Research Article

Nutrient Analysis of Soil Samples Collected From Yercaud Road, Salem District, Tamilnadu, India

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ABSTRACT

The soil was assessed for the identification of nutrients in the area selected. The area selected for the study was roadsides of Yercaud from adivaram to top bend, Salem District, Tamil Nadu, India. Hence, the soil was collected at three different locations at the roadside of bend1 (Sample 1), between bend 10 and 11 (Sample 2) and third location within two kilometers from twentieth bend (Sample 3). The results observed at these three locations exhibited variations in their nutrient content. The humus content in sample 3 was 88.13 mg/kg, and it was 73.25 mg/kg for sample 2, but it was found to be high with sample 1 showing 97.59 mg/kg. Likewise, the mineral content of the soil samples collected at three different locations showed promising results. The observed mineral content was high (246.18 mg/kg) for the sample 2. Whereas it was low for other soil samples collected at two different locations. The present study was done to assess the adequacy, deficiency of the nutrients prevailed in the soil.

Keywords: Soil, Nutrients, Major, Minor, Yercaud road, Humus.

INTRODUCTION

Soil is the most important component of any landscape. Healthy soil will be able to maintain beautiful plants. Nutrient cycling, water regulation, and other soil functions are normal processes occurring in all ecosystems, which gives many benefits to humans, such as food production, water quality as well as tool for flood control etc. The term "soil health" is defined as a vital living system containing biological elements which are key to ecosystem function.[1,2] Soil quality protection is a challenging issue for the use of resources in a sustainable way as it is a prime factor for land use, economic development , thereby maintaining soil health.[3] Hence, a pilot study was initiated to study the profile of soil in the particular locality in order to study the health status of the soil. So, yercaud road side soil samples were collected at three different locations from adivaram to top bend. The different locations include roadsides of bend 1 (Sample 1), between bend 10 and 11 (Sample 2) and third location within two kilometers from twentieth bend (Sample 3). All three samples collected were analysed for its major and minor nutrient contents.

MATERIALS AND METHODS

Soil sample collection

The collected soil samples were removed from debris, stones and then sieved. The sieved 500gm samples were packed, sealed in an airtight plastic cover and sent for analysis.

Soil nutrient analysis

The physio-chemical properties of soil samples were determined by following an alternative analytical indigenous technology developed by MCRC, IIT(M) with financial assistance from Department of Science & Technology, GOI, New Delhi and Murugappa group, Taramani, Chennai.

RESULTS AND DISCUSSION

Soil nutrients

The obtained results were tabulated in Table 1. Normal values are shown in Table 2.

Table 1: Showing results of physio- chemical properties of soil samples collected from yercaud road side at three different locations.

Nutrients assessed	Sample 1	Sample 2	Sample 3
pH	07.64	07.18	06.68
EC	00.18	00.54	00.59
Organic Carbon (%)	01.80	01.50	01.68
Nitrogen (Kg/acre)	102.72	99.21	108.23
Phosphorus (Kg/acre)	13.87	13.50	13.33
Potassium (Kg/acre)	114.91	133.46	112.24
Calcium (mg/kg)	398.53	511.16	548.31
Magnesium(mg/kg)	165.70	162.38	187.98
Sodium (mg/kg)	100.98	91.59	104.65
Iron (mg/kg)	13.15	15.13	16.21
Manganese(mg/kg)	06.93	07.22	07.41
Copper (mg/kg)	01.44	01.64	01.50
Zinc (mg/kg)	00.62	01.35	01.51
Boron (mg/kg)	00.49	00.42	0.58
Sulfate (mg/kg)	18.69	12.85	14.52
Humas (Kg/acre)	97.59	73.25	88.13
Total minerals (Kg/acre)	231.5	246.18	233.79

Sample 1: Soil collected from yercaud roadside (hairpin bend 1).

Sample 2: Soil collected from yercaud roadside (between hairpin bend 10 & 11).

Sample 3: Soil collected from yercaud roadside (Within two kilometers from Hairpin bend 20).

