CHAPTER I

INTRODUCTION

Antibiotics are secondary metabolites. Most of them are produced from microorganisms in the group of actinomycetes. They have been extensively studied and have been used in agriculture, food and nutrition, and espectially medical science. Actinomycetes have been described as the greatest source of antibiotics since Waksman introduced *Streptomycetes* into his systematic screening program for new antibiotics in early 1940s. They have provided about two-thirds (more than 4000) of the naturally accuring antibiotics discovered , including many of those important in medicine, such as aminoglycosides, anthracyclines, macrolides and tetracyclines (Goodfellow, 1988).

Actinomycetes are numerous and widely distributed not only in soil but in a variety of other habitats including composts, river muds, and lack bottoms. Organisms belonging to the group of actinomycetes are *Streptomyces, Micromonospora, Microbispora, Actinomadura, Actinomyces, Actinoplanes* and *Streptoverticillium* and others. They have been searched for antibiotic production. Actinomycetes are still regarded as a major potential source of new bioactive substances (Vobis, 1997).

Micromonospora is a genus in the group of actinomycetes. This genus is well developed, branched, septate mycelium averaging 0.5 μm in diameter. Spores are borne single, sessile or short long sporophores which often occur in branch clusters. The formation of single spore on substrate mycelium is one of the well-defined criteria in the genus *Micromonospora*. Spore surface ornamentation of the strains and the species of *Micromonospora* have been characterized by the terms smooth, rough, warty, or blunt spiny of sporophore development monopodial or in some case sympodial. Aerial mycelium is absent or in some culture appears irregularly as a restricted white or grayish bloom, gram-positive, not acid fast. Walls contain *meso-*

diaminopimelic acid. Xylose and arabinose are present in cell hydrolysates. Colonies on agar media are initially pale yellow or light orange, becoming orange, red, brown, blue-green, or purple. Mature colonies take on a progressively dark hue along with the production of brown-black, green-gray or black spores, and become mucoid. They are sensitive to pH below 6.0. Growth occurs normally between 20°C and 40°C but not above 50°C (Holt, 1989).

Many members of this genus are main sources of bioactive compounds. They produce a large number of antibiotics such as gentamicin, dynemicin, sagamicin, especially, gentamicin against gram positive and gram negative bacteria. They are not restricted to antibacterial antibiotics but include antifungal, antitumor antibiotics and to a lesser extent, antiviral antibiotics. They also produce a number of biologically active substances such as enzyme inhibitors.

Up to the present, the search for, and discovery of, new antibiotics are generally based on screening of naturally occurring actinomycetes and on biotechnological manipulation of known antibiotic producing strains. However, current efforts to find new probability of discovering them are decling as the number of known antibiotics is increasing. Many causative agents of the infectious deseases are resistant to antibiotics. Some antibiotics have low activity against microorganisms, but high toxicity to host cells. *Micromonospora* is a genus which produce a large number of antibiotics. In Thailand research on antibiotics from *Micromonospora* so far recieved little attention. These bacteria may provide new antibiotics. The main objectives of this investigation are as follows.

1. to isolate , screen and identify of *Micromonospora* strains with antibacterial activity.
2. find optimum conditions for growing selected strains.
3. to isolate and purify antibacterial antibiotics from *Micromonospora* strains.
4. to determine the structure of isolated compounds.