# CHAPTER 1

# OBJECTIVE OF THE PROJECT

# 1.0 Objective of the Project

## 1.1 General Introduction

General concern for the environment has prompted researchers to look for alternative ways in dealing with wastes. Plastics, which have been used extensively since the last world war have raised major concerns in their disposal. Plastics are strong, inexpensive, easily processed and very durable. However, these very attributes of strength and indestructibility cause problems when these materials enter the waste stream. Their resistance to microbial degradation is due to the inability of microorganisms to produce enzymes that could degrade these man-made polymers. In addition, the hydrophobic character of plastics inhibits enzyme activity and low surface area of plastics with very high molecular weight further compound the problems (Narayan, 1993)

An alternative to plastics is biomaterials. Biomaterials are synthesised from renewable carbon sources, able to degrade in nature thus returning the elements to their natural cycle. They are considered environment-friendly because they do not persist in nature, thus lessening the impact on the environment. Currently several biomaterials such as poly(hydroxyalkanoates), poly(β-caprolactones), thermoplastics starch, poly(vinylalcohol) and poly(lactic acid) have been suggested as substitutes for plastics but it is not economically feasible yet. The interest of these biomaterials have shifted towards their applications as medical devices such as sutures and as plates and screws for bone fractures (Lipinsky, 1981).

In the microbiological production of lactic acid, the choice of organism is important as it could influence the process and cost. The choice of organisms for the production of lactic acid ranges from moulds and bacteria. As for moulds, *Rhizopus* species is the most commonly used in the production of lactic acid. The drawback in using moulds is their nature of fermentation. Their production culture needs to be aerated. Furthermore, moulds only produced one molecule of lactic acid per molecule of glucose consumed. This would ultimately increase the cost of producing lactic acid. The other choice of organisms would be using bacteria. The most common bacteria used in lactic acid fermentation comes from a group of bacteria called lactic acid bacteria. Some of the species from the group of bacteria have the characteristics and potential to be good producer of lactic acid. Certain species of lactic acid bacteria could produce in theory, two molecule of lactic acid per molecule of glucose consumed and since lactic acid bacteria are anaerobic, aeration is not a problem in the production of lactic acid using these bacterial strains.

## 1.2 Objective

The aim is to isolate and screen lactic acid bacteria and identify strains with the potential to produce lactic acid suitable for synthesis of poly(lactic acid).