

Physico-Chemical Properties of The Soil of kakrajhor Forest, Belpahari, Jhargram and Joypur Forest, Bankura Region

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ABSTRACT

Physico-chemical properties of seven two sites of Jhargram and Bankura district of West Bengal has been studied in this paper. This study of soil is based on various parameters like pH, electrical conductivity, texture, moisture, temperature, soil organic matter, available nitrogen, phosphorus and potassium. The results of this study showed that soil samples are mostly sandy and acidic in nature. Colour of soil ranges from yellow to brown. Water holding capacity is maximum in Kankrajhore forest region and minimum in Joypur forest region.

Index Terms - Acidic, Organic Carbon, Physico-Chemical Structure, Soil Sample.

I. Introduction

The superficial layer of earth chest which can support vegetation is called soil. It has been derived from the Latin word "solum". It also acts as the reservoir of nutrients and water. Soil is composed with many living organisms, minerals and some organic materials. It is the main source of nutrients for all types of plants and organisms. For the all living organisms, these plants are the main source of food and nutrients. The soil is the most important compounds of agriculture to fulfilment of all the basic needs of human beings. The physico-chemical study of soil is based on various parameters. Quantify the physical, chemical and biological parameters soil play a very crucial role that impacts on the agricultural sustainability and productivity. Organic matter is the main part of soil which is the complex assemblage of small organic molecules. These organic molecules are collectively called humid substances. There are several studies have been done on physicochemical structure of soil. (Addis *et al.*, 2014; Castrignano *et al.*, 2000; Chamizo *et al.*, 2012; Chandra *et al.*, 2016; Dandwate, 2020; Ebere *et al.*, 2017; Ghare *et al.*, 2021; Medina *et al.*, 2012; Ramamurthy *et al.*, 2012; Shah *et al.*, 2016).

II. Material and Methods

The study has been undertaken in seven different natural forest sites of Jhargram and Bankura District of West Bengal. The quality test survey of the soil was done during two years (June, 2022 to October, 2023). Seven representative samples were collected in the depth of soil from seven different

forest sites of two different districts. During soil collection the soil surface was dig up to 16 cm depth from the top surface layer and soil sample were collected randomly, with sterile equipment. After collection, samples were packed in zip -locked plastic bag. Collected soil samples were taken to the laboratory and physico-chemical parameters of all collected samples are analysed following the standard methods. This analysis helps up for interpreting their correlation with the forest vegetation. (Table-1)

Table 1: Soil Physico-Chemical Parameters for The Samples Collected at The Selected Forest Site of Purulia and Jhargram District

| Name of the district | Forest site | Mechanical Analysis | | Colour | Water Holding capacity (%) | PH (1.3) | EC (dsm-1) | Oxidizable organic Carbon (%) | Available K(PPM) |
|----------------------|------------------------------------------|---------------------|----------|--------------|----------------------------|----------|------------|-------------------------------|------------------|
| | | Sand (%) | Clay (%) | | | | | | |
| BANKURA | Joypur site | 70 | 9 | Light brown | 61.14 | 7 | 0.92 | 0.64 | 308.50 |
| | Susunia Hill site | 66 | 3 | Light yellow | 56.9 | 6 | 0.83 | 2.66 | 252.2 |
| Jhargram | Kakrajhore forest site | 55 | 5 | Dark yellow | 70.3 | 4 | 0.96 | 3.68 | 266.3 |
| | Mayurjharna Elephant Reserve forest site | 59 | 4 | Black | 87.9 | 5 | 0.88 | 5.77 | 280.7 |
| | Khandarani lake forest site | 67 | 9 | Light Yellow | 55.7 | 7 | 0.56 | 7.66 | 323.5 |
| | Laljal Hill site | 45 | 8 | Deep Yellow | 77.23 | 9 | 0.49 | 9.7 | 502.66 |

III. Results and Discussion

Data analysis: Soil textural, physical and other characteristics of different study sites of Jhargram and Bankura District have been mentioned in Table-1. Different forest region of Jhargram district is covered with red and laterite soil. The silt content of different study site varies from 16% (susunia hill site) to 32% (Joypur forest site). The content of clay varies from 9% to 3 % where the site of Joypur forest site has the highest value and the Sunia hill site Forest Range has the lowest value. In Susunia hill site and Joypur Forest Range soil colour may be light and deep Yellow. Water holding capacity varies from 56.9 to 661.14% where the site Susunia hill site has the lowest value and the Joypur forest site has the highest value. The pH value of the soil varied from 7 (Joypur site forest) to 7.6 (Susunia hill site). The analysis further revealed that the highest available potassium content (308.50 ppm) found in the soil of Joypur forest and Susunia hill site forest the lowest available potassium content (252.2ppm). Different Forest regions of Jhargram district is covered with red and lateritic soil. The analysis reveals that the sand

content ranges from 48% to 72% where the site Kankrajhore forest range has the lowest value and the Belpahari Forest Range has the highest value. The silt content of different study site varies from 20% (Belpahari Forest Range) to 40% (Kankrajhore forest range). The content of clay varies from 5% to 8% where the site Laljal Hill site has the highest value. In Kakrajhore Forest site the soil may be Dark Yellow and in Mayurjharna Elephant Reserve Forest site and Khandarani Lake Forest site it may be black and light yellow. Water holding capacity varies from 87.9% to 55.7% where the Khandarani Lake Forest site range has the lowest value and the Mayurjharna Elephant Reserve Forest site has the highest value. The pH value of the soil varied from 4 (Kakrajhore Forest site Range) to 8 (Laljal Hill site forest) that is acidic in nature. The analysis further revealed that the highest available potassium content (502.66 ppm) found in the Laljal hill site forest range and the lowest available potassium content (266.3 ppm) found in the Mayurjharna Elephant Reserve Forest site and Khandarani lake forest site Range.

IV. Conclusion

Conclusively from study area soil samples on different forest ranges of Jhargram and Bankura Districts show slightly acidic soil and medium proportion of organic carbon. The majority of soil samples high status of available phosphorous was found in all soil samples of study site. The result of this study covers the effects of soil compaction on soil physical and chemical properties like moisture, soil texture, colour, water holding capacity, soil pH, EC, soil organic carbon content at different depths.

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