



## CHAPTER I

### INTRODUCTION

Marine natural products researches have intensively been interested for the last three decades. Several thousand marine natural products have been chemically defined, many of these are biologically active compounds possessing novel functional groups and molecular structures (Valerie, 1988). Many of these compounds have been developing to pharmaceutical products.

For example,

1. Didemnin B, the first marine compound was entered as anticancer in human clinical trials. This cyclic peptide was isolated from the Caribbean tunicate, *Trididemnum solidum*. This compound was extremely potent against B<sub>16</sub> murine melanoma and had broad activity against tumor stem cells in culture (Suffness and Thompson, 1988).
2. Bryostatins, macrocyclic polyether lactones were isolated from the bryozoan, *Bugula neritima*. These compounds were extremely potent against P-388 mouse leukemia and human ovarian sarcoma (Suffness and Thompson, 1988).
3. Manoalide, a sesterterpene isolated from the sponge *Luffariella variabilis* was shown to be a potent antiinflammatory agent (De Silva and Scheuer 1980).

Among the marine organisms, sponges have many interesting chemical constituents. Sponges, belonging to the Phylum Porifera, are the most primitive metazoan and are classified to four Classes: Calcarea, Hexactinellida, Demospongiae, and Sclerospongiae. The Demospongiae is the largest Classes of sponges. Sponges are multicellular animals of simple and loose organization having spicules of silica or calcium carbonate embedded in their bodies for supporting. Skeleton made of a horny substance called spongin. Sponges obtain food by propelling water through tiny pores in the body wall, thus capturing microorganisms and organic detritus that may be present. They constitute a rich source of biologically active substances, including antibiotics and toxic materials (Halstead and Vinci, 1988).

The interest in sponge metabolites has been credited to Bergmann and Feeney (1950) with the discovery of the nucleosides, spongouridine and spongothymidine from Jamaican sponges *Tethya crypta*. These compounds served as models for the synthesis of Ara-C, a nucleoside analogue with antiviral and antitumor properties (Quinn *et al.*, 1980). In the course of search for bioactive metabolites by Kato *et al.* (1985), they found that the lipophilic extract of a marine sponge, *Mycale* sp. inhibited the cell division of fertilized star-fish eggs. The active compounds were isolated and their structures were elucidated as unusual nucleosides, mycalisine A and mycalisine B. The Genus *Mycale* belongs to Class Demospongiae, Subclasses Ceractinomorpha, Order Poecilosclerida, Family Mycalidae. Mycalidae is Poecilosclerida with diffuse plumoreticulate spicule and fiber skeleton. The megascleres always include anisochelae to which may be added sigma, toxas, raphides and isochelae of many types (Bergquist 1978). Member of this Family, including Genus *Mycale* has been recorded as producing large amount of mucus. Many group of compounds have been isolated from *Mycale* spp. such as nucleosides, terpenoids, amides, macrolides, halogenated acetogenins and fatty acids. However, study on chemical constituents from Thai marine sponge, *Mycale* sp. has been reported only the cytotoxic and antiviral norsessterterpene 1, 2 dioxanes, mycaperoxide A and mycaperoxide B which have been isolated by Tanaka *et al.* (1993).

In this work, The Thai sponge of the Genus *Mycale* collected by using scuba at a depth of 5 metres at Kang Ta Sin of Si-Chang Island, Chonburi Province, was selected to investigate its chemical constituents. The blue sponges (Figure 1, Page 3) were encrusting on the rock. The structure of this sponge after removing mucus looks like retiform. The dichloromethane extract of the sponges exhibited cytotoxic against murine leukemia cell (P-388), human lung carcinoma (A-549), human colon carcinoma (HT-29) at  $IC_{50} = 0.26-0.6 \mu\text{g/ml}$  and antimicrobial activity against *Bacillus subtilis* and *Staphylococcus aureus* at active dose 100  $\mu\text{g/disc}$ . The main objectives for the investigation are

- i) to isolate and purify the chemical constituent from *Mycale* sp.
- ii) to elucidate the chemical structures of the isolated compounds, and
- iii) to study bioactivity of the isolated compounds.

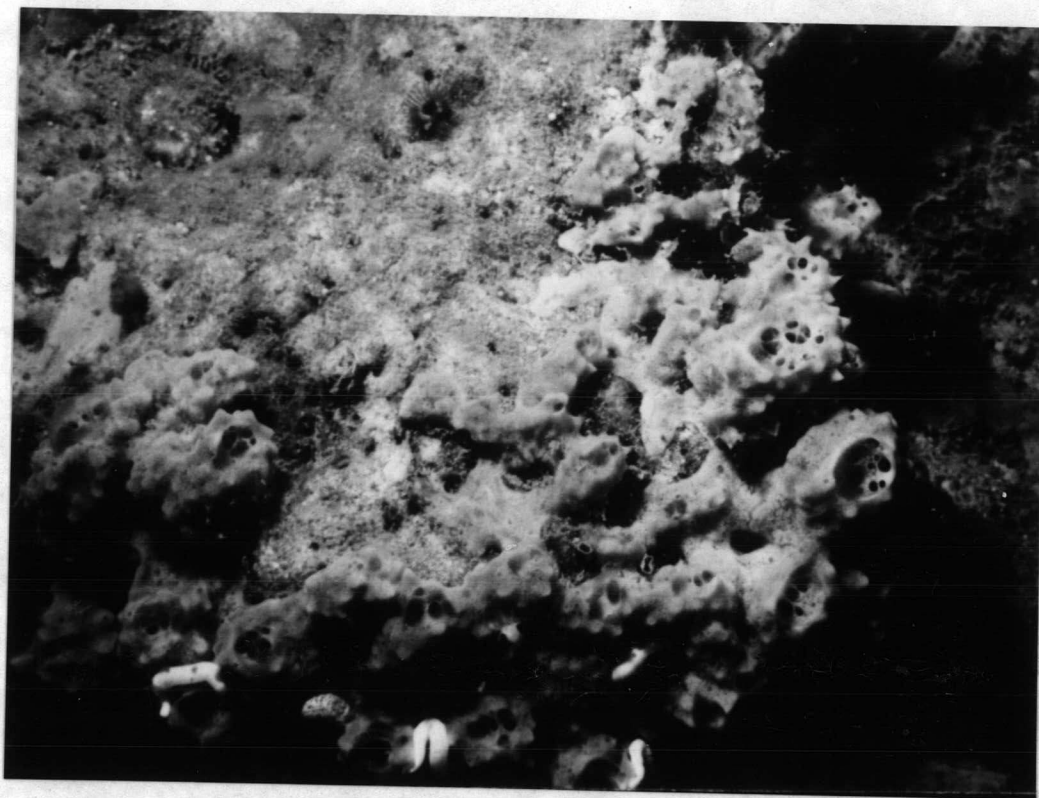


Figure 1. A Thai marine sponge, *Mycale* sp.

