Physical And Chemical Characteristics Of Soil Samples In Jind District, Haryana

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Abstract:

Soil is an essential component for agriculture. It is an important constituent to fulfilment of all the basic needs of human beings. The growth of plants and production of agriculture is depends on physico-chemical properties of soil. The physico-chemical study of soil is depend upon various parameters like pH, electrical conductivity, organic carbon, sulphur, phosphorus, potassium. A twenty soil samples were collected at the depth of 0-15 cm and analyzed the soil. This study of physico-chemical properties of soil helps the farmers to know the sufficient amount of fertilizers to be added in soil to make good production.

Keywords: agriculture, conductivity, organic, farmers

1. Introduction

In the intricate arrangement of topographical ecosystem, soil acts as the silent architect, holding a complex matrix teaming with sustainability of life on earth. The physical and chemical composition of soil is aintricate interplay which influences plant growth, nutrient and overall ecosystem health. India is primarily an agricultural country. Indian farmers relies on the extent and soil quality. The quality of soil is determined by the climate, natural vegetation and rocks. Soil contains 5-25% air, 25-35% water and 50-60% mineral[1]. These are numerous methods for analyzing the chemical and nutrients properties of the soil[2]. To improve the soil fertility, agricultural productivity and production soil analysis is

important. Because optimal use of nutrients based on soil analysis will increase crop productivity and reduce waste of these nutrients. In this research work research is conducted on the crop in a specific area, as well as the management practices of the concerned farmers. The soil analysis result confirms which fertilizer suggested was the actual connecting link between agricultural research and its practical application in the fields of the farmers. For better plant growth farmers use fertilizers without knowing actual quantity of fertilizer needed in plant growth. Solution to this problem is soil analysis. Because soil analysis improve the crop production. Analysis is based upon various physical and chemical properties like- pH, organic carbon, phosphorus, electrical conductivity,
potassium[3][4][5][6][7][8][9].

In this work an attempt to analysis the amount of nutrients in soil of srfabad and shanpur , Jind.

2. Methodology

Material

Twenty samples were collected from sarfabad and shanpur. Ten from sarfabad and ten samples from shanpur. The soil sample are collected in transparent polythene bag (from the 0 to 15cm depth) from the field and stored at 30^{o}C-35^{o}C temperature in oven until use.

Methods

For physico-chemical properties all twenty samples were brought to laboratory. Colour of soil is determined by viewing and pH of soil is determined by potentiometry and electrical conductivity is determined by conductometry and walkley black method[10] is used to determine organic carbon and potassium is analysis by neutral normal ammonium $NH_4CH_3CO_2$ accetate, phosphorous is determined by brays method[11].

3. Result and Discussion

The values of physical and chemical parameters are present in table1.

Table 1 physical and chemical parameters of study area

S.NO	PH	EC(ds/m)	OC(%)	PHOSPHOROUS (kg/ha)	POTASSIUM (kg/ha)	SULPHUR (ppm)
1	7.5	0.48	0.45	12.2	395	135
2	7.8	0.56	0.48	13	350	116
3	7.6	0.52	0.4	16.2	345	101
4	7.4	0.45	0.34	9.2	420	131
5	7.9	0.6	0.42	9.5	375	95
6	8.2	0.55	0.46	10.5	345	118
7	7.4	0.64	0.45	13.7	565	104
8	8.1	0.72	0.34	10	575	89
9	7.9	0.49	0.3	14	565	102
10	7.6	0.43	0.27	11.2	575	113
11	7.4	0.6	0.33	15.5	495	102
12	7.9	0.54	0.42	10	435	111
13	8.2	0.58	0.28	12.7	505	97
14	7.4	0.6	0.19	16	615	111
15	8.1	0.7	0.3	13	445	105
16	7.9	0.81	0.22	16.2	430	95
17	7.6	0.61	0.39	14.5	400	96
18	7.4	0.72	0.31	16.5	420	121
19	8.1	0.5	0.42	14.7	430	113
20	7.9	0.64	0.3	12	445	99

	7.9					

3.1 pH

The alkalinity of soil can be determine by soil pH. To determine the capacity of soil pH is very important. pH of soil affects crop growth. In this work the value of pH is in between 7.4 to 8.2. which shows normal pH of soil.

