

CHAPTER I

INTRODUCTION

The amount of solid waste in Thailand has increased every year. The process of waste reduction and elimination is difficult to process. In 2005, Thailand produced approximately 36,000 tons of solid waste each day, in which 9,000 tons of the total waste mainly derived from Bangkok (BMA, 2005). There are three ways to eliminate the solid waste, namely, incineration, opened-dump or sanitary landfills and composting. Solid waste composting could help municipalities tackle the problem effectively, avoiding the controversy resulted from incineration systems. Opened-dump sites or sanitary landfill is the most common system currently used by Thai municipalities. However, in sanitary landfill operations, most waste can not be efficiently and completely divided and this operation is not properly designed to protect the environment such as groundwater contamination (Thailand Environment Monitor, 2003).

The decomposition process is mostly accomplished by various microorganisms, including bacteria and fungi. In the process of composting, microorganisms usually break down organic matter and carbon dioxide, water, energy in forms of heat humus, and the relatively stable organic end product are produced. In general, the ratio of C:N for composting is considered to be approximately 20:1 by weight. All kinds of organic wastes can be applied to produce compost, for example, agricultural residues, industrial waste, and municipal waste. The conventional method for compost production recommended for farmers is to allow the mixture of organic waste, fertilizer, and fertile soil or animal manure to compost under sufficient moisture content for 3 to 4 months. However, for commercial compost production where time is limited, the uniform property of compost is needed. As a result, more active and suitable microorganisms appear to be the absolute requirement (Insam, Riddech and Klammer, 2002).

In this research, the selection of the suitable bacteria, capable of producing cellulase, protease and lipase would be used for the production of biofertilizer. The efficiency of the biofertilizers would be tested for the growth of the plants (Chinese spinach: *Amaranthus viridis* L).