CHAPTER I

INTRODUCTION

Studies of the marine natural products or, in particular, metabolites from marine invertebrates such as marine sponges, coelenterates, bryozoans, molluscs, tunicates, and echinoderms have been considerable devoted along ago. A large number of sometimes highly toxic metabolites has been isolated from these organisms. Examples of these substances are tetrodotoxins, saxitoxins, ciguatera toxins, brevetoxins, and palytoxin. Etiological studies revealed that the majority of marine toxins are produced by microalgae, especially the dinoflagellates (Yasumoto and Murata, 1993). On the other hand, a variety of compounds possessing known or novel pharmacological activities in mammalian species or having antimicrobial, antiviral, or antineoplastic properties have also been isolated. In many laboratories, the fertilized sea urchin egg and the brine shrimp are used as models in the study of the site and mode of action of compound that inhibit cell division or exhibit cytotoxicity. Many of them may be useful as drugs or as biochemical, physiological, and pharmacological tools in biomedical researches. As many valuable drugs have already been found in terrestrial plants, it seems likely that a search for new natural products from marine organisms might uncover unknown entities which could be added to the already existing drug utilization (Krebs, 1986). The roles of natural products in the marine environment are just begining to be understood. Although the major thrust of studies of chemical ecology in the marine environment has been to elucidate defensive roles of the secondary metabolites, there is an increasing interest in the possibility that secondary metabolites may also act as inducers of settling and as natural antifouling agents (Faulkner, 1986).

Marine natural products research in Thailand has been initiated only a few years ago. Thai tropical marine invertebrates have mainly remained unexplored both biologically and chemically. Some marine invertebrates from Si-chang Island were screened for their bioactivities such as anticancer, antimicrobial, and immunoregulatory activities. The results showed that Thai marine organisms can be potential sources for new bioactive compounds and urgently need to be extensively investigated. Examples of marine natural products which have been isolated from marine invertebrates, mostly sponges from Si-chang Island, are as followed :

-Two new isoquinoline quinones, N - (1″*E* - buten - 3″ - onyl) - 1,2 - dihydro-renierone and renierine B, and four known isoquinoline quinones, mimosamycin, renierone, N-formyl-1,2-dihydrorenierone, and 1,6-dimethyl-7-methoxy-5,8-dihydro-isoquinoline-5,8-dione have been isolated from a Thai sponge, *Reneira* sp. These compounds excluding renierine B showed the antimicrobial activity against *S. aureus* and *B. subtilis* at the concentration of 0.1 mg/ml (Plubrukarn, 1993).

-Three bioactive brominated polyacetylenic acids were obtained as the methyl esters from the methanolic extract of a Thai marine sponge, *Petrosia* sp., by utilizing brine shrimp bioassay-guided isolation (Wongsinkongman, 1993).

-Two new norsesterterpene 1,2-dioxane, mycaperoxide A and B, have been isolated from a Thai sponge of the genus *Mycale*. Both compounds showed significant cytotoxicity and *in vitro* antiviral activity (Tanaka *et al.*, 1993).

-Two new steroidal ketones, (24*R*)-methylcholest-4-en-6β-ol-3-one and (24*S*) -ethylcholest-4-en-6β-ol-3-one, were isolated from the dichloromethane extract of a Thai sponge, *Mycale* sp., and four known nucleosides, thymine, uracil, thymidine, and 2′-deoxyuridine were also isolated from the aqueous extract of the same sponge (Watthanapiromsakul, 1995).

-Three steroids and a partially elucidated bioactive polyether were isolated from a Thai sponge, *Biemna fortis* (Thitithanapluk, 1995).

The soft coral, *Cladiella tuberosa* Tixier Durivault, is one of the marine invertebrates collected from Si-chang Island. The biological screening tests showed that the dichloromethane extract of this organism exhibited cytotoxic and brine shrimp lethality activities, thus this soft coral was chosen for recollection and investigation. Therefore, the objectives of this project are to isolate by means of bioassay-directed fractionation and, then, to elucidate the chemical structures of the isolated compounds.

Figure 1. The soft coral *Cladiella tuberosa* Tixier-Durivault