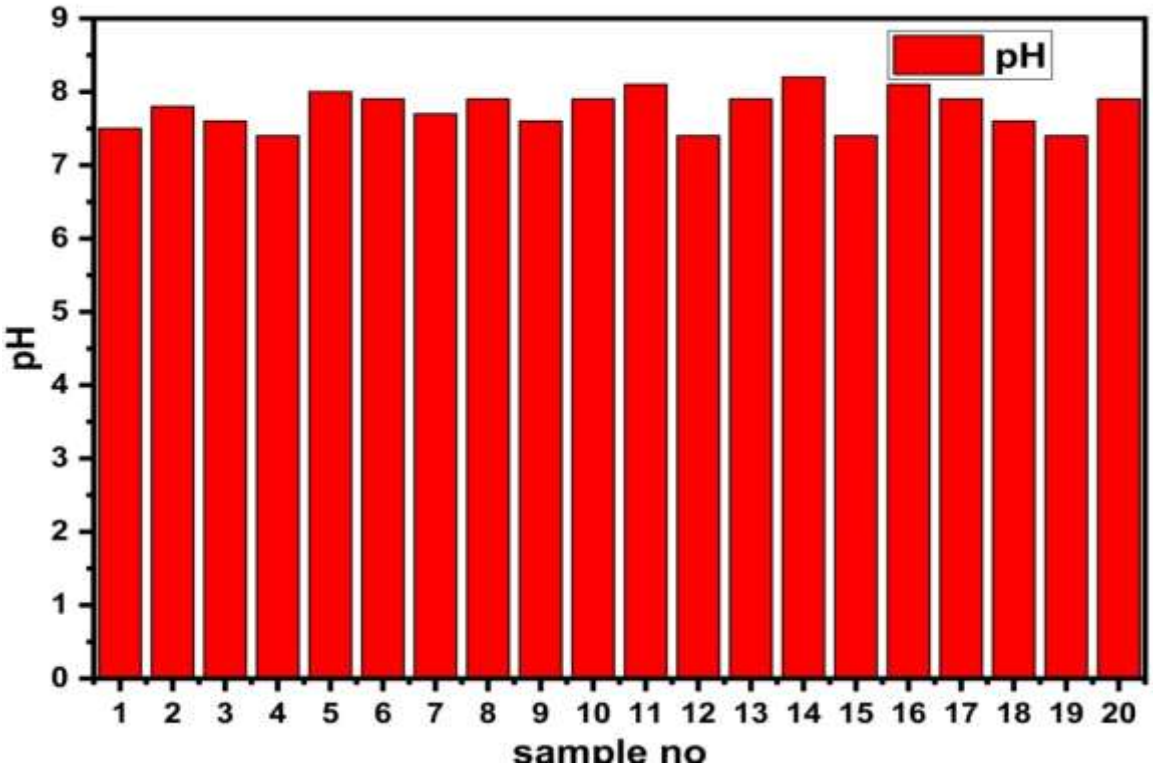

Figure 1 pH indicator against sample no.

3.2 Electrical conductivity

EC refers to the ability of water in soil to conduct electricity. Itbis an very important property of soil in agriculture., environmental science and its provide information about the soil's composition salinity and moisture content. It provides insights intothe soil's physico-chemical properties. The normal EC value is less than 4 is normal. In this work the EC value ranges from 0.43-0.81. The EC value of all samples are lower.

