

CHAPTER 1

INTRODUCTION

A knowledge of the biological properties and chemical constituents of plants is desirable, not only for the discovery of new therapeutic agents, but also because such information may be of value in disclosing new sources of economically important materials. In addition, a knowledge of the chemical constituents of a plant is also important for the study of plant chemotaxonomy (biochemical systematics) and plant biosynthesis, as well as for deciphering the actual value of folkloric remedies.

Mansonia gagei Drumm. is the only species belonging to *Mansonia* genus in Sterculiaceae family found in Thailand.¹ This plant is commonly known as *chan-cha-mod*, *chan-hom*, *chan-khao* or *chan-pha-ma* which is used as herbal medicine. Following folklore beliefs, the heartwoods of this plant were utilized as a cardiac stimulant, onilivertigo, antiemetic, antidepressant and refreshment agent.²

The general characteristics of the plants in *Mansonia* genus are cited as follows: "Large tree; scattered in dry evergreen forests on the slopes of limestone hills, leave simple, toothed, flower several, in a short inflorescence. Naturally dry wood scented, used in cremation ceremony."³



Fig 1 Flowers and leaves of *Mansonia gagei* Drumm.

According to a preliminary study involving a collaborative research between the Natural Products Research Unit of the Department of Chemistry and Department of Biology, Chulalongkorn University with the aim of screening for bioactive compounds possessing cytotoxicity against brine shrimp (*Artemia salina* Linnaeus), among various plants screened, the ethanolic extract of the heartwoods of *Mansonia gagei* Drumm. gave attractive results. Therefore, the heartwoods of this plant was selected for further investigation.

Chemical Constituents Studies on *Mansonia* Genus

Literature surveys of chemical constituents of the plants belonging to *Mansonia* genus revealed that the only one species, *Mansonia altissima* has been thoroughly studied since 1965. Many new compounds were isolated from this plant as shown in Table 1.1. The structures of all isolated compounds are presented in Fig 2.

Table 1.1 All isolated compounds found in *Mansonia altissima*

Scientific Name	Plant Part/ solvent	Organic Compound	ref
<i>Mansonia altissima</i>	heartwood/ CHCl ₃	mansonone A (1), mansonone B (2), mansonone C (3), mansonone D (4), mansonone E (5), mansonone F (6),	4
	heartwood/acetone	mansonone G (7), mansonone H (8)	5
	seed/CH ₃ OH	stophanthidin-2,3-di-O-methyl-6- deoxy-β-D- glucopyranoside (9), stophanthidin-3-O-methyl-6-deoxy-β- D-glucopyranoside (10)	6
	heartwood	mansonone I (11)	7
	heartwood/ CHCl ₃	mansonone L (12)	8

