CHAPTER I

INTRODUCTION

The triterpenes are a large group of terpenoid compounds found widely as natural products. Many structures of tetracyclic and pentacyclic triterpenes have been discovered in higher plants and reported to have various biological and pharmacological activities [1, 2]. Triterpenes are mainly biosynthesized from a common precursor, 2,3-oxidosqualene, by the group of enzymes, called either as oxidosqualene cyclases (OSC), named after their common substrate, or as triterpene synthases, named after their preferred products. Each of these enzymes can facilitate the mechanism of cyclisation which comprises protonation, cyclisation, rearrangement and deprotonaton. All of these steps occur within a single reaction to give the structure of tetracyclic or pentacyclic triterpene [3]. Due to the complex mechanism of triterpene synthases and the diversity of the triterpene products, it is interesting to know how each triterpene synthase produces each product specifically. In higher plants, it has been established that cycloartenol, a product of triterpene synthase, is the precursor of sterol biosynthesis, and other triterpene synthase products for triterpene biosynthesis [4]. Not only from the viewpoint of plant metabolism, but triterpene synthases also have an attractive viewpoint of mechanism. Several studies have been reported on cloning and characterization of triterpene synthases from plant species and it was interesting that some of them were reported as multifunctional triterpene synthases [for review, see[4]]. So far, the data of triterpene synthase genes from many plant species has been used for predicting the formation of various triterpenes which are taken place in active sites of the enzymes. In this study, a medicinal plant, namely *Alangium lamarckii* was used as a model to study its nature of triterpene synthases.

Alangium lamarckii is a small to medium tree belonging to the family Alangiaceae. Previous study has shown that friedelin can be found in *A. lamarckii* leaves [5]. Therefore, this plant is an ideal source of this triterpene ketone. Here, we report the cDNA cloning of triterpene synthases from *A. lamarckii* and heterologous expression in a mutant yeast lacking lanosterol synthase, which is a member of triterpene synthase family.