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SYUDIES ON EFFECT OF INTENSIVE EXCAVATION OF COAL FROM COAL FIELD ON INCREASING POLLUTION IN SOIL IN THE COAL FIELD AREAS

Manish Upadhyay[1*] and Sandhya Baghel[2]

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

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ABSTRACT

The principles objective of Soil Analysis was to study the soil at the coalfields area .The effect of soil analysis of coalfields can give significant improvement in its soil quality. The study therefore provides an opportunity to investigate some aspects such as-acidity & basisity nature of soil, toxic effect of soil, importance of the soil etc. The main objectives of this study are:-. To collect information of soil type, slope, acidity viz. of the soil causes trace element deficiencies for these four sampling station East, West, North, South around Dipika coalfields area. To study the effect of coal excavation on physical, and chemical properties of soil to know what soil pH & conductivity is and how it is calculated & Crop fertility. Take some property like water holding capacity (mg/l), pH, conductivity, organic matter, silica and calcium oxide.

INTRODUCTION

Soil is the top layer of the Earth's crust in which organic matter grows .Soil Analysis can provide important information's about, physical condition, fertility (nutrients) status and chemical properties, such as pH and conductivity. That affects soil suitability for growing plants. In order to know the details of soil and to overcome the bad after effect of soil, the soil survey was felt necessary [1]. Soil-so essential to life on earth-is one of the most complicated of materials. A complex mixture of inorganic and organic solids, liquids, and gases, soil presents a challenging material for analysis, especially for researchers who are not specialists in soil chemistry. It is very imp constituents of lithosphere [2]. The word soil is derived from a Latin word "Solum" which mean early material in which growth of plants takes place. Soil is the dynamic natural body on the surface of the earth in which plants grow, and is composed of mineral and organic materials and living forms.

Corresponding Author

Manish Upadhyay
Email: - man_bsp@rediffmail.com

METHODOLOGY

Planning of study

Without planning we cannot do our work complete [3]. Planning of study will be done after the preliminary survey of concerned villages near coalfields area s1-east, s2 –west, s3 north, s4 south. Planning of study include that which area is already researched, which soil fertility is good, preparation of tools to collect data ,need of time and money, laboratory facility for soil testing.

Collection of Soil Samples

Collection of a representative soil samples from the field, which is an outside laboratory activity, is most challenging and difficult task through appears to be the simplest in the face of high heterogeneous nature of the soil [4].

Time of Sample Collection

Soil can be tested round the year but summer season is most appropriate for this work. The condition of farms is ideal for sample collection in this season ,and the results of testing can be obtained before the monsoon

crops.

Study Area and Number of Samples

The study area of the present investigation is located along the soils of the Dipika coalfields, korba district, Chhattisgarh, India the soil samples were analyzed for various parameters such as pH, conductivity, organic matter, calcium, silica etc.

METHODS OF STUDY

Different type of equipments can be used for sampling. Soil auger tube or knife or Khurpi and polythene bags are used for taking samples. Firstly Divide the field in to area so that each sample represents an area [5].A sample should be collected separately from areas which differ in soil colour. Clean the site from where soil sample is to be collected by removing undecomposed organic materials, garbage, etc. Scrap away the surface litter and insert sampling tube to a plough depth (above 15 cm) dig a V-shaped shaped hole to a plough depth .Take at least 05 samples randomly distributed over each area in a polythene.

SOIL pH

The pH of the soil is the measure of hydrogen ion activity (or concentration) in a soil solution [6]. This is a key element of soil chemistry that determines how available most nutrients are, both to plants and to the soil micro-organisms. [7]A neutral soil has a pH of 7.0-it is either too acidic or too alkaline. As the concentration of hydrogen ions increases, the soil becomes more acidic (due to the way it is denoted scientifically, it actually means that the pH number decreases). At a pH of 5.0, which is quite acidic, less than half of the major nutrients are available to the plants.

Organic Matter

Organic matter consists of the remains of living organisms in various stages of decomposition as well as living microorganism. Organic matter occurs in various forms from undecomposed to completely decomposed (humus) with all forms providing benefits to the soil. Nutrients are added as the soil microorganisms break down the organic matter [8]. When the organic matter is fully broken down, one of the things, left is humus. Microorganisms form the living components of organic matter; they feed on organic matter, decomposing it to humus. Microorganism are important to soil health.

High ranging indicates that plants will not respond to additional fertilizer being applied and low means that almost certainly plants will be lacking in the nutrient [9].

CONDUCTIVITY OF SOIL

Electrical Conductivity measured soluble salts in soil. Salinity is a measure of the total amount of soluble salts in soil. [10]As soluble salt levels increase, it becomes more difficult for plants to extract water from soil. Some plants are more resistant than other's, but as the salt levels exceed their ability to extract water, they become water stressed [11]. This is known as chemical drought, since affected plants show visual symptoms similar to those plants suffering from a lack of water.

Calcium oxide (Cao)

Calcium, an essential part of plant cell wall structure, provides for normal transport and retention of other elements as well as strength in the plant.[12] It is also thought to counteract the effect of alkali salts and organic acids within a plant.Source of calcium are dolomite lime, gypsum, and superphosphate [13].

RESULT AND ANALYSIS

The result of analysis of soil is reported in table no 1.the soil with pH greater than 8.5 is generally called as sodic soil.but pH less than 8.5 indicating that soil samples are free from sodicity hazards. Water holding capacity varies to 0.58 to 0.80 mg/l. Conductivity is a measure of the total concentration of the ionized substances. [14] The mobility of ions, their valencies and their actual and relative concentration affects conductivity [15]. It's ranging 1.50 to 1.80 mho/cm, the range behind the critical limit. The organic matter plays a vital role in the soil fertility. It was ranges between 10.20 to 14.50 mg/l.

Table 1. Physico-chemical analysis of soil

S/N	Parameter	Station 1-S_1	Station 1 -S_2	Station 1- S_3	Station 4- S_4
1	Water holding capacity (mg/l)	0.60	0.80	0.58	0.59
2	pH	8.5	8.5	8.4	8.5
3	Conductivity (μ Scm-1)	1.60	1.50	1.55	1.80
4	Organic matter	10.20	11.50	12.50	14.50
5	Silica (%)	60.20	55.50	64.20	54.00

CONCLUSION

It is concluded from present study were undertaken to the study of physico-chemical properties of soil samples from above coalfields area. Some of the properties (OM, Silica) & metals present in coal are extremely essential to soil, for example cobalt, copper and iron but large quantities of them may cause physiological

disorders. The cadmium, chromium, and lead are highly toxic to humans even in low concentration. As regards the presence of toxic elements shown increasing trends as compared to their value in unpolluted soil. The pretreatment is essential for water before using for drinking.

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

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