

SOLID WASTE MANAGEMENT

UNIT – III

RESOURCE AND ENERGY RECOVERY

1. Resource Recovery

Extraction of useful materials or energy from waste.

Benefits

- Reduces landfill burden
 - Conserves natural resources
 - Generates revenue
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2. Material Recovery Systems

Recoverable Materials

- Paper
- Metals
- Plastics
- Glass

Recovery Methods

- Manual sorting
 - Magnetic separation
 - Air classification
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3. Composting

Biological decomposition of organic waste under controlled conditions.

Products

- Compost manure
- Soil conditioner

4. Types of Composting

(a) Aerobic Composting

Occurs in presence of oxygen.

Advantages

- Faster process
- Less odor

(b) Anaerobic Composting

Occurs without oxygen.

Produces

- Methane gas
 - Organic manure
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5. Composting Process

Pre-Processing

- Segregation
- Shredding
- Mixing

Post-Processing

- Screening
 - Curing
 - Storage
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6. Critical Parameters in Composting

Parameter	Ideal Range
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Moisture content	50–60%
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Parameter	Ideal Range
Temperature	55–65°C
C:N ratio	25:1 to 30:1
pH	6.5–8

7. Problems with Composting

- Bad odor
 - Fly breeding
 - Poor aeration
 - Excess moisture
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8. Thermal Conversion Processes

(a) Pyrolysis

Decomposition of waste in absence of oxygen.

Products

- Gas
 - Oil
 - Charcoal
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(b) Gasification

Partial combustion producing combustible gas.

Products

- Carbon monoxide
 - Hydrogen
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(c) Refuse Derived Fuel (RDF)

High-calorific fuel produced from municipal waste.

Uses

- Cement industries
 - Power plants
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9. Energy Recovery Systems

Energy generated through:

- Incineration
 - Biogas plants
 - Waste-to-energy plants
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