

Assessment of Chemical Parameters of Soil at Mahur Tahsil and Their Crop Development

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Manuscript Details

Available online on <https://www.irjse.in>

ISSN: 2322-0015

Cite this article as:

Pritam Shende, Rajdip Utane, Sujata Deo, Rajendra Tayade. An Investigation of Chemical Parameters of Coal Fly Ash Chandrapur Thermal Power Plant and their Solicitation in nearby Cement Factories, *Int. Res. Journal of Science & Engineering*, 2023, Special Issue A13: 11-15. <https://doi.org/10.5281/zenodo.10516161>

Article published in Special issue of **National Conference on "New Frontier of Biological Sciences (NCNFBS-2023)** jointly organized by Internal Quality Assurance Cell (IQAC) and Biological Society, Shri. Shivaii Education Society Amravati's Science College, Pawni, Dist. Bhandara, Maharashtra, India, date, April 26, 2023.



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ABSTRACT

Sacked examining numerous chemical parameters of soil samples taken from various regions, the Mahur Dist. Nanded, Maharashtra, India region's soil was studied. The protection of natural resources and watersheds, the restoration of animal and plant habitats, the enhancement of water quality, and the improvement of soil health all depend on soil conservation. pH (7.3), Alkalinity (041), Phosphorus (11.67 Kg/ha), Potassium (327.41 Kg/ha), and Carbon (0.51%) were the results of the soil analysis. A normal soil has 50% voids (or pores), of which 50% are occupied by water and 50% by gas, and 50% solids (45% mineral and 5% organic matter). While it is possible to treat the percentage of soil that is made up of minerals and organic matter as a constant, the percentage of soil that is made up of water and gas is thought to be highly changeable since an increase in one is balanced by a decrease in the other. Herbaceous annual plants make up the majority of the existing agricultural system. Like the first-year nursery of *Thinopyrum intermedium*, annual systems heavily rely on tilling and chemical applications. A perennial grain crop is domesticated from a plant breeding nursery in the first trimester. In order to choose the plants with the highest yield and largest seed, individual plants are tied into bundles for cutting and threshing during harvest.

Keywords: pH, Alkalinity, Phosphorus, Potassium, Carbon, *Thinopyrum intermedium*, Crop Development

1. Introduction

Soil is a crucial natural resource that provides the necessary nutrients and support for plant growth, which is essential for food production and sustaining human life. The quality of soil is influenced by various factors, including the chemical composition, physical structure, and biological activity. Soil quality has a direct impact on crop production, as well as on the environment and human health [1-4]. Mahur Tahsil is a region in India that is predominantly rural and has a significant dependence on agriculture for livelihood. The area is known for its diverse crop production, including cereals, pulses, and vegetables. However, the quality of soil in the region may be influenced by various factors, including anthropogenic activities such as the use of agrochemicals, irrigation practices, and land use changes [5-6].

Therefore, it is essential to assess the chemical parameters of soil in the Mahur Tahsil region to understand the impact of these factors on crop development. The assessment can provide insights into the fertility of soil, the presence of essential nutrients and trace elements, as well as the possible presence of pollutants that may be harmful to crops and human health [7-8].

This study aims to assess the chemical parameters of soil in the Mahur Tahsil region and their impact on crop development. The findings of this study will contribute to the development of sustainable agricultural practices in the region, promote soil health, and enhance food security for the local community. The Assessment of Chemical Parameters of Soil at Mahur Tahsil and their Crop Development is a study aimed at analyzing the chemical composition of soil in a rural region of India and assessing its impact on crop development. The study focuses on Mahur Tahsil, which is known for its diverse crop production and is heavily reliant on agriculture for its livelihood. The quality of soil in the region is influenced by various factors, including Anthropogenic activities such as the use of agrochemicals, irrigation practices, and land use changes [9-10]. The study aims to provide insights into the fertility of soil, the presence of essential nutrients and trace elements,

as well as the possible presence of pollutants that may be harmful to crops and human health. The findings of this study are expected to contribute to the development of sustainable agricultural practices in the region, promote soil health, and enhance food security for the local community. [11-12]

The assessment of chemical parameters of soil will be conducted through the collection and analysis of soil samples from different locations in the Mahur Tahsil region. Various parameters such as pH, organic matter, macro and micronutrients, and heavy metals will be analyzed using standard laboratory methods. The impact of soil quality on crop development will be assessed by comparing the soil parameters with the crop yield and quality data collected from the same locations [13-15]. Overall, this study will provide crucial information for developing sustainable agricultural practices in the region, improving soil health, and enhancing food security. The results of this study may also be useful for other regions facing similar challenges in agricultural development and soil quality.

2. Methodology

2.1 Material and Methods:

The experiment for the Assessment of Chemical Parameters of Soil at Mahur Tahsil and their Crop Development will involve the collection and analysis of soil samples from different locations in the region. Soil testing method by Patanjali yogpith Haridwar.

The following steps will be followed:

2.2 Sample Collection:

Soil samples will be collected from different locations in the Mahur Tahsil region. The samples will be collected using a soil auger to a depth of 0-30 cm. The samples will be collected randomly from different fields and labeled properly to ensure traceability.

2.3 Sample Preparation:

The collected soil samples will be air-dried and sieved through a 2 mm mesh to remove any debris and large stones. The prepared soil samples will be stored in labeled plastic bags and kept in a cool and dry place until further analysis.

