E.C., organic carbon, organic matter, Potassium, Sodium, Calcium, Magnesium.

KEYWORDS: Physico-chemical, WHC, EC, OC, OM, Potassium, Sodium, Calcium, Magnesium

I. INTRODUCTION

Soil is a vital component, medium of unconsolidated nutrients and materials forms the life layer of plants. The soil supports the plants that provide us with food, fiber and forest product. due to soil contamination, the productivity of crop diminished seriously and poses the problem of shortage of food. Hence, in recent year, study of physiochemical parameter of soil to monitor soil pollution and nutritional value of soil become important.

Number of review studies had been performed to assess the quality of soil M Akter, S Sultana, A K C Chaudhary, M A H Chaudhary (2010) have studied Physiochemical Characteristic of soil in tropical Sal (Shorea robusta Garten.) forest in eastern Nepal [1-2].

Tukura Birtus Wokhe, Yahaya Mohammad and Madhu Paschal Chima (2013) [3] have studied Evaluation of physiochemical and biological properties of irrigated soil and showed that Physical and chemical properties of the soil differed according to farm [4]. The most common chemical involved in causing soil pollution are petroleum hydrocarbon [5], heavy metals [6]. Municipal wastes increase the nitrogen, pH, cation exchange capacity, percentage base saturation and organic matter [7-8]. Organic waste [9] can provide nutrients for increase plant growth and such positive effect will likely encourage continued land application of this waste however excessive waste in soil may increase heavy metal concentration in the soil and underground water. Heavy metal may have harmful effects on soil, crop and human health [10-11].

II. MATERIALS AND METHOD

1. WATER HOLDING CAPACITY AND CaCO₃ CONTENT:

i) WATER CONTENT :

Water content capacity was measured by taking 20g samples in pre weigh aluminum pan and placed it in an oven at 110°C. The sample was dry after overnight heating. Cool the sample in desiccators at room temperature.

ii) CaCO₃ CONTENT

Place a 5g of sample on filter paper in a funnel and remove carbohydrate by washing with 10% HCl, after removing bubbling of carbon dioxide rinse with deionized water. Dry the sample in oven at 110°C. after a week place the sample in desiccator for a while

2. pH:

Take 20g of soil in 40ml distilled water and stir. Calibrate the pH meter with two buffers, (4.0 and 7.0 or 9.2). shake the soil suspension and calculate the pH on the pH meter.

3. ELECTRICAL CONDUCTIVITY:

The conductivity of a saturation extract is generally recommended for appraising soil salinity in relation to plant growth. In the range of EC, suitable for plant growth.

Electrical conductivity of soil sample was measured by 'Solution Bridge'. by adding 10 gm soil sample in 100 ml distilled water. after stirred for 15 min. leave overnight. after calibration dip the conductivity cell in the supernatant soil. and measure the conductance

4. OC and OM (ORGANIC CARBON AND ORGANIC MATTER) :

OC and OM percentage calculated by Walkley- Black Method using the following formula

a. Percentage of easily oxidizable organic carbon (OC) :

$$\% C = \frac{(B - S) \text{ M of Fe (II) } 12 * 100}{\text{grams of soil} * 4000}$$

where,

B= ml of Fe (II) solution used to titrate blank

S= ml of Fe (II) solution used to titrate sample

12/4000= mill equivalent weight of C in grams

b. calculating percent of organic matter (OM)

% of OM = %C * 1.72

5. ESTIMATION OF POTASSIUM AND SODIUM :

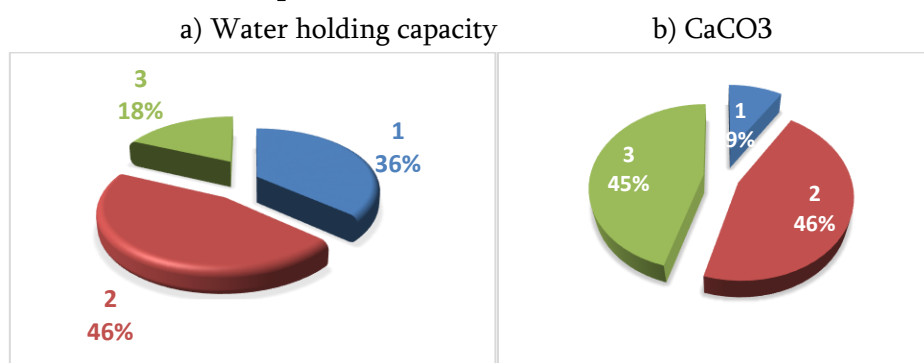
Weight 5g of sample in 25ml of neutral ammonium acetate solution. shake it for 5 min. Feed the filtrate into the atomizer of flame the photometer. For standard curve take the 1000 ppm solution of K and Na for estimation of potassium and sodium respectively and dilute the stock solution 20 times to get 50 ppm of K solution. Take the reading by feeding solution of different concentrations.

