CHAPTER I

INTRODUCTION

Recently, chemicals from natural sources were widely studied in order to used in agriculture as insecticides and herbicides, in cosmetic and most importantly as medicines. There are numerous medicinal plants that were clinically used in Thailand because they are readily available, inexpensive and has less side effect .

The genus Excoecaria (Euphorbiaceae) comprise 40 species distributing throughout tropic Africa and Asia. *Excoecaria cochinchinensis* Lour. var. *viridis* Merr. is a Tropical Plant that is available in all a parts of Thailand and has been used in folk medicine in Indonesia and Thailand [1] .

The common name of *E. cochinchinensis* var. *viridis* in Thai is "Lin krabue", "Kamlang krabue" and "Krabue chet tua" (central region), "Ka buea" (Rachaburi province), "Bua ra" (Northern) .*E. cochinchinensis* Lour. var. *viridis* Merr. is a small evergreen shrub with acrid milky latex. Leaves are elliptic and serrate, 2-6 in in length, dark green with red underneath and commonly cultivated as an ornamental plant. Flowers are minute on short axillary and terminally spikes. Male flower is sessile, sepals: 3, oblong irregularly toothed and has three stamens. Female flower is pedicelled, sepals: 3, ovate, acute with a large gland at the base within, bracteoles subulate as long as the flower and had three-chambered ovaries. Fruits are a small, smooth, three-lobed capsule and splitting into three-bivalved parts. Seeds are broadly ovoid and mottled [1,2].

For medicinal uses of Lin krabue, it was used for treatment of disordered blood system and as a drug for treatment of menstrual fever. In Indonesia, its leaves were used as astringent [3,4].

Hippocratic screening of alcoholic extract of Lin krabue showed that it decreases motor activity, suppressed respiration, decreased body temperature and blood pressure, suppressed contraction of cardiac muscle, stimulated the contraction of smooth muscle of intestine and uterus but does not stimulate smooth muscle of trachea in mice. Furthermore, experiments with mice and rabbits showed that it stimulated contraction of uterus [5,6].

Figure 1 The leaves of *Excoecaria cochinchinensis* Lour. var. *viridis* Merr.

1.1 Chemical constituents of plats in Excoecaria genus

Literature surveys indicated that chemical constituents of plants in Excoecaria genus have been investigated and they are summarized in Table 1.1 .

Table 1.1 Chemical constituents of plants in Excoecaria genus

Scientific name	Plant parts	Isolated compouds	Reference
E. cochinchinensis Lour. var. *viridis* Merr.	root, stem	shikimic acid , 1-cyclohexane-1-carboxylic-acid-5-hydroxy 3,4-isopropylidene-dioxy , Oxy-bis(5-methylene-2-furaldehyde), β-sitosterol , tetracosanoic acid , palmitic acid , stearic acid , hentriacontane ,	7
	latex	9,13,14-(orthoester) of 5β-hydroxyresiniferol - 6α,7α-oxide (I-IV) ,	8
E. agalloca Linn.	bark, twig, leaf	12-deoxyphorbol 13- (3*E*,5*E*-decadienoate) ,	9

Table 1.1 (continued)

Scientific name	Plants parts	Isolated compounds	Reference
E. agalloca Linn.	latex	9,13,14-(orthoester) of 5β-hydroxyresiniferol - 6α,7α-oxide (II-IV),	10
		9,13,14-(orthoester) of 5β,12β-dihydroxyresiniferol - 6α,7α-oxide (VI-VII),	
		exocarol,	11
		agalocol,	
		isoagalocol,	
		behenic acid,	
	leaf	taraxerol,	
		epitaraxerol,	
		taraxeryl acetate,	
		taraxerone,	
		fricdirin,	
		β-amyrin,	
		β-sitosterol,	
	stem	β-amyrinyl acetate,	12
		β-amyrin,	
		taraxerol,	

Table 1.1 (continued)

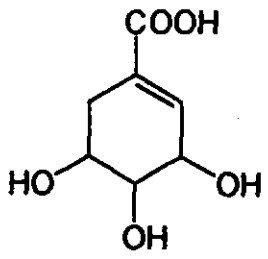
Scientific name	Plant parts	Isolated compounds	Reference
E. agalloca Linn.	stem wood latex	β-sitosterol , β-amyrin , β-amyrenone , 3-epi-β-amyrin , cycloartenol , glycerides of fatty acid (C_{24}-C_{32}) ,	13
	stem wood	2,4-dimethoxy- 3 Ψ, Ψ-dimethyl - allyl - *trans*- cinnamoylpiperidide , 2',4',6',4 - tetramethoxy chalcone ,	14
E. oppositifolia Griff	leaf	9,13,14-(orthoester) of 5β-hydroxyresiniferol - 6α,7α-oxide (I, V) ,	15
E. awakamii hayata	leaf	ellagitannins , excoecarinin	16

The target of this research

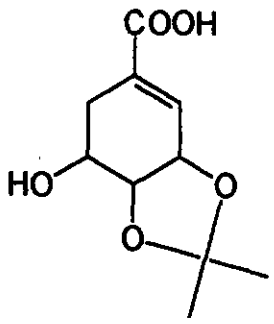
The target of this resrarch can be summarized as follow :

1. To extract and isolate the chemical constituents from the leaves of *Excoecaria cochinchinensis* Lour. var . *viridis* Merr.

