Research Paper

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Improvement of Soil for some Villages of Shehra Taluka by Measuring Potassium Elements. Dist : Panchmahals (Gujarat) India

Chemistry

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ABSTRACT

Quality of the soil is important part for growth of any plants related with the crops. Various parameters like Nitrogen (N), Phosphorus (P), Potassium (K), PH and total Organic Carbon help the soil for improvement of this quality. This study give information to the farmers available Potassium in soil and how to improve the crops in the land of Shehra Taluka Dist : Panchmahals. The fertility index for Potassium for Shehra Taluka 1.26 to 6.5. This information will help farmers to decided the problems related to soil nutrients amount of Fertilizer to be added to soil to make to the production economic.

INTRODUCTION

Soil is the main roll in the life of human being. So the quality of soil required for good quality crops that helps animals healthy. Soil are unconsolidated material of the earth's crust, in which land plants can grow, if water and temperature are adequate atleast the minimum the minimum nutrients are available and toxic substance are in low concentration. Soil test based nutrient management has emerged as a key issue efforts to increase agriculture productivity & production since optimal used of nutrients based on Soil Analysis can improve crop productivity and minimize wastage of these nutrients thus minimizing impact an environment leading to bias through optimal production. Deficiencies of primary, secondary and micronutrients have been observed in intensive cultivated areas. [1,2].

One of the group [3] studied soil samples of 17 different villages of tribal area around to Shehra. The physico-chemical properties such as moisture content, specific gravity. PH measurement and estimation of Mg^{2+}, Na^{2+}, K^{+}, and Cl^{-}, HCO_3^{-}, PO_4^{3-}, NO_3^{-}, of soil were studied. The fertility of the soil depends on the concentration of N, P, K organic and inorganic materials and water. Nitrogen is required for growth of plant & Nucleic Acid. Potassium is found in its mineral form and affect plants cell division, carbohydrate formation, translocation of Sugar, various enzyme action and resistance to certain plant disease over 60 enzymes are known to require Potassium for activation. Amount of nutrients to be added to soil for crop production depend on their present amount in the soil. Fertilizer additional is recommended now a day an STR.

Several state including Gujarat, Haryana, Karnataka and Uttar Pradesh have made commendable progress in soil testing programme in various ways such as expansion of soil testing facilities state wise and highlight main issue in soil testing programme compendium on soil health [4]

There is no intent with this system to make any interpretation as to the potential environment impact of sensitive nutrients such as Potassium. The interpretation system is meant strictly for the determination of current soil suitability for agronomic or horticulture crop production. While nutrient availability can be important in gauging the potential for adverse environment effects, it is only one factor in the overall picture. Slope, ground cover, incorporation of nutrient sources, timing of application and other considerations all affect the potential movement of nutrients off-site and their potential for adverse environment impact of surface and ground water [5,6]. In cold climate, rapid root development early in the season is important.

EXPERIMENTAL

Potash (K_2O) in Indian soils from 0.05-3.5 percent out of which 95% part is present in completed from 1.10% part in relatively non available from 2% part in available. The term available Potassium includes both exchangeable & water soluble forms of the Potassium present in soil. The available K (reading exchangeable water soluble K is usually determine in neutral normal ammonium acetate (1N CH_3COONH_4) extract of soil. The degree of agitation during extraction & the extraction time can affect CH_3COONH_4) extrable K& this effect may very among soils (Grave 1980). To estimate exchangeable K first water soluble K estimated in a saturation extract & the same is deduced from the ammonium acetate extractable K [1]

EQUIPEMENTS

(1) Erlenmeyer flask (150ml)
(2) Flame Photometer with K filter
(3) Centrifuge with centrifuge tubes
(4) Volumetric flask (100ml)

REAGENTS

1.0 N ammonium acetate solution of PH 7. Dissolve 154g ammonium acetate in distilled water & dilute it to 1-8 Litres mix the grouchily adjust PH to 7-0 with dilute NH_4OH or acetic acid as required & make to 2 litres or take 700ml of distilled water. Add 57ml 99.5% glacial acetic & then 69ml of concentrated NH_4OH or CH_3OOH & make up 1 liters store in pyres or polypropy bottle.

STANDARD KCl SOLUCTION

Dissolve 1.90g AR grade KCl (dried at 60^0 for 1 hr) in distilled of deionized water make volume to 1 litre. This will give stock solution of 1000ppm. Now take 100ml this stock solution & diluted it with neutral normal ammonium acetate. (Extracting sol^n) up to 1 litre. This gives solution of 100 from ppm.

From this solution take 0,5,10,15 & 20ml in volumetric flask of 100ml capacity acetate solution. This will give a selies of standard solutions having 0,5,10,15 & 20 ppm K respectively.

METHOD

The ammonium acetate extract of soil can be obtained by shaking of followed by filtration (Schollen ber ger & simon **1945**) or shaking followed by centrifugation (Knudsen etal. **1982**)

SHAKING & FLITRATION

(1) Place 5g air dried soil in a 150ml Erlenmeyer flask & pour in 25ml of neutral normal ammonium acetate.

