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PHYSICO-CHEMICAL PROPERTIES OF SOIL IN BHAIYATHAN, SURAJPUR DISTRICT OF CHHATTISGARH: A RESEARCH STUDY

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ABSTRACT

This research paper investigates the physico-chemical properties of soil in Bhaiyathan, Surajpur District of Chhattisgarh. The study aims to assess key soil characteristics such as electrical conductivity, pH value, carbon content, and concentrations of essential nutrients including zinc, copper, iron, manganese, boron, and molybdenum. Soil samples were collected from different depths and analyzed in the laboratory to determine their properties. The findings provide valuable insights into the fertility and nutrient status of the soil in the study area, guiding recommendations for sustainable agricultural practices and soil management.

Keywords: Soil, Physico-Chemical Properties, Bhaiyathan, Nutrient Analysis, Soil Fertility.

1. INTRODUCTION

Bhaiyathan in Surajpur District, Chhattisgarh, is known for its agricultural significance, with farming being a primary occupation of the local community. Understanding the physico-chemical properties of soil in this region is crucial for optimizing agricultural productivity and sustainable land use. This research aims to analyze various soil parameters to assess soil fertility and nutrient status in Bhaiyathan.

Geographical location: Latitude 23.368515^0 and zLongitude- 83.026857^0

2. METHODS

Soil samples were collected from multiple locations in Bhaiyathan at different depths, including surface and sub-surface layers. The samples were analyzed for electrical conductivity, pH value, carbon content, and concentrations of zinc, copper, iron, manganese, boron, and molybdenum using standard laboratory procedures. Data analysis was conducted to evaluate the soil properties and nutrient levels in the study area.

Table 1: Physico-chemical properties of Soil.

S.No.	Physio-chemical properties	Unit	Value in Soil		Level Description/ Critical Level
			Sample A	**Sample B**	
01	**Electrical Conductivity**	**Ds/m**	**0.38**	**0.37**	Less than 1.0-Normal
02	**pH-value**	**pH-Scale**	**6.05**	**6.41**	Neutral 7
03	**Carbone (C) %**	**Kg/Hactare**	**0.49**	**0.45**	Less than 0.50- Lower
04	**Zinc (Zn)**	**mg/Kg**	**0.3**	**0.3**	0.6
05	**Cupper (Cu)**	**mg/Kg**	**0.1**	**0.1**	0.2
06	**Iron (Fe)**	**mg/Kg**	**0.8**	**0.9**	4.5
07	**Manganese (Mn)**	**mg/Kg**	**2.1**	**2.2**	3.5
08	**Boron (B)**	**mg/Kg**	**0.2**	**0.2**	0.5
09	**Molybdenum (Mo)**	**mg/Kg**	**0.1**	**0.1**	0.2

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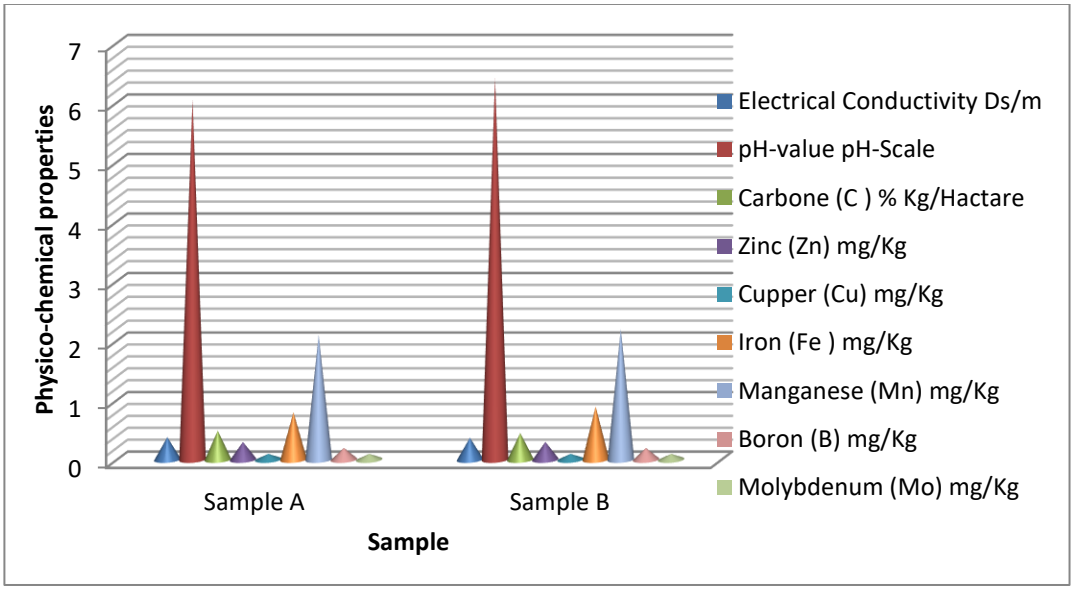
3. RESULTS & DISCUSSION:



