iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** XII **Month of publication:** December 2017

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor :6.887
Volume 5 Issue XII December 2017- Available at www.ijraset.com

Investigation of Soil of Jaipur District of Rajasthan Irrigated with Water of Dravyavati River (Amanishah Nala) for its Suitability for Agricultural Purposes

Ranjeet Jagariya[1], C. P. Singh Chandel[2]
[1, 2] *Department of Chemistry, University of Rajasthan, Jaipur Rajasthan (India)*

Abstract*: Analysis of collected soil samples (from June 2014 to September 2014) was carried out for the studies of various parameters Like pH, Conductivity, total Organic Carbon, Potash, Phosphorous and micronutrient i.e. Iron, Zinc, Copper and Manganese. This study leads us to the conclusion of the nutrient's quantity of agricultural land around area Dravyavati River (Amanishah Nala) of Jaipur, Rajasthan. Results shows that average of all the area around Dravyavati River have low or medium mineral content and high pH. This study will help the farmers of nearby villages to solve the issue related to soil quality to increase the productivity of soil.

Keywords: Physicochemical parameters, Conductivity, micronutrients, Dravyavati River Organic Carbon.

I. INTRODUCTION

Soil samples were collected from ten different villages of Jaipur District around Dravyavati River (previously called Amanishah Nala), which represent soils of that area. Soil samples were given sample codes as A, B, C, D and so on up to soil sample J. The soil samples were collected by standard procedure [1-3] and collected in clean polythene bags.

All the samples were collected in Monsson session (June-September) of year 2014. In laboratory these collected samples were analyzed for various physico-chemical parameters by standard methods [4-8]. Analysis of soil was carried out for the studies of various physico-chemical parameters Like pH, Conductivity, total Organic Carbon, Potash, Phosphorous and micronutrient i.e. Iron, Zinc, Copper and Manganese. Plants obtain carbon, hydrogen, and oxygen from air and water.

The remaining elements are derived from the soil.

When the soil cannot supply the amount of these nutrients required for adequate growth, supplemental fertilizer applications become necessary.

Nitrogen, phosphorus, and potassium are often referred to as the primary macronutrients, because of the general probability of plants being deficient in these nutrients and the large quantities taken up from the soil compared to other essential nutrients [9]. The fertility of the soil depends on the concentration of N, P, K, organic and inorganic materials and water [10]. The physicochemical properties such as moisture content, specific gravity Nitrogen as a fertilizer [11-13] required for the growth of plant. Potassium is used for flowering purpose and phosphate is used for growth of roots in plants.

II. EXPERIMENTAL

A. Materials and methods

All the chemicals and reagents used were of A R grade. Analysis of physico-chemical parameters of the soil samples were suspended in distilled water (1:4 w/v) and allowed to settle down the particles. The pH of the suspension was determined using pH meter (Equiptronics, India). Electrical conductivity of the soil was determined in the filtrate of the water extract using Conductivity meter. % Organic carbon (OC) content was determined by adopting chromic acid wet digestion method as standard procedure of Walkley and Black method, available phosphorus determined by volumetric method. Available potassium content in the soil was determined by using turbiditimetric methods.

B. Micronutrient analysis

Trace metals extracted with 4N HNO_3 digestion followed by DTPA extraction and estimated by Atomic Absorption Spectrophotometer (AAS) using air–acetylene mixture.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor :6.887
Volume 5 Issue XII December 2017- Available at www.ijraset.com

III.RESULT AND DISCUSSION

Physical chemical properties of soil samples were studied. The term pH is used to express the acidity or alkalinity of the soil. It is measured on a (0-14) scale. Seven is neutral, while values below 7 are acid and values above 7 are alkaline. The pH is important because it affects the availability of nutrients in the soil that are essential for plant growth. The pH of soil samples shows variation 8.3 to 9.4, the above results shows that the soil found is highly alkaline in nature. Fertilizer recommendations are based on the kinds of plants that are grown, the type of soil in which they are growing. Soil testing provides information on the availability of nutrients in the soil and which is required for accurate fertilizer and lime recommendations. A pH measurement is therefore an important part of a soil testing program. The pH values had shown in Table 1. The Conductivity study of soil shows variation in conductivity values between 0.09 ds/m to 0.40 ds/m this value suggest normal soil. Percentage of carbon varies from 0.12 to 0.45 also shows low percentage of organic carbon than required. Percentage of P and K are also in normal range except two samples namely E and J. above parameters are shown in Tables 1 and 2.

The amount of Zinc varies from 0.56 to 1.69 ppm (desired value of zinc in soil is 0.6 ppm or more), in sample H the percentage of Zn is (0.56 ppm) abnormal. The quantity of Iron varies from 1.77 to 4.74 ppm, the desired Iron un soil was 4.5 ppm or more, and in all samples except B and E we observe iron content less than desired value which is not good. Amount of copper varies from 0.2 to 0.27 ppm and found within the permissible limit of 0.2 ppm or more. The amount of Manganese varies from 1.72 to 2.77ppm (Desired value is 2 ppm or more), except E sample (1.72 ppm) all other found in permissible limits.