(2) Shake on a mechanical shaker for 5 min & immediately filter through whatman filter paper No. 1. First few ml of the filtrated may be discarded.

SHAKING & CENTRIFUGATION

(1) Place 5g air dried soil into 50ml centrifuge tube.

(2) Add 25ml of neutral normal ammonium acetate sol^n stopper & shake the tube 10 minutes.

(3) Decant the supernatant liquid into a 100ml volumetric flask.

(4) Make three additional extraction in the same manner. Dilute the combined extracts to 100ml with CH_3COONH_4 & mix.

(5) Determine K in the extract prepared by either of the above methods with the help of flame photometer. keep air pressure at 5 lbs & adjust the gas feeder so as to have a blue sharp flame cones.

(6) Adjust zero reading on the scale by feeding extract solution (CH_3COONH_4) in the flame photometer.

(7) Feed standard KCl solution of the highest value in the standard series (20 ppmk) and adjust the flame photometer to read full scale i.e. 100 reading. Now take reading of each standard solution plot a standard curve between cone & reading of standard K solution.

(8) Take extract of sample & feed in flame photometer note the reading for sample & determine K content in the sample with the help of standard curve.

AR grade reagents and double distilled water were used for soil analysis. Results were compared with standard values [7,8] to find out low, medium or high nutrient's content essential for STR. The available phosphorus value can be calculated by multiplying a standard factor. Based on the soil test values for different nutrients soil sample are generally classified into three categories low, medium and high. Using these fertility classes nutrient / fertility index was calculated.

Table 1: Study of Presence of Potassium Content in the Soil of Shehra Taluka, Dist : Panchmahals

No.	Name of Village	No. of Sample	No. of samples in Low Potassium content	No. of samples in Medium Potassium content	No. of samples in High Potassium content	Fertility in Index
1	Labhi	250	0	0	250	6.24
2	Hansapur	155	13	92	52	3.48
3	Bhadrala	130	10	50	70	3.01
4	Narsana	70	0	0	70	1.95
5	Bamrola	185	38	72	75	4.01
6	Mithapur	56	5	15	36	1.32
7	Kherdiya	201	22	98	81	5.77
8	Sambhali	115	22	65	28	1.98
9	Guneli	230	32	118	80	5.15
10	Dharapur	290	52	133	105	7.66
11	Bhimtahal	110	5	30	75	2.95
12	Kavali	85	0	0	85	1.89
13	Bodidrakhurd	209	29	130	50	4.58
14	Umarai	108	0	0	108	2.46
15	Punjelav	40	1	1	38	1.27
16	Chhapri	45	0	0	45	1.20
17	Kanod	121	11	30	80	2.94

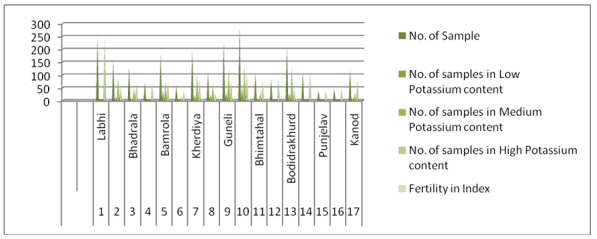

Figure 1 : Number of samples of all 17 villages of Shehra Taluka lies in Low, Medium and HIgh Potassium content range.

RESULT AND DISCUSSION

Table 1 represent label of Potassium low, Medium and high content as per soil analysis. It is standard according to Anand Agriculture University. This table represents the number of samples lies in Low, Medium and High Potassium content. The same table represents the calculated values of fertility index for available Potassium of the soil for all these 17 villages. Data presented in Table 1 shows that soils of few villages contain lower available Potassium and very few villages have high range of available Potassium that might be due to poor of excessive use of fertilizer. Wide range of infect average all the samples lies in medium range indicate good quality of soil suggest sufficient amount of presence of available Potassium and hence no need of nutrient supplements of this soil.

Figure 1. represent the village wise category for number of sample lies in Low, Medium and High Potassium . This clears that how many samples were collected from the village and what is the status the Potassium level in that sample whether in has Low, Medium or High nitrogen content. Using these fertility classed nutrients / fertility index was calculated as per the following equation.

Fertility index = (NL*1 +NM*2+NH*3)/100

Where NL, NM and NH are number of sample falling in low, medium and high classes of Potassium status of samples analyzed for a give are Figure 1. shows are the fertility index for available Potassium in finally used for recommendation of fertilizers and crop selection.

Table 1: Range of Low, Medium and High category of Available Potassium in the form of K2O

Category	Total Available Potassium
Low	< 140 kg K2O /Ha
Medium	140-280 kg K2O /Ha
High	> 280kg K2O /Ha

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CONCLUSION

This study that the available Potassium deficient soil is recommended for Potassium rich fertilizer. Average all village have medium category or available Potassium so no need to add Potassium contained fertilizer. This study evaluated soil fertility status for making fertilizer recommendations. To classify soil into different types of soil groups, fertility groups for preparing soil maps and soil fertility maps which are presented in form of graphics. 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 and orchard. To find suitability for irrigation. To study the soil genesis.

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