Effect of Plastic Waste Disposal on Water and Soil Quality at disposal site of Lucknow

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Abstract- **Unscientific dumping of garbage and mismanagement of plastic wastage has started effecting the quality of water and soil in the Lucknow. This environmental damage lead to the serious concern.This creates complexitites on land and water. The dumpsites was selected in Lucknow city i.e Ghaila at Hardoi Road. This creates problem worsens during monsoon when garbage stinks more rain. The chemicals moieties like chloride, phthalates, heavy metals etc. migrate from waste into the surrounding medium due to non-chemically bound to the polymeric chain and remain leachable phase and freely mobile. Due to contaminating the surrounding soil, surface and ground waters through the leachate can cause considerable pollution problems. The promotion of sustainable economic growth, the rapid and unplanned urbanization , industrialization and population growth had lead to proliferation of consumer articles i.e generation of waste.**

Index Terms- **Plastic, Dump site, Heavy water, Leachate, Infiltration, synthetic, Ghaila.**

INTRODUCTION

Plastics are synthetic or semi synthetic organic compounds i.e made up of long chain of hydrocarbons and non-biodegradable. Plastics are widely used for transportation , storage and packaging of food stuffs. The usage includes plastics wrap, water bottles, cutlery, baby bottles ,disposables and reusable containers.

Plastic are usually made from petroleum. If the plastics is destroy by burning, it increase carbon emissions; if it is placed in a land or water area , it becomes a carbon sink. This lead to depletion of ozone layer. The leaching of plastics additives , stabilizers, plasticizers, harmful moieties of colorants occur which ultimately filter in different segments of contaminates soil and water bodies. This harmful effect of plastic on environments, there is a need for study on effects of plastic waste disposal on water and soil.

PH OF SOIL SAMPLES

Soil acidity and basicity are taken by the Soil pH. The lysimetric method is used for determination of pH, from the dumpsite soil solutions were extracted. The pH>7 indicate the alkaline medium and pH<7 indicate the acidic medium of soil solutions. Soil is alkaline due to presence of bicarbonates and Carbonates of calcium, sodium, magnesium and potassium. Accumulated dumped waste containing high plastic contents as well as hard soil profile of low infiltration capacity caused water logging at Ghaila dumpsite area. The increase in soil pH due to the water logging and more rapidly than the clay.

CHEMICAL PROPERTY OF SOIL SAMPLES

Assessment of soil quality with respect to its chemical composition is done by evaluating essential mineral level. Availability of higher concentration of Potassium and Phosphorous indicate the depletion of nutritional quality of dumpsite soil .This problem arises due to the decomposition of dumped waste under eco –condition, thus lead to formation of chemical moieties.

ORGANIC AND HEAVY METALS CONTAMINANTS IN SOIL

The level of Di-butyl phthalate, Dimethyl phthalate and etc. were also determined in soil samples. Heavy metal like Lead ,Copper , Zinc, Cobalt, Titanium, etc. were found in soil sample.

From data analysis, Ghaila Land fill site having sandy texture of soil and greater contamination of organic and inorganic moieties in soil which can

easily percolate through it .This show how much soil get polluted.

Soil have property to bind various chemicals and it depends on the form in which they exist in the environment. It consist of organic matter and mineral particles and organic –mineral particles. They help in giving the soil's ability to absorb exchange, oxidise reduce, precipitate chemical and metal ions in particular. It's is a good absorber of inorganic and organic materials due to the larger surface area. Due to the environmental agents contaminants may migrate and filter into the lower soil strata. Leachate production has also been found to be higher when the disposed refuse is less compacted, since compaction was found to reduce the filtration rate.

HEAVY METALS IN WATER

Heavy metal like Lead , Copper , Zinc, Cobalt, Titanium, etc. were found in water sample. Data revealed that Ti, Cd and Co were found below detection limit (BDL) in all samples. However , Cu and Zn are present in good amount.

The effect of filtaration was more at Ghaila dumpsite area due to sandy soil texture.Out of six control water samples ,five samples are collected near Ghaila Municipal waste dumpsite area from tube well or hand pump, which was uses by local peoples. Detected phthalate level found to follow the trend as per samples: DEHP>DEP>DBP>DOP>>DMP.

CONCLUSION

The abiotic and biotic transformation processes of different wastes give rise to pools of inorganic and organic material in the nature. Identification of dumpsite samples could be a yard-stick for the measurement of extent of pollution in environment. Due to production of leachates it contaminate the ground water basins in the area of the dumpsite or land fills.

In this study , we extract the information , monitor and asses the effects of plastic waste on water and soil quality with reference to phthalates and heavy metals. From the various data, an approach has been made to understand the toxicological and migration of chemical moieties present in the waste. Therefore, data has been archieve from soil and water sample of the dumpsites i.e Ghaila, Hardoi Road . Sailent finding of the study are ut infra:

- The availability of leachability of inorganic pollutants depends upon the pH of the landfill matrix.
- Data obtained from TCLP of dumpsite show migration of chemical moieties from plastic waste.
- Presence of phthalates and heavy metals in underground water of dumpsite area is due to migration of waste.
- The period of seasonal factors , geological factors and waste dumping are essential parameters to identities the leachate and implication of waste dumping.
- With the increase of pH values caused a certain decrease in metal solubility.
- With the increase of rate of decomposition of dumped waste, concentration of nitrogen and chloride ions of soil profile increase.
- Higher concentration of Potassium and Phosphorous indicate the increase of rate of depletion of nutritional quality of dumpsite soil due to plastic waste.

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