

# Soil Organic Carbon Related to Soil pH in Korchi Tehsil Gadchiroli District, (M.S). India

Satpute GD<sup>1</sup> and Rewatkar SB<sup>2</sup>

<sup>1</sup>Shree Govindrao Munghate College of Art & Science College, Kurkheda tahsil, Gadchiroli District, Maharashtra India-441209

<sup>2</sup>Dean, Science and Technology, Gondwana University Gadchiroli, Maharashtra India-442605.

Email: [ganesh.d.satpute@gmail.com](mailto:ganesh.d.satpute@gmail.com)

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## ABSTRACT

The Chemical properties of soil were analyzed for 10 villages of Korchi tehsil of Gadchiroli district. The parameter such as pH and Soil Organic Carbon were undertaken for study. The pH values of soils in all the villages slightly acidic in nature with the range 5.99 to 6.11. Organic carbon was found that, nil samples in low range, seven samples in middle range and three samples found in high range of organic carbon. The correlation in between organic carbon with pH of paddy field soil of Korchi tehsil showed that, medium positive correlation ( $r = 0.456^*$ ), The result is not significant at  $p < 0.05$ .

**Keywords:** soil organic carbon, Gadchiroli tehsil, Korchi tehsil, paddy crop.

## INTRODUCTION

Soil is composed of small rock particles/debris in a mixture form and contains organic materials / humus which develops on the earth surface and tends to support plant growth. Soil is rich in number of contents such as organic matters, minerals, gases, liquids, and innumerable organisms. Hence, soil is termed as dynamic, living matrix maintaining the terrestrial ecosystem which actually acts as "Skin of the Earth". Soil not only supports the agricultural base but also supports many other plant lives available on wonder planet "Earth".

Soils are the largest carbon reservoir of the terrestrial carbon cycle and hold potential for expanded carbon sequestration. Thus, they provide potential way to reduce atmospheric concentration of carbon dioxide. Soils store two or three times more carbon than that exists in the atmosphere as CO<sub>2</sub> and 2.5 to 3 times as much as that stored in plants. Carbon storage in soils is the balance between the input of dead plant material (leaf and root litter) and losses from decomposition and mineralization processes (heterotrophic respiration).[1]. Soil carbon or soil organic carbon (SOC) is the carbon stored within soil. Soil carbon is an important attribute of soil quality and its productivity. The soil quality is define as, "the capacity of a soil to function, within ecosystem boundaries, to sustain biological productivity, improve environmental quality and support human and plant health". Soil quality cannot be measured directly but inferred indirectly by measuring soil physical and chemical properties which serve as quality indicators [2]. However, soil properties do have different degrees of influence on soil quality. The soils native ability to supply sufficient nutrients has decreased with higher plant productivity levels associated with increased human demand for food. Therefore one of the greatest challenges today is to develop and implement soil, crop and nutrients management technologies that enhance the plant productivity and the quality of soil, water and air. If we do not improve the production capacity of our fragile soils, we cannot continue to support the food and fiber demands of our growing population.[3].

The carbon cycle is a fundamental part of life on earth. Soil Organic Carbon (SOC) the amount of carbon stored in the soil is a component of soil organic matter-plant and animal materials in the soil that are in various stages of decay. As soil carbon is important factor for soil quality and productivity but with the exhaustive use by increasing crop productivity the nutrient level of soil is shifting towards lower side. Hence, with ever new technology everyone should ensure that increasing food demand needs to be managed by implementing soil, crop and nutrient management aspect in great detail[3].

Looking at the global scenario of soil and land degradation, there is an opportunity to take decisive

steps to improve or retain soil quality. This could be achieved by implementing new knowledge and the implementation of informed policy and management practices suggested [4]. By the year 2050 as human population will reach to 9.6 billion with an accompanying quadrupling in the global economy, almost double in demand for food is expected. Hence it is important to receiving a sizeable food supply from soil presently available for agriculture [4].

However, the correlation of organic carbon with soil pH properties in the Korchi tehsil of Gadchiroli district do not studied so; I choose Soil Organic Carbon Related to Soil pH.

## METHODOLOGY

The study was carried out in 10 villages namely Korchi, Kotgul, Khurana, Gutekasa, Maseli, Lekurbodi, Modgaon, Botekasa, Bijapur, Pitesur. The soil samples were taken from 0-15 cm depth with the help of auger of 20 sites were randomly selected in each form; soil sampling was done in a zigzag pattern within each field and mixed thoroughly following a standard procedure for soil sampling and sample preparation [5]. All the collected samples were air dried in shade, crushed gently with pestle and mortar, and then sieved through 2.0 mm sieve to obtain a uniform soil sample. The samples were analyzed for physicochemical properties by using standard methods of analysis for soil organic carbon (OC), soil pH and electrical conductivity (EC).

