



# PHYSICO-CHEMICAL ANALYSIS OF SOIL FROM REGION OF NORTH SOLAPUR, MAHARASHTRA

Algunde S. M<sup>1</sup>, Kadam A.S<sup>2</sup>.

Department of Botany, DSMs, ACS College, Jintur, Parbhani-MH India.

(Corresponding author Email: [algundeshital2015@gmail.com](mailto:algundeshital2015@gmail.com))

## Abstract:

The soil is one of the most important ecological factor called edaphic factor of living organism and also important for terrestrial environment. Abundant of organic matter are continuously added into the soil. Water, air and soil play important role in an ecosystem. Out of that soil is most important as it does not recycle itself like air and water due to any reason once the soil is lost by its quality, it take a long time to become good by its quality. The soil health and soil quality are both the same words but the soil quality it basically more focused on its physico-chemical, and biological characters. A study of soil quality may helpful to give set of parameters which may be the evidence of the soil ability to carry out its functions.

The present study based on the physico-chemical analysis of soil parameters from Solapur region. The good quality of soil depends on its different properties such as; soil P<sup>H</sup>, Potassium, Nitrogen, Phosphorus, total organic compound etc. The present study focused on the availability of nutrient quality of soil. On seasonal basis soil of area shows great variation regarding the soil nutrients. The pH of soil is found to be neutral for all season ranges from (6.7-7). In summer season availability of P is medium (47.9) compared to other season. Organic carbon and K are found to be excess in all seasons. In overall the present investigation provides information regarding the nutrient quality of soil which will provide great information for any problem related to soil and plants growth.

**Key Words:** Nutrients, Physico-chemical parameters, P<sup>H</sup>

## INTRODUCTION-

Every human being is closely related with the soil as it is essential for food, clean water, and cleans air and have important role in biodiversity (Katsuyuki, 2009; Keesstra *et al*, 2016). Soil forms most important part of any geographical areas which is closely associated with other components like climate, vegetation. For any kind of the soil analysis, the soil sampling becomes the most difficult task. From huge soil samples a very fraction of soil used for its analysis, and it becomes the

representative for the field soil sample. Soil analysis becomes a key factor for the nutrient management of the soil. Soil analysis gives information for to increase the productivity and production of agriculture, soil is directly or indirectly very important. Soil forms basic body on which growth, development and productivity of agricultural products depends. A good quality soil with required mineral nutrient is basically needed for the agricultural crop production. The heterotrophic soil micro-organisms also helpful to enhance the availability of nutrients. It provides support for the productivity and for food web (Fenchel *et al*, 2012., Whitman *et al*, 1998). There are numerous external factors which play vital role in the growth and development of plant like air, temperature, light, mechanical support, water nutrients like K, N, P, H.C etc. on the basis of seasons, the different parameters of soil were studied from the study site.

## Material and method

### Collection of samples-

The present study deals with the study of physico-chemical analysis of soil from Solapur. For that the soil samples were collected on the seasonal basis (summer, winter and Rainy season). The soil samples collected from site and brought into laboratory for further analysis of soil.

### Analysis of soil samples-

#### 1. Soil Temperature-

The soil temperature is one of the most important soil parameters which provide important information like the chemical, biochemical properties of soil.

#### 1) Soil P<sup>H</sup>

Estimation of soil P<sup>H</sup> was done according to Jackson (1973) method, by immersing the electrode in the water- soil suspension the reading was taken in the p<sup>H</sup> meter.

#### 2) Organic carbon

SOC as well as SOM was determined by Walkley and Black method. For this method titration method was used. At the end of the titration, the solution changes from blue-violet to green. Percentage of SOC and SOM was

**Calculated as:**

$$\text{SOC (\%)} = \frac{(A - B) \times 0.003}{W} \times 100$$

$$\text{SOM (\%)} = \% \text{ Carbon} \times 1.724$$

Where, A = Volume of K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub> (10 ml)

B = Volume of ferrous ammonium sulphate

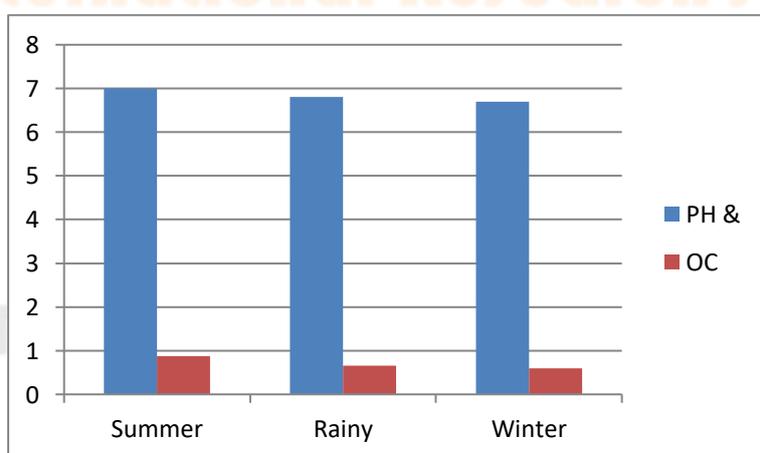
W = Weight of the soil taken (g)

**Table 1. Physico-chemical analysis of soil-**

Sr. No.	Soil Parameters	Seasons		
		Rainy	Winter	Summer
1	pH	6.8	6.7	7
2	Salt	0.31	0.19	0.37
3	Organic Compound	0.66	0.59	0.87
4	Nitrogen ( kg/hect)	245	257	254
5	Available Phosphorous (kg/hect)	368.4	242.9	47.9
6	Available Potassium(kg/h)	482	392	403
7	Free Calcium Carbonate (%)	1.3	4.9	18.8
8	Calcium	36.5	40.5	39.6
9	Magnesium	20.2	39.2	14.0
10	Sulphur	8ppm	6ppm	11ppm

