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WASTE MANAGEMENT: DEFINITION, METHODS, BENEFITS AND SOLUTIONS

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ABSTRACT

Due to population growth and tremendous consumerism, exploitation of natural resources is at its peak. And we have an important obligation to protect the environment in front of us, when the whole world is uniting on the issue of Global Warming and Climate Change, because demanding more products means using more raw material. However, we can do our bit to save the environment by recycling products.Our greatest responsibility as a human being and society is to live in harmony with nature and according to that we have to mold our genre. Usually garbage comes from homes, markets, offices, educational institutions and hospitals. There is a straightforward chain for disposal - people put garbage in the specified places, the people of the municipality pick it out of the city and put them in the landfill outside the city or by burning or by other means. The best step taken in this direction is being proved. Garbage disposal, recycling, energy production from waste all these are called waste management. Recycling makes many consumer goods available again in the market, which is reducing the exploitation of natural resources. Recycling of aluminum, copper, steel, glass, paper and many types of plastics can be done. By recycling metals, many items are available in the market and demand reduces in mining according to demand.

By recycling the paper, at least as many trees can be cut to stopped. At the same time, the optimum utilization of the food used by the people is being made by changing the organic waste from the houses in the garbage disposal to bio compost and methane gas. While methane gas is the best source of energy, organic fertilization is important to naturally increase soil fertility. It also reduces dependence on farmers' artificial manure. Products made from organic composts get a good price in the market. During the primitive days, human kind used to discard their household waste such as trash, other worthless or defective items simply by digging a hole and burying them. This method was useful in those days because the population was relatively small and their needs were limited and they used to produce the waste on a small scale. Now days the situation become changed due to tremendous increase in human population and industrial development. Consequently, managing the colossal waste has become a very challenging task for the human being.

KEYWORDS: *Consumerism, Organic Waste, Garbage Disposal, Organic Fertilization, Artificial Manure.*

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Introduction

Waste management is a process in which randomly dumping unwanted items and making a systematic process like collection, transport, and proper disposal of waste, sewage and other waste products. Various types of methods for recycling the items are there for putting the waste to productive use.

Sustainable Development

Waste management is considered to be an important component of sustainable development. Sustainable development refers to the environmentally friendly and long-term development. Consumption and reuse of garbage management creates a cycle that reduces our reliance on natural resources to a lesser extent and reduces their harness. So, these days, a lot of emphasis is placed on garbage management while planning sustainable development.

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The American Environmental Protection Agency (EPA) has reported that in 279 million tonnes of hazardous waste were produced in 1996, of which ninety percent industrial process was water by-product wastewater. In 1997, the rule was changed by the EPA, which separates industrial wastewater from hazardous waste reporting. The result has been changed, the current reporting numbers should be clearly seen; in 2005, the EPA was that hazardous waste was less than 38.5 million tonnes.

Recent studies of six Indian currency have been found that waste pickers are harvested approximately 20%, 80,000 people are involved in recycling approximately three million tonnes. This ensures that it is imposed that every vocabulary of recyclable material is saved the ULB approximately INR 24 500 per year and avoids 721 kilogram CO2 emissions per year. (Annapur, 2012).

Due to various operational and design reasons, the vast majority have not been. For example, the first large scale MSW incinerator built in Timarpur in New Delhi in 1987 was the cost of processing 300 tons per day and cost was about Rs. 250 million (US $ 5.7 million).The plant failed because of poor waste segregation, isolation, seasonal changes in waste structure and properties, improper technology selection and operational and maintenance issues. (Indo-UK seminar report 2015).

India generates about 133 760 tonnes of MSW per day, of which about 91,152 tonnes are collected and about 25 884 tonnes are treated [CPCB (Central Pollution Control Board). 2000]. Per capita MSW generation in India is around 0.17 kg per person per day in 0.62 kg per person per day in small towns. (Kumar 2009). MSW may also include hazardous wastes such as pesticides, paints, used drugs and batteries. Compostable Organics include fruits, vegetables and food waste. Healthcare waste includes disposable syringe, sanitary material and blood cloth and is not compounded by the Biomedical Waste (Management and Handling) Rules 1998 and the Amended Rules, 2003, and not mixed with MSW (Bhalla, 2013; Mathur, 2012).

