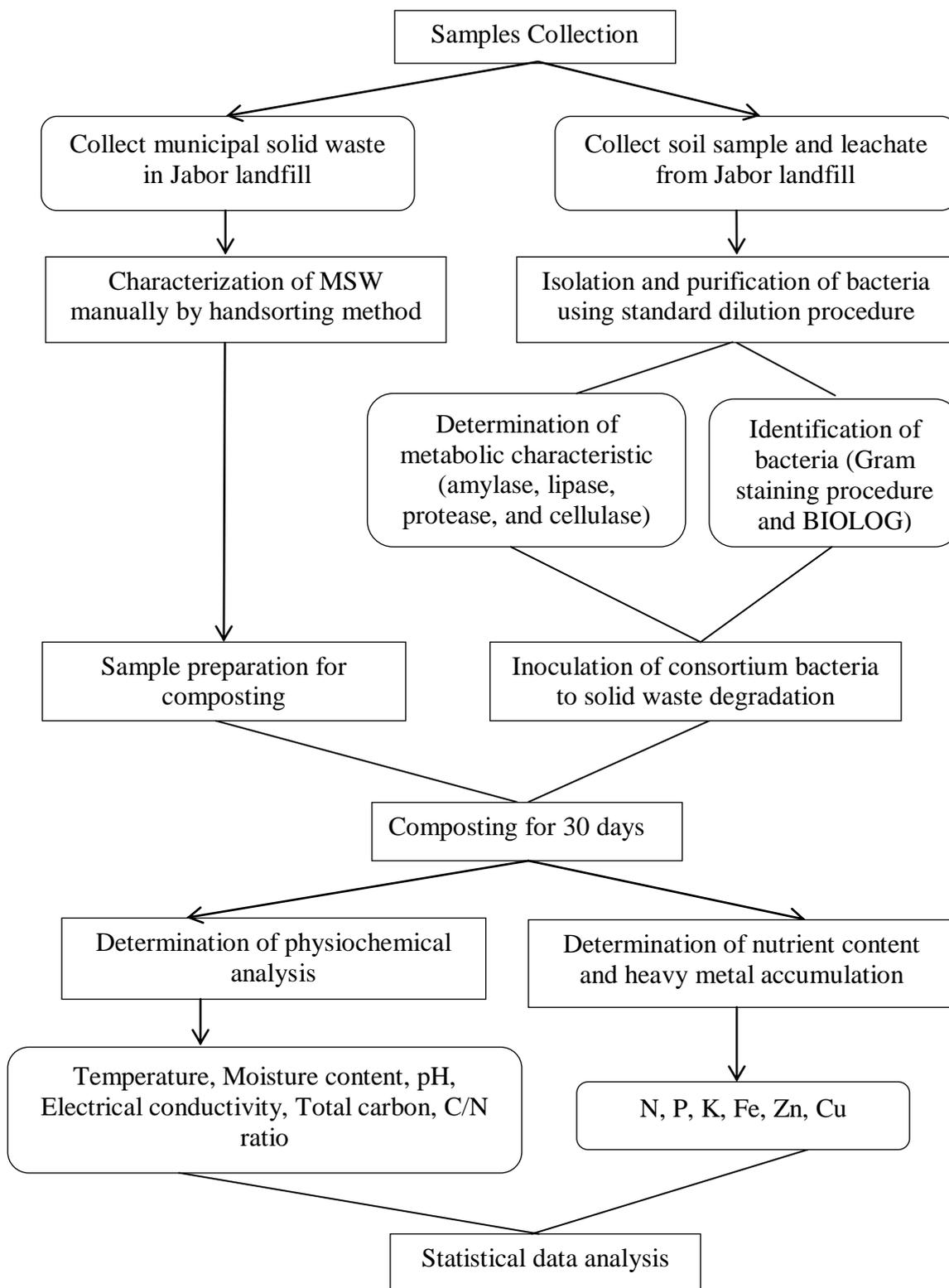


## CHAPTER 3

### MATERIALS AND METHODS

#### 3.1 MATERIALS

In this study, municipal solid waste from Jabor landfill was used as the main sources for batch scale composting. Bacterial consortium was inoculated to the raw material to enhance the biodegradation process. This bacterium was isolated from soil and leachate obtains from Jabor landfill, Kuantan. All the materials were shredded and composted together in a plastic container. Figure 3.1 shows the flow chart of the methodology from the preparation of materials and data analysis. Materials that were used for identification were nutrient agar (NA), nutrient broth (NB), skim milk powder, carboxy methyl cellulose (CMC), congo red, gelatin, casein enzymic hydrolysate,  $\text{CaCO}_3$ ,  $\text{NH}_4\text{NO}_3$ ,  $\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O}$ ,  $\text{KH}_2\text{PO}_4 \cdot \text{MnCl}_2 \cdot 7\text{H}_2\text{O}$ ,  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ , yeast extract, Rhodamine B (olive oil, NaCl, agar, nutrient broth), peptone, phenol red and Gram-staining reagents, which were supplied by Merck, Malaysia Division. Meanwhile, automated BIOLOG identification system kit was used to identify bacteria. Sulphuric acid, potassium sulphate, copper sulphate, glycerol and selenium powder were supplied by Merck.



**Figure 3.1:** Flow chart of the methodology.

### **3.2 CHARACTERIZATION OF MUNICIPAL SOLID WASTE IN JABOR LANDFILL**

Solid wastes were categorized into four main sections, namely municipal solid waste, hazardous waste, agricultural waste and commercial waste. This classification is important in order to identify several criteria that include all the sources, types, classification and composition. It is also to ensure that the landfill operations can be carried out more regularly and systematically (Agamuthu, 2001).

The municipal solid waste was generated from residential areas, housing estates, villages, office, institutional and commercial areas. Most municipal solid waste generated in a residential area consists of the remnants of the house, such as food waste, paper, plastic, metal, glass and yard waste (Razman, Othman and Marzuky, 1993). Industrial waste is a source of waste generation and it includes waste generated as a result of industrial and manufacturing activities. Examples of the component are generated debris, dust, dirt, construction waste and hazardous waste (Agamuthu, 2001).

The characterization methodology, which is site-specific, sampling, sorting, and weighing the individual components of the waste stream could be used. This methodology is useful in defining a local waste stream, especially if large numbers of samples are taken over several seasons. In addition, quantities of MSW components such as food scraps and yard trimmings can only be estimated through sampling and weighing studies. Source of waste in Jabor landfill were from commercial waste and domestic waste, which are separated in different disposal wastes. The solid wastes from domestic waste (100 kg) and commercial waste (100 kg) from Jabor landfill were separated manually using a hand-sorting method according to food waste, green waste, plastic, paper, aluminum, glass, solid waste and others. The solid waste used for composting was biodegradable matter and was then analyzed for chemical and biochemical properties during the biodegradation process.

The classification used the following formula:

$$\text{Percent type of waste} = (\text{weight of the type of waste} / \text{total weight of waste}) \times 100$$