**Table 2: Seasonal variations of the micro-nutrients of soil -**

Ratings	pH	Salt	OC	N	Ava. P	Ava.K	S	Ca	Mg
Summer	Neutral	Normal	Excess	Less	Medium	Excess	Less	Excess	Less
Rainy	Neutral	Normal	Excess	Less	Excess	Exces	Highly less	Excess	Normal
winter	Neutral	normal	Medium	Less	Excess	Excess	Highly less	Excess	excess

Figure 1- Seasonal variations of  $PH$  and Organic Carbon-

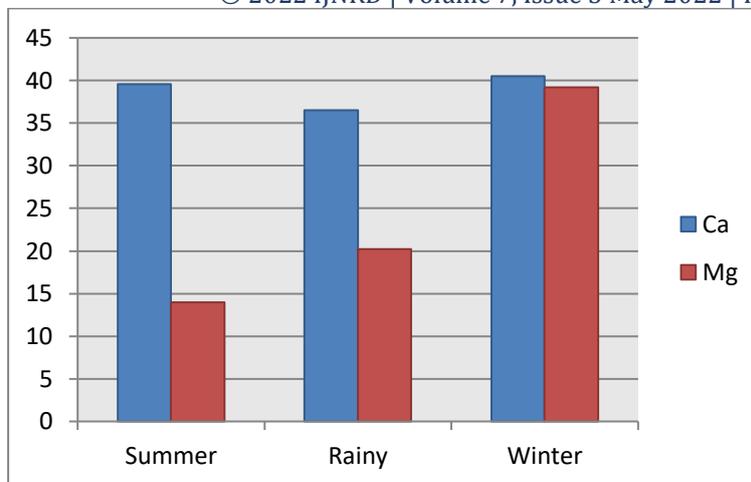


Figure 2- Seasonal variations of Ca, and Mg of soil-

## Result and Discussion-

The quality of soil is generally the ability of soil to play its function on sustainable way. But, now days the quality of soil can be get degraded naturally as well as artificially. For ecosystem, edaphic factor plays an enormous role but still a little focus given on the maintains of soil quality. In order to make soil more suitable, more sustainable, everyone need to be aware for to improve the soil quality this one is not by adding the excess fertilizers. According to (Brady and Weil, 2008) good quality of soil is most important for plant growth but once soil lost its quality the it takes long period for to become good with its quality. The word soil quality basically focused on its physico-chemical and biological properties which is different from soil health (Doran and Zeiss, 2000).

The soil solution is the primary source of nutrients for plant roots. Soil contain major elements like N,P,K,Ca, S, Mg and minor element like Fe, Mn, Al, B etc. These elements are important as mineral nutrition.

The quantitative analysis of soil parameters were studied by different methods and recorded in table 1. It shows all soil parameters on seasonal basis, in which soil  $P^H$  ranges from 6.7 to 7 which is almost neutral for all season. The most important element N is found to be less in all seasons while the availability of K is high (392-482) in all seasons. Variation in soil  $P^H$  and organic carbon on seasonal basis is shown in figure 1.

The result shows that the soil deficient from the presence of important nutrients like P, and K, Organic Compound etc. recommended rich fertilizers in table 1: figure 1. The result shows significant variation in availability of nutrients. In rainy season the availability of Nitrogen, Phosphorous and Potassium was generally maximum. So, such kind of physico-chemical analysis of soil will provide any difficulties related to soil, salinity, and alkanity and gives idea related to solve the problem. The present study provides an idea about the presence of the entire soil nutrient in their neutral and normal range which is much good for vegetation development in table 2.

The study of physico-chemical analysis of soil is important for the normal growth of plants and for proper management of soil. (Borkar A.D., 2015) According to the (Carr,1982), the site is with highest calcium levels indicates that it was refuse the dumping ground that is why area should be kept clean.

The soil where organic matter like carbon and nitrogen deficiency, in that soil vegetation were not developed.

### **Discussion-**

Soil is a basic life supporter for living organism. By reducing the unnecessary use of fertilizer during the cultivation of lands and for to enhance the soil vitality, we can improve the growth, development and productivity (B.V.Rama Krishna *et al*, 2016). The different soil parameters shows variation in their values due to the different different sites shows difference in soil quality (Borkar A.D., 2015). Such variation is observed during the present work. Limitation in nutrient availability have impact on plants growth and in turn food web and also the process of succession of plants and animals also get checked. The  $P^H$  of soil is one of most important factor of soil, basic or neutral  $P^H$  is usually important for cultivation of rice (Chandra Sharma,2015). Increased soluble salt level becomes difficult for plants for to extract the water from soil, in present work salt level is normal in all season. Use of fertilizers in farm without its proper knowledge may results in adverse effects on fertility of soil (Sharma,2004). According to (kiran G.Chaudhari, 2013) nutrient quality of soil of Yawal,Dist. Jalgaon shows the presence of nutrients in soil in medium to excess contents, this information will be helpful for farmers to solve the problem related to soil nutrients. Same observation was found in present work.

### **Conclusion-**

The study of physicochemical properties of soil is important as it provides information for plant growth and management of soil. From above investigation , it is concluded that soil samples does not shows much variation on seasonal basis but generally some nutrient found to be excess while some nutrients to be less. N is an important elements which is in lower amount in all seasons Soil. So, such fertilizers which contain N rich are added to soil for its proper growth and development of plants.

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