

# Studies of some physico-chemical properties of soil samples in Vidul, taluka Umarkhed, dist Yavatmal, MS, India

Awate PJ<sup>1\*</sup> and Bhokare PR<sup>2</sup>

<sup>1</sup>Department of Zoology, <sup>2</sup>Department of Chemistry, L.R.B. Arts, Commerce & S.S.R.B. Science College, Arni Dist-Yavatmal, MS, India

\*Corresponding author email: [mr.prashantawate@gmail.com](mailto:mr.prashantawate@gmail.com)

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## Abstract

The quality of soil depends on the micronutrients present in soil. Soil properties that are sensitive to change in the management can be used as indicator. The present investigation objectively conducted to analysis the physico-chemical properties of soil sample of Vidul village. The five samples were collected from different sites of the study area of Vidul in February 2020. The analysis of soil was carried out for the study of various parameters like Moisture, pH, EC, Organic Carbon, Nitrogen, Potassium, Phosphorous, Magnesium & Calcium. The study revealed that all the five samples from selected area of Vidul village are medium to high in mineral content, the pH of the soil samples ranged from 7.7 to 8.40 and was slightly on alkaline side but within the limit of 6.5-8.5 which is optimum for crops. EC values ranged from 0.4ms to 0.7ms. and indicating low salinity status of the soils. OC content ranged from 1.30% to 1.64% and all the samples were of medium rating. Available nitrogen ranged from 250 kg/ha to 298kg/ha; available phosphorous ranged from 20.5kg/ha to 24.0 kg/ha and samples were nitrogen and phosphorous deficient. Potassium ranged from 440 kg/ha to 542 kg/ha and samples were of medium rating except one sample of high rating with respect to potassium.

**Keywords:** Physico-chemical parameters, Vidul village, Soil quality.

## Introduction

Soil is one of the most precious natural resource, which requires several years to develop a inch of soil and it provides

a medium for plant growth to meet our food and fibre need. Soil filters water, decomposes waste, stores heat and exchanges gases and hence have great bearing on environmental balance [1].<sup>3</sup> It is a complex mixture of minerals, water, air and organic matter and also it's called as "skin of the earth." The quality and health of soil is important for both agricultural sustainability and environmental quality which connected to the plant, animal and human health. Soils of Maharashtra state are categorized as poor to moderate in fertility and they are widely in genetic, morphological, physical, chemical and biological characteristics. It is well known fact that the periodical analysis of soil provides the up-to date information about the nature and the composition of the soil.

Soil analysis is well recognized as a sound scientific tool to assess the status of available micronutrients in soils and their relationship with various physico-chemical properties 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 India have been attempted by several investigators [1-3] <sup>3,4,5</sup>. Khadake P.A. reported soil analysis and its environmental impact on Nanded city of Maharashtra State [4] <sup>6</sup>. The status of micronutrients

in soils district Bhimber and their relationship with various physico-chemical properties were investigated by Nazif et al. [5]<sup>7</sup>. It is a real time to carry out the physico chemical analysis of soil because as with the increasing use of chemical fertilizer to the soil, it is difficult to control the adverse effect of the chemical fertilizer to the soil, land, animal and the human being [6-7].<sup>1,2</sup>

## Methodology

### Study Area

Vidul is a village in UmarchedTahsil in Yavatmal District of Maharashtra State, India; which is shown in Fig.-1. It belongs to Vidarbha region Yavatmal Division, This area is well known for cotton, termaric and soyabean. The sources of water for this area is of well and tube well.

### Sample Collection

Five samples were collected from the study area (farmers field) in the month of February 2020. Soil samples were collected randomly at 0 to 15 cm depths with five plots, five samples from each plot respectively, in well sterilized polythene pouches. Soil sample were collected from following Farmers fields-