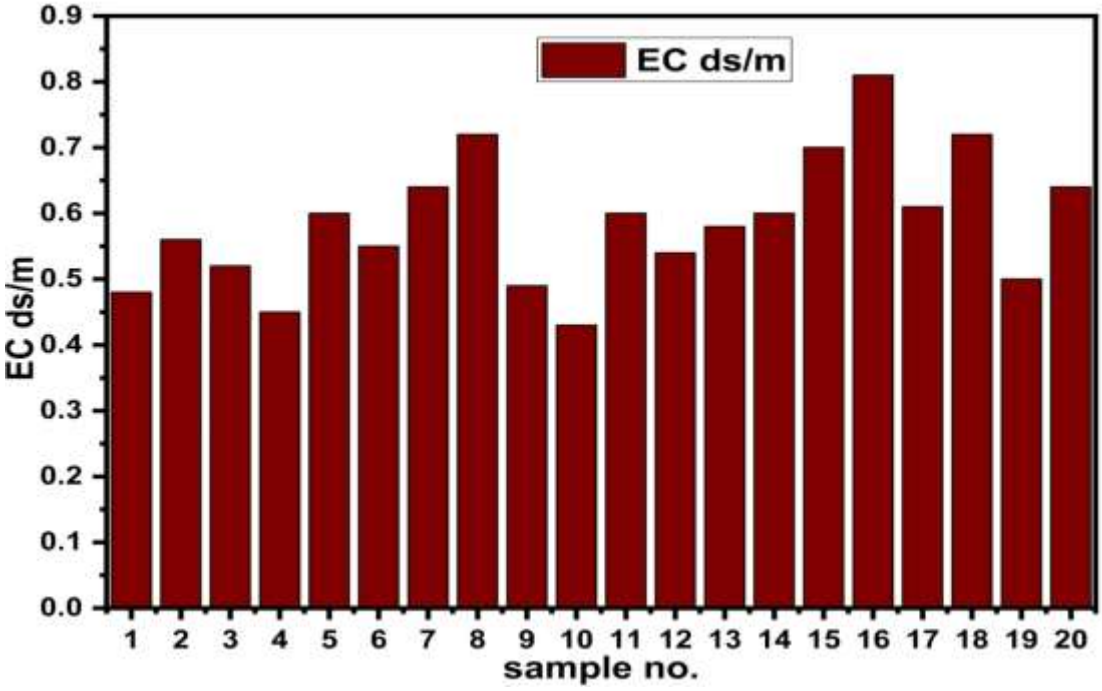

Figure 2 Electrical conductivity against sample no.

3.3. Organic carbon

For soil fertility the organic matter contributes an important role. It increase soil organic carbon improves plant growth, soil, health and fertility[12]. In this work organic carbon ranges from 0.19 to 0.48%. it is in low proportion. The data is given in table 1.

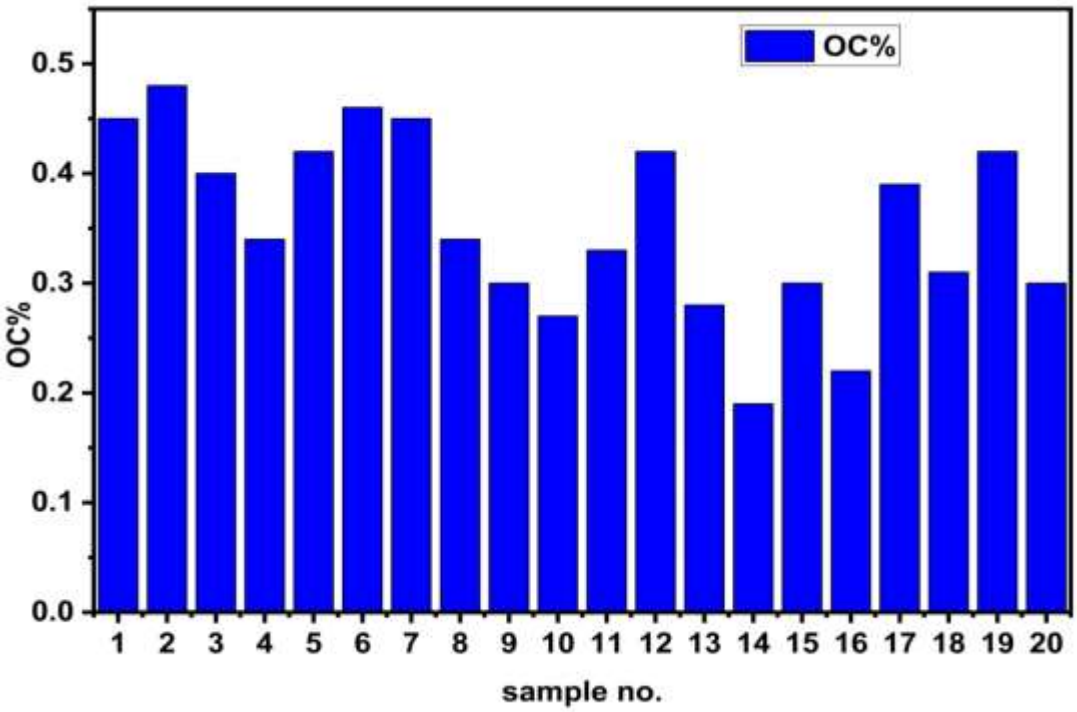

Figure 3 OC indicator against sample no.

