CHAPTER I

INTRODUCTION

In the present time, research on marine natural products is an interdisciplinary area. There is a growing interest from the pharmaceutical industry in the biologically active marine natural products that have been isolated by organic chemists (Garson, 1989). The last decade has been a phenomenal expansion in the research effort in the field of marine invertebrate natural products chemistry. This has been motivated by the sheer novelty of the structures discovered (Bergquist, 1983). Marine metabolites often differ in absolute stereochemistry from their terrestrial counterparts. It is not clear whether differences such as these reflect the individuality of the producer organism or are more fundamentally important, possibly of evolutionary significance. It is pertinent to note that marine environment provides different biosynthetic conditions to those found on land (Garson, 1989).

Among the marine natural products, sponges are the best target for isolation of new bioactive metabolites (Fusetani et al, 1987). Marine sponges are highly prized by marine natural products chemists since many new compounds with diverse structural features and biological activities have been isolated during the last decade (Fusetani et al., 1983). In recent years, over five hundred unprecedented sponge metabolites have been reported, many of which possess useful of novel biological activities. Marine metabolites are often believed to play a role in chemical defence (Garson, 1989). Although some of these metabolites have been attributed to symbiotic organisms, the majority are considered to be true sponge metabolites, and their chemotaxonomic patterns are assuming greater importance (Faulkner, 1986).

Sponges are the most primitive of the multicellular animals. They constitute the phylum Porifera and all members of them are sessile and exhibit little detectable movement. Except for some 150 freshwater species, sponges are marine animals. They abound in all seas, wherever there are rocks, shells, submerged timbers, or coral

to provide a suitable substratum (Barnes, 1980). The general characteristics of sponges are as below:

..Sedentary, aquatic, filter-feeding Metazoa bounded by a 1-cell layer of flat pinacocytes containing flagellated choanocytes that create a unidirectional water current through the body. Water enters numerous small ostia and leaves through larger oscula. Mesohyle (between pinacoderm and choanoderm) contains various mobile cells, collagen and, usually, a skeleton of spongin material (silica or calcium carbonate) or both. The size ranges from mm to more than 1 m in diameter, commonly 0.1-10 liters in volume (Rützler, 1986).

Sponges are divided to four classes: class Calcarea, class Hexactinellida, class Demospongiae, and class Sclerospongiae. Calcareous sponges are distinctive in having spicules composed of calcium carbonate. In the class Hexactinellida and Demospongiae, the spicules are always siliceous. The Sclerospongiae differ from other sponges in having an internal skeleton of siliceous spicules and spongin fibers and an outer encasement of calcium carbonate (Barnes, 1980).

Petrosia is a genus of marine sponges in class Demospongiae, subclass Ceractinomorpha, order Nepheliospongida, family Nepheliospongiidae (Bergquist and Wells, 1983). In Thailand, *Petrosia* is known as "Fong Num Khrok" (ฟองน้ำครก) and in English as "Neptune's Cup Sponge". It is a barrel-shaped sponge and one of the biggest sponges. Its diameter is approximately 60 cm and the oscula measure approximately 40 cm in diameter. The surface is often rugged with brown radial bands (สุรินทร์ มัจฉาชีพ, 2532).

The genus *Petrosia* has been reported about biologically activities of extracted chemical compounds such as polyacetylenes and sterols (Fusetani et al., 1987; Cimino et al., 1989; Cimino et al., 1990; Koehn, Gunasekera and Cross, 1991; Sun et al., 1991). Some interesting biological properties range from antimicrobial to cytotoxic (Fusetani et al., 1987; Cimino et al., 1990). Some compounds have been reported as antiviral, ichthyotoxicity, sea urchin egg development inhibitors (Cimino et al., 1989; Cimino et al., 1990; Koehn et al., 1991; Sun et al., 1991).

A collection of *Petrosia* sp. obtained from Sichang Island, Chonburi Province, Thailand was pursued because its crude extract was active in biological pre-screens

(brine shrimp lethality). Furthermore, since there were no reports either on chemical or biological activities of this marine sponge in Thailand and in order to increase the information for chemotaxonomy, it stimulated the author to appraise chemical works on this sponge. This investigation deals with the isolation by means of the *Artemia salina* bioassay-directed isolation, and the spectral analysis including uv, ir, nmr, ms of components occurring in this organism. The author hopes that this work may stimulate scientists to be interested in studying about chemistry, taxonomy, ecology, and biology of many Thai marine organisms that have never been extensively studied.