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ANALYSIS OF SOIL SAMPLE TO DETERMINE ITS PHYSICAL AND CHEMICAL PARAMETER FROM ROHTAK DISTRICT, HARYANA

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ABSTRACT:

Soil is a intricate and dynamic natural resource that plays a important role in agriculture and environmental sustainability. The physicochemical properties of soil is essential for crop production and environmental conservation. A number of of factors, including soil pH, electrical conductivity (EC), phosphorus (P), potassium (k), sulfur and organic carbon, determine the physichochemical qualities of soil. After Fifteen sample soil samples were taken at a depth of 0.02 meters, their pH values ranged from 7.20 to 8.30, indicating that soils were neutral to slightly alkaline. The conductivity was ranging from 0.15-1.18 ds/m , phosphorous was ranging from 2.79-9.89 kg/ha, organic carbon was found to be 0.24-0.72 and potassium 44.07-450.74 kg/ha, sulphur 40.07- 410.30ppm.This analysis provides valuable information for farmers that promotes agricultural productivity.

Keywords: Conductivity, Agricultural, Environmental, physichochemical.

1. Introduction

Understanding the physical and chemical characteristics of soil is essential for increasing agricultural output, as crop productivity will rise and nutrient waste will decrease when nutrient are used optimally based on soil analysis. The study should concentrate on a particular crop farmed in a specific location and look at the farming methods used by farmers. The results of the soil study validate which fertilizer was suggested as the real link between agricultural research and practical implementation in farmer fields. Farmers apply chemical fertilizers and pesticides to plants without first conducting a soil analysis. The long-term use of chemical fertilizers gradually altered the qualities of the soil, which could lead to a decrease in productivity. Chemicals have leached into surface and groundwater as a result of it [1-3].

The solution of this problem is soil analysis by which farmers knowing the proper use of fertilizers. For farming soil is most important component. Soils are 5% organic matter, 25% water,45% mineral particle size and 25% air etc. A combination of texture, structure, chemistry, color and temperature make up soil's characteristics. Sand particles are often the largest among the various sized particles found in soil [4]. This study aims to quantify the nutritional content of soil in the state of Lakhan Majra Haryana. This work's primary goal is to evaluate the soil's current condition.

A physic-chemical examination was conducted on Fifteen representative samples that were gathered from different location of the lakhan Majra. The purpose of the analysis was to determine several parameters like pH, Electrical conductivity, potassium, phosphorous, organic carbon, Sulphur.

2. Material and methods

Fifteen surface soil (0.02 m) samples from three different regions of Lakhan Majra of Haryana state was collected for analysis.

2.1 Physicochemical analysis

Physical and chemical parameter of soil quality, such as soil pH, electrical conductivity, phosphorus, potassium, organic carbon were examined in the gathered sample [5-8]. Methods used for estimation of parameters is mention in Table1.

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Table1

Sr. No.	Parameter	Method
1	colour	By viewing
2	pH	Pontentiometry
3	Electrical-conductivity	Conductometry
4	Available Potassium	Neutral normal ammonium acetate
5	Available phosphorous	Bray's method
6	Organic carbon	wakley black method

3. Result and discussion

Physical parameters of fifteen different location of Lakhan Majra is present in Table 2.

Sr. No	Lakhan-Majra	pH	EC(ds/m)	Phosphorus (P) Kilo/hectare	Potassium (K) Kilo/hectare	Carbon (C) %	Colour
1	Kharak-Jatan	7.90	0.15	4.84	140.15	0.72	Black
2		7.90	0.18	4.74	156.74	0.63	Black
3		7.90	0.22	2.79	115.84	0.24	Black
4		7.90	0.23	3.79	122.92	0.39	Black
5		7.90	0.27	3.76	132.19	0.72	Black
6	Nandal	7.70	0.62	4.04	44.07	0.57	Black
7		7.80	0.79	5.07	45.67	0.57	Black
8		7.90	0.98	4.80	56.19	0.60	Black
9		7.80	0.99	3.99	49.57	0.63	Black
10		7.60	1.00	3.99	50.12	0.60	Black
11	Bainsi	8.30	1.08	9.89	407.10	0.69	Black
12		8.40	1.12	7.47	230.84	0.63	Black
13		8.20	1.15	9.06	406.56	0.72	Black
14		8.30	1.16	9.76	452.64	0.72	Black
15		8.30	1.18	9.18	450.74	0.63	Black

3.1. pH

The soil's pH level is its most significant property. All other parameters effects by it. Therefore, to analyse any kind of soil, pH is considered. Soil typically has a pH between 6.5 and 8.5. soil is classified as acidic if its pH is less than 6 and as alkaline if it greater than 8.5. Using a buffer solution with a pH of 4.0 and 7.0 as a reagent, a potentiometric pH meter was used to measure the pH of soil. These soil samples' pH values are higher than 7, indicating a somewhat alkaline state. Graphical representation of pH is illustrated in figure 1

