

Municipal Solid Waste Management and Processing for Safe and Environment Friendly Handling

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Introduction

The document details the proposed research to be carried out on Municipal Solid Waste for effective segregation, processing, and disposal in a better format as is in use and/or available using innovative and inventive methodology through lab testing, simulation, and controlled application.

Concept

The research is based on the concept of chemical conversion of waste through natural, biological, semi-natural and controlled chemical processing of the waste into products of value. It will lead to development of processes and processing setups to ensure the same along with providing sustainable solution to the ever-increasing waste disposal needs.

Vision

The purpose of the study and practice is to determine the different aspects of Municipal Solid Waste, introduce better options for safe and environment friendly handling, and provide authorities with statistical, technical, and other data for practice and implementation for the same or related aspects.

Abstract

As per our previous research, municipal solid waste could be used to generate electrical

energy. Several technologies have been developed that make the processing of MSW for energy generation cleaner and more economical than ever before, including landfill gas capture, combustion, pyrolysis, gasification, and plasma arc gasification. While older waste incineration plants emitted high levels of pollutants, recent regulatory changes and new technologies have significantly reduced this concern. United States Environmental Protection Agency (EPA) regulations in 1995 and 2000 under the Clean Air Act have succeeded in reducing emissions of dioxins from waste-to-energy facilities by more than 99 percent below 1990 levels, while mercury emissions have been reduced by over 90 percent. The EPA noted these improvements in 2003, citing waste-to-energy as a power source "with less environmental impact than almost any other source of electricity."

Proposed Study and Practice

The study and research will be carried out in a controlled environment as created inside a lab and further tested on field. The research and analysis will be conducted in several parallel studies as described further:

Study I

- General analysis of waste and documentation with appropriate units and conversion for composition and condition. Identification of material and chemical

composition of the aggregate, distribution patterns, and other aspects as may be required.

- Identification of problems with segregation and development of an efficient methodology for segregation using, partially, wholly, or in modified forms the current technologies and/or devising new ones.
- Development and testing the segregation methods, optimisation, development of units based on the same. Please note, the requirements and methods of segregation may vary based on the other studies and proposed processing thereof.

Study II

- Collection and redistribution of sample material for the different studies to be conducted.
- Categorical study and general analysis of the material as obtained from different samples, their general, chemical, physical and other properties.
- Based on this data, different processing methods will be selected, modified, redeveloped/combined and redesigned to study possibilities of reprocessing, chemical conversion, isolation and recyclability of the materials, and inputs and outputs for energy and chemicals being analysed.
- This data will also be used in the first study to devise and optimise the segregation requirements and methods.
- Also, data from the first study, as independently obtained, will be used to devise different possibilities of mixed samples and thus, will be used to further select, modify, combine, and optimise the above processes.

Study III

- The above two studies as proposed will also

be conducted over the samples collected from current landfill sites.

- Testing and data will be used to include, modify, or introduce separate processing for the material available in landfills and actions will be proposed accordingly.

Study IV

- Statistical, mathematical and field analysis will be carried out on the generation, collection, transportation of the waste.
- Economic and financial analysis will be carried out for the above and processing as being studied.
- Environmental impact analysis will be carried out for all the above.
- Problems, drawbacks, limitations and other factors will be identified and further studied for resolution and optimisation.
- Standard practices will be studied for efficiency and tested for similar factors, as and when applicable.
- Resources and data will be sought and procured as and when needed and used for accomplishing the goals.

Pre-existing Data

- An extensive research has been carried out to procure information and data which has been studied for the same which will give a head start to the study, pertaining to the previous and on-going researches being carried out nationally and internationally.
- Multiple processes have been identified for the different processing needs of the segregated and mixed compositions. Segregation technologies and their concept and theory has also been studied.

Points to be noted

- The studies will be conducted in laboratory environment initially and tested further in

field.

- The foremost identified problems are that of the composition and condition of the collected wastes, and the presence and complications posed by plastics in segregation and processing along with other materials.
- The study will be carried out and processes developed in the following order of priority: use of natural and nature aided processing, recycling, processing for chemical conversion into viable products, energy generation. The order of priority is set to mitigate and reduce negative environmental impact and make processing economic and efficient. The order is subject to change based on the latter point after analysis of data and results.
- As per current understanding, energy generation through thermal processing seems

to be the most promising prospect and studies will be conducted to test it in initial stages.

Conclusion

The document clearly specifies the approach that will be taken to conduct the said studies in general. While subject to change, it will be carried out keeping in consideration the Concept and Vision and as permitted by the concerned authorities.

Foreword

This document aims at providing the general information for the proceedings as proposed, and is to be used by the personnel and/or authorities for their intended purpose, as requested, for aiding in the proceedings. It may or may not contain technical and privileged information, and is suggested to be used with similar discretion.

