CHAPTER I

INTRODUCTION

Although much use has been made of marine plants and animals for food, when compared with land plants and animals, the use of marine organisms in folk medicine is very restricted. Serious consideration of these organisms as sources of biologically active compounds has been confined to the last 40 years (Blunden, 1996). However, marine organisms have since provided a rich harvest of secondary metabolites that differ significantly from terrestrial natural products (Ireland *et al.*, 1988). These bioactive secondary metabolites were isolated from many types of marine organisms including algae, bryozoans, coelenterates, echinoderms, microbes, sponges and tunicates.

Examples of bioactive metabolites from marine organisms are

(i) peyssonols A and B, two rare sesquiterpene hydroquinones isolated from the Red Sea algae *Peyssonnelia* sp., inhibited enzyme HIV reverse transcriptase (Talpir *et al.*, 1994),

(ii) pseudopterosins A and B, two anti-inflammatory constituents of the gorgonian *Pseudopterogorgia elizabethae* (Look *et al.*, 1986),

(iii) holothurinosides A - D and desholothurin A, triterpene glycosides with cytotoxic and antiviral activities from the sea cucumber *Holothuria forskalii* (Rodriguez, Castro and Riguera, 1991),

(iv) phomactin A, a PAF (platelet activating factor) antagonist from the culture medium of the marine fungus *Phoma* sp., isolated from the shell of a crab (Sugano *et al.*, 1991),

(v) kalihinols A - H and X - Z, a group of antimicrobial diterpenes isolated from the marine sponge *Acanthella* sp. (Chang *et al.*, 1987) and

(vi) didemnins, a group of cyclic depsipeptides found from the tunicate, *Tridemnum solidum*, which are immunosuppressive, antiviral and antitumor (Rinehart *et al.*, 1990).

Sponges are the oldest and most primitive metazoans. Research on sponge metabolites has continued to expand at faster rate than for other phyla and also provided many of the most interesting marine natural products (Faulkner, 1996). A large number of compounds from sponges possess biological activities of which their mechanisms of action have never been found in terrestrial natural products. Sponges are prolific producers of terpenoids (Ireland *et al.*, 1988).

Examples of bioactive terpenoids from marine sponges are as follows.

(i) Agelasidine - A, an antispasmodic sesquiterpene from a species of the genus *Agelas* collected in Japan (Nakamura *et al.*, 1983; Carpon and Faulkner, 1984).

(ii) (-)-Reiswigin A, an antiviral diterpene from *Epipolasis reiswigi* (Kashman *et al.*, 1987).

(iii) Kalihinols A - H and X - Z, a group of antimicrobial diterpenes from sponge, *Acanthella* sp. (Chang *et al.*, 1987).

(iv) Mycaperoxides A and B, two cytotoxic and antiviral norsesterterpene peroxides from a *Mycale* sp. from Thailand (Tanaka *et al.*, 1993).

(v) Penasterone and acetylpenasterol, two triterpenoids isolated from the Okinawan sponge *Penares incrustans* that inhibit IgE-induced histamine release from rat peritoneal mast cells (Shoji *et al.*, 1992).

Although a large number of bioactive terpenoids from marine sponges have been reported for at least 20 years, only a limited number of these were isolated from Thai sponges. Investigation of marine natural products in Thailand has been performed for the last few years and is still in a comparatively early stage. Fortunately, Thailand possesses both the long coastlines along the Andaman Sea and the East and West coast of the Gulf of Thailand, providing a large variety and abundance source of marine organisms for our country. A lot of these Thai marine fauna may prove to be quite different from those found in other areas of the world.

A Thai marine sponge *Acanthella cavernosa* Dendy investigated in this work belongs to the genus *Acanthella*, of which a series of bioactive chemical constituents called kalihinols were reported and further interesting compounds can be expected.

Therefore, the objectives of this investigation are as follows.

(i) to isolate chemical constituents from *Acanthella cavernosa* by suitable chromatographic techniques.

(ii) to identify and elucidate the chemical structures of these compounds by spectroscopic techniques.