Table 2: Showing Normal Nutrient Values

Nutrients	Low	Medium	High
Nirogen (Kg/acre)	<113	113-182	>182
Phosphorus (Kg/acre)	<18	18-36	>36
Potassium (Kg/acre)	<60	60-138	>138
Organic carbon (%)	<0.75	0.75-1.5	>1.5
Magnesium (mg/kg)	<10	10-15	>15
Humus (Kg/Acre)	<18	18-31	>31
Iron (mg/kg)	<6	6-8	>8
Mn (mg/kg)	<1	1.2-2.5	>2.5
Cu (mg/kg)	<0.3	0.3-1	>1
Zn (mg/kg)	<0.5	0.5-1	>1
Sulphur (mg/kg)	0-10	10-15	>15
Ca (mg/kg)	<300 (Deficient)	>300 (Sufficient)	-
Boron (mg/kg)	<0.5 (Deficient)	>0.5 (Sufficient)	-
Molybdenum (mg/kg)	<0.2 (Deficient)	>0.2 (Sufficient)	-

The soil sample was collected from three locations from yercaud road side. The pH was found to be 6.68 in sample 3. Whereas, it was 7.18 and 7.64 in the sample 2, 1 respectively (Table 1). The observed pH was suitable for plant growth as most of the nutrients are available at this pH. In addition, it might also allow sufficient microorganism to breakdown organic matter. The electrolyte conductance was found to be very low for the soil sample 1 compared to other locations. The difference observed in EC might be due to the leaching induced by heavy rainfall. The percentage of organic carbon was found to be higher for the soil sample 1, next lies sample 3 and it was found to be low with sample 2 (Table.1). The organic matter present in soil improves its structure, aeration and also protects the oxidation and precipitation of micronutrients into unavailable forms. The nitrogen content lies in the order of 108.23, 102.72, 99.21 Kg/acre for the three locations studied. But the phosphorus content lies equal for all the three location studied (13.33, 13.50, 13.87 Kg/acre) showing minor variation only (Table.1). The potassium content was found to be higher with sample 2 showing 133.46 Kg/acre, while it was comparatively lower for other two locations. Calcium was found to be in the higher range for sample 3 depicting 548.31mg/kg and it was 511.16 mg/kg for sample 2, whereas, it was low with sample 1 having only 398.53 mg/kg (Table 1), even though there is variation in between three samples all are grouped under higher nutrient content according to normal values shown in Table.2. To our surprise, the magnesium content was found to be extremely high (187.98mg/kg) with sample 3. The copper, iron content was higher in all the three locations (Table 1). Copper forms an essential micronutrient for normal plant growth and as well as iron is essential for chlorophyll, protein formation, photosynthesis, electron transfer oxidation, reduction of nitrates and sulphates and other enzyme activities. In general, iron is a common nutrient required for the overall plant growth and development. The boron was found to be sufficient with soil sample 3 showing 0.58mg/kg whereas it was low for the samples collected at other two locations (Table.1). Murthy[4] also observed that boron deficiency is a global phenomenon, at present, nearly 33 percent of Indian soils were found be deficient in available boron.

CONCLUSION

The study was performed to know the nutrients present in the yercaud road side soil samples.

From the results, it is concluded that the yercaud road side soil sample collected between hairpin bend 10 and 11 showed higher mineral content but it was more or less same in other two road side soil samples. The studied soil sample showed higher potassium content but the amount of nitrogen, phosphorus was found to be low for the road side soil samples studied. So, it is essential to improve nitrogen and phosphorus content in the soil as NPK is a major essential nutrient required for the overall plant growth.

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REFERENCES

1. Doran JW, Zeiss MR, Soil health and sustainability: managing the biotic component of soil quality, Applied Soil Ecology., 15, 2000, 3-11.

2. Karlen DL, Andrews SS, Doran JW, Soil quality: Current concepts and applications, Adv. Agron., 74, 2001, 1-40.

3. Doran JW, Sarrantonio M, Liebig MA Soil health and sustainability. Advances in Agronomy., 56, 1996, 1-54.

4. Murthy IYLN, Boron studies in major oilseed crops, Indian Journal of Fertilizers., 1, 2006, 11-20.

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