

CHAPTER I

INTRODUCTION

Microbes have been widely used as food, food additives, microbial insecticides and sources of antibiotics or bioactive compounds. Since the antibiotic research from the Fleming to our days, more than fifty years, thousands of natural products derived from microbial sources have been known (Bérdy, 2005). Antibiotics discovered in this period were mainly isolated from *Streptomyces* species, one of the species belonging to the group of actinomycetes that have been described as the greatest source of antibiotics.

Microorganisms that can survive in extreme environments such as the acidic condition or high temperature are of great interest for scientists. During the investigation of new actinomycetes from peat swamp forest soil in the southern area of Thailand, we isolated an actinomycete strain BTG10-2 showing the potent antimicrobial activity against gram positive bacteria, including *Micrococcus luteus* ATCC 9341 and *Bacillus subtilis* ATCC 6633 and against gram negative bacteria, including *Pseudomonas aeruginosa* ATCC 27853, *Eschericia coli* ATCC 25922 and *Salmonella* sp. by disc diffusion assay. The strain BTG10-2 showed typical morphological characteristics of the genus *Micromonospora* and it was genotypically and phenotypically distinguished from all validly described *Micromonospora* species (Thawai *et al*, 2005). Many members of this genus are main sources of bioactive compounds. They produced a large number of antibiotics such as gentamycin (Weinstein, 1963), dynemicin (Konishi, 1989), and sagamicin (Okashi, 1974). They produced not only antibacterial antibiotics but also antifungal, antitumor and antiviral antibiotics.

The other source of antibiotics is being directed to the endophytes, a big reservoir of specially inhabiting microorganisms (Liu *et al.*, 2004). Endophytic microorganisms are to be found in virtually every plant on earth. These microorganisms reside in the living tissues of the host plants and may contribute to their host plant by producing a plethora of substances that provide protection and ultimately survival value to the plant. The most frequently isolated endophytes are the fungi (Strobel, 2004). One of the

popular model of secondary metabolites from endophytic fungus is paclitaxel (Taxol[®], anticancer drug from Pacific yew bark) isolated from *Taxomyces andreanae* (Strobel et al., 1993)

During the course of our study, an endophytic fungus strain *Exserohilum rostratum* RNAS5, isolated from a surface-sterilized leaf of the medicinal plant, *Rhinacanthus nasutus*. The agar plugs of this fungus were tested for biological activity by agar diffusion assay and showed synergistic activity with ketoconazole against *Candida albicans* ATCC 10231.

The main objectives of this investigation are:

1. To purify the secondary metabolites produced by *Micromonospora* sp. BTG10-2 and the endophytic fungus, *Exserohilum rostratum* RNAS5.
2. To elucidate chemical structures of the isolated compounds.
3. To examine biological activities of the isolated compounds.