2. To identify the structural formulas of the isolated substances.

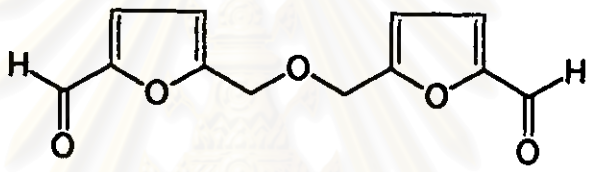


gallic acid

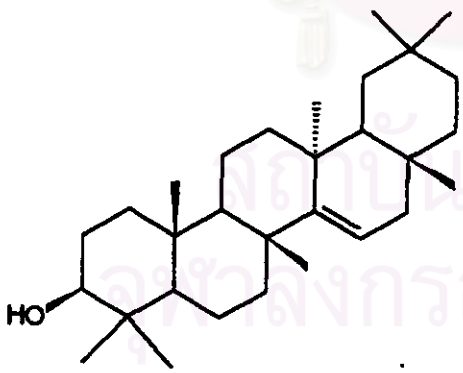


1- cyclohexene-1-carboxylic acid-

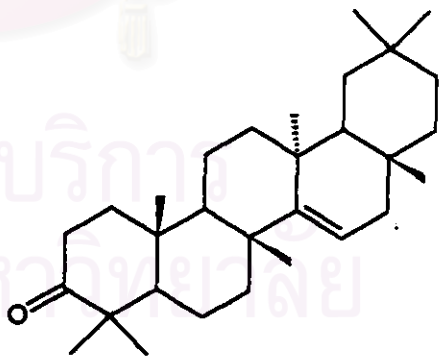
5-hydroxy-3,4-isopropylidene-dioxy



oxy-bis(5-methylene-2-furaldehyde)

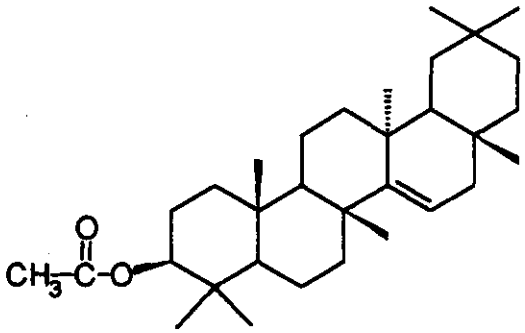


taraxerol

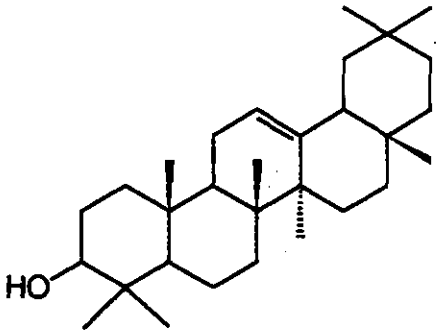


taraxerone

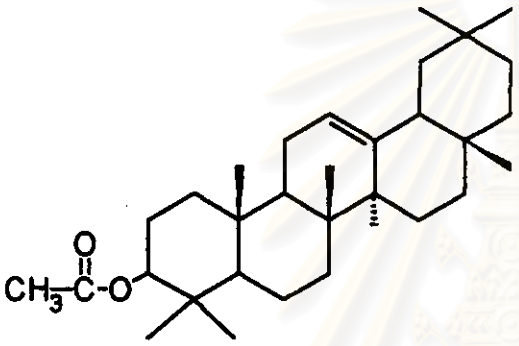
Figure 2 The chemical constituents of plants in Excoecaria genus



