

## CHAPTER 1

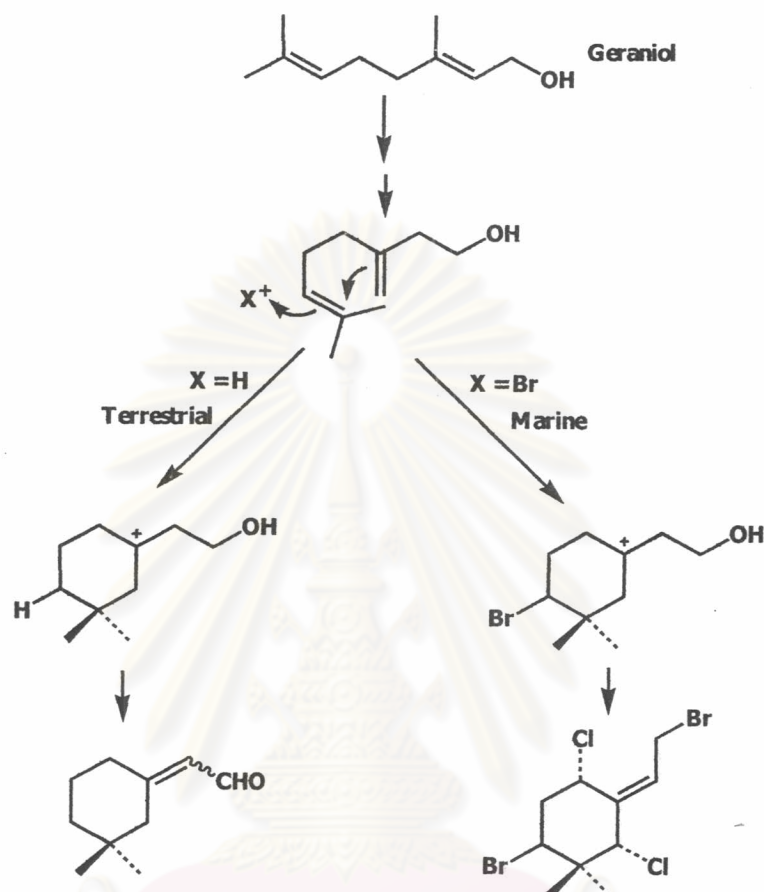
### THE INSPIRATION OF THIS RESEARCH

The marine environment is a rich source of biologically active natural products, many of which have not been found in terrestrial sources.<sup>1</sup> This is due to the physical and chemical properties of the marine environments that are quite different from the terrestrially conditions. These differences depend on the various biology between the ocean and the terrestrial resources are (i) the high quantity of elemental components in the sea such as salt content and halogen elements (  $\text{Cl}^-$ , 19,000 mg/liter;  $\text{Br}^-$ , 65 mg/liter; and  $\text{I}^-/\text{IO}_3^-$ ,  $5 \times 10^{-4}$  mg/liter )<sup>2</sup>; (ii) the various pressure that increases 1 atm at every ten metres in the depths of the ocean; and (iii) unusually high or low temperatures and light in the seawater. These properties make the food chains in ocean environment become complex and various skeletal of secondary metabolisms could be found.

One such example is the elemental composition of halides that are rich in seawater environment. These halides have readily allowed marine organisms to incorporate into organic structures. In contrast, the utilization of halogens in terrestrial secondary metabolism is a rare process observed in only a few microorganisms. The halogenation process attains a major significance in the sea. (Figure 1.1)

As mentioned above, the world's oceans represent huge unexplored resources of plants and animals. To date, the marine organisms have continuously provided a broad spectrum of novel pharmacologically active agents that have led to the discovery of many clinically useful drugs. Interestingly, increasing number of natural products from marine invertebrates showed structural similarities to known metabolites of microbial origin. This led to the speculations that microorganisms are in fact the true sources of these metabolites. Thus, the interesting organisms to be studied are

microorganism. One such microorganism is the marine cyanobacteria, especially *Lyngbya majuscula*, which have proven to be the novel potential pharmaceuticals.



**Figure 1.1** A biosynthetic sequence illustrating the contrast between hydrogen ion and bromonium ion-induced cyclizations of a geraniol-derived precursor in the terrestrial and marine environments.<sup>2</sup>

### Objective of this research

The aim of this research is to find bioactive compounds from the marine cyanobacteria *L. majuscula*.

### Expectation of this research

This research look forward to discover novel bioactive compounds from cyanobacteria *L. majuscula* and for the use in basic research and medical applications.