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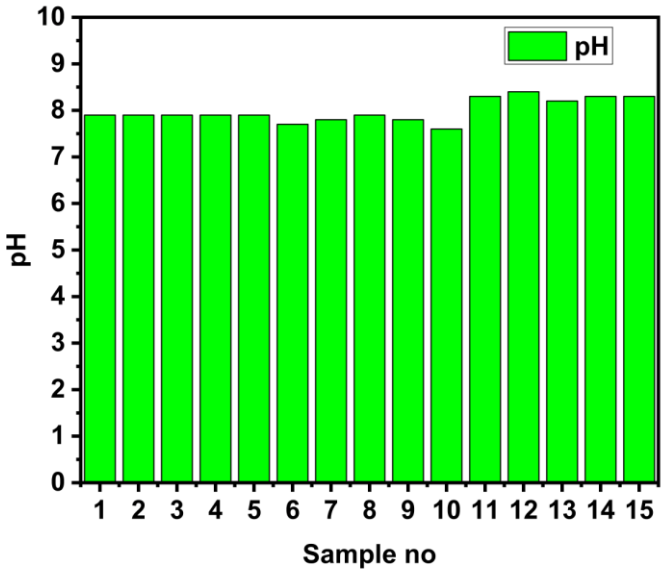

3.2. Electrical conductivity

The soil's electrical conductivity is a crucial characteristic. It displays the total amount of soluble salts in the soil. The amount of ions in a soil sample is measured by conductivity [9]. As the concentration of ions increases, so does the EC of the soil solution. The amount of ions in the soil solution is measured by EC. EC quickly and easily assesses the condition of soils. If the conductivity value is less than 4 ds/m, it is considered normal. The research area's EC varies from 0.15 to 1.8 ds/m, indicating that the EC values of the soil samples were lower.

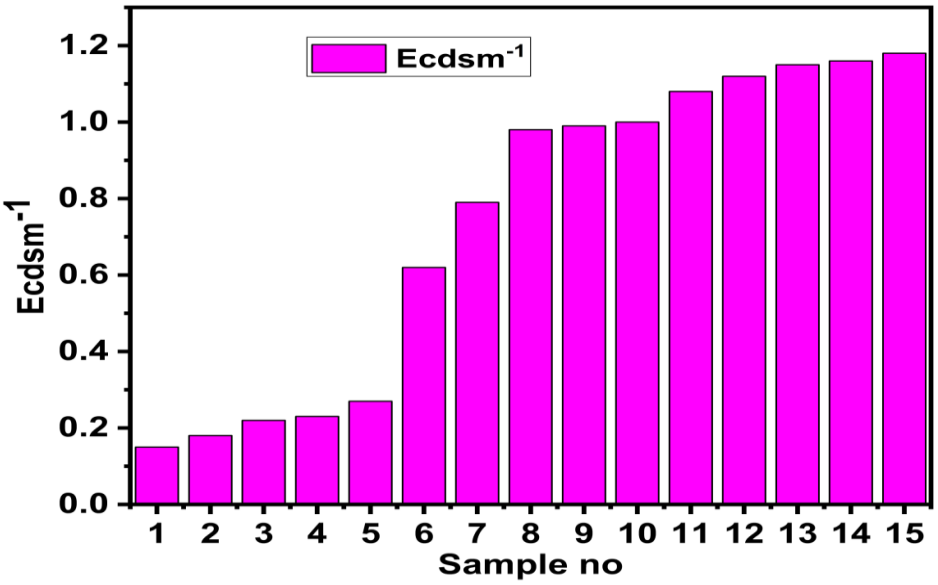

Figure 2 Electrical conductivity against sample no.

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3.3. Phosphorous

In every living cell phosphorous is the most important element. It is the master key element in soil quality. It is essential for growth, cell division root growth and elongation seed [9]. Phosphorous act as an energy storage and transfer. Phosphorous normal range lies between 23-57kg/ha. In this study area phosphorous range 2.79-9.89 kg/ha. Phosphorous is very low in all soil samples.