III. RESULT AND DISCUSSION

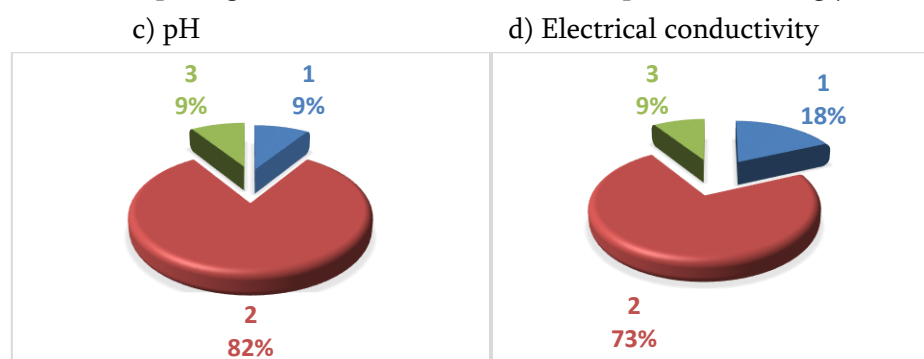
Number of parameters were studied are as follows

Sample no.	% of Moisture	% CaCO ₃	pH	E.C. in Mhos/cm-1	%OC	%OM	KKg/hc	Na kg/hc	%Ca	%Mg
1	135	10	8.22	0.92 X 10 ⁻³	2.79	4.80	333.76	246.4	1.66	2.82
2	145.24	13.8	8.1	0.27 X 10 ⁻³	2.56	4.40	174.72	327.04	1.57	2.64
3	117.30	16.8	7.42	0.38 X 10 ⁻³	3.00	5.17	192.64	259.84	1.6	2.64
4	105.43	0.6	8.31	0.30 X 10 ⁻³	3.00	5.17	212.8	268.8	1.1	0.75
5	100.67	11.6	7.35	0.34 X 10 ⁻³	3.57	6.14	172.48	152.32	1.44	2.24
6	110.52	16.4	6.3	0.19 X 10 ⁻³	3.36	5.26	176.96	159.04	1.53	1.53
7	118.44	10	8.27	0.45 X 10 ⁻³	3.39	6.23	248.64	219.52	1.66	2.46
8	120.50	4.4	7.53	0.20 X 10 ⁻³	2.82	4.85	192.64	201.6	0.86	1.42
9	129.35	16.2	8.4	0.67 X 10 ⁻³	3.27	5.62	203.84	185.92	0.92	1.82
10	127.94	9.4	8.61	0.65 X 10 ⁻³	2.82	4.85	201.6	206.08	0.94	2.50
11	110.21	8	8.32	0.31 X 10 ⁻³	3.00	5.32	421.12	383.04	0.64	2.04

Graphical representation of calculated parameter as follow:



WHC 18% sample highest value (130-150%) 45% samples show strongly calcareous

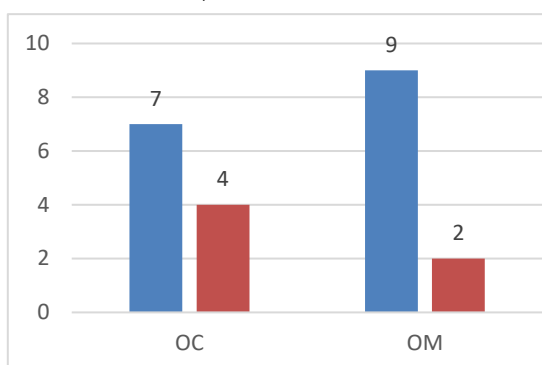


9%, 82%, 95 sample shows normal(acidic) 18 sample shows low amount of salt

and above the normal range (alkaline) respectively

73% sample shows normal range, 9% sample shows H.C.

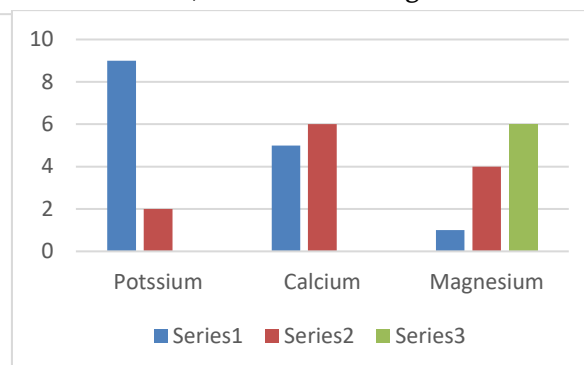
e) OC and OM



OC- 2.56-3.57%

OM- 4.40-6.14%

f) % K, % Ca, %Mg



Potassium- 152-383.04 Kg/

Magnesium- 0.75-2.86%

IV. CONCLUSION

Out of 11 samples, 5 samples show 45% moderately calcareous behaviour. 5 samples show 45% strong calcareous due to accumulation and precipitation of CaCO_3 in semi-arid condition. WHC shows optimum level range from 100.67-145.27 which is high due to high Na content. pH in this area shows normal range i.e. 6.5-8.5. The nature of most of the soil is slightly alkaline due to process of accumulation of CaCO_3 . EC in this region are found satisfactory. 73% sample shows normal EC. OM and OC are found in optimum level, high level of OM is supportive for the microbial activity of soil. In present study amount of available K in the soil present satisfactory range which is very essential nutrient for plant. Ca and Mg are required trace quantity for the plant. In present study the level of both cations is up to the marks. out of 11 samples 5 samples of soil show low level of Ca, level of mg is somewhat high, 55% of sample show Mg level above the desirable level, which causes faster rate of photosynthesis.

From the above result it concludes that the development of salinity or sodicity soil is in progress but all other Physico-chemical parameters are found in optimum level and hence soil in Rama (Sahur) area is good for the farming.

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