



Physico-Chemical Study of Soil in Dholpur City

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(Received 24 January, 2020, accepted 19 March, 2020)

(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: The soil contamination is increasing at a very rapid rate due to influx of pollutants in the agriculture ecosystems. This has changed the physical, chemical and nutritive value of the soil and has caused damage not only to the productivity of soil but has also caused damage to the human health as pollutants get accumulated in the trophic levels. The physical and chemical properties of the soil and the impact of the pollutants were investigated in the different soil ecosystems.

Keywords: Soil, physical properties, chemical properties, dholpur.

I. INTRODUCTION

Soil is a basic resource in the agricultural production system and monitoring its fertility is an significant objective in the sustainable development of agro-ecosystems [1]. The agriculture land is wide spread in Dholpur which is fundamental and essential for production of different crops and a big cause of population is associated with this sector. However, the productivity of these ecosystems depends on the quality of the soil and different management practices [2-3]. Micronutrients such as Copper, Iron, Manganese, and Zinc are essential metals for plant growth and yield. However, pollutants which are not essential for plant growth get accumulated in plants from existing soils cause negative impacts. The availability of ions to plants is dependent on the concentration of pollutants in soil solution and many factors like soil pH, organic carbon, electrical conductivity etc., influence their concentration in soil solution. The most important factors affecting metal availability are soil. Industrial production, mining, agriculture and transportation release large amount of

pollutants into the soil ecosystems and ultimately to different food chains [4]. The accumulation of pollutants in different food chains is of concern due to the probability of food contamination through the soil root interface. It is argued that pollutants like lead and mercury are not necessary for plant growth, they are accumulated by plants in toxic forms [5-6]. An increasing concern for the sustainability of soil quality has led to the development of a set of management practices that reduce the potentially negative impact of agricultural activities [7]. Keeping the above facts into consideration an analysis was carried out to know the status of different soils in Dholpur.

II. STUDY SITES

Sampling sites: Soil samples were collected from four different areas which are as follows:

1. Farm soil sample
2. Barren land soil sample
3. Road side soil sample
4. Garden soil

III. METHODS AND MATERIALS

Experimental

Parameter	Method
pH	pH strip method
Conductivity	Electrical conductivity meter
Texture	Feel method
Alkalinity	Neutralization method
Hardness	Complex method
DO	Winkler method
TDS	Evaporation method
Chloride ion	Mohr's method
Sulphate	Gravimetric method

IV. RESULTS

Soil analysis of the effluents from four sampling sites has been carried out for pH, color, conductivity, TDS,

DO, hardness, alkalinity, sulphet, chloride, texture. The result are as shown in Table 1 and Figure 1:

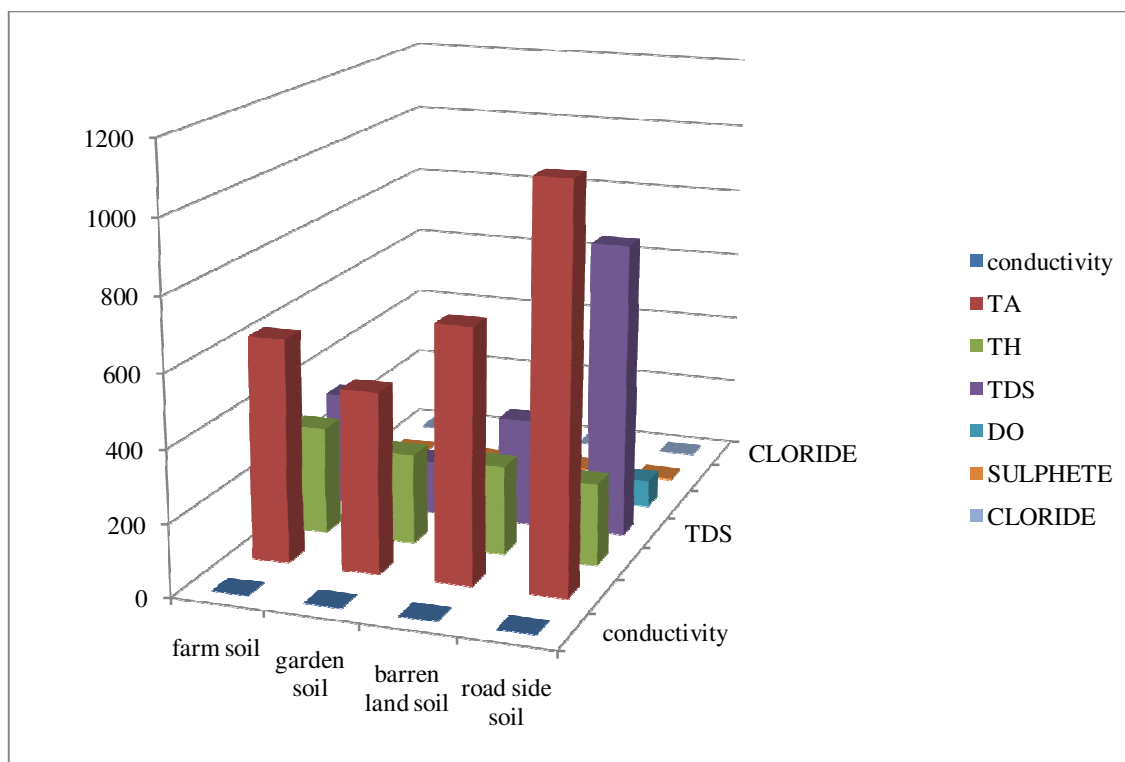


Fig. 1. Physico-Chemical Study of Soil in Dholpur City.

