CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Rapid increase in volume and types of solid and hazardous waste as a result of continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003 (Global Waste Management Market Report 2007). The segregation, handling, transport and disposal of waste are to be properly managed so as to minimize the risks to the health and safety of patients, the public, and the environment. The economic value of waste is best realized when it is segregated.

Waste segregation means dividing waste into dry and wet. Dry waste includes wood and related products, metals and glass. Wet waste, typically refers to organic waste usually generated by eating establishments and are heavy in weight due to dampness. Waste can also be segregated on basis of biodegradable or non-biodegradable waste.

Landfills are an increasingly pressing problem.[citation needed] Less and less land is available to deposit refuse, but the volume of waste is growing all time. As a result, segregating waste is not just of environmental importance, but of economic concern, too.

Waste is collected at its source in each area and separated. The way that waste is sorted must reflect local disposal systems. The following categories are common

- Paper
- Cardboard (including packaging for return to suppliers)
- Glass (clear, tinted – no light bulbs or window panes, which belong with residual waste)
- Plastics
- Textiles
- Wood, leather, rubber
- Scrap metal

- Compost
- Special/hazardous waste
- Residual waste
- Organic waste can also be segregated for disposal:

Leftover food which has had any contact with meat can be collected separately to prevent the spread of bacteria. Meat and bone can be retrieved by bodies responsible for animal waste If other leftovers are sent, for example, to local farmers, they can be sterilised before being fed to the animals Peel and scrapings from fruit and vegetables can be composted along with other degradable matter. Other waste can be included for composting, too, such as cut flowers, corks, coffee grindings, rotting fruit, tea bags, egg- and nutshells, paper towels etc.

Chip pan oil (fryer oil), used fats, vegetable oil and the content of fat filters can be collected by companies able to re-use them. Local authority waste departments can provide relevant addresses. This can be achieved by providing recycling bins.

Understanding segregation is not so difficult. There are four types of garbage

- **Wet waste**
- **Sanitary waste**
- **Dry waste**
- **Hazardous household waste or E-waste Wet waste**

Wet waste

Rotten fruits, vegetable and their peels, left-over food, egg shells and rotten eggs, mango seeds, tea bags, used coffee powder, coconut shell and fibre, used flowers, non-veg food remains, bones, spoiled spices, chewing gum, garden waste, rangoli colours and dust come under wet waste. Spoiled or expired food should be removed from its packet and discarded. Nails must be wrapped in a paper. Anything liquid amongst these must be drained and the remaining must be wrapped in a newspaper.

Sanitary waste

Used sanitary napkins, panty liners, sanitary cloths, condoms, syringes, cotton and bandages, diapers, tissue papers, ear buds, dental floss, blood-stained cloth, etc., is sanitary waste. This should be wrapped properly in newspapers and marked with a red cross before handing over to garbage collectors.

Dry waste

Mop stick and mop clothes should be handed over directly. Toilet cleaning brushes, other brushes, toothbrushes and scrubs must be dried first and then wrapped in newspapers. Doormats and containers of pesticides, various papers and stationery, razors and blades, various bottles should be kept separate. All the covers of various food/dairy items like tetra packs etc must be cleaned, dried and handed over separately. Hair, waste pet food and thermocol should be wrapped in paper

Hazardous household waste

Mosquito repellent bottles and mats, used phenyl air fresheners, expired medicines, tablet covers, syrup bottles, injection bottles and other medical discards, old paints, fluorescents and button cells should be separately handed to the collectors. Batteries, CDs and cassettes, CFL, tube lights, printer cartridges, broken clocks and thermometers should be packed in newspaper or cardboard box and handed over. Cosmetics should be wrapped in the newspaper marked with red cross on it. You will need four dustbins and absolutely no plastic bags for this kind of garbage segregation. Though it is not practically possible to do follow all the above-mentioned steps to a ‘T’, we must try our best to get as close as possible.

Remember, being cleaner and organised today means a healthier and happier tomorrow!

Currently there is no such system of segregation of dry, wet and metallic wastes at a household level. This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system at households, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste.

The AWS employs parallel resonant impedance sensing mechanism to identify metallic items, and conductivity sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the AWS.