

2.2 Characterization of land fill sites and waste

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Physical characteristic of waste

Chemical characteristic of waste

Biological characteristic of waste



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Modern landfill sites are used in isolating the trash from air and water for preventing contamination.

Characteristic of these landfills are:

1. These landfills help in preventing the leachate from seeping into the underground aquifers. It helps in preventing soil pollution as well as groundwater pollution.
2. Compaction and covering of landfills help in preventing it from being blown by air. Compaction helps in better space utilization as more waste can be accommodated in small spaces whereas covering prevents the spread of dust and harmful germs this is safer from a health perspective.
3. These landfills help in the extraction of gas for the use of generation of power. In some countries, they become an important contributor to power generation.

Characterization of waste

Waste

Waste is described as discarded material that does not have no further use to the primary user. Waste exists in different forms like solid, semi-solid, liquid and gas. Based on its nature and source of origin it is categorized as municipal waste, hazardous waste, biomedical waste, radioactive waste and so on. Different waste streams are composed of different materials and therefore have different health and environmental impacts. Also the quantities to be managed differ from waste stream to stream. Consequently, the methods by which various waste streams are collected, recovered, processed, treated or disposed of may vary broadly.

Waste characterization

Waste characterization is a method that is used to determine the types and proportion of materials that are being discarded in a waste stream. Waste characterization is essential in determining the management practices that are to be adopted to manage them. It is

especially useful for policy makers and city planners who are involved in identifying and assigning landfill sites and setting up recycling programs.

Since the characteristic of waste determines the method of its management it is important and useful to know about the physical, chemical and biological nature of the waste. These characteristics vary depending on the source and type of solid waste and this in turn will affect the leachate and gas production from landfills.

Physical characteristic of waste

Coming to MSW the physical characteristic of the waste includes moisture content, waste particle size, waste density, temperature and pH as these affect the extent and rate of degradation of waste.

Chemical characteristic of waste

Chemical composition of solid wastes is important while evaluating alternative processing and recovery options.

Chemical characteristics can be analyzed by proximate and ultimate analysis of the substrate.

A typical proximate analysis includes moisture, ash, volatile matter, and fixed carbon contents.

The ultimate analysis of a waste component typically involves the determination of the percent C (carbon), H (hydrogen), O (oxygen), N (nitrogen), S (sulphur), and ash. Due to the concern over the emission of chlorinated compounds during combustion, the determination of halogens is often included in an ultimate analysis.

Biological characteristic of waste

The most important biological characteristic of the organic fraction of MSW is that almost all of the organic components can be converted biologically to gases and relatively inert organic and inorganic solids. The production of odours and the generation of flies are also related to the putrescible nature of the organic materials found in MSW (e.g., food wastes). The organic fraction of MSW (excluding plastic, rubber and leather) includes water-soluble

constituents (such as sugars, starches, amino acids, and various organic acids), hemicellulose, cellulose, Fats, oils, and waxes, lignin, lignocellulose and proteins.

While evaluating incineration as a means of disposal or energy recovery, it is important to keep in view the following facts:

- Organic material yields energy only when dry;
- The moisture contained as free water in the waste reduces the dry organic material per kilogram of waste and requires a significant amount of energy for evaporation; and
- The ash content of the waste reduces the proportion of dry organic material per kilogram of waste. It also retains some heat when removed from the furnace.

