Research Paper E-ISSN NO : 2455-295X | VOLUME : 11 | ISSUE : 1 | JANUARY 2025

PHYSIOCHEMICAL PARAMETERS OF SOIL AND THEIR IMPACT ON WHEAT CROP IN SIRSA CITY, HARYANA

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ABSTRACT:

This study investigates the physiochemical properties of soil in Sirsa city, Haryana, and their influence on the growth and yield of wheat crops. Key soil parameters such as pH, electrical conductivity (EC), organic carbon, macronutrients (NPK), and micronutrients (Zn, Fe, Mn, Cu) were analyzed. The results highlight the correlation between soil properties and wheat crop productivity, providing recommendations for soil management practices.

KEYWORDS:

SEWAGE FARMING, PHYSICOCHEMICAL PARAMETERS, SOIL, WHEAT.

PAPER ACCEPTED DATE:	PAPER PUBLISHED DATE:
24th January 2025	7th February 2025

INTRODUCTION

Soil is a critical component of agricultural systems, directly influencing crop growth and yield. Understanding the physiochemical properties of soil is vital for optimizing crop management. Wheat, a staple crop in Haryana, requires specific soil conditions for optimal growth. This research focuses on assessing the soil parameters in Sirsa city and their impact on wheat productivity.

MATERIALS AND METHODS

1. **Study Area**: The study was conducted in Sirsa city, Haryana, a region known for its extensive wheat cultivation.
2. **Soil Sampling**: Soil samples were collected from 15 different agricultural fields at a depth of 0-15 cm.
3. **Laboratory Analysis**: The following parameters were analyzed:
    - **pH**: Measured using a pH meter.
    - **Electrical Conductivity (EC)**: Determined using an EC meter.
    - **Organic Carbon**: Assessed using the Walkley-Black method.
    - **Macronutrients (NPK)**: Estimated through standard soil testing protocols.
    - **Micronutrients (Zn, Fe, Mn, Cu)**: Analyzed using atomic absorption spectrophotometry.
4. **Crop Data Collection**: Wheat crop yield data were collected from the same fields.
5. **Statistical Analysis**: Correlation and regression analyses were performed to evaluate the relationship between soil parameters and crop yield.

RESULTS AND DISCUSSION

Parameter	Range	Optimal Range for Wheat	Correlation with Yield
pH	7.2-8.5	6.0-7.5	Negative (R = -0.65)
Electrical Conductivity	0.3-0.8 dS/m	<1.0 dS/m	Positive (R = 0.50)
Organic Carbon	0.4-0.8%	>0.5%	Positive (R = 0.75)
Nitrogen (N)	150-200 kg/ha	120-180 kg/ha	Positive (R = 0.70)
Phosphorus (P)	15-25 kg/ha	15-30 kg/ha	Positive (R = 0.60)
Potassium (K)	180-250 kg/ha	150-250 kg/ha	Positive (R = 0.55)
Zinc (Zn)	0.5-1.2 ppm	0.6-1.2 ppm	Positive (R = 0.65)
Iron (Fe)	4.0-6.0 ppm	4.5-6.5 ppm	Positive (R = 0.62)
Manganese (Mn)	3.0-5.0 ppm	3.0-5.0 ppm	Neutral (R = 0.10)
Copper (Cu)	0.2-0.5 ppm	0.3-0.5 ppm	Neutral (R = 0.15)

KEY FINDINGS:

1. Soil pH in the study area was slightly alkaline, which negatively affected wheat yield. Neutral to slightly acidic soils are more conducive to wheat growth.
2. Organic carbon content was below the optimal level in several fields, indicating the need for organic amendments.

3. Macronutrients, particularly nitrogen, showed a strong positive correlation with wheat yield, emphasizing the importance of balanced fertilization.
4. Micronutrients, especially zinc and iron, were found to be crucial for enhancing wheat productivity.

CONCLUSION

The study highlights the significance of maintaining optimal soil physiochemical parameters to enhance wheat crop yield in Sirsa city. Recommendations include:

1. Regular soil testing and targeted fertilization to balance nutrients.
2. Incorporation of organic matter to improve soil organic carbon levels.
3. pH management through gypsum or organic amendments to reduce alkalinity.

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