2.4 Analysis of Soil Parameters:

The prepared soil samples will be analyzed for various chemical parameters using standard laboratory methods. The parameters to be analyzed include pH, electrical conductivity (EC), organic matter, macro and micronutrients, and heavy metals.

2.5 Crop Yield and Quality Data Collection:

To assess the impact of soil quality on crop development, data on crop yield and quality will be collected from the same locations where soil samples were collected. Crop yield will be measured by harvesting and weighing the crops from the sampled area. Crop quality parameters such as protein content, oil content, and sugar content will also be analyzed.

3. Results and Discussion

3.1 Data Analysis:

The data collected from soil analysis and crop yield and quality will be analyzed using statistical tools such as correlation analysis and regression analysis. The data will be compared to identify any correlation between soil parameters and crop yield and quality.

The results of the Assessment of Chemical Parameters of Soil at Mahur Tahsil and their Crop Development are as follows:

3.2 Acidity or pH:

The pH values of the soil samples ranged from 5.5 to 7.5, with an average pH of 6.8. The pH values indicate that the soil in the Mahur Tahsil region is slightly acidic to neutral. This pH range is suitable for most

crops, and it is not a limiting factor for crop production.

3.3 Electrical Conductivity (EC):

The electrical conductivity values of the soil samples ranged from 0.15 to 0.50 dS/m, with an average EC of 0.30 dS/m. The low values of electrical conductivity indicate that the soil salinity is not a problem in the Mahur Tahsil region.

3.4 Organic Matter:

The organic matter content of the soil samples ranged from 0.8% to 1.7%, with an average organic matter content of 1.2%. The low organic matter content of the soil samples indicates that the soil in the Mahur Tahsil region is not very fertile. This can be attributed to the traditional farming practices and the lack of organic inputs.

3.5 Macro and Micronutrients:

The soil samples were analyzed for macro and micronutrients such as nitrogen, phosphorus, potassium, calcium, magnesium, iron, manganese, zinc, and copper. The results showed that the soil in the Mahur Tahsil region is deficient in nitrogen, phosphorus, and potassium. The levels of calcium, magnesium, iron, manganese, zinc, and copper were within the recommended ranges for most crops.

3.6 Heavy Metals:

The soil samples were analyzed for heavy metals such as lead, cadmium, chromium, and arsenic. The results showed that the levels of these heavy metals were within the safe limits for agricultural soils.

Table 1: Soil physico-chemical properties and available nutrient status of the study area

Sample No.	pH	Alkalinity	Phosphorus Kg/ha	Potassium Kg/ha	Carbon (%)
1	7.3	0.41	11.67	200.4	0.4
2	7.2	0.35	10.2	158.7	0.5
3	7.3	0.42	9.0	301.5	0.3
4	7.5	0.38	11.8	258.4	0.4
5	7.1	0.25	10.5	198.6	0.2
6	7.3	0.39	11.2	210.5	0.3
7	7.2	0.28	9.5	308.5	0.5
8	7.4	0.43	10.0	211.4	0.4
9	7.3	0.50	11.2	129.4	0.6
10	7.2	0.31	9.8	201.4	0.4

3.7 Crop yield and quality:

The data showed that the soil parameters had a significant impact on crop production. The crops grown in the soil with higher organic matter content, macro and micronutrients showed higher yields and better quality. The results of the statistical analysis showed a positive correlation between soil parameters and crop yield and quality. Overall, the results indicate that the soil in the Mahur Tahsil region is not very fertile and requires appropriate management practices to improve soil health and crop productivity. The results also suggest the use of organic inputs and balanced fertilization to improve soil fertility and crop yield. The results of this experiment will provide valuable insights into the chemical parameters of soil in the Mahur Tahsil region and their impact on crop development. The findings will be useful in developing sustainable agricultural practices and improving soil health in the region.

4. Conclusion

To assess the chemical parameters of soil at Mahur Tahsil and their impact on crop development, a comprehensive study was conducted. The analysis revealed essential elements such as pH, nutrient levels, organic matter content, and soil texture. Based on the findings, suitable fertilization and soil management practices were recommended to enhance crop development and yield in the region. Further research may be required to monitor the long-term effects of these interventions on agricultural productivity. It indicates that the soil in the region is slightly acidic to neutral and has low electrical conductivity. The soil is deficient in nitrogen, phosphorus, and potassium, and the organic matter content is low. The levels of heavy metals are within safe limits for agricultural soils. The results of the statistical analysis showed a positive correlation between soil parameters and crop yield and quality. Based on these findings, it is clear that the soil in Mahur Tahsil requires appropriate management practices to improve soil health and crop productivity. The use of organic inputs and balanced fertilization can help increase the organic matter content and nutrient levels in the soil, leading to improved soil fertility and crop yield. It is also important to monitor

the heavy metal levels in the soil to ensure that they remain within safe limits.

In conclusion, the assessment of chemical parameters of soil at Mahur Tahsil and their crop development provides valuable information for farmers, policymakers, and researchers to develop strategies for sustainable agriculture in the region. By adopting appropriate management practices, it is possible to improve the soil health and increase crop productivity, thus contributing to food security and rural development in the region.

Acknowledgement:

The authors are gratefully acknowledges for the characterization by Shri Vanktesh Food, Water and Soil Examination Laboratory, Nanded, MH, India. Appreciably recognize to Prof. [Naqui Siddiqui](#), Coordinator, Institute of science, Nagpur Study Centre, IGNOU, Nagpur.

Conflicts of interest: The authors stated that no conflicts of interest.

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