A Case Study on Physical – Chemical Characteristics of Soil Around Industrial and Agricultural Area of Jaipur

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Abstract :- **Soil provides the most important medium for growing plants and it is very important for agricultural and building. Seven soil samples from 150 – 250 mm depth were collected in the vicinity of industrial and agricultural land of Jaipur, Rajasthan (India). The physical – chemical parameters such as CBR (California bearing ratio) ,index properties of soil and shear strength of soill were analysed.**

I. INTRODUCTION

Soil is one of the important and essential resource of the nature. All living things are directly and indirectly relay on soil for day to day needs and 96 % of the food is produced from the earth. Making plan for having healthy and growing soil is important for humans . Soil is a natural body consisting of sub layers of mineral having a different thicknesses, which differ from the existing materials in their physical, chemical and mineralogical properties. Soil is composition of particles of broken rock that have been changed by chemical and mechanical processes that include weathering & erosion. Soil has complicated function which is beneficial to human and other living organism. It acts as a filter, transformation system and thus protects the global ecosystem against the adverse effects of environmental pollutants. Soil pollution is developed due to regularly fall of cement dust, resulted in the formation of gels of cal. silicate and cal. aluminate. The cement dust, produced by cement industries is considered one of the most hazardous pollutants which have adverse effect on surrounding environment. These particles can enter into soil as dry, humid or occult deposits and can undermine its physical – chemical properties. the atmospheric stability, the roughness of the surfaces as well as the diameter of the particles are controlled the deposit of these particles. Soil has important ecological functions in recycle resources require for plant growth. Soils have purification property as well. Soil supports terrestrial life through five processes: (Ramasamy et al., 2007) biomass productivity, (Hosker and Linderg, 1982) restoration and resilience of ecosystems, (Jha and Singh, 1991) purification of water, (Bray and Kurtz, 1945) detoxification of pollutants, and (Lal Singh, 2012) cycling of C, N, P, S, and H2O. Inherent soil physical – chemical properties influence the behavior of soil, knowledge of soil property is important. Soil is one of the planet's largest reservoirs of carbon in the form of organic matter. If we lose soil organic matter from fields, more carbon dioxide goes into the atmosphere and climate change is promoted. If we increase soil organic matter, carbon dioxide is withdrawn from the atmosphere, and climate change is moderated.

II. RESEARCH ARTICLE

Soil physical – chemical properties deteriorate to the change in land use especially from agriculture and forest. For agriculture leaching defines the loss of water-soluble plant nutrients from the soil, due to rain and irrigation. Soil structure, crop planting, type of fertilizers, in turn adversely affects physical – chemical properties of the soil. The waste materials discharges from industrial activities cause adverse effects on soil and soil organic matter. The change in physical – chemical properties of soil leads to infertile the soil that does not support normal growth of agriculture purpose.

III. MATERIALS AND METHODS

A. Study area

Jaipur city is the Indian state of Rajasthan. It have several indusries, coordinates of jaipur are latitudes 75.8000° E and longitude 75.8000° E . Jaipur is also famous for stones, which is used for houses flooring and construction of houses.

B. Soil sampling location in the study area

Soil samples taken at 150 – 250 mm in depth were collected from different locations in the vicinity of the industrial soil and agricultural soilWithin the studyarea. The soils are ground and passed through 0.25 mm sieve and were used for the analysis.

TABLE SHOWS PROPERTIES OF DIFFERENT SOILS

Properties Locations	Free Swell Index	Plastic Limit	Liquid Limit	Specific Gravity	In –Situ Dry Density Kg/m^3	Max. Dry Density g/cc	Bearing Capacity
Chaksu	3.15%	31.25	39.80	2.61	1667	1.87	8.00
Sitapura	2.94%	25.23	32.11	2.50	1568	1.75	6.12

CONCLUSION

The present study shows that the soil is rich in calcium and magnesium. The pH of most of the soil samples was found to be alkaline. Free swell index indicating the effect of highly expansion soil such as sodium betonites. The organic carbon of soil was high near industry area as well in agricultural land which clearly indicates the fertile soil and we are testing CBR test for finding bearing capacity of soil which shows variation in bearing capcity of industrial and agricultural soils ,agricultural soil have high bearing capacity as well as specific gravity. The physical– chemical properties of soil around industrial and agricultural area under study show significant variations.

REFERENCES

[1] Singh, H.P. (2011), "Strength Characteristics of Soil Reinforced With Geosynthetic". International Journal of Earth Sciences and Engineering ISSN 0974-5904, Vol 04, No 06 SPL, October 2011, pp 969-971, 2011

[2] Singh, H.P. (2012), "Improvement in CBR Value of Soil Reinforced with Coir fiber". 3rd International Conference on Natural Polymer (ICNP 2012), held at Mahatma Gandhi University Kottayam, Kerala, India. 26-27 October Paper No-118.

[3] SivakumarBabu, G.L., and Vasudevan, A.K. (2008) "Strength and Stiffness Response of Coir - Reinforced Tropical Soil". Journal of Materials in Civil Engineering, ASCE/September2008/571- 578.

[4] Gray, D.H., and Ohashi, H. (1983). "Mechanics of fibre reinforcing in sand." Journal of Geotechnical Engineering, ASCE 112(8):335-353.

[5] H. P. Singh1, M. Bagra "Improvement InCbr Value Of Soil Reinforced With Jute Fiber" ISSN: 2319-875.