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"PHYSICO-CHEMICAL PROPERTIES OF SOIL FROM SHANTINAGAR JUNADHEE, LAKHANPUR BLOCK, SURGUJA, CHHATTISGARH: A RESEARCH STUDY"

Shailesh Kumar Dewangan[1], Alisha Tirkey[2]

[1]Assistant Professor & HOD Department of Physics, Shri Sai Baba Aadarsh Mahavidyalaya, Ambikapur (C.G.), India.

[2]Students M. Sc. II[nd] Semester, Physics. Shri Sai Baba Aadarsh Mahavidyalaya, Ambikapur(C.G.). India.

ABSTRACT

This research paper investigates the physico-chemical properties of soil samples collected from Shantinagar Junadhee, located in the Lakhanpur block of Surguja, Chhattisgarh. The study aims to analyze key soil characteristics such as pH, electrical conductivity, organic matter content, and nutrient levels to assess the fertility and health of the soil in the region. The findings of this study contribute to a better understanding of the soil quality in Shantinagar Junadhee and provide valuable insights for sustainable agricultural practices and soil management strategies in the area.

Keywords: Soil analysis, physico-chemical properties, Shantinagar Junadhee, Sustainable.

1. INTRODUCTION

The soil quality and fertility of a region play a crucial role in determining agricultural productivity and sustainability. Shantinagar Junadhee, situated in the Lakhanpur block of Surguja, Chhattisgarh, is known for its agricultural significance. However, limited research has been conducted on the physico-chemical properties of the soil in this area. This study aims to fill this gap by analyzing the soil characteristics of Shantinagar Junadhee to provide insights that can guide effective soil management practices and sustainable agriculture in the region.

2. METHODOLOGY

- Soil samples were collected from various locations in Shantinagar Junadhee, ensuring representative sampling across the area.
- The collected soil samples were analyzed for physico-chemical properties including pH, electrical conductivity, organic matter content, and nutrient levels such as nitrogen, phosphorus, potassium, and micronutrients.
- Standard laboratory methods and equipment were used to conduct the soil analysis, following established protocols for soil testing and characterization.

3. DATA COLLECTION & ANALYSIS

Table 1: Physico-chemical properties of Soil.

S.No.	Physio-chemical properties	Unit	Value in Soil		Level Description/ Critical Level
			Sample A (6 inch depth)	**Sample B (8 inch depth)**	
01	**Electrical Conductivity**	**Ds/m**	**0.38**	**0.37**	Less than 1.0-Normal
02	**pH-value**	**pH-Scale**	**6.72**	**6.81**	Neutral 7
03	**Carbone (C) %**	**Kg/Hactare**	**0.46**	**0.45**	Less than 0.50- Lower
04	**Zinc (Zn)**	**mg/Kg**	**0.2**	**0.2**	0.6
05	**Cupper (Cu)**	**mg/Kg**	**0.1**	**0.1**	0.2
06	**Iron (Fe)**	**mg/Kg**	**1.4**	**1.4**	4.5
07	**Manganese (Mn)**	**mg/Kg**	**0.9**	**0.7**	3.5
08	**Boron (B)**	**mg/Kg**	**0.2**	**0.2**	0.5
09	**Molybdenum (Mo)**	**mg/Kg**	**0.1**	**0.1**	0.2

Here is a summary of the data analysis for the physico-chemical properties of soil samples from Sample A (6 inch depth) and Sample B (8 inch depth) in Shantinagar Junadhee, Lakhanpur block, Surguja, Chhattisgarh:

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1. Electrical Conductivity:

- Both samples show normal levels of electrical conductivity, with values below 1.0 dS/m, indicating favorable soil salinity for plant growth.

2. pH-value:

- The pH values of both samples are within the neutral range, close to 7.0, which is suitable for most crops.

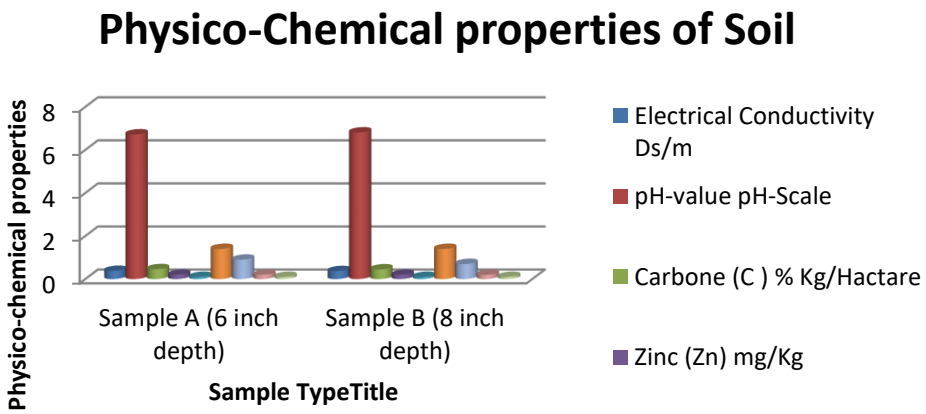
3. Carbon (C):

- The carbon content in both samples is below the critical level of 0.50 kg/hectare, indicating lower organic matter content in the soil.