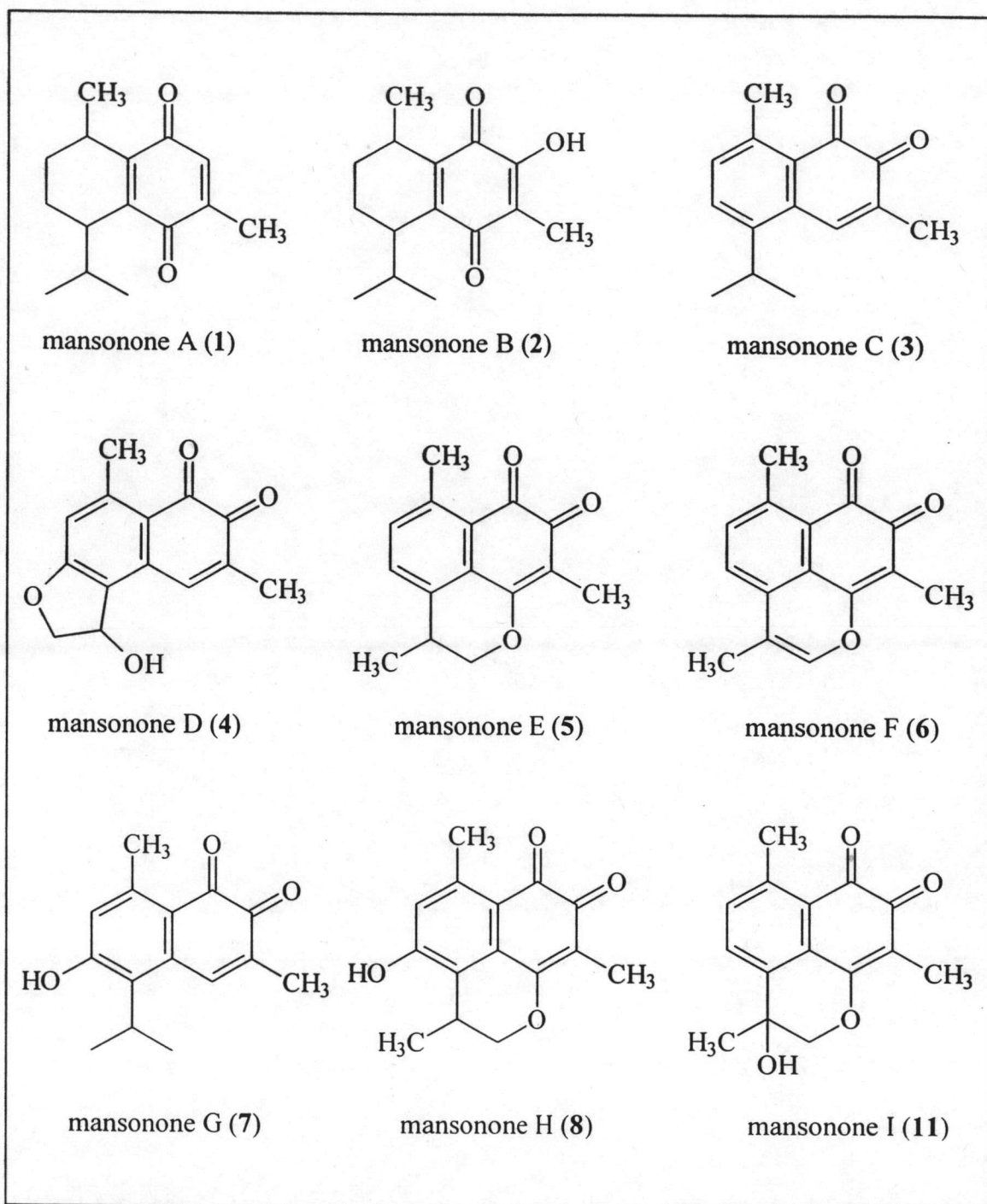
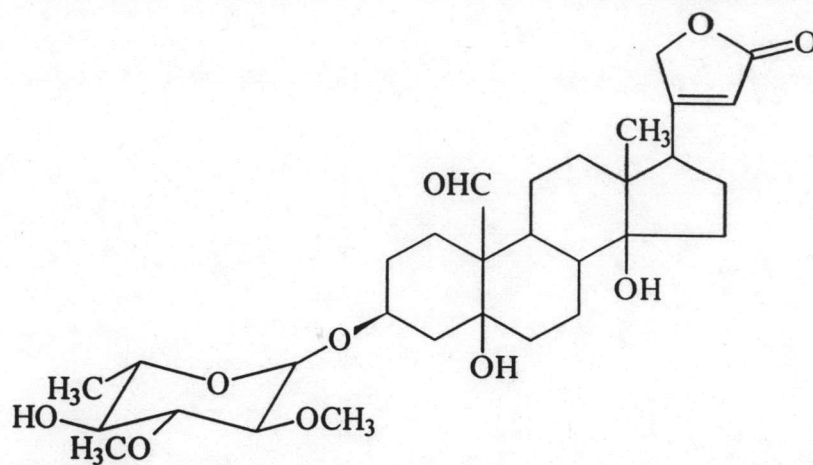
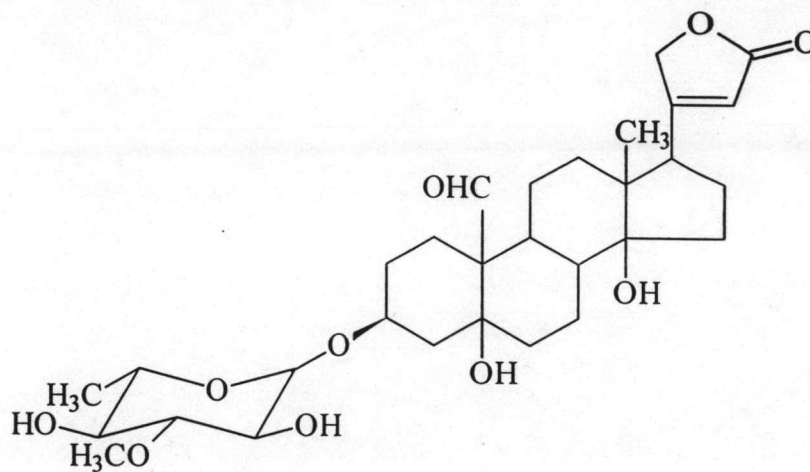


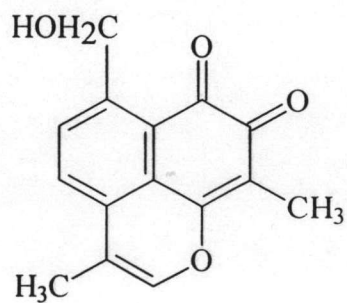
Fig 2 All isolated compounds found in *Mansonia altissima*



stophanthidin-2,3-di-O-methyl-6-deoxy- β -D-glucopyranoside (9)



stophanthidin-3-O-methyl-6-deoxy- β -D-glucopyranoside (10)



mansonone L (12)

Fig 2 (Continued)

The occurrence of mansonone A (1), mansonone B (2), mansonone C (3), mansonone D (4), mansonone E (5) and mansonone F (6) as chemical constituents in the chloroform crude extract of the heartwoods of *Mansonia altissima* was first reported in 1965 by G. B. Marini Bettolo and coworkers.⁴ Later, in 1966, N. Tanaka *et al* studied the acetone crude extract of the heartwoods of this plant and found mansonone G (7) and mansonone H (8).⁵ The seeds of *M. altissima* was first investigated by H. Allgeier and his colleagues in 1967. Two glycosides, namely stophanthidin-2,3-di-O-methyl-6-deoxy- β -D-glycopyranoside (9) and stophanthidin-3-O-methyl-6-deoxy- β -D-glycopyranoside (10) were identified.⁶ In the same year, K. Shimada and co-workers isolated another new mansonone from the heartwoods of this plant and designated this new compound as mansonone I (11).⁷ In 1969, C. Galeffi and his colleagues separated the chloroform crude extract of the heartwoods of this plant and found another new mansonone, mansonone L (12).⁸ Afterwards, there were no further reports on the chemical constituents study of *Mansonia* plants.

The goal of this research can be summarized as follows:

1. To extract and to isolate the organic constituents from the heartwoods of *M. gagei*
2. To elucidate the structures of the isolated substances
3. To search for bioactive compounds that possibly can be used as cytotoxic agents against brine shrimp (*Artemia salina* Linnaeus) using bioassay results as a guide.