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INVESTIGATION OF SOME PARAMETERS AND NUTRIENTS FROM SEWAGE IRRIGATED AND RIVER WATER IRRIGATED SOIL SAMPLES FROM GADHINGLAJ, MAHARASHTRA

Shobha D. Jadhav
Department of Chemistry, Dr.Ghali College, Gadhinglaj 416502, Maharashtra, India
E-mail: shobhajdhv120@gmail.com

ABSTRACT

The present paper deals with the some parameters of soil samples. The objective of present study is to estimate the relationship of two soil samples irrigated by sewage water and river water because the problems of soil pollution is serious due to presence of pollutants in soil. The soil sample has been collected in December 2011 from two different sites of Gadhiglaj, i. e. one from where regular river water irrigated where as other from sewage water irrigated agricultural field and analyzed for different parameters and some nutrients. During this study it has been found that there was a marked variation in nutrient levels at two sites. The parameters such as pH, Potassium, Magnesium, Calcium, Phosphorous, Sulphur, Nitrogen, Oxygen and Chloride were analyzed and significant variations were found from site to site. It has also found that the phosphorus value at both the sites was exceeding the normal range.

Keywords: Soil samples, irrigation, sewage water and river water.

INTRODUCTION

Soil testing plays an important role in crop production & nutrient management. Soil generally refers to the loose material composed of weathered rock and others minerals and the partly decayed organic matter that covers large part of earth[1]. Soil is ultimate resource like water and air. Soil science is changing and we wanted a text that would make a current concept easy to understand. Understanding soil and managing it well is essential to human welfare. Soil analysis data is used in many fields like construction of roads and building survey and mapping etc. Soil testing is considered a useful tool for making fertilizer recommendation for various crop and crop sequences[2].

Soil plays a vital role in supporting the growth of crops and other vegetation maintaining the environment clean and act as source and sink for atmospheric gases. Soils are natural bodies on which plant grow.The increasing population, industrialization and changing life style have negative effect on soil and responsible for soil pollution. Good soil and climate for more crop production are valuable things for any nation[2].

EXPERIMENTAL

The soil samples were collected in the depth of 1 foot from the surface of land at two different sites in polythene bags. Sample 1 is from soil irrigated with sewage water and sample 2 from soil irrigated with river water of Gadhinglaj, Maharashtra State[3]. The pH was measured by pH meter. The potassium determination was carried out by Flame photometer. The micronutrients were determined by photometer (oral ap instrument Pvt. Ltd. Hyderabad). The dissolved element in the extract was then measured by Atomic absorption Spectrometer from Department of AGPM, Devchand College, Arjunnager.

RESULTS AND DISCUSSION

pH

The soil pH value is a measure of soil acidity or alkalinity and directly affects nutrient availability. The pH scale manages from 1 to14 with 7 as neutral numbers less than 7 indicate acidity while number greater

than 7 indicates alkalinity. In the present study higher pH value were observed in sample I was 8.7 than sample II was 8.1. These values were in normal range.

Table-1: Physico-chemical parameters of Soil samples

S.No.	Soil Parameters	Sample I	Sample II	International agricultural standard for soil analysis
1	pH	8.7	8.1	5.8-8.3
2	E.C.	0.41	0.47	<1
3	Salinity	0.28	0.36	---
4	T.D.S.	0.33	0.31	---
5	Oxygen	-287	-242	---
6	Nitrate/Nitrogen	237.44 Kg/ha	239.68 Kg/ha	217.6-272 Kg/ha
7	Ammonium nitrate	275.52 Kg/ha	237.48 Kg/ha	272-544 Kg/ha
8	Phosphorous	83.6 Kg/ha	58.52 Kg/ha	22.5-56 Kg/ha
9	Potassium	236.08 Kg/ha	213.59 Kg/ha	150-340 Kg/ha
10	Sulphur	14.78 Kg/ha	12.09 Kg/ha	5-20 Kg/ha
11	Magnesium	5 ml /100g	10 ml /100g	5-10 ml /100g
12	Chloride	25 ml /100g	25 ml /100g	20-50 ml/100g
13	Calcium	10 ml /100g	15 ml /100g	10-30 ml /100g

Sample I: Soil irrigated with sewage water
Sample II: Soil irrigated with river water

Electrical Conductivity
Electrical conductivity is one of the important parameter of the soil sample because it shows the salinity of the soil. In the present study conductivity of sample I (0.41) is less as compared to sample II (0.47) .