3.4. Phosphorous

Phosphorous is one of the essential nutrients for plant growth. Its levels in the soil are essential for the development of strong root systems flowering, fruiting and elongation seed early ripening[13]. It plays a crucial role in various physiological process, including energy transfer ans storage and photosynthesis. In this work phosphorous ranges from 9.2 to16.5 kg/ha.

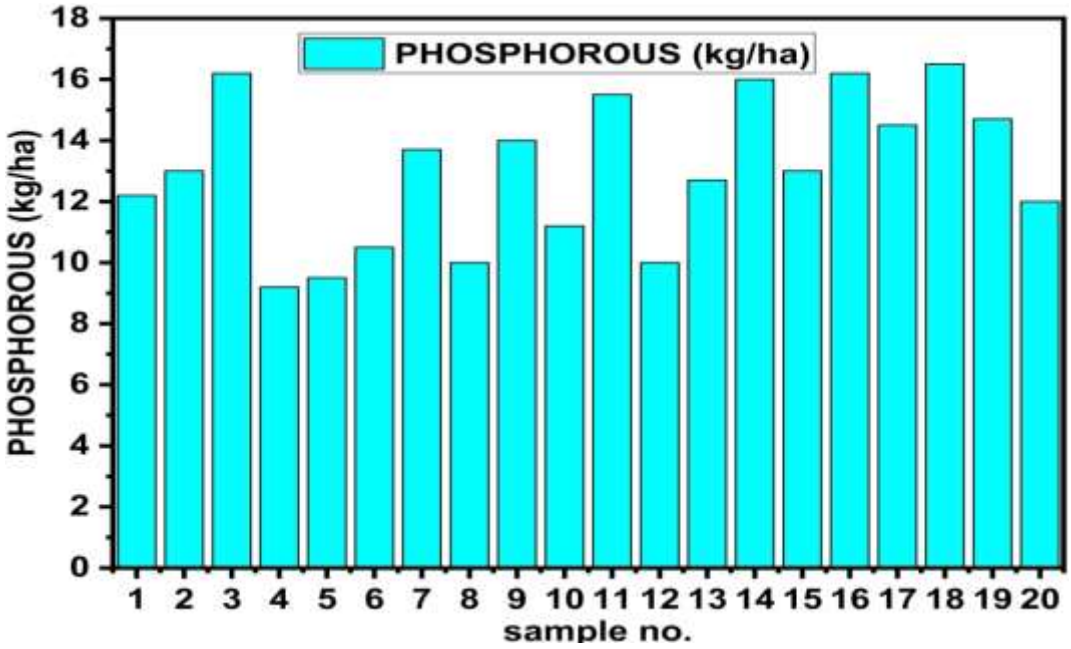

Figure 4 Fertility status of study area

3.5. Potassium

Potassium plays a key role in various physiological process within plants. Potassium is essential for sustainable agriculture. Sufficient potassium levels in the soil play important role in overall plant health, root development, water uptake and activation of many enzyme systems. In this work the potassium ranges from 345 to 615 kg/ha. Which show high value of potassium.