TABLE I

OBTAINED VALUES OF VARIOUS PARAMETERS (MACRONUTRIENTS) OF SOIL OF SOUTH EASTERN PART OF AMANISHAH-NALA (DURING JUNE 2014 SEPTEMBER 2014)

Sample code	pH	EC (ds/m)	Organic C %	Phosphate Kg/Hc	Potash Kg/Hc
A	8.3	0.22	0.16	35	210
B	9	0.12	0.17	36	250
C	8.9	0.09	0.23	35	190
D	8.6	0.16	0.45	23	250
E	8.6	0.21	0.25	14	140
F	8.8	0.16	0.16	26	210
G	9.2	0.26	0.18	34	190
H	9.4	0.36	0.21	23	320
I	8.9	0.13	0.12	35	150
J	9	0.4	0.25	73	130

TABLE II

OBTAINED VALUES OF VARIOUS PARAMETERS OF SOIL OF SOUTH-EASTERN PART OF AMANISHAH-NALA (DURING JUNE 2014 TO SEPTEMBER 2014) (MICRONUTRIENTS)

Sample code	Zn ppm	Fe ppm	Cu ppm	Mn ppm
A	1.69	4.32	0.24	2.73
B	1.56	4.74	0.27	2.23
C	1.32	4.07	0.24	2.22
D	0.78	4.22	0.23	2.32
E	0.95	4.73	0.22	1.72
F	1.12	4.23	0.27	2.72
G	1.32	1.77	0.2	2.77
H	0.56	4.3	0.27	2.23
I	0.75	4.4	0.27	2.77

J	1.45	2.77	0.27	2.11

TABLE IIII
OBTAINED VALUES OF VARIOUS PARAMETERS OF SOIL OF SOUTH-EASTERN PART OF AMANISHAH-NALA
(DURING JUNE 2014 TO SEPTEMBER 2014)
(EXCEPT MICRONUTRIENTS)

Parameters	Value	Conclusion	Representing samples
pH	7-8.5	Normal	
		Close Proximity of alkalinity	A
	> 8.5	Problem of alkalinity	All samples except A
EC (In ds/M)	0-1	Normal	All Soil Samples
	> 1	Problem of alkalinity	Nil
Org. Carbon (%)	0-0.50	Low Nutrient Level	All Soil Samples
	0.5-0.75	Medium Nutrient Level	Nil
	>0.75	High Nutrient Level	Nil
Phosphate (In Kg. /Hector)	0-23	Low Nutrient Level	E
	23-56	Medium Nutrient Level	All except E and J
	>56	High Nutrient Level	J
Potash (In Kg. /Hector)	0-142	Low Nutrient Level	E and J
	142-337	Medium Nutrient Level	All Samples except E and J
	>337	High Nutrient Level	Nil