## RESULTS AND DISCUSSION

### Soil reaction (soil pH)

The measure of soil pH is an important parameter which helps in identification of chemical nature of the soil as it measures hydrogen ion concentration in the soil to indicate its acidic and alkaline nature of the soil. It follows from 0 to 7 are diminishing acidic, 7 to 14 increasing alkaline and 7 is neutral.

In the ten samples of **Gadchiroli tehsil**, the variation of pH in June 2015 is from 6.00 to 6.11. The variation of pH in Dec. 2015 is from 6.00 to 6.08. The variation of pH in June 2016 is from 6.03 to 6.11. The variation of pH in Dec 2016 is from 5.99 to 6.11 were found.

**Organic Carbon (OC)**

Organic carbon has a vital role in agricultural soils. It supplies plant nutrients, improves soil structure, improve water infiltration and retention, feeds soil micro flora and fauna, and enhance the retention and cycling of applied fertilizer.

In the ten samples of **Korchi tehsil**, the variation of Organic carbon in Jun. 2015 is from 0.31% to 0.87%.

The variation of Organic carbon in Dec. 2015 is from 0.30% to 0.81%. The variation of Organic carbon in Jun. 2016 is from 0.32% to 0.88%. The variation of Organic carbon in Dec. 2016 is from 0.30% to 0.83%. In the Korchi tehsil, out of ten samples, four samples in low range, three samples in middle range and three samples in high range were found as shown in Table No. 4 and 5.

**Table 1 : Method were used for analyzed soil parameter**

Sr.No.	Parameters	Method	References
1.	Organic carbon	Combustion	Walkley and Black, (1934)[6]
2.	pH	Water extract (1:2.5)	Rhoades and Oster (1986)[7]
3.	Electrical Conductivity	Water extract (1:2.5)	Rhoades and Oster (1986)[7]

**Table 2 : Soil samples collected from cultivator around of Korchi Tehsil**

Sr. No.	Name of cultivators	Address of cultivator	Survey No.	Sample Code
1	Mr. Kewalram V. Mohurle	At + post- Korchi	17 [538]	Ko-1
2	Mr. Krushna D. Uikey	At+post- Kotgul	40 [12]	Ko-2
3	Mr. Mangalsing G. Kumare	At+ post - Khunara	1 [32]	Ko-3
4	Mr. Amaru K. Gotta	At+post-Gutekasa	22 [11]	Ko-4
5	Mr. Pandhri L. Chaudhari	At+post- Maseli	1 [35]	Ko-5
6	Mr. Ankalu S. Hidako	At+post-Lekurbodi	23 [3]	Ko-6
7	Mr. Mayam J. Naitami	At+post- Modgaon	113 [73]	Ko-7
8	Mr. Dulekha A. Pathan	At+post- Botekasa	357 [53]	Ko-8
9	Mr. Rajaram M. Komara	At+post- Bijapar	86 [17]	Ko-9
10	Mr. Motiram D. Katenge	At+post- Pitesur	190 [28]	Ko-10

**Table 3 : Showing the result of pH of paddy soil of Korchi tehsil**

Sr. No.	Sample Code	pH				Mean
		(June-2015)	(Dec-2015)	(June-2016)	(Dec-2016)	
1	Gd-1	6.08	6.01	6.07	6.05	6.05
2	Gd-2	6.07	6.06	6.06	6.07	6.06
3	Gd-3	6.11	6.05	6.08	6.07	6.07
4	Gd-4	6.01	6.00	6.08	6.09	6.04
5	Gd-5	6.00	6.01	6.07	6.06	6.03
6	Gd-6	6.10	6.08	6.03	6.01	6.05
7	Gd-7	6.08	6.02	6.05	6.02	6.04
8	Gd-8	6.09	6.05	6.07	6.07	6.07
9	Gd-9	6.02	6.00	6.07	6.05	6.03
10	Gd-10	6.03	6.01	6.11	5.99	6.04