1. Electrical Conductivity: Sample A: 0.38 dS/m, Sample B: 0.37 dS/m

Both samples exhibit low electrical conductivity levels, indicating normal soil salinity suitable for plant growth and agricultural activities. Low electrical conductivity is generally favorable for most crops as it indicates low levels of salts in the soil.

2. pH-value: Sample A: 6.05, Sample B: 6.4

The pH values of both samples are slightly acidic but still fall within an acceptable range for many crops. However, it is important to monitor and potentially adjust the pH levels to ensure optimal nutrient availability for plant growth.

3. Carbon Content: Sample A: 0.49% Kg/Hectare, Sample B: 0.45% Kg/Hectare

Sample A has a higher carbon content compared to Sample B, indicating better organic matter levels. Organic matter is essential for soil fertility, water retention, and overall soil health.

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

Zinc and Copper levels are consistent between Sample A and Sample B, indicating no significant difference in these nutrient concentrations. Iron levels are slightly higher in Sample B compared to Sample A. Manganese levels are similar in both samples. Boron and Molybdenum concentrations are consistent between the two samples. Overall, the results suggest that both samples have favorable physico-chemical properties for plant growth, with minor variations in pH, carbon content, and iron levels. It is important to focus on maintaining adequate organic matter levels and monitoring nutrient concentrations to support healthy soil and sustainable crop production. Regular soil testing and appropriate nutrient management practices are recommended to optimize soil fertility and productivity in the study area.

4. CONCLUSION

The soil samples from Sample A and Sample B exhibit similar physico-chemical properties with minor differences in pH, carbon content, and iron levels. Overall, both samples show characteristics that are conducive to plant growth and agricultural activities.

1. Electrical Conductivity:

- Both Sample A and Sample B have low electrical conductivity levels of 0.38 dS/m and 0.37 dS/m, respectively, indicating normal soil salinity suitable for plant growth.

2. pH-value:

- Sample A has a pH of 6.05, while Sample B has a pH of 6.41, both falling within an acceptable range for most crops. Monitoring and adjusting pH levels may be necessary for optimal nutrient availability.

3. Carbon Content:

- Sample A has a slightly higher carbon content of 0.49% Kg/Hectare compared to Sample B's 0.45%, indicating better organic matter levels in Sample A.

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

- Zinc, Copper, Boron, and Molybdenum levels are consistent between Sample A and Sample B.
- Sample B has a slightly higher iron level (0.9 mg/Kg) compared to Sample A (0.8 mg/Kg).
- Manganese levels are similar in both samples at 2.1 mg/Kg and 2.2 mg/Kg.

In conclusion, both soil samples exhibit favorable characteristics for plant growth, with minor variations in pH, carbon content, and iron levels. It is recommended to monitor soil properties regularly and consider adjustments to pH levels and organic matter content to maintain soil health and optimize nutrient availability for sustainable agriculture practices in the study area.

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