

Methods of Microbiology and Molecular Biology

ISSN 2517-7435

Solid Waste-An Introduction

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Abstract

Solid waste treatment is an important part of ecological maintenance and pollution control strategies that should be adopted to keep the environment clean and safe for the inhabited living organisms. Several solid waste management and treatment methods have been employed to ensure minimization of contaminant and its related contamination. Different types of solid waste from different resources could be treated using different methods such as incineration, composting, pyrolysis etc to reduce its unwanted accumulation and its harmful impact on the environment.

Keywords

Incineration; Composting; Agricultural solid waste; Sanitary Landfill; Pyrolysis

Introduction

Solid waste is defined as the unsolicited or unusable solid materials produced by manmade activities in suburban, developed or commercial areas [1]. The process of assembling and treating solid wastes is termed as solid waste treatment [2]. Waste management and recycling are the principal objectives of this treatment procedure [3]. Solid waste from different origin is altered and transformed into a useful resource that could be utilized for human benefit [4].

Characterization of solid waste is based on its

Origin either industrial, domestic, commercial, construction, etc. [5].

Contents either organic, inorganic plastic, metal, glass, etc. [6].

Harmful potential either lethal, non-toxin, combustible, radioactive, communicable, etc. [7].

Residential solid waste: Residential solid waste includes organic biomass, paper, cardboard, leather, plastics, glass, yard wastes metals, ashes, bulky household items, etc. [8].

Industrial solid waste: It includes heavy and light manufacturing industries waste, construction site waste, fabrication plant wastes, power and chemical plant wastes, etc. [9].

Commercial solid waste: It includes solid wastes such as plastics, edible wastes, paper, metals, wood, glass, special wastes and other lethal residues [10].

Institutional solid waste: Some of the common solid wastes include rubber waste, plastics, biomass wastes, glass, wood, electronics, cardboard materials, etc. [11].

Construction and demolition solid waste: Solid wastes such as steel, wood, concrete, plastics, copper wires, rubber, dirt, glass, etc. [12].

Municipal solid waste: Such solid waste includes waste from street, recreational areas, beaches, treatment plants, landscaping, etc. [13].

Treatment plants solid waste: Solid waste including industrial wastes, unwanted metabolites products, plastics, metal residues, etc. [14].

Agriculture solid waste: Agricultural wastes, spoiled food, pesticide containers, come under this category [15].

Biomedical solid waste: These solid wastes include needles, dressings, gloves, drugs, packaging wastes, used sample containers, etc. [16].

Methods of Solid Waste Management

Different methods of solid waste management which are as follows:

Sanitary landfill

One of the most widely used method of solid waste disposal which involves spreading of waste in thin layers then compacted and enclosed with topsoil or plastic foam [17]. In contemporary landfills, base of the landfill is surrounded with an water-resistant lining of thick plastic and sand granules to guard the ground water from being polluted due to percolation [18]. When the landfill is occupied, it is then concealed sand, clay, gravel, etc. to avoid leakage of water [19].

Article Information

DOI: 10.31021/mmmb.20182107

Article Type: Mini Review

Journal Type: Open Access

Volume: 2 Issue: 1

Manuscript ID: MMB-2-107

Publisher: Boffin Access Limited

Received Date: 28 September 2018

Accepted Date: 06 November 2018

Published Date: 11 November 2018

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Citation: Khan NT. Solid Waste-An Introduction.
Methods Microbiol Mol Biol. 2018 Nov;2(1):107

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Incineration

Scorching of solid wastes in incinerators at elevated temperatures to convert it into ashes. It decreases the bulk of waste up to 20 or 30% of the original volume [20].

Recovery and recycling

It involves the processing and cleaning of discarded items. The process aimed at minimizing energy loss, utilization of new material and decrease of landfills [21,22].

Composting

Only applicable for biodegradable waste treatment [23].

Pyrolysis

Chemical decomposition of solid wastes into gases, solid residues or liquid forms by heating under anaerobic conditions [24].

Advantages and disadvantages of solid waste treatment

Advantages:

- Clean the environment
- Preserves energy
- Minimize environmental pollution
- Source of earning profit
- Creates job opportunities [25-28]

Disadvantages:

- Cost-ineffective
- Short lived resultant product
- Risk of contamination exposure

Non uniform approach waste management can cause more problems [29-32]

Effects of improper waste management

Improper waste management leads to increased amounts of solid waste accumulation which in turn becomes a serious environment problem [33]. It will result in the decomposition of biodegradable waste under improper and uncontrolled conditions producing undesirable pungent odor and thus contributing a fraction to air pollution [34]. Besides, accumulation of such waste leads to the growth of disease causing pathogens responsible for causing numerous diseases in humans and animals [35]. Aesthetic value of the area is also spoiled [36]. When waste is released in to the environment it might affect or alter the productivity of soil, chemical properties of ground water, etc. [37]. During solid waste assembling, the harmful wastes usually combined with usual compost and other inflammable wastes making the discarding process even tougher and dangerous [38]. When wastes like insecticides, electronic batteries, cleaning solvents, radio nuclides, plastics and other scraps are scorched they yield dioxins and other harmful gases [39].

Conclusion

Appropriate solid waste management should be practiced by human population globally to keep the surrounding environment sanitary and free of contaminants.

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