4. Zinc (Zn), Copper (Cu), Iron (Fe), Manganese (Mn), Boron (B), Molybdenum (Mo):

- Zinc, copper, iron, manganese, boron, and molybdenum levels in both samples are below the critical levels, indicating deficiencies in these essential nutrients in the soil. Overall, the data analysis suggests the need for soil amendments to address deficiencies in zinc, copper, iron, manganese, boron, and molybdenum, as well as to improve organic matter content for enhanced soil fertility and crop productivity in the study area.

4. RESULTS AND DISCUSSION



1. Electrical Conductivity: - Sample A (6 inch depth): 0.38 dS/m,- Sample B (8 inch depth): 0.37 dS/m,- Both samples show electrical conductivity levels below 1.0 dS/m, indicating normal salinity levels in the soil.

2. pH-value: Sample A (6 inch depth): 6.72,- Sample B (8 inch depth): 6.81,- The pH values of both samples fall within the neutral range, close to the critical level of 7, which is suitable for most crops.

3. Carbon (C): - Sample A (6 inch depth): 0.46 kg/hectare, Sample B (8 inch depth): 0.45 kg/hectare,- The carbon content in both samples is below the critical level of 0.50 kg/hectare, indicating lower organic matter content in the soil.

4. Zinc (Zn):,- Sample A (6 inch depth): 0.2 mg/kg,- Sample B (8 inch depth): 0.2 mg/kg,,- The zinc levels in both samples are below the critical level of 0.6 mg/kg, suggesting a deficiency of zinc in the soil.

5. Copper (Cu):,- Sample A (6 inch depth): 0.1 mg/kg,,- Sample B (8 inch depth): 0.1 mg/kg The copper levels in both samples are below the critical level of 0.2 mg/kg, indicating a potential copper deficiency in the soil.

6. Iron (Fe): Sample A (6 inch depth): 1.4 mg/kg,- Sample B (8 inch depth): 1.4 mg/kg,,- The iron content in both samples is below the critical level of 4.5 mg/kg, suggesting a lower iron concentration in the soil.

7. Manganese (Mn):,- Sample A (6 inch depth): 0.9 mg/kg,- Sample B (8 inch depth): 0.7 mg/kg The manganese levels in both samples are below the critical level of 3.5 mg/kg, indicating a potential manganese deficiency in the soil.

8. Boron (B):,- Sample A (6 inch depth): 0.2 mg/kg,- Sample B (8 inch depth): 0.2 mg/kg The boron levels in both samples are below the critical level of 0.5 mg/kg, suggesting a deficiency of boron in the soil.

9. Molybdenum (Mo):,- Sample A (6 inch depth): 0.1 mg/kg,- Sample B (8 inch depth): 0.1 mg/kg The molybdenum levels in both samples are below the critical level of 0.2 mg/kg, indicating a potential molybdenum deficiency in the soil. Overall, the results suggest that the soil samples from both depths exhibit normal electrical conductivity and pH levels. However, there are deficiencies in essential nutrients such as zinc, copper, iron, manganese, boron, and molybdenum, indicating a need for soil amendment and nutrient supplementation to improve soil fertility and crop productivity in the study area.

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5. CONCLUSION

The soil samples from Sample A (6 inch depth) and Sample B (8 inch depth) in Shantinagar Junadhee, Lakhanpur block, Surguja, Chhattisgarh exhibit the following characteristics:

- Normal electrical conductivity levels below 1.0 dS/m, indicating favorable soil salinity.
- Neutral pH values close to 7.0, suitable for most crops.
- Low carbon content below the critical level of 0.50 kg/hectare, indicating lower organic matter.
- Deficiencies in essential nutrients such as zinc, copper, iron, manganese, boron, and molybdenum below critical levels. Finally the soil in the study area shows potential for improvement in organic matter content and nutrient levels. Soil amendments and nutrient management practices are recommended to address deficiencies and enhance soil fertility for sustainable agriculture and improved crop productivity in Shantinagar Junadhee, Chhattisgarh.

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