CHAPTER I

INTRODUCTION

Medicinal plants are one of the natural products evolved from men's desperate attempts to conquer physical suffering, coupled with overwhelming desire for an eternal life. There is a worldwide trend towards the use of drugs of natural origin since they are believed to possess less harmful side effects than synthetic drugs. There has also been an effort to develop medicinal plants in order to make them be safe and effective drugs such as the development of an antipeptic ulcer drug from plao-noi (*Croton sublyratus* Kurz.). From the Thai medicinal plant compilation [1], plao-yai (*Croton oblongifolius* Roxb.) was often used with plao-noi.

Croton oblongifolius is an interesting medicinal plant because of its properties in therapeutic drugs such as the leaves can be used as a tonic and teniacide. The fruits are used as an emmenagogue, the roots as an urticaria and skin protectives, the flowers as a teniacide, the heartwood as a laxative, the seeds as a drastic, the seed-oil as a purgative, and the bark as an expectorant. Moreover, the hot water extract of the bark of *Croton oblongifolius* can be used as an antipyretic, myalgia, arthralgia and treatment of hepatitis.[2-4]

Eventhough a number of reports on chemical constituents of *C. oblongifolius* [4,8-14] have been appeared in the literature, there are many things still needed to be clarified. For example, are there any diterpenoid compounds that might resemble plaonotol? Therefore, it is very interesting in terms of both medicinal value and chemotaxonomy to investigate the chemical constituents of *C. oblongifolius* again.

1.1 Botanical Aspects of *Croton oblongifolius* Roxb.

The genus *Croton* belongs to the family Euphorbiaceae and comprises 700 species. They are distributed all over warm countries and are reported to possess important medicinal uses. Their flowers usually have unisexual flowers of different sexes on the same plant. Calyx usually has 5- rarely 4-6- (or in the females up to 12-) parted, slightly imbricate in bud. There are as many petals as sepals, in the males usually developed, in the females often rudimentary or obsolete. Glands of disk alternate with the petals. There are 5 to very numerous of stamens , usually 10-20, the filaments inflected in bud. Ovary usually has 3- rarely 2- or 4-celled, with a solitary ovule in each cell ; styles dichotomously cleft. Capsules usually have 3-coccus, the cocci 2-valved and 1-seeded albuminous, with a spermaphore. They are generally trees or shrubs, rarely undershrubs or herbs, with alternate simple leaves. Stipules paired, developed or obsolete. Flowers small, in racemes or spikes, rarely in clusters.

Croton oblongifolius is a medium-sized tree and found throughout evergreen forests, shrubs or groves less than 700 meters above sea level . *Croton oblongifolius* is called as Plao-yai (central), Khwa-wuu (Kanchanaburi), Seng-khe-khang, Sa-kaa-waa, Saa-kuu-wa, Haa-yoeng (Mae Hong Son), Poh (Kamphaengphet), Plao-luang (Northern), Masundi (Oriya), Putri (Bengali), Mahson (Tharu), Kuti, kuti-kenyer (Ho), Gote (Santali), Bhain suan (Kharw.), Puton (Mal Pahari), Poter (Uraon) and Maisonda (Koderma) [2-5].

General description of *Croton oglongifolius* can be summarized as follows. The trunks are straight. The ash-coloured barks are pretty smooth. The pale green leaves are petioled, alternate, and thickly set about the ends of the branchlets, spreading or drooping, oblong, serrate, obtusepointed, very smooth on both sides, from six to twelve inches long, glabrous when full grown. The solitary small flowers usually have a few female ones mixed with many male ones. They have yellowish

green colour and rather slender lepidote pedicels about 2 lin. long, forming lepidote, more or less glabrescent, elongate racemes in the axils of the upper leaves and above the scars of the fallen ones. The petioles are round and smooth, with a lateral gland on each side of their apices. The stipules are small and caducous. The racemes are terminal, generally solitary, erect; shorter than the leaves. The three-fold Bracts are one-flowered. On the inside of each of the small, lateral bractes is a round permanent gland. The petals usually have six, woolly and smaller than calix. The filaments usually have twelve, distinct, nine in the circumference and there in the centre. The female calyxs and corollas are as many as in the male. There is no stamens. The styles usually have three, each divided into two very long , variously bent segments. The capsules are fleshy, six-fur-rowed and tricoccus [6-7].

1.2 Chemical Constituents of the *Croton oblongifolius* Roxb.

From the literature surveys, *Croton oblongifolius* Roxb. have been studied between 1968-1972. The chemical constituents can be summarized as follows.