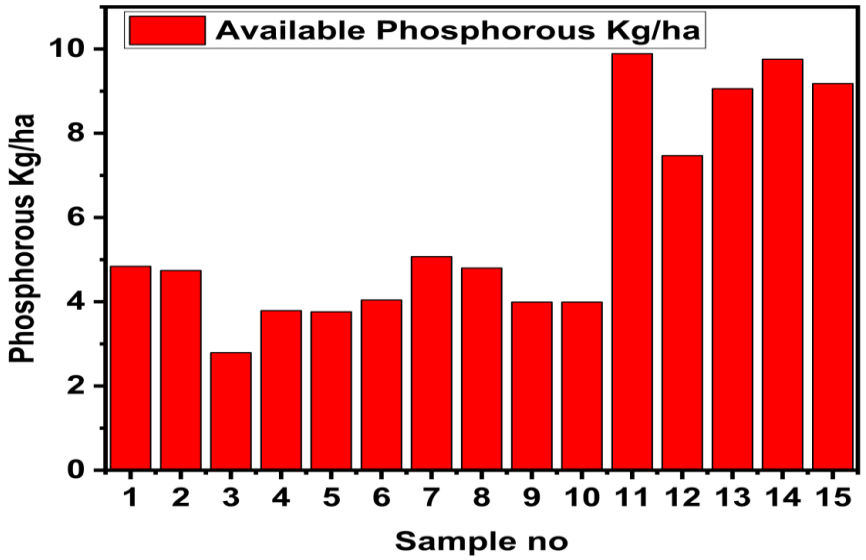

Figure 3 Fertility status of study area

3.4. Potassium

Potassium is a necessary nutrient for plants and it plays several vital roles in soil and plant health. It is one of the primary macronutrients required by plants. The normal range of potassium is 145-337 kg/ha. Available potassium content of bainsi is ranges from 230.84-452.64 kg/ha which is very high, For kharak-jatan it is 122.92-156.74 kg/ha and for Nandal it is 44.07-50.12 kg/ha . In nandal area potassium is very low.

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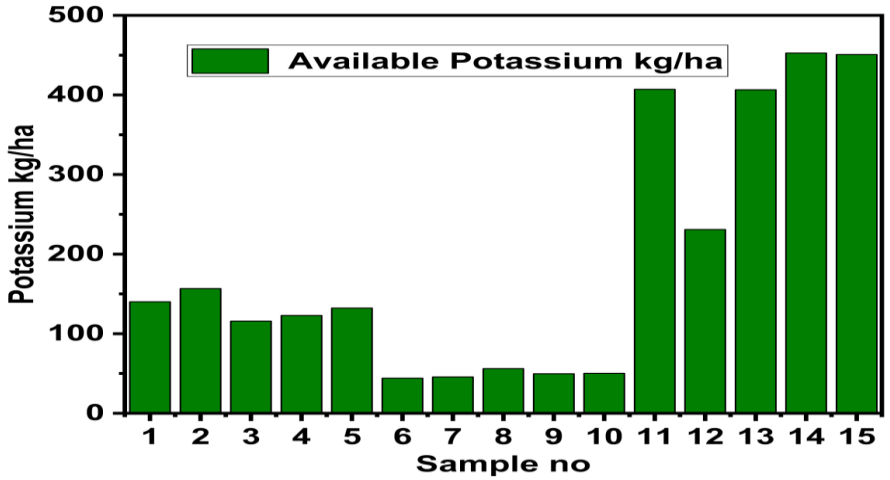

Figure 4 Fertility status of study area

3.5 Organic carbon

Carbon is vital component of soil. It is an important of soil that contributes to soil fertility. Its presence are essential for soil function and growth of plants. It improves soil health and fertility. Organic ranges from 0.24-0.72%. Majority of soil sample shows medium proportion of organic carbon.

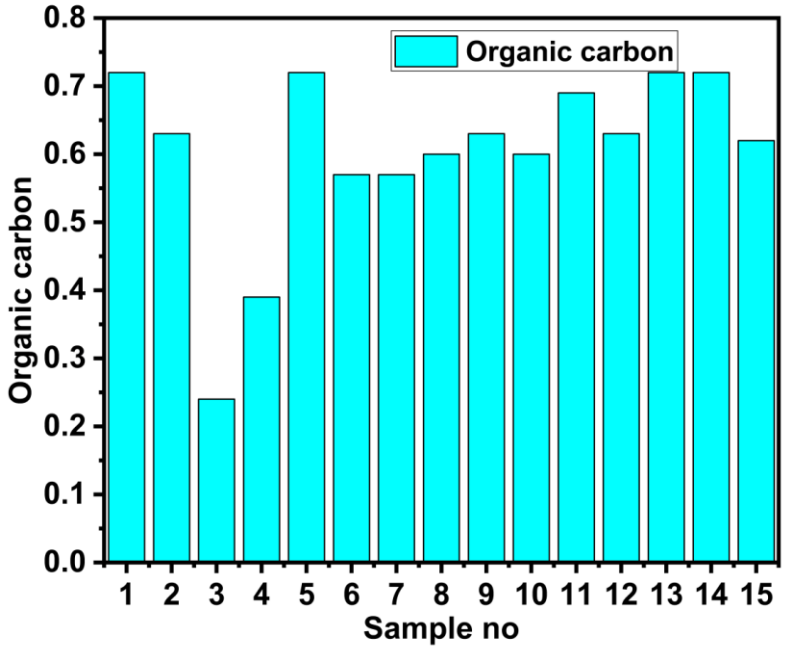

Figure 5 Organic carbon against sample no.

3.6. Sulfur

Sulphur is an essential nutrients in the soil, such as phosphorus. Plants require sulphur for proper growth and development, it is needed in very low amount. Sulfur deficiency causes serious plant health problem, it reduced plant growth and lower crop yields. In this study area sulfur is in sufficient amount.

4. Conclusion

This study's finding indicate that most soil samples were found to be acidic in nature, and all soil samples had low phosphorus status. A sample of soil reveals a moderate amount of organic carbon. Intense cultivation and planting of income crops like cotton, sugarcane and vegetables are associated with increased nutrient fertility in irrigated areas. Farmers can use this generated information on the status of nutrients as useful tool.

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Declarations

The author declare that there is no competing of interest.

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