

CHAPTER I



INTRODUCTION

The mangrove areas are important as coastline stabilizers, retainers and builders of land, buffers against wave and storms and reservoir in the tertiary assimilation of wastes, and in the global cycle of carbon dioxide, nitrogen and sulfur⁽¹⁾. So the mangrove forests play a very important role to the human population of the country. People have depended on mangrove plants for many purposes. Therefore, in order to optimise the usage of these forest resources without destroying their ecosystems, there mangrove plants should be investigated for their chemical constituents. These chemicals are not only basis of the ecological equilibrium and productivity of the mangrove, but also providing the discovery of new compounds, new biological active substance or new sources of economically important materials. Ngueak pla mo, one of the dominant Thai mangrove plants in the family of Acanthaceae was selected to be examined for chemical constituents.

Ngueak pla mo belongs to the *Acanthus* genus in Acanthaceae family. The genus consists of 14 species⁽²⁾. Three species, *Acanthus illicifolius*, Linn., *Acanthus ebracteatus*, Vahl., and *Acanthus vollubilis*, Wall are found in Thailand.

A. illicifolius is an erect or ascending, slightly branched, smooth shrub, 0.5 to 1.5 meters in height. The stems are cylindrical, and greenish, with a pair of short, shape spines at the base of each stalk. The leaves are rigid, leathery, green, shining, belong to oblong-lanceolate, 9 to 14 centimeters in length, and sinuate-toothed in the margins with spinous teeth. The leaf stalks are 1 centimeter long or less. The

flowers are about 4 centimeters long, each being subtended by an ovate, green closely appressed bract 7 to 8 millimeters long, and by 2 similar but smaller bracteoles; they are born in terminal, solitary, dense, or interrupted spikes. The calyse is green and is 10 to 12 millimeters long. The corolla-tube is 1 centimeter long and the lower lip, pale blue, spreading or recurved, about 3 centimeters long, 2.5 centimeters wide, and hairy within. The capsule is brown, shining, and 2 to 2.5 centimeters long. The seeds are 6 to 10 millimeters long, with white testa⁽³⁾.

1.1 Chemical Constituents Studies.

Derris Trifoliata⁽⁴⁾ found the highest concentration of protein, lipid, and carbohydrate in A. illicifolius. Mo and Zn also occurred in this plant.

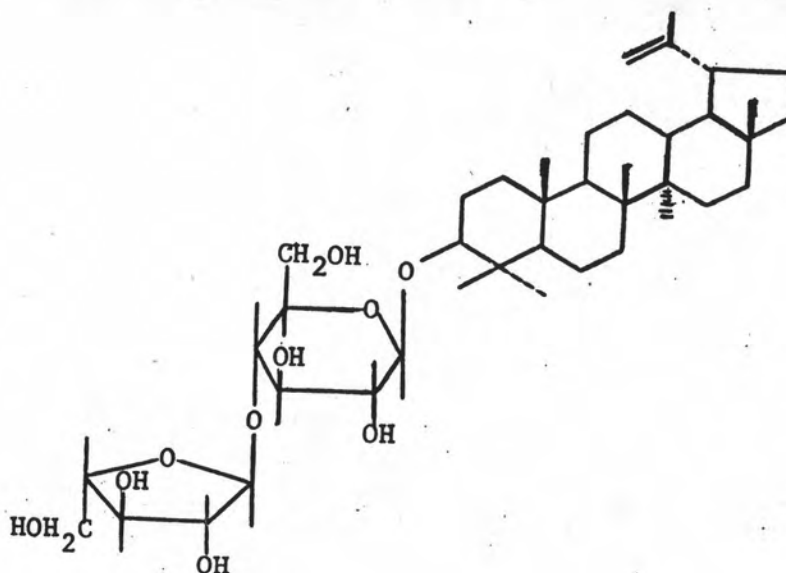
From the leaves of A. mollis L.⁽⁵⁾, β -sitosterol, caffeic acid rhamnoglucoside, a flavanoid glucoside and unknown glucoside of mol. wt. 800 were isolated. Six fatty acids were characterized as methyl esters by gas chromatography and fourteen free amino acids were characterized by TLC and PC.

Three substances, m.p. 240° - 252° , 168° - 171° and 170° - 178° were isolated from methanol extract of the leaves of A. longifolius. The first one was identified as linaroside. The second was flavanoid but it was not identified⁽⁶⁾.

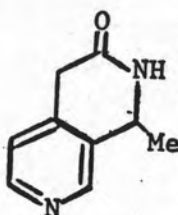
From the leaves of A. spinosus L., β -sitosterol, caffeic acid rhamnoglucoside, luteolin-7-glucoside, apigenin-7-galactoside were isolated and identified⁽⁷⁾.

A new triterpenoid saponin were isolated from the ethanolic extract from the roots of A. illicifolius⁽⁸⁾. It was shown to be α -L-arabinofuranosyl-(1 \rightarrow 4)- β -D-glucopyranosyl (1-3)- β -hydroxy-lup-20 (29)-

ene., having the structure:



Tiwari and coworkers^(9,10) isolated and identified as oleanolic acid, β -sitosterol, lupeol, quercetin-3-O- β -D glucopyranoside, trigonellin, and a new alkaloid, acanthicifolin.



acanthicifoline

1.2. Uses of *A. illicifolius*

A. illicifolius was used as a folklore medicine. In the Philippines, Guerrero⁽³⁾ reported that the leaves and roots were used in decoction as an antiasthatic. Nadkari et al.⁽³⁾ reported that the roots of *A. illicifolius* have been used for coughs, and asthma and also used for paralysis in Thailand and Indochina. In Thailand, the boil water of the roots and stems were used for treatment of the skin and for smallpox. The seeds were also used for tonic.

In 1981, Miss Upa Jongsvat⁽¹¹⁾ studied on the toxicities and anticancer effects of A. illicifolius