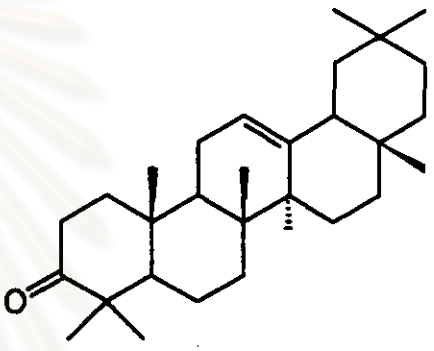
taraxeryl acetate



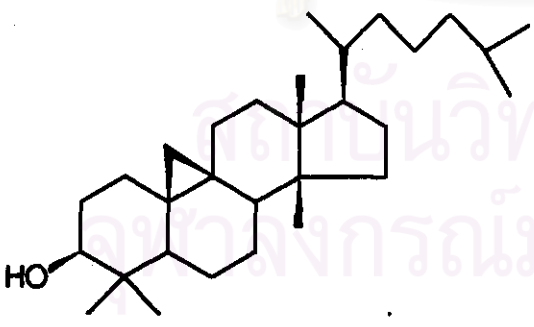
β-amyrin



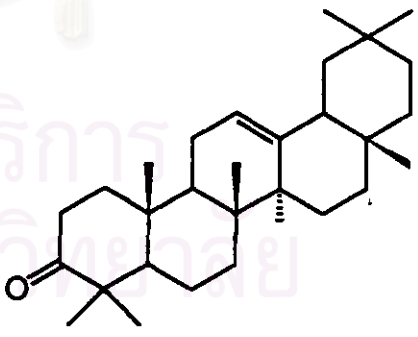
β-amyrinyl acetate



β-amyrenone

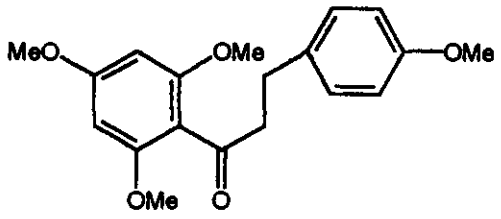


cycloartenol

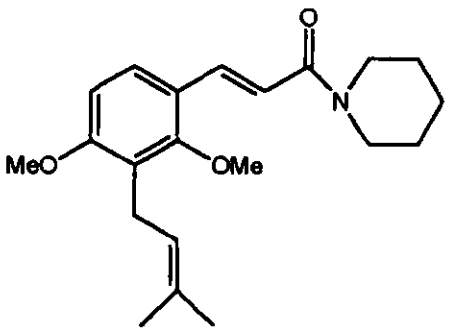


friederin

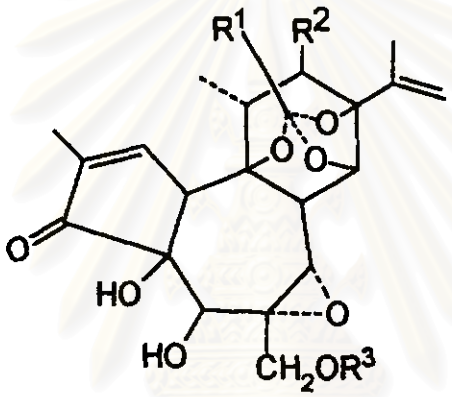
Figure 2 (continued)



2',4',6',4-tetramethoxychalcone

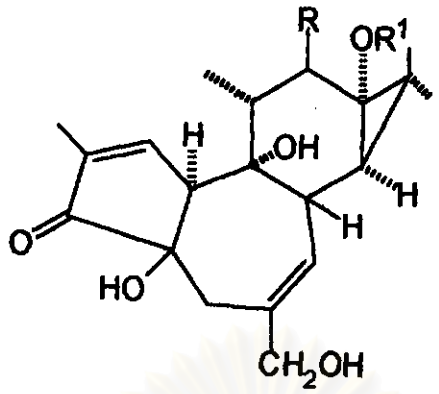


2,4-dimethoxy-3-dimethylallyl-trans-cinnamoylpiperidide



	R^1	R^2	R^3
I. (2,4,6-decatrienoate)	: CH_3-$(CH_2)_2$-$(CH{=}CH)_3$-	H	H
II. (2,4-decadienoate)	: CH_3-$(CH_2)_4$-$(CH{=}CH)_2$-	H	H
III. (2,4,6-hexadecatrienoate)	: CH_3-$(CH_2)_8$-$(CH{=}CH)_3$-	H	H
IV. (2,4,6,8-hexadecatetraenoate)	: CH_3-$(CH_2)_6$-$(CH{=}CH)_4$-	H	H
V. (2,4-octadienoate)	: CH_3-$(CH_2)_2$-$(CH{=}CH)_2$-	H	H
VI. (2,4,6-hexadecatrienoate)	: CH_3-$(CH_2)_8$-$(CH{=}CH)_3$-	H	H
VII. (2,4,6,8-hexadecatetraenoate)	: CH_3-$(CH_2)_6$-$(CH{=}CH)_4$-	H	H

Figure 2 (continued)



12-deoxyphorbol 13-(3E,5E-decadienoate)

VII. $R = H$, $R^1 = -\overset{O}{\overset{\|}{C}}-CH_2-(CH=CH)_2-CH_2-CH_2-CH_2-CH_2-CH_3$

Figure 2 (continued)