World waste production is expected to be around 27 billion tonnes per year by 2050, of which one-third will come from Asia, with greater contribution from China and India (Modak 2010). In 2025, in urban areas of India, the waste will be 0.7 kg per person per day, which is about four to six times higher than in 1999. The community is increasing with the size of legends because the problem is getting more and it provides decentralized management of self-help and decentralized non-governmental organizations. (Kumar 2014).

Waste produced in urban areas of India is approximately 170 000 tonnes per day, which is equivalent to 62 million tonnes per year, and changing population and changing life style is expected to increase by 5% per year. (Planning Commission, Government of India, 2014).

In 2006, Americans produced more than 250 million tons of garbage about 33 percent, 82 million tons of material was recycled; Energy equivalent to 10 billion gallons of gasoline. Through the energy recovery process, more than 30 million tonnes (12.5 percent) was consumed, and about 138 million tonnes (55 percent) of material was rejected in the landfill. When the city trashes and it is done properly, human health or the environment does not pose a threat.

Types of Waste

Waste is classified into four major types' like that urban waste, industrial waste, biomass waste, and biomedical waste. More specific, waste can be classified as:

- **Solid Waste**: Solid rubbish means of number of items found in household along with some commercial as well as industrial locations. Where human habitat and human activity occur, it is natural to find solid waste. We give it the name of garbage.
- **Liquid Waste**: Liquid wastes any waste which is generating Households and industries.
- **Organic Waste**: Any waste that's comes from plants or animals such as food waste and vegetable peels, garden and lawn clippings organic waste and includes animal and plant based material such as paper are called organic waste, cardboard and timber, commonly found in household. They can be turned into manure.
- **Agricultural Waste:** Any Waste are generated by agriculture includes waste from crops and livestock.
- **Bio-medical Waste**: Bio-medical waste means any waste, which is generating during the diagnosis, treatment, or immunization of human beings or animals.
- **Recyclable Rubbish**: Any waste which can be reused to make a new product is called Recyclable rubbish, which convert into products and use again as all types of metals, paper, and organic wastes.

- **Biological Waste:** Includes in blood and blood products, pathological waste, stock of cultures and infectious agents and related biological, polluted animal bodies and product pollution by bedding, sharps, and biotechnology.

The main components of an integrated waste management strategy

Following are the effective methods of waste management:

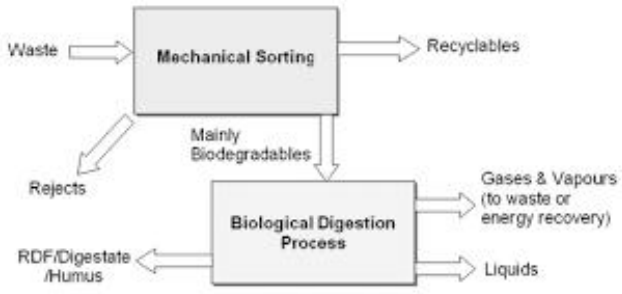
We can be waste management according this picture

- **Sanitary Landfill**: Throwing daily garbage in the landfills is the most popularly used method of waste disposal used today. The process is used that eliminates the odors and dangers of waste before it is placed into the ground. It is true, this is the most popular form of waste disposal method.
- **Incineration**

Incineration Waste management technology

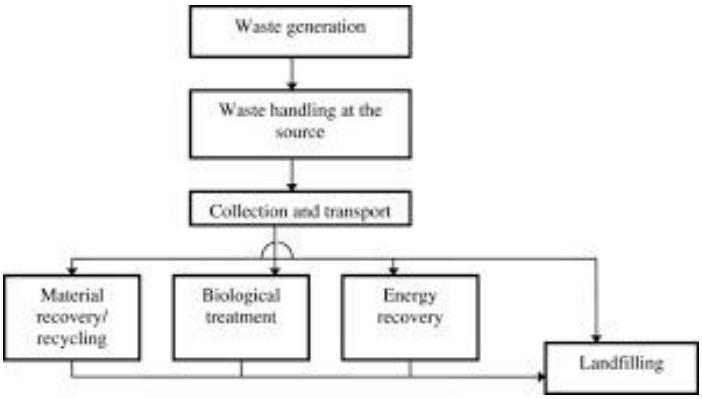
Incineration or combustion is a thermal treatment in which solid wastes are burned at high temperatures so that is convert them into heat, steam and ash residue and gaseous products. The result of this type of method is that it can reduce the volume of solid waste to 20 to 30 percent of the original volume and decreases the space they take up and reduce the landfills. Incineration is the process of burning municipal solid wastes, in which the waste is properly lit in proper furnace, under proper temperature and operation. Incineration is a chemical process in which the burning part of the waste material is released into the atmosphere of oxygen formed by the combination of carbon dioxide and water.

