Impact of Solid Industrial Waste on Soil

Mukul Nama, Dhrindra Singh, Dileep Kumar Dhobi, Gaurav Sharma, Deepak Vaisnav

Department of Civil Engineering

Poornima Group of Institutions,

BT-1, Bio Technology Park, Industrial Area Sitapura

Jaipur

Abstract:- **Soil samples were collected from RIICO industrial area to study the possible impact of solid industrial waste on soil quality. The physical and chemical property such as pH by pH meter, electrical conductivity, calcium, magnesium, chloride, nitrate, sulphate, phosphate and the metal like iron, potassium, copper, manganese, lead, cadmium, chromium, nickel, palladium, antimony were studied using various analytical techniques. It is concluded that the contamination is due to the solid waste materials that are dumped in the area.**

Key words-: Soild industrial waste; soil; analysis; physical parameters; chemical Parameters.

I. INTRODUCTION

Industrial solid waste is defined as waste which is generated from an industries or manufacturing processes or waste generated from non-manufacture activities that are managed as a separate waste stream. Solid industrial wastes are any discarded or unwanted materials. Solid industrial wastes generated from industries include inorganic and organic wastes. Some of the industrial waste are recycled to produce energy. Other type of waste is either land filling or incineration. During the production process of these industries, a lot of solids and, semi-solids are generated that may contain substantial amount of harmful organic and inorganic products, and if dumped in the environment without treatment then this may lead to serious environmental problems. This will also undoubtedly deteriorate soil productivity and adversely affect crop production in the surrounding land. Environmental pollution is the major problem associated with rapidindustrialization, urbanisation and development of standards of people. For developingcountries, industrialisation was must and still this activity demands for building of self reliant and in uplifting nation's economy. However, industrialization on the other hand has also caused serious problems relating to environmental pollution.

Therefore, wastes seem to be a by-product of growth. The country like India can illafford to lose them as sheer waste. On the other hand, with increasing demand forraw materials for industrial production, the non-renewable resources are dwindlingday-by-day. Therefore, efforts are to be made for controlling pollution arising outof the disposal of wastes by conversion of these unwanted wastes into utilizing rawmaterials for various beneficial purposes. The problems relating to disposal of industrial solid waste are associated with lack of infrastructural facilities and negligence of industries to take proper safeguards. The large and medium industries located in identified (conforming) industrial areas still have some arrangements to dispose solid waste. However, the problem persist with small scale industries. In number ofcities and towns, small scale industries find it easy to dispose waste here and thereand it makes difficult for local bodies to collect such waste though it is not theirresponsibility. In some cities, industrial, residential and commercial areas aremixed and thus all waste gets intermingled. Therefore, it becomes necessarythat the local bodies along with State Pollution Control Board (SPCB) work outrequisite strategy for organizing proper collection and disposal of industrial solid waste. Ex: Food waste, Cloth, Waste paper, Glass bottles, Polythene bags, Waste metals, etc. Commercial wastes: It includes wastes coming out from shops, markets, hotels, offices, institutions, etc. Ex: Waste paper, packaging material, cans, bottle, polythene bags, etc. construction wastes: It includes wastes of construction materials. Ex: Wood, Concrete, Debris, etc. Biomedical wastes: It includes mostly waste organic materials Ex: Anatomical wastes, Infectious wastes, etc.

S.no	Tests	Soil sample 1	Soil sample 2	Waste sample 1	Waste sample 2
1	pH	8.41	8.26	8.63	8.48
2	Conductivity (ms/m)	1.32	1.77	1.68	3.13
3	moisture	.18	.21	.14	.27
4	nitrogen	3.45	3.67	.27	1.87
5	Phosphorous	.11	.13	.17	.14

s.no	Heavy metals (mg/kg)	Soil samp le 1	Soil sample 2	Waste sample 1	Waste sample 2
6	cadmium	0.47	0.015	0.143	0.037
7	Lead	0.015	0.0	0.058	0.0
8	Zinc	.0.78	0.31	2.753	1.547
9	Iron	43.32	46.18	114.04	96.24

II.   STUDY AREA

Jaipur (longitude: 950 24. E; latitude: 270 18. N), a city located at the central part of Rajasthan, is undergoing rapid urbanization and industrialization. The study is conducted in the RIICO area of Jaipur city.Baisgodam and vki are taken for soil sampling. these has an average elevation of 18 metres (51 feet). The EXPERTA PVT LTD and HB AGRO INDUSTRY are taken for waste soil sample respectively.
The address of expertamedicapvt.ltd is F-442, road no. 13, vki, jaipur.
The address of HB agro industry is F-80, katarpura industrial area, BaisGodam, Jaipur

III.   METHODOLOGY

A.   Soil samples: Sample collection, preservation and analysis were done as per the standard methods . The representative soil samples were collected as per standard methods. The sampling of soil was done using hand augur. The augur was used to bore a hole to the desired depth and then take it out. The samples were collected directly from the augur. The sampling area first to be cleaned and first 15cm of surface soil was removed with the radius of 4 inches around the drilling location. Begin auguring, periodically removed and deposited accumulated soil onto the sample container[1]. After reaching the desired depth slowly and carefully remove by the augur from the hole and the samples were directly collected from the augur. The composite samples collected and they were kept in the container. The collected soil samples were protected from sunlight to minimize any reaction. Sample of soil is taken from both the sites. The dry soil samples for various tests were prepared as per the indian standard methods. The obtained soil samples dried in sun or air and the sample was done. The soil sample was passed through the specified sieve and taken for various analysis.

B.   Solid waste samples: 500 g of representative soil waste samples were collected from both places of jaipur on 17 jan 2016. The solid waste samples were collected as per the standard procedure.

IV.   LABORATORY ANALYSIS:

The station-wise distributions of analytical parameters such as physical parameters includes pH, conductivity, size texture and moisture are determined by the various tests as follows pH is done by pH meter. Conductivity is done by conductivity meter,size test is done by IS sieve test, moisture content is done by oven dried method, nitrogen content is done by using kjeldal method, organic content is done by chemical reaction such as heated with $k_2cr_2o_7$ in presence of conc. H_2so_4.Heavy metal test is done by AB-DTPA[2] (ammonium bicarbonate diethylene triaminepenta acetic acid.).

V.   CONCLUSION-:

Thus it will be analyzed that how industrial waste distributed the quality of soil and show adverse effects on growth of plants and crops. The presence of heavy metals in soil disturbs food chain and cause serious effect on human health. Therefore there is a need for proper management and treatment of industrial solid waste for our health and wealth.

REFERENCES

[1]   Donahue, R.L., R.W. Miller and J.C. Shickluna 1987. Soils: An introduction to soils and plant growth, 5th Ed. Prentice-Hall of India Private Limited, New Delhi, India.

[2]   Nelson, D.W. and L.E. Sommers. 1982. Total carbon,organic carbon and organic matter. p. 539-579. In: Methods of Soil Analysis. Patr-2. (Second Ed.). A. L. Page (ed.), American Society of Agronomy Publication, Madison.