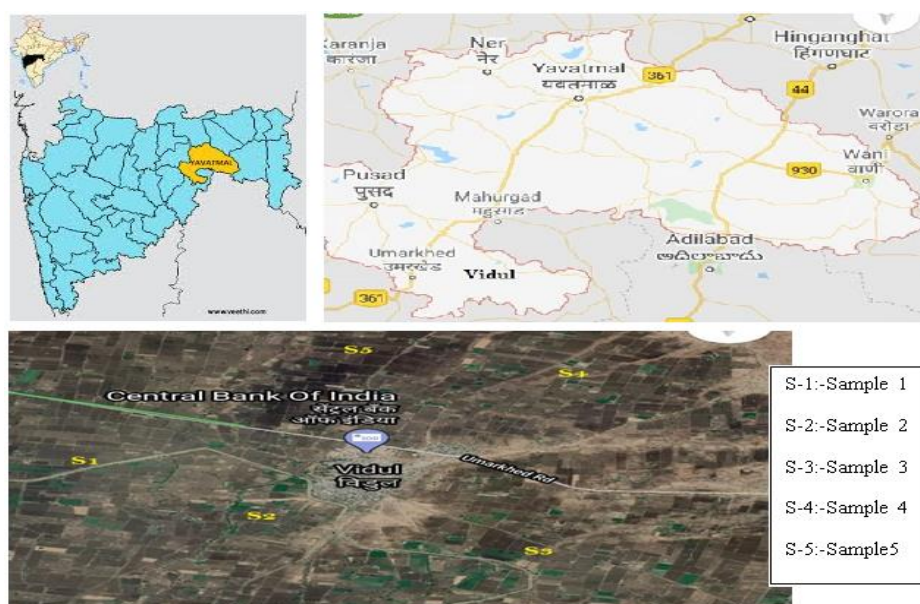


Figure1: Map of Study area Vidul, Umarched, Tehasil, Yavatmal, MS, India

1. Sample-1 was collected from Mr. Bhagavan Bonsale's field.
2. Sample-2 was collected from Mr. Shivaji Bichewar's field.
3. Sample-3 was collected from Mr. Digambar Bonsale's field.
4. Sample-4 was collected from Mr. Nilesh Kacharde's field.
5. Sample-5 was collected from Mr. Shivaji Gajewar's field.

### Physicochemical Analysis of Soil Samples

The soil sample were Collected and dried for about 24 hrs. grinded more finely. Methods use for estimation of various parameters is as fallows, like Determination of Moisture was by Weighting Method, pH by Digital pH Meter, EC by Conducto meter, OC, Ca, N, P, Ca by Titration Method, Determination of Mg was done by EDTA Titration Method. Determination of Pottasium (K) by Flame Photometry.

## Results and Discussions

**Colour of Soil:** The soil sample S1, S4 and S5 are Black, sample S2 are Reddish Brown and S3 was Faint Black in colour.

**Moisture:** Value of moisture contain ranges from 1.7% - 9 %. The result shows that the moisture of sample S4 is less as compared to other samples.

**pH :** The range of pH is found in between 7.70 – 8.40. The sample S3,S5 are slightly alkaline sample as compare to S1,S2,S4 soil sample which is medium alkaline.

**Organic Carbon:** Organic carbon were recorded in the range of 1.30 – 1.64 %. The soil sample S1 has high percentage of organic carbon. sample S3, S5 have moderate and sample S2, S4 has less organic carbon.

**Nitrogen:** Nitrogen content in the soil ranged from 250 - 298 kg/hect. The sample S3 have high nitrogen content as compared to other sample.

**Phosphorous:** Phosphorous content in the soil sample ranged between 20.5- 24.0 kg/hector. The soil sample S2 has more phosphorous content as compared to other sample.