- **Mechanical and Biological Waste Treatment**: The use of MBT method is done to isolate mixed waste streams in a series of mixed waste streams generally in a series of dry products (usually iron and non-ferrous metals and glass), suitable derivatives for high calorific value incubation (RDF), and wet biodegraded slurry suitable for either composting or anaerobic digestion (AD).



Waste management in pharmaceutical industry

- **Solid Wastes Management**: Waste collected from residences, commercial buildings, institutions such as hospitals and schools, and light industrial operations is most often categorized as municipal solid waste. MSW as like paper, containers and packaging, food wastes, yard trimmings and other inorganic wastes and also include industrial sludge, classified as hazardous or non-hazardous.

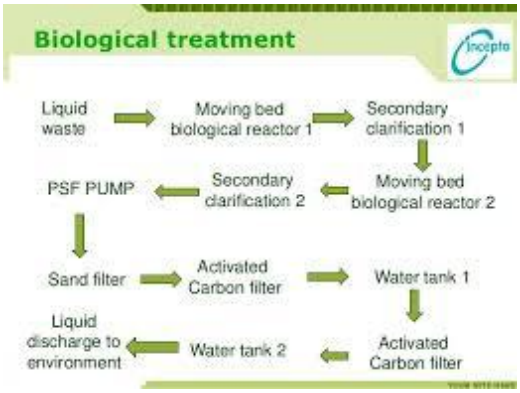


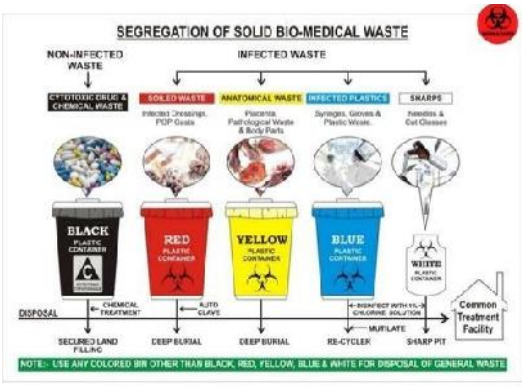
Stages the solid waste Management process

Solid waste management

Solid waste management is concerned with the disposal of wastes from the disposal of the waste by its production and re-circulation. Therefore, solid waste management can be defined as: systematic control, collection, storage, transport, exhaust separation, processing, treatment, retrieval and disposal of solid waste production.The Municipal Corporation is responsible for the disposal of this waste in planned urban areas. In the past century, cleanliness and waste management have emerged as a science. Whether the city is rich or poor, there is a need for waste disposal, no municipality can manage waste without a basic mechanism. The term "municipal waste" (MSW) is often used for the city, village or town waste, in which the daily waste is collected and it is carried out by transport to the settlement area. The sources of municipal waste material (MSW) come with private homes, commercial establishments and institutions as well as industrial facilities.

- **Biological Waste Management**: Organic waste is any material in which the bio hazardous have been contaminated or contaminated by agents. Organic waste is included, but it is not limit to; Petri dishes, surgical wrap, culture tube, syringe, needle, blood vials, absorbent material, personal protective equipment and pipette tips. .





Waste management in pharmaceutical industry

- **Recycling and Recovery**

Waste separation, recycling and recovery Resource recovery is the process of taking useful discarded items for a specific next use.

Waste treatment

Recycling process is widely used around the world, most material are recycled is reused for its original purpose. The discarded items like that plastic, paper and metal leading the list of the most recyclable items are processed to extract or recover materials and resources or convert them to energy in the form of useable**. Recycle** is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. The idea behind recycling is to reduce energy usage, reduce volume of landfills, reduce air and water pollution reduce greenhouse emissions and preserve natural resources for future use.

- **Plasma Gasification:** Plasma is a primarily an electrically charged or a highly ionized gas. Plasma gasification is a processed in which produces temperatures that exceed 12,600 °F and convert this method of waste disposal, a vessel uses characteristic plasma torches operating at +10,000 °F which is creating a gasification zone till 3,000 °F for converting solid or liquid wastes into a syngas.
- **Waste to Energy (WtE):**

Integrated waste management

The process involves converting of non-recyclable waste items into useable heat, electricity, or fuel through a variety of processes. In his type the source of energy is a renewable energy source as non-recyclable waste can be again to create energy. It can also help to reduce carbon emissions from fossil sources.Waste-to-Energy, also widely recognized by its acronym WtE is the generation of energy in the form of heat or electricity from waste.

