

CHAPTER I

INTRODUCTION



Actinomycetes, the filamentous bacteria, have been described as the greatest source of antibiotics since Waksman introduced Streptomycetes into his systematic screening program for new antibiotics in the early 1940s. About two-thirds of the naturally occurring antibiotics are produced by them (Okami and Hotta, 1988). Actinomycetes are very common inhabitants of soil (Tortora *et al.*, 1995).

The best-known genus of actinomycetes is *Streptomyces*, which is one of the bacteria most commonly isolated from soil (Tortora *et al.*, 1995). The genus *Streptomyces* was found to produce large numbers and varieties of antibiotics. The data mainly based on the 1976-1986 issues of the Journal of Antibiotics showed that the genus *Streptomyces* yielded many groups of antibiotics such as aminoglycosides, macrolides, ansamacrolides or ansamycins, β -lactam antibiotics, peptides, glycopeptides, anthracyclines, tetracyclines, nucleosides, polyenes, and quinones (Okami and Hotta, 1988).

The strains of *Streptomyces* are valuable because they produce most of commercial antibiotics. Examples include amphotericin B produced by *Streptomyces nodosus*, chloramphenicol produced by *Streptomyces venezuelae*, chlortetracycline and tetracycline produced by *Streptomyces aureofaciens*, erythromycin produced by *Streptomyces erythraeus*, neomycin produced by *Streptomyces fradiae*, nystatin produced by *Streptomyces noursei* and streptomycin produced by *Streptomyces griseus* (Tortora *et al.*, 1995).

During the course of screening for bioactive metabolites from actinomycetes, the crude ethyl acetate extract from culture broth of the strain TRA 9875-2 isolated from the rotten bark collected from a mangrove forest along the Andaman coast, Trang province, Thailand, showed interesting antimicrobial activity against *Candida albicans* ATCC 10231 and *Staphylococcus aureus* ATCC 25923 with 17.5 mm and 10.1 mm zone of inhibition at 1 mg/6mm disc, respectively, by using agar-disc

diffusion assay. The strain TRA 9875-2 was later identified as *Streptomyces*, based on morphological, cultural, and chemotaxonomic characteristics.

The main objectives of this investigation are as follows:

1. To identify and characterize the strain TRA 9875-2 collected from mangrove forest.
2. To isolate the secondary metabolites from the strain TRA 9875-2.
3. To elucidate the chemical structures of the isolated secondary metabolites.
4. To evaluate the biological activities of the isolated secondary metabolites such as antimicrobial activity, antimalarial activity and cytotoxicity.