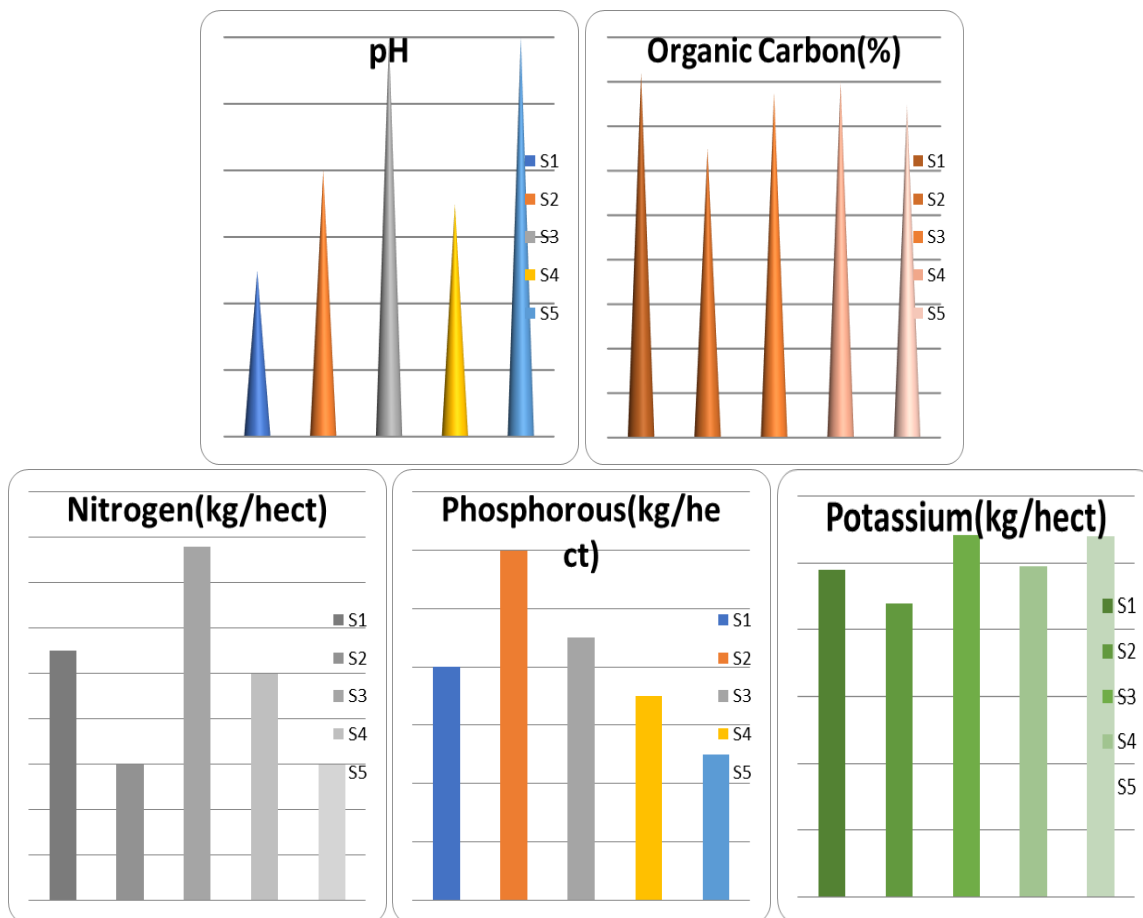
**Potassium:** Potassium content in the soil sample ranged between 440 – 542 kg/hector. The soil sample S3 and S5 have more potassium content as compared to sample S1,S2& S4 .

**Magnesium:** The Magnesium content in the soil sample ranged from 0.840 – 0.885 %. It is seen in sequence S1=S4<S3<S2<S5.

**Electric Conductance:** The Electric Conductance values varies from 0.4 – 0.7 ms. It is seen that soil sample S2 have less amount of Electric Conductance as compared to another sample.

**Table 1: Physico chemicals parameters of soil samples.**

Parameters	S1	S2	S3	S4	S5
Colour	Black	Reddish Black	Faint Black	Black	Black
Moisture (%)	3.1	9	2.5	1.7	2.6
pH.	7.7	8.0	8.40	7.9	8.40
Organic Carbon (%)	1.64	1.30	1.55	1.6	1.50
Nitrogen (kg/hect)	275	250	298	270	250
Phosphorous(kg/hect)	22.0	24	22.5	21.5	20.5
Potassium (kg/hect)	490	440	542	496	540
Magnesium (%)	0.840	0.871	0.864	0.84	0.885
Electro Conductance(ms)	0.6	0.4	0.7	0.5	0.6
Calcium (%)	0.08	0.11	0.12	0.08	0.18
Alkalinity(mg/L)	720.5	530	1160	727.5	1020
CaCO <sub>3</sub> ( %)	5.25	5.65	7.25	5.25	5.25



**Calcium:** The Calcium content in soil sample ranges from 0.08 - 0.18 %. The soil sample S5 has high percentage of calcium as compared to other sample.

**Alkalinity:** The Alkalinity was observed in the range between 530-1160 mg/lit. and it is in the range  $S3 > S5 > S4 > S1 > S2$ .

**Calcium Carbonate:** The Calcium Carbonate content in soil samples ranges from 5.25-7.25 %. It is seen that soil sample S3 have more amount of Calcium Carbonate as compared to other soil samples.

## Conclusion

The physico-chemical analysis of soil provides necessary information to set the target of nutrient application. The soil samples are slightly alkaline and

the pH is in  $S1 < S4 < S2 < S5 < S3$  order hence the Suggestion the use of compost manure, In the soil sample S1 and S4 the magnesium is less. In the soil sample S5 phosphorous is less as compare to other sample. In the soil sample S1 and S4 the organic carbon is approximate high and nitrogen is approximate high.

**Conflicts of interest:** The authors stated that no conflicts of interest.

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