Nitrogen
Nitrogen is essential to nearly every aspect of plant growth. Nitrogen is absorbed from the soil as nitrate (NO_3) and ammonium (NH_4^+), this soil parameter estimates there current levels[4]. Available nitrogen content in the soil sample II (293.68 kg/ha) have high nitrogen content as compared to sample I (237.44 kg/ha).

Phosphorous
Phosphorous provides plants with means of using the energy harnessed by photosynthesis to drive its metabolism. The normal range for phosphorous is 22.5 kg/ha to 56 kg/ha. Phosphorous content from soil sample I (83.6 kg/ha) is greater than sample II (58.52 kg/ha). All samples are exceeding the normal range.

Potassium
Potassium (K) is vital for plant growth because it is known to be an enzyme activator that promotes metabolism and improve disease resistance in plants, improve the size of grains and seeds, and also improve the quality of fruits and vegetables[5]. In this work the sample I shown high potassium value (236.08 kg/ha) than sample II (213.59 kg/ha).

Magnesium
The predominant role of Mg is as a major constituent of the chlorophyll molecule and it is therefore actively involved in photosynthesis and it also assists the movement of sugars within a plant[5]. The magnesium content in the soil sample ranged from 5 to 10 ml/100g. It is seen that sample I (5ml/100gm) have less amount of Magnesium as compared to sample II (10 ml /100gm).

Chloride

Chloride is required even smaller amount than secondary nutrients so called micronutrients[6]. Chloride is essential in photosynthesis; it increases cell osmotic pressure and water content of plant tissues. Deficiency of chloride causes plant wilting. In sample I chloride content is 25ml /100gm which is also same in sample II.

Calcium

The measure source for supplementing the soil with calcium is dolometic lime (aglime). Calcium is also available from variety of fertilizer source i.e. Gypsum (Calcium sulphate $CaSO_4$, 22.5 %Ca). It is used as secondary nutrients. Calcium is component of plant cell wall and regulates the cell wall construction. Calcium deficiency is uncommon in monotona and Wyoming areas due to presence of Calcium carbonate and gypsum in most agriculture soil. In sufficient Ca cause young leaves to become distorted and turn abnormally dark green. Leaf tips often become dry or brittle and will eventually wither and die. Stems are weak & germination is poor[7]. Calcium content in present investigation was ranged from 10ml/100gm -15 ml /100gm in sample I and sample II respectively.

Sulphur

Sulphur is the secondary nutrients it requires in the smaller amount than the primary nutrient. It is essential constituents of certain amino acids and proteins. It is available in fertilizers such as potassium and magnesium sulphate, Gypsum (Calcium sulphate) and elemental sulphur. The deficiency symptoms initially occur in younger leaves, causing them to turn light green to yellow (chlorosis). In later growth the entire plant may be pale green. Characteristic spot or strips are generally not displayed. Additionally plant deficient in sulphur tends to be spindly, small & stems are often thin[5]. Sulphur content value ranged from 14.78 kg/ha (sample I) to 12.09 kg/ha (sample II).

CONCLUSION

From present study it has been concluded that most of the parameters like pH, T. D. S., oxygen, ammonium nitrogen, phosphorus and sulphur have been increased in sample I and other parameters were decreased in sample I than that of sample II hence sewage water irrigation is effective to increase the soil and recommended for the irrigation. But the Phosphorous contents at both samples were exceeding the normal limit.

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