**Table 4 : Showing the result of organic carbon of paddy soil of Gadchiroli tehsil.**

Sr. No.	Sample Code	OC (%)				Mean
		(Jun.-2015)	(Dec.-2015)	(Jun.-2016)	(Dec.-2016)	
1	Ko-1	0.56	0.47	0.57	0.50	0.52
2	Ko-2	0.35	0.30	0.36	0.31	0.33
3	Ko-3	0.37	0.33	0.36	0.30	0.34
4	Ko-4	0.51	0.46	0.48	0.45	0.47
5	Ko-5	0.31	0.29	0.32	0.26	0.29
6	Ko-6	0.57	0.56	0.63	0.59	0.58
7	Ko-7	0.78	0.71	0.79	0.70	0.74
8	Ko-8	0.79	0.78	0.82	0.76	0.79
9	Ko-9	0.78	0.76	0.81	0.73	0.77
10	Ko-10	0.87	0.81	0.88	0.83	0.85

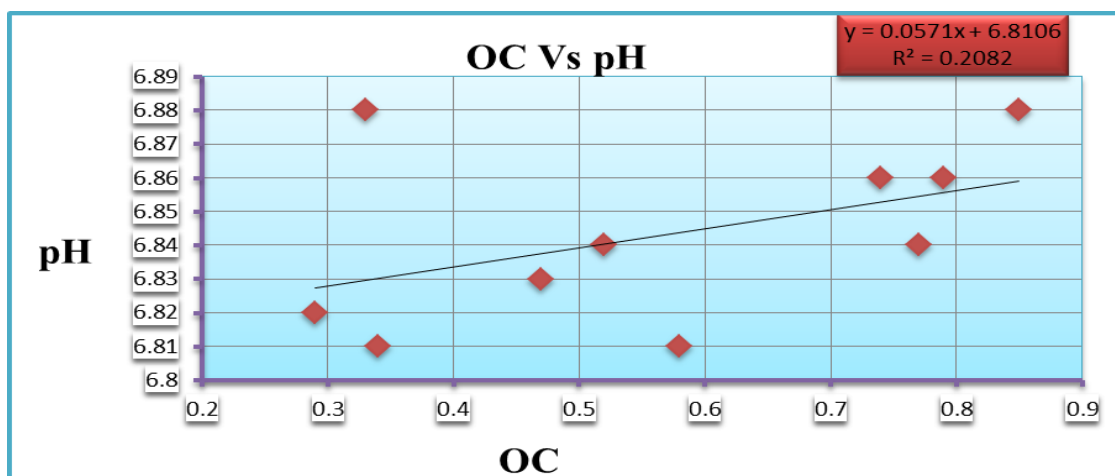
**Table 5 : Tabulated formats of range of soil organic carbon**

Range of OC	Name of Samples	No. of Samples
Low Range (< 0.50 %)	Nil	00
Middle Range (0.50 to 0.75%)	Ku-1, Ku-2, Ku-3, Ku-6, Ku-7, Ku-8, Ku-10	07
High Range (> 0.75 %)	Ku-4, Ku-5, Ku-9	03

**Table 6 : Interpretation for correlation between organic carbon and pH of Korchi tehsil**

Variables	Mean	SD	r	P Value	Level of Significance at 5%
X (OC)	0.568	0.199	0.456	0.18532	P<0.05
Y (PH)	6.843	0.025			

\*Significant at 5 % level.

**Figure 1: Correlation in between organic carbon with pH of paddy field soil of Korchi tehsil.**

### Correlation of soil organic carbon with soil pH by using statistical analysis Pearson Correlation Coefficient (r)-

It is observed from above Table No.6, that there is a medium positive correlation between Organic carbon and pH of Korchi tehsil by having correlation value of ( $r = 0.456^*$ ). The P value is 0.18532, the result is not significant at  $P < 0.05$  for = 0.456\*.

### CONCLUSION

Soil organic carbon and pH of soil were analyzed for ten samples of Korchi tehsil of Gadchiroli District. For organic carbon, nil samples found in low range, seven samples found in middle range and three samples in high range in study area. The variation in pH ranges from 5.99 to 6.11 which is slightly acidic in nature. The correlation in between organic carbon with pH of paddy field soil of Korchi tehsil showed that, medium positive correlation ( $r = 0.456^*$ ), The result is not significant at  $p < 0.05$ .

The Chemical properties of soil were analyzed for 10 villages of Korchi tehsil of Gadchiroli district. The parameter such as pH and Soil Organic Carbon were undertaken for study. The pH values of soils in all the villages slightly acidic in nature in the range 5.99 to 6.11. Organic carbon was found that, nil samples in low range, seven samples in middle range and three samples found in high range of organic carbon. The correlation in between organic carbon with pH of paddy field soil of Korchi tehsil showed that, medium positive correlation ( $r = 0.456^*$ ), The result is not significant at  $p < 0.05$ .

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

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