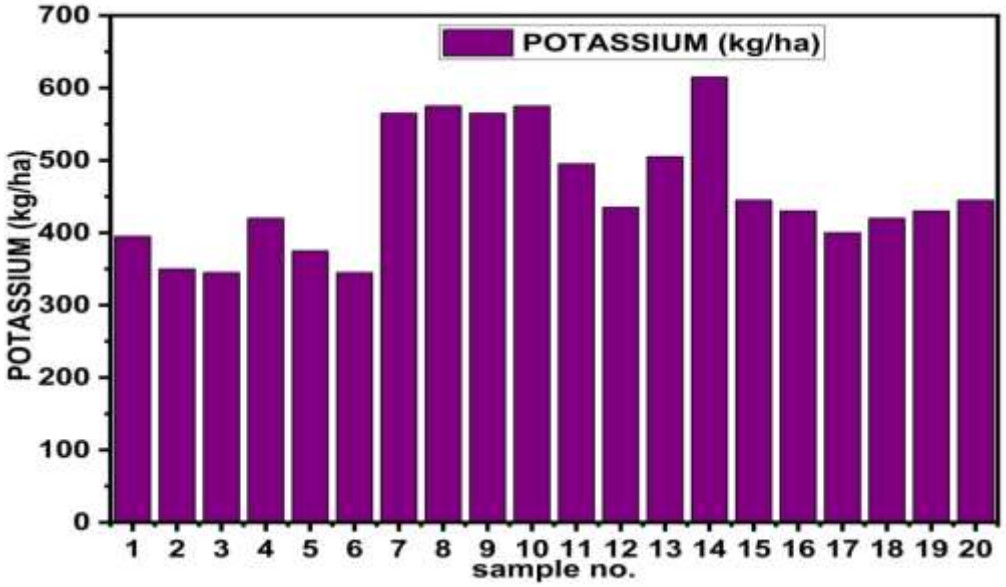

Figure 5 Fertility status of study area

3.6. Sulphur

For plant growth and development sulphur plays an important role. In soils sulphur is generally present in organic matter, minerals and sulphate forms. In this work sulphur ranges from 89 to135 ppm.

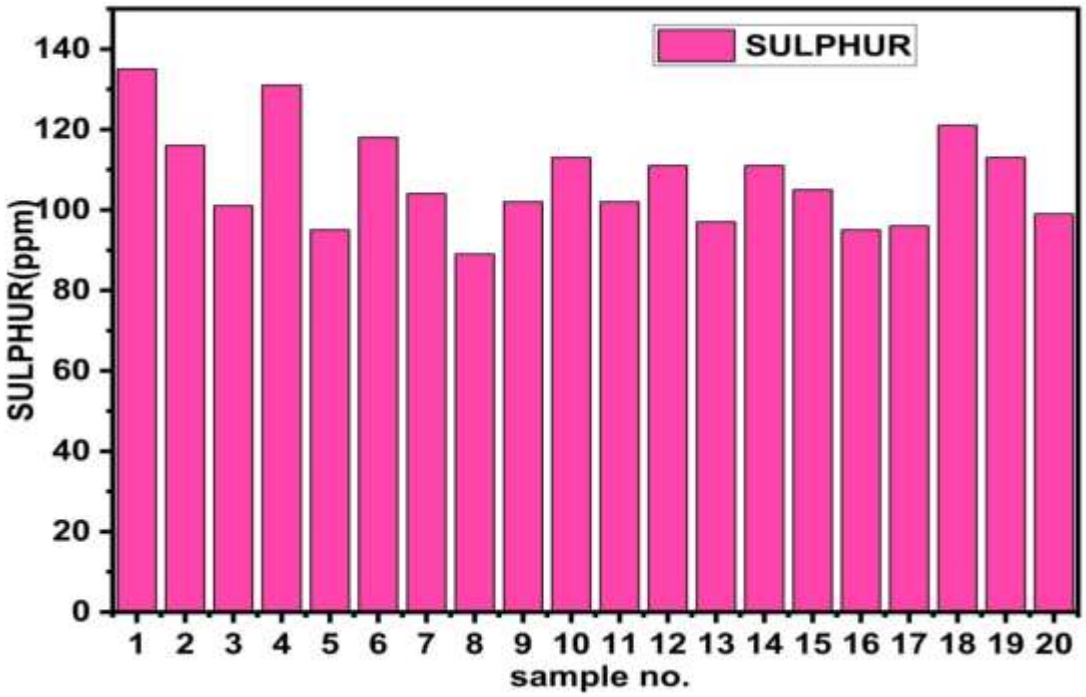

Figure 6 Fertility status of study area

4. Conclusion

In this work we conclude that available potassium is very high. Low organic carbon and phosphorous and soil pH is normal. This information helps farmers of sarfabad and shanpur is balancing the nutrients levels in the soil and it is essential for sustainable agriculture. Farmers often work with agroecologist and use soil testing services to develop nutrients management plans to tailored their specific crops and growing conditions.

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