Plant parts	Crude Extract	Organic Compounds	References
Bark	light petroleum	oblongifolic acid **(I)**	[10]
		ent*-isopimara-7,15-diene-3β,19-diol **(II)	[8,11]
		ent*-isopimara-7,15-diene-3β-ol **(III)	[9,11]
		ent-isopimara-7,15-diene **(IV)**	[12]
		19-hydroxy-*ent*-isopimara-7,15-diene **(V)**	[12]
		ent-isopimara-7,15-diene-19-aldehyde **(VI)**	[12]
		acetyl aleuritolic acid **(VII)**	[13]
		11-dehydro (-) hardwickiic acid **(VIII)**	[14]
		(-) hardwickiic acid **(IX)**	[14]

Plant parts	Crude Extract	Organic Compounds	References
Wood	-	oblongifolic acid **(I)**	[4]
		ent*-isopimara-7,15-diene-3β,19-diol **(II)	[4]
		ent*-isopimara-7,15-diene-3β-ol **(III)	[4]
		ent-isopimara-7,15-diene **(IV)**	[4]
		19-hydroxy-*ent*-isopimara-7,15-diene **(V)**	[4]
		ent-isopimara-7,15-diene-19-aldehyde **(VI)**	[4]
		acetyl aleuritolic acid **(VII)**	
		11-dehydro (-) hardwickiic acid **(VIII)**	[4]
		(-) hardwickiic acid **(IX)**	[4]
Leaves	-	waxy materials	[4]

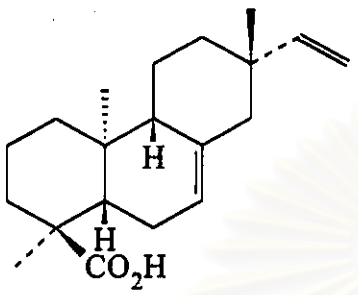
*** The structures were erroneously assigned in [8,9] and were corrected later in [11].**

The objective of this research will be summarized as follows :

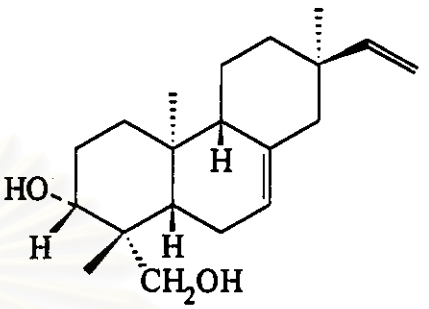
1. To extract and isolate the chemical constituents from the stem bark of *Croton oblongifolius* Roxb.

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

Croton Oblongifolius Roxb. [15]



(I)



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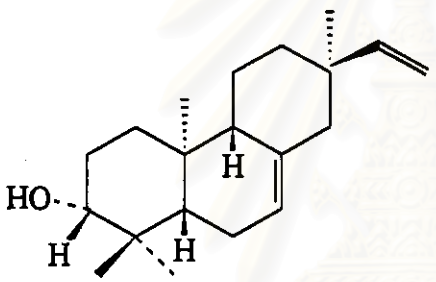

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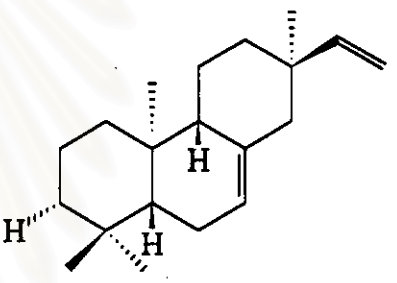

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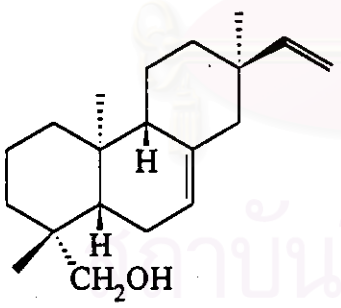

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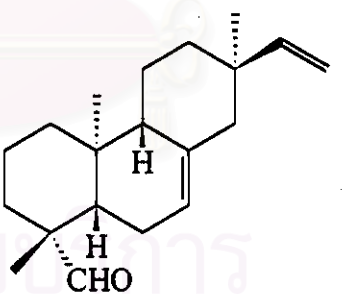

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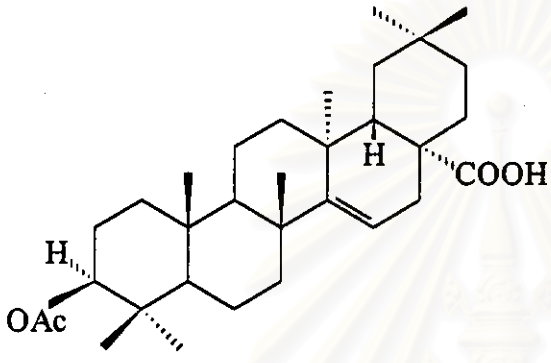

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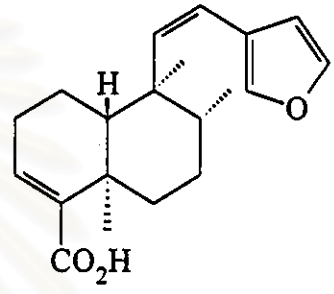

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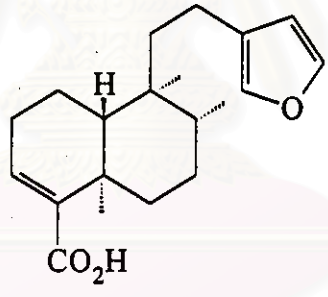

(IX)