Table 1: Physico-Chemical Study of Soil in Dholpur City.

Parameters	Farm soil	Garden soil	Barren land	Road side
pH	Alkaline	Alkaline	Alkaline	Alkaline
Colour	Black dark grey	Red-yellow	Blackish	Brown
Texture	Sandy loam	Loamy	Loamy	Sandy loam
Conductivity (us/m)	0.2	0.7	0.2	0.4
Total Alkalinity (mg/l)	620	500	700	1100 mg/L
Total Hardness (mg/l)	300	252	248	228mg/L
Total Dissolve Solid (mg/l)	320	150	300	820mg/L
Sulfate (mg/ml)	2.80	1.46	6.08	4.5
Chloride (mg/l)	0.18	0.48	0.17	0.02

V. DISCUSSION

The soils of Dholpur showed different characteristics as compared to the soils of Gwalior reported in earlier studies [3]. We found that the value of soil pH in this area indicates an alkaline nature of soil, because of some alkali salts like OH ions.

The pH is one of the most important factors in soil quality management [8]. It must be noted that the migration of the contaminants in the soil depends on a variety of factors like inter alia, the concentration of contaminants, climate and the parameter of the soil: type, sorptive capacity, pH, and content of solid, liquid and air phase [9].

All the soil samples have good value of electrical conductivity. Maximum conductivity was found in garden soil because of higher concentration of ions. And minimum conductivity was found in farm and barren land soil because of lower concentration of ions. Maximum alkalinity was measured in road side soil because quantity of calcium carbonate and other compounds were high and minimum alkalinity was measured in garden soil because many plant nutrients including iron, zinc, copper is reduced at high pH values. Maximum hardness was found in farm soil because of Ca and Mg ions. Minimum hardness was found in road side soil because Zn, Fe, Co, Mn is reduced at high pH values. Maximum TDS was found in road side soil because soil particles may contain soluble components that can dissolve, this will increase the TDS. Minimum TDS was found in garden soil because fewer components were dissolved. Maximum DO was found in road side soil because loss organic matter and Zn deficiency and presence of nitrogen, magnesium, and phosphates and minimum DO was found in barren land soil because of loss of soil structure, poor internal drainage and soil acidity are other problems. Maximum chloride was found in garden soil because concentration of ions was high. And minimum chloride was found in road side soil because of lower concentration of ion. Maximum sulfate was found in barren land soil because of concentration of ions was high and minimum sulfate was found in garden soil because of low concentration of ions.

VI. CONCLUSION

It was observed that different areas of soil had influences on the physiochemical characteristics of the soils. The sulfate and chloride was within the standards as such it may not cause any harmful impact to the soil or crop productivity. Soil texture for all soil samples is investigated in this study was different.

REFERENCES

- [1]. Sherene T. (2017). Role of Soil Enzymes in Nutrient Transformation: A Review. *Bio Bulletin*, **3**(1): 109-131.
- [2] Ishizuka, S., Sakurai, K., Kendawang, J.J. and lee, H.S. (2000). Soil characteristics of an abandoned shifting cultivation land in Sarawak, *Malaysia. Tropics*, **10**: 251-263.
- [3]. Wani K.A., Yadav, R., Singh, S. and Upadhyay, K.K. (2014) Comparative Study of Physicochemical Properties and Fertility of Soils in Gwalior, Madhya Pradesh. *World Journal of Agricultural Sciences*, **10**(2): 48-56.
- [4]. Ismail, S.A. (1993). Keynote papers and extended abstracts. Proceedings of congress on Traditional Science and Technologies of India, Nov. 28-Dec.3, Bombay, 10.27-10.30.
- [5]. Montesur, J.G., Nagatsuka, S. and Higashi, T. (1997). A study on pedogenesis and characteristics of red yellow soils in the Philippines. *Morphology, I., physic-chemical properties and classification. Pedologist*, **41**: 79-88.
- [6]. Sharma, S.C., Verma, R. S., Trivedi, S.K., and Tomar, P.S., (2006). Practical manual soil fertility. Department of Soil Science and Agriculture Chemistry college of Agriculture, Gwalior (M.P.).
- [7]. Javanmard, A. (2015). Improvement of Soil Physicochemical Characteristics Using Legume Crops *Biological Forum – An International Journal*, **7**(2): 869-874.
- [8]. Kumari, A., Shalini, S., and Mamta, S. (2018). Effect of Physicochemical Properties of Soil on Secondary Metabolites of *Calotropis gigantea* (L) Collected from Shivalik hills of Himachal Pradesh, India, *Biological Forum–An International Journal* **10**(1): 146-157.
- [9]. Kupozulu Swuro, Wani, B. A., Wani, K.A. (2018). Hydrocarbons and Their Impact on Certain Soil Properties: A Review, *Bio Bulletin*, **4**(2): 01-12.