IV. CONCLUSIONS

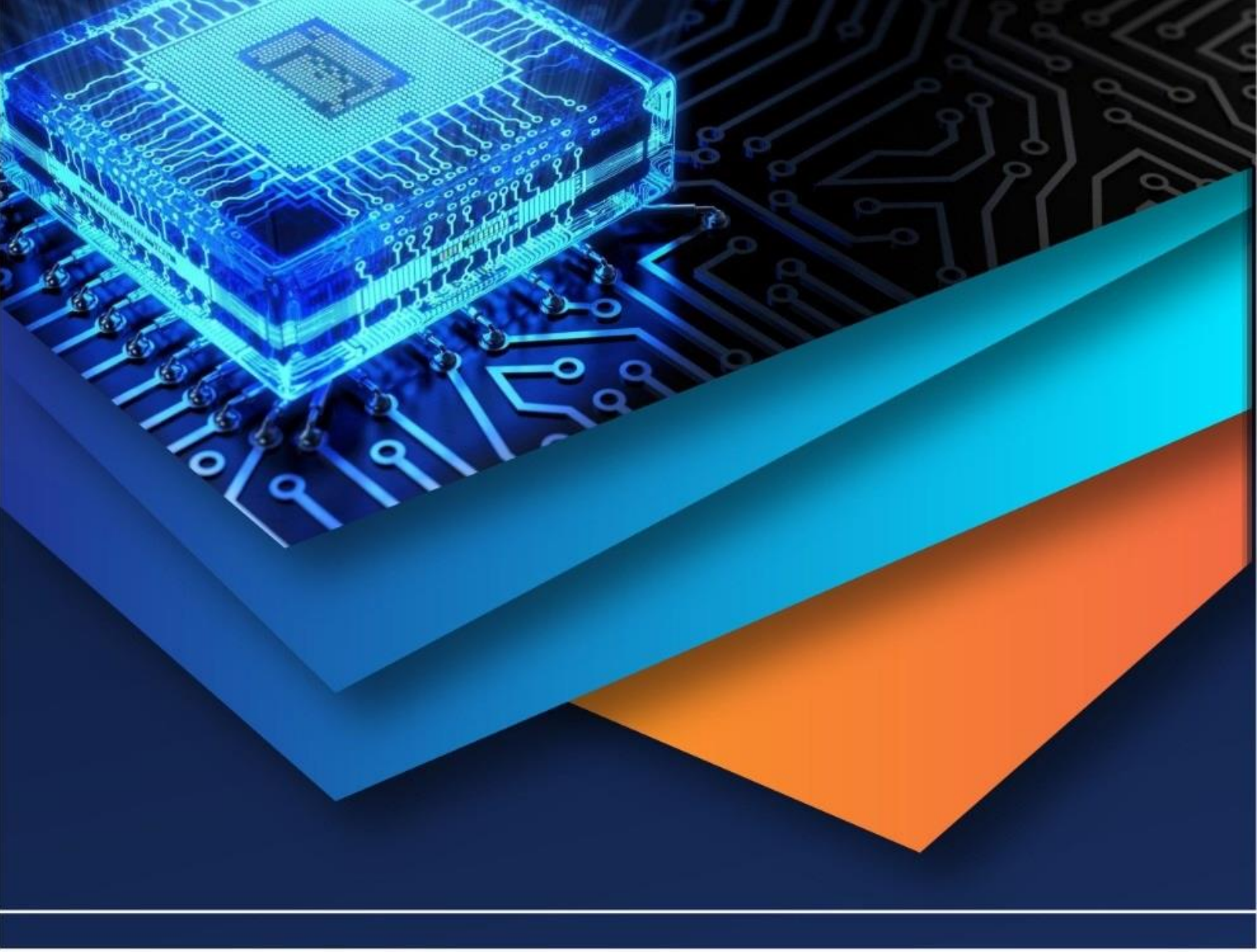
A physicochemical studies of soil samples from these ten different location around Dravyavati River, shows that all the soil parameters conductivity, pH, EC, %P, %K and % Organic carbon are not in normal range We found that there is problem of high alkalinity that may lead us non-availability of nutrients as well as micronutrients. Although the micronutrient availability is very much in the permissible limits except in few soil samples but because of high pH these nutrients are very less available for the sorption by the plant. Organic carbon present in soil is all very low which is not good for agricultural practices as it also reduces availability of micronutrients.

V. ACKNOWLEDGMENT

The authors acknowledge Soil testing laboratory, Durgapura Jaipur for providing access to facilities and also acknowledge UGC for providing financial assistance for the research work done.

REFERENCES

[1] A.K.Gupta, and M.L. Varshaney, Practical Manual for Agricultural Chemistry., Kalyani Publisher Delhi, India., 1994.
[2] H.O. Buckman, and C.N. Brady, The Macmillan company., New York, 1960.
[3] I. Ifenna and L.C. Osuji, "Physico-chemical characteristics of soils within the vicinity of a hot mix asphalt (HMA) plant in Obigbo, Port Harcourt, Nigeria" Archives of Applied Science Research., vol.5(3), pp. 184-192, 2013.
[4] A.F. Aiyesanmi, A.E. Okoronkwo and O.M. Sunday, "Lead accumulation in Siam weed (Chromolaena odorata), Node weed (Synedrella nodiflora) and Water leaf (Talinum triangulare): Potential phytoremediators" Archives of Applied Science Research, vol.4(1), pp. 360-371, 2012.
[5] K. Rajendren and R. Veeraputhiran, "Biochemical properties of soils under crop rotation" Agric. Rev, vol. 22(1), pp.68-70, 2001.
[6] C.C.Trasar, M.C. Leiros, S. Seoane and F, Gilsotres, Soil Biol. Biochem, vol. 1, pp. 301-307, 2008.
[7] S. Jain and A. Singh, Int. J. chem. Sci, vol. 6(1), pp. 80-86,2008.
[8] E.W. Hilgard, Soils. The Macmillan company, New York. 1911.
[9] F. Gelman, R. Binstock and R. Halicz, Report Geological Survey of Israel, **13**, 2011.
[10] C. Gazey and S. Davies, Soil acidity, a guide for WA farmers and consultants. Bulletin 4784, ISSN 1833-7246.
[11] P.K. Chauhan, V. Singh and V.K. Dhatwalia, J. Chem. Pharm. Re, vol.3, pp. 799-804, 2011.
[12] B. Minamba., Journal of Research in Environmental Science and Toxicology, vol.1, pp.328-337, 2012.
[13] K.G. Chaudhari, Studies of physicochemical parameters of different soil samples, Archives of Applided Science Research, vol.5(6), pp. 72, 2013.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY