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USE OF INORGANIC CHEMICAL & ITS IMPACT ON SOIL: A CASE OF FARMERS IN CHHATTISGARH, INDIA.

Manish Upadhyay[1] and Pramod Rathore[2]

[1]Professor & Head, [2]Research Scholar, Dr C V Raman University, Kota, Bilaspur, Chhattisgarh, India.

Corresponding Author

Manish Upadhyay
Email:- man_bsp@rediffmail.com

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ABSTRACT

In recent years the newer environmental issues regarding hazardous waste, global climate change, stratospheric ozone depletion, ground water contamination, Soil Pollution, disaster mitigation and removal of pollutants have become the focus of environmental, attention. Though all the segments of environment are being polluted in various ways, the study of soil pollution is selected as soil is very important for all types of crops. Janjgir-Champa is one of the most important city areas in the state of Chhattisgarh which has Integrated Coal Miles, chemicals, distillery units and large number of small and medium industries. Keeping the above in view, the study area has rightly been selected. It involves the soils which collect form Janjgir-Champa field area. The Soil Analysis indicates that Soil samples of some areas are not suitable for crop production. All soil samples have low fertility due to have less content of nutrients. The regularly monitoring of the quality soil necessary because quality of soil directly affects the human health and other animals. My aim of the study is clear that the quality of soil in Janjgir-Champa field area directly related to our health, in Villages area; large numbers of people live and use available Crops which produced in soil which affect by human activity. People do not know the quality of soil so these studies give information to such people.

Keywords: Soil, Nutrients, Physico-chemical Parameters and Fertility.

INTRODUCTION

Soil can be defined as the solid material on the Earth's surface that results from the interaction of weathering and biological activity on the parent material or underlying hard rock. Soil formation, or paedogenesis, is the combined effect of physical, chemical, biological and anthropogenic processes on soil parent material. Soil is said to be formed when organic matter has accumulated and colloids are washed downward, leaving deposits of clay, humus, iron oxide, carbonate, and gypsum, These constituents are moved from one level to another by water and animal activity.

As a result, layers (horizons) form in the soil profile. The alteration and movement of materials within a soil causes the formation of distinctive soil horizons. Sixteen nutrients are essential for plant growth and reproduction. They are carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, sulphur, calcium, magnesium, iron, boron, manganese, copper, zinc, molybdenum and chlorine. Nearly all plant nutrients are taken up in ionic forms from the soil solution as cation of as anions. pH and buffering (reserves) of soils are controlled by a number of soil components such as clay minerals, organic matter, oxides of aluminium and iron and compounds of calcium and sodium. pH reveals the reactions which dominate the soils. Phosphorus is the second most critical plant nutrient. The soil mineral apatite is the most common mineral source of phosphorus. While there is on average 1000 lb of phosphorus per acre in the soil, it is generally in unavailable forms. The available portion of phosphorus is low as it is in from of phosphates of low solubility.

The potassium is bonded between layers of clay. Under certain conditions, dependent on the soil texture, intensity of drying, and initial amount of exchangeable potassium, the fixed percentage may be as much as 90 percent within ten minutes. Potassium may be leached from soils low in clay. The movement of heavy metals down the soil profile is often evident in high applications of heavy metals, usually in sewage sludge, in soils with low organic matter and clay contents, acidic conditions, and when high rainfall or irrigation water rates have been applied. The movement occurs through soil macro pores or cracks which is also referred to as preferential flow. Organic matter plays an important role in metal binding; some researchers have tested whether organic carbon (OC) compounds influence metal leaching.

Study Area

Samples of surface soils are collected near four villages of Janjgir-Champa area, Chhattisgarh, India, during 2016. Samples are coded SN1, SN2, SN3, SN4 and SN5. Soil samples were taken at depth of 20-30 cm below the surface.

Water Quality Parameter

The Soil sample was analyzed in the laboratory of Dr. C. V. Raman University, Bilaspur. The soil samples were brought in polythene bags to laboratory for the analysis of physico-chemical parameters. The collected soil samples are first dried in metal tray and crushed in powdered and then analysed pH, OC, EC, P and K in soil samples.

MATERIAL AND METHODOLOGY

Soils samples have been examined for their pH value 20-x slurry in distil water and for presence of major component (organic matter, silicon, chloride, sulphate calcium oxide, magnesium oxide, ferric oxide aluminium oxide sodium oxide, potassium oxide,) pH meter, Flame photometer, systronic digital Nephlometer and systronic spectrophotometer were used for determination of physicochemical parameters. The organic matter was determined by the walkley and black method. The analysis was carried out using standard methods. The samples also analysed by method which mentioned in table and for testing used all chemical used in AR grade.

Figure 1. Map of state of Chhattisgarh located in India

Figure 2. Map of Janjgir-Champa and sample of soil taken from this place.

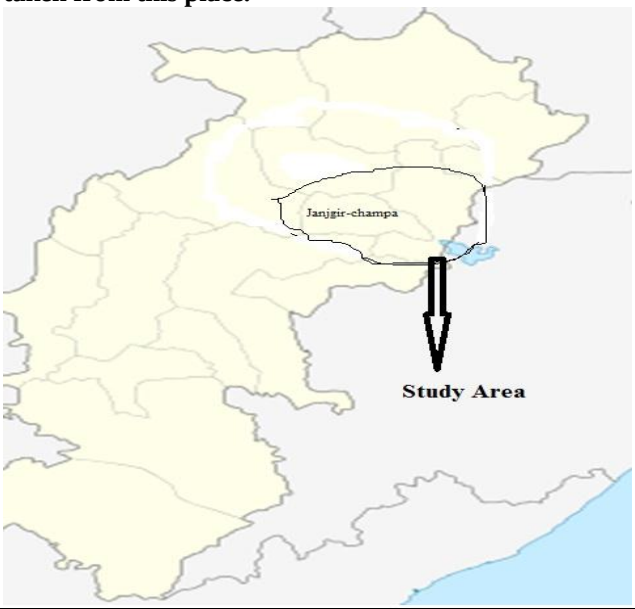

Table 1. Methods of examination of Soil Sample.

S. No.	Parameters	Method
1	Soil reaction (pH)	Glass electrode (1:2.5 soil water suspension)
2	Soluble salts (EC)	Conductivity bridge (1:2 soil water extract)
3	Organic Carbon	Colorimetric Method (Datta et. al., 1962)
4	Available phosphorus	Brays and Kurtz P1 method (1945)
5	Available potassium	Ammonium acetate extract method

Table 2. Soil Quality parameters of villages of Janjgir-Champa area, Chhattisgarh, India.

Sites of Station	pH	E.C. (ds/m)	Nutrients		
			O.C.kg/ha	Pkg/ha	KKg/ha
SN_1	5.4	0.42	0.25	2.40	280
SN_2	5.6	0.27	0.19	3.15	120
SN3	5.8	0.16	0.35	3.86	104
SN4	5.5	0.11	0.17	4.70	95
SN5	6.0	0.08	0.20	3.79	188

RESULTS AND DISCUSSION

The observed value of soil quality parameters has been mentioned in the given table number 2 and the pH values in the range of low 5.4 to high 6.0. Minimum pH was observed from SN1 Soil sample and a maximum of pH was 6.0 observed from SN5 sample. The acceptable limit of pH value is between 6.5 to 8.5. So it was found that the soil of the area under study is slightly acidic. The EC values were in the range of 0.08 to 0.42. And minimum EC was 0.08 observed from SN5, and a maximum of 0.42 was observed from SN1 sample. Beyond this range it will not affect the crop production.

Electrical conductivity is a measure of the ability of the solution to conduct electricity. It is related to the amount of conduct electricity. It is related to the amount of dissolved substance (or ions) in soil solution. Organic carbon are used to assess the amount of organic matter in soils increasing soil organic carbon (SOC) can improve soil health and can help to mitigate climate change. The Organic carbon values in the range of 0.17 to 0.35. Minimum Organic carbon was 0.17 observed in SN4 Soil sample and a maximum of Organic carbon was 0.35 observed from SN3 sample. Phosphorus (P) is an essential element classified as a macronutrient because of the relativity large amounts of P required by plants. The Phosphorus values were in the range of 2.40 to 4.70. Minimum Phosphorous was 2.40 observed in SN1 Soil sample and a maximum of Phosphorous was 4.70 observed from SN4 sample. On the basis of different percentage of potash it can be divided in to low, medium and high. The Available Potash values were in the range of 95 to 280. Minimum Available Potash was 95observed in SN4 Soil sample and a maximum of Available Potash was 280 observed from SN1 sample.

CONCLUSION:

The current study suggests that quality of soil villages of Janjgir-Champa area, Chhattisgarh, India, are not suitable for crop production. Soil samples analysed and conclude that the all sample have low value of Phosphorous and Carbons. Which adversely affect the fertility of soil, for increasing fertility of soil used natural fertilizers which maintain the all nutrients of soil. One more suggestion to farmer used Bio-fertilizer to maintain the value of Organic Carbon in soil. And all soil also have acidic nature so used alkaline water to control pH value of soil.

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CONFLICT OF INTEREST:
The authors declare that they have no conflict of interest.

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