- **Waste Minimization:** The easier method of waste management is to reduce creation of waste materials thereby reducing the amount of waste going to landfills. This method can be done by recycling old materials like jar, bags, repairing broken items instead of buying new one, avoiding use of non-degradableProducts such as plastic bags, reusing second hand items, and buying items that uses less designing.
  - **Composting**: Composting is a best methods of waste management.Composting is so far only possible on a small scale, either by private individuals or in areas where waste can be mixed with farming soil or used for landscaping purposes.
  - **E-Waste:** *E*-waste applies to much of the electronic equipment used by businesses and individual consumers that are nearing the end of their usefulness. This includes, computers, fax machines, copiers, and televisions these items are that certain components contain hazardous materials for example is cathode ray tubes in computer monitors and televisions.
  - **Ocean Dumping:** Ocean dumping which has been controlled regulated and banned in some cases in order to stop the hazardous materials to be dumped into the sea.
- **Benefits of Waste Management**

  The benefits of managing wastes are very clear from the following:
  - **Saving Natural Resources**: It is a challenge for us that many natural resources such as trees, gas and water are being reduced very fast. Paper, cupboards, paper cups, and many other products are made of trees. However, the trees are cutting on a large scale every year and new trees are not replacing them at the rate they are cut.
  - **Producing Energy:** By recycling something, we save energy. For example, it is possible to get energy from recycling waste. In many homes, garbage is used to make electricity. Firstly, dry and wet wastes are separated, after which electricity is generated.
  - **Reduce Pollution**: Recycling is a one of the most powerful method to save nature and humanity. The more people start to manage their waste, the better planet in which we live in. Apart from leaving a lot of waste, humanity pollutes the environment by producing various products. Corrosive to pollute the atmosphere with smoke by manufacturing processes. Recycling reduces pollution and helps save energy.
  - **Recycling Rubbish:** Rubbish is too big for aquatic life. A lot of waste is thrown away into the sea and ocean. Large areas of waste are called "waste islands", which are stored in a place made of waste.
  - **Efficient Management of Landfill**: Most landfill after a period of time, these landfills are leaking and polluting the ground water and other neighboring environmental housing waste management forms a very difficult task. These landfills are also producing unsafe gases.

Solutions for Waste Management

- Waste management should be dumped and managed in a scientific way, laws and regulations and city planners consider this aspect in the planning stage itself, inguiding the operations of landfills are often slack at monitoring and regulating the different types of wastes like medical waste, municipal waste, special waste, or hazardous waste.
- **Concept of 3R**:- the three R's mantra of Reuse, Reduce and Recycle play an important role in cutting down the amount of waste.
  - **Reduce:** The amount of waste you produce at home
    - Buy only those things which you need.
    - Carry a bag when you go shopping.
    - Give away things which you do not use anymore

- **Reuse:** The things that end up as waste but can be used again.
  - Use old wrapping paper to wrap gifts.
  - Write on both sides of the paper.
- **Recycle:** used products and waste material into new products-
  - Products such as soda cans, shoppingbags, plasticbottles. Brokenglass, used newspaper and magazines can be recycled.
  - Throw trash in proper trash bins.

- There is a need to educate the public and plan in a proper way for waste management programs and workshop organized into current waste management system. And also provide the knowledge about managing the waste in an eco-friendly way.
- Alternative to this problem, we should be to use bio-plastic, which tend to be more favorable to the environment. Therefore, we should be think to recycle paper products so that is no need of cutting new trees. That is also quite possible to reuse plastic products and metal items. Some countries have established certain sites where people are bring and sell old newspapers, metal items, or glass.
- Various communities in all walks of life Urban or rural through multimedia, the harmful effects of waste on basic mold and public health and how waste collection should be described locally.People should understand if they are not able to manage them, these waste materials might cause a serious hazard to human health as well as to the environment.
- We should be habit of shopping with a cloth bag. The goods purchase from the market can be used to be brought home usually in this bag. We should not use a plastic bag of shopping. Therefore, now the use of plastic will be decrease of day-to-day life.
- Every people should be contribute to saving nature for future.

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