

Analysis of Agricultural Soil Sample for Its Physico-Chemical Parameters of Uttarakhand State, India

Abstract

In the present study it was preferred to investigate the soil samples for its physico-chemical analysis of some parameters. A proper soil analysis helps to analyse nutrients which are available to plant and which must be supplied to them for a productive crop, through soil variation can be seen within and a small region a small analysis of Pithoragarh district, Uttarakhand State, soil has been done with major macronutrients present. Twelve representative samples were obtained and analyzed for its pH, EC, Nitrogen, Phosphorus, Potassium, Sulfur and Carbon. These results will empower future the product development by identifying target in soil microorganisms and the most viable fields. Result show that overage all the villages of Pithoragarh district have various parameter like EC, PH, OC, N, P, K. This information will help farmers to decide the all problems related to soil nutrients amount of fertilizers to be added to soil to make the production economic

Keywords: Physico-chemical, EC, PH, Phosphorus, Potassium, Sulfur and organik Carbon.

Introduction

Soil analysis is to determined both the amount of each nutrient that is immediately available and the amount that can become available during the life of the crop, beside it nutrients which are not available in low amount could be supplied to the soil thus completing the plant requirement. The most of the soil testing laboratories in India, the chemical analysis are done to determine the following e.g, Soil pH, Electrical conductivity, Oxidizable organic carbon, Phosphorus, Available potassium, Available nitrogen. Usually it is determined by chemical analysis. It is determined by calculation using C : N:10: 1 if needed, the nitrogen is determined by chemical analysis. The Soil testing is an important part for determining the nutrient needs of plants. This is widely accepted and used in most advanced crop production areas of the Uttarakhand to determine fertilization needs for crops.. Soil analysis imply that To provide the basis for calculating the required fertilizing of each crop. To evaluate the status (supply) of each nutrient element and simultaneously determine the compensation plan (nutrient management). To determine the level of availability of nutrients or the need for its introduction. Soil samples are collected from a number of sites of a soil unit. The samples are thoroughly mixed. The mixed sample is termed composite soil sample. It represents the properties of the soil unit. Its analytical value is equivalent to the mean analytical value of the individual sites e.g, the nitrogen content of a composite soil sample is equivalent to the mean of the nitrogen contents of the individual sites. The analysis of soils of individual sites is expensive, laborious and time consuming. Soil testing involves different distinct phases:

Sample Collection

It reliably reflects the average status of a field for the parameter considered.

Extraction or Digestion and Nutrient Determination

It should be extract and reflect all of element in the soil which is related to the availability to the plant.

Interpreting the Analytical Results

This indicate if a nutrient is deficient, adequate, or in excess (in some cases toxic to plants).



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Fertilizer Recommendation

This is depended upon the soil test calibrated for field conditions, and considers other factors such as yield, crop nutrient requirement, management of the crop, soil, etc. These include calcium which helps to neutralize the Soil pH levels, iron which is essential for photosynthesis, which is an important component of chlorophyll, nitrogen which is assimilated in the form of nitrates, phosphates which encourages root development, and potassium which improves the vine metabolisms and increases its health for next year's crop.

Determination of Soil

Soil Temperature

Soil temperature is one of the most important soil properties that effect crop growth. The major source of heat is sun and heat generated by the chemical and biological activity of the soil is negligible.

pH of the Soil

The soil pH is the negative logarithm of the active hydrogen ion (H⁺) concentration. The pH is very important property of the soil is it determines the capacity. The PH values fluctuated less than 8.5(table-1). The limit of PH value for soil Acidic. < 6.5, Normal 6.5-7.8, Alkaline 7.8- 8.5, Alkali > 8.5.

Electrical Conductivity (EC)

Total soluble salts are estimated from electrical conductivity (EC) of aqueous soil extracts. Standard value of EC in soil- Normal < 0.8 dsm-1, critical for salt sensitive crops, critical for salt tolerant crops 1.6 -2.5 dsm-1, Injurious to most crops > 2.5 dsm-1. The EC value 04 to 1.8.

OC and Nitrogen (N)

Soil organic carbon is the seat of nitrogen in soil and its determination is often carried out as an index of nitrogen availability. OC in Lunawada taluka 0.23 to 0.85 (table no.1). Standard value of OC low < 0.50, medium 0.50- 0.75 and high > 0.75. In the colorimeter method (Datta et al, 1962), Organic matter is oxidized with chromic acid

Phosphorus (P):-

Phosphorus was found in the range of low, medium, high Inorganic phosphorus as orthophosphate plays a dynamic role in aquatic ecosystem. The most important micro nutrient, is utilized by plant in the form of H₂PO₄- & HPO₄ 2-species.

Potassium (K)

Standard value of K as K₂O in soil low < 140 kg K₂O ha⁻¹, medium 140-280 kg K₂O ha⁻¹ high > 280 kg K₂O ha⁻¹. Potassium was found in the range of low, medium, high (table no.1). The K is relatively abundant in the earth's crust, most of it is not accessible to plant.

Materials and Methods

Study Area

The Chaukori, Thal, Kumoor, kanalichhina, Badabe, Chandak, Cealing, Gurna, Muwani, Munsayari are located in the District Pithoragarh a part of Uttarakhand state. The soil of these area is recorded to be moderately acidic usually clayey. Tea is favored by the acidic soil, high content organic carbon, low aluminium intake. usually cultivated in slopes excellent drainage responsible for acidic content moreover because Tea plant is highly sensitive to stagnation of water. In growth and production studies of bush tea, the application of K for maximum biomass production occurred between 0 and 200kg-ha⁻¹. Pinus roxburghii (known as chir pine) prefers to loamy soil and can grow even in water deficient condition though recorded soil is acidic it may grow well under highly alkaline soil and it usually prefers and loamy soils. Banjh (Quercus leucotrichophora), Blackjack Oak (BANJH) is an ever green tree to 25m, founds in Himalayas. It is a large or medium sized tree, with leathery dull green leaves, sharply toothed leaves, 6-8 cm long. The upper layer was high in humus content due to decomposing leaves, trees are closely spaced hence a much larger humus content are usually recorded as compared to some other Himalayan trees; the tree usually grows in acidic, neutral to alkaline soil, the above region include neutral soil.

Table 1: Study of Presence of Research Area and Its Important Crop in The Soil of District : Pithoragarh, Uttarakhand

S.No.	Study Area	Important Crop
1	Chaukori	Tea(<i>Camelliasinensis</i>),Wheat(Triticum),Paddy(Dhan),Maize(Makka)
2	Chaukori And Thal	Pinus roxburghii
3	Kumoor	Wheat(Triticum),Paddy(Dhan), Madua(Eleusine coracana)
4	Police Line (Pithoragarh)	Wheat (Triticum), Paddy (Dhan). Maize(Makka), Madua(Eleusine coracana)
5	Kanalichhina	Wheat (Triticum), Paddy (Dhan). Maize (Makka), Soyabean.
6	Vada	Wheat (Triticum), Paddy (Dhan). Maize (Makka), Soyabean. Black Gram (Urd Bean).
7	Badabe	Paddy (Dhan). Black Gram (Urd Bean), Maize(Makka), Potatoes (Solanum tuberosum)
8	Chandak	Paddy (Dhan). Black Gram (Urd Bean), Maize(Makka), Madua(Eleusine coracana)
9	Cealing	Paddy (Dhan). Black Gram(Urd Bean), Maize(Makka), Madua(Eleusine coracana), Wheat(Triticum).
10	Gurna	Paddy (Dhan). Black Gram (Urd Bean), Madua(Eleusine coracana), Wheat (Triticum).
11	Muwani	Paddy (Dhan). Black Gram (Urd Bean), Wheat (Triticum).
12	Munsayari	Wheat (Triticum). Potatoes (Solanum tuberosum),

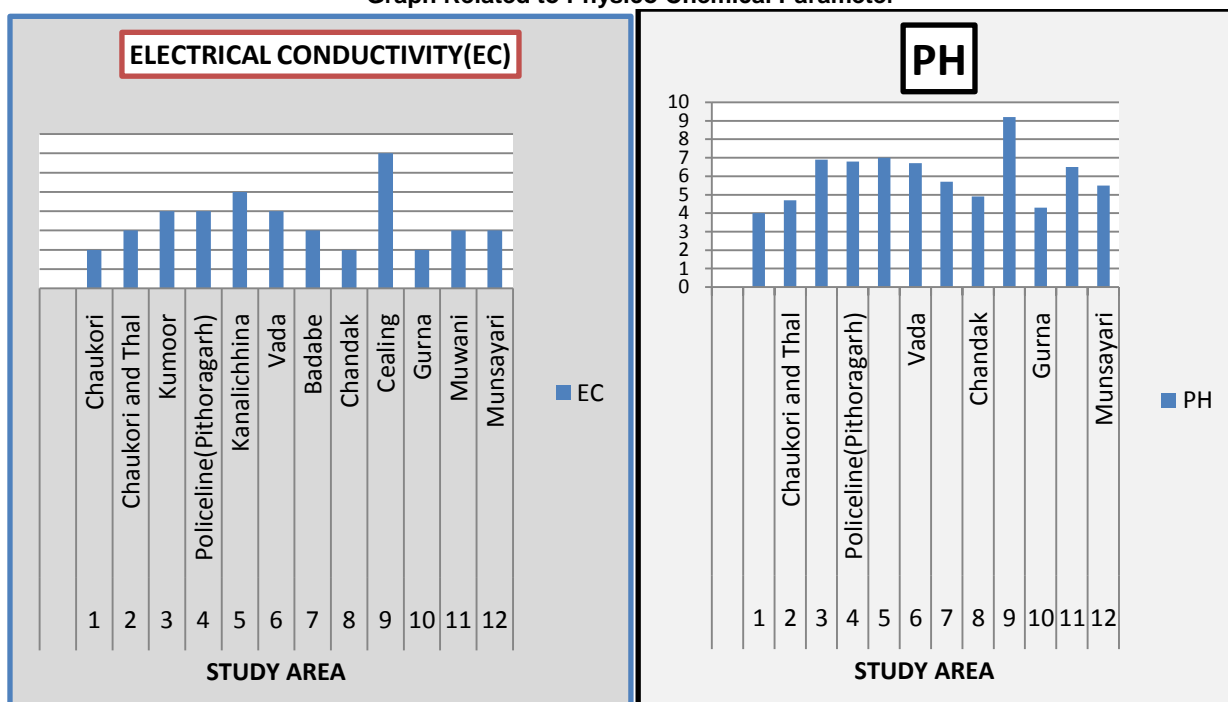
Some Important Research Area



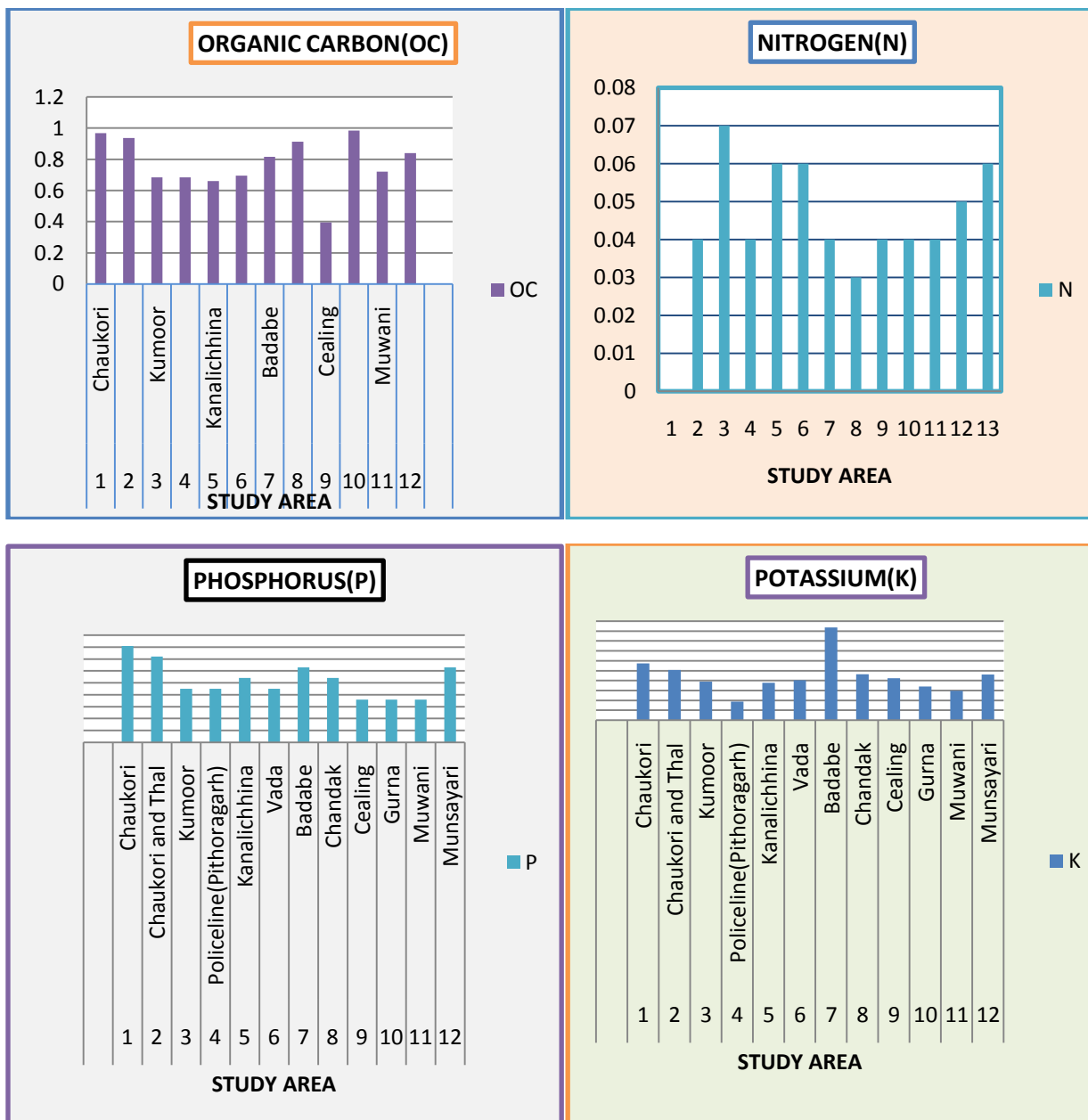
Table 2 : Study of Presence of EC, PH, OC, N, P, K, in The Soil Of District : Pithoragarh , Uttarakhand

S.No.	Study Area	EC	PH	OC	N	P	K
1	Chaukori	0.2	4.0	0.968	0.04	40.5	286.72
2	Chaukori and Thal	0.3	4.7	0.936	0.07	36.0	253.12
3	Kumoor	0.4	6.9	0.684..	0.04	22.5	194.08
4	Policeline(Pithoragarh)	0.4	6.8	0.684	0.06	22.5	94.08
5	Kanalichhina	0.5	7.0	0.660	0.06	27.0	188.16
6	Vada	0.4	6.7	0.696	0.04	22.5	201.60
7	Badabe	0.3	5.7	0.816	0.03	31.5	468.16
8	Chandak	0.2	4.9	0.912	0.04	27.0	231.84
9	Cealing	0.7	9.2	0.396	0.04	18.0	211.68
10	Gurna	0.2	4.3	0.984	0.04	18.0	170.24
11	Muwani	0.3	6.5	0.720	0.05	18.0	147.84
12	Munsayari	0.3	5.5	0.840	0.06	31.5	230.60

Graph Related to Physico Chemical Parameter



Periodic Research



Conclusion

This can be concluded from this study that the available EC, PH, OC N, P, K, deficient soil is recommended rich fertilizer. Plants take up basic cation such as k^+ , Ca^+ , and Mg^{++} , for there growth these are removed from the soil, they are replaced with H^+ in order to maintain electrical neutrality. To predict the probable crop response to applied nutrients. To identify the type and degree of soil related problems like salinity, alkalinity and acidity etc. and to suggest appropriate reclamation / amelioration measure. To find out suitability for growing crops. To find out suitability for irrigation. To study the soil genesis. The soil sample studied area of. Dist : Pithoragarh, Uttarakhand State has been found to be fit for crop productivity.

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