CHAPTER I
INTRODUCTION

Biosurfactants are microbially produced surface-active compounds. They are amphiphilic molecules with both hydrophilic and hydrophobic regions causing them to aggregate at interfaces between fluids with different polarities. Generally the hydrophilic moiety of biosurfactants composes of amino acids or peptides, anions or cations, or mono-, di-, or polysaccharides. The hydrophobic portion is often made up of saturated, unsaturated, or hydroxylated fatty acids (Georgiou *et al.*, 1992), or composed of amophophillic or hydrophobic peptides. Biosurfactants occur in nature in bacteria, yeasts, and fungi which grow on water-immiscible substrates such as hydrocarbon.

By evolution these microorganisms have adapted themselves to feeding on these substrates by manufacturing and using a surface active product that helps them to adsorb, emulsify, wet, disperse, or solubilise the water immiscible materials.

Many of the known biosurfactant producers are hydrocarbon-degrading microorganisms that produce biosurfactants for the purpose of hydrocarbon uptake. These microbially produced biosurfactants are considered as potential agents in enhanced oil recovery. Although chemically-synthesized surfactants have been used in the oil industry to aid the clean up of oil spills, as well as to enhance oil recovery from oil reservoirs, these compounds are not biodegradable and can be toxic to the environment. From an environmental view point it is important that all substances released into the environment are biodegradable in order to prevent any damage that may occur due to their long-term existence in the environment.

Furthermore, in many cases biosurfactants have been shown to have equivalent emulsification to the synthetic surfactants and they may be particularly useful in assisting oil recovery from deposits which are considered as exhausted so far as conventional methods are applied, and they may have a price advantage over synthetic surfactants in this context. Accordingly, the demand for biosurfactants has been steadily increasing and may eventually replace their chemically synthesized counterparts.

The objective of this study was to isolate microorganisms with elevated potential for biosurfactant production and to characterize the surface-active properties of the metabolites produced. The preliminary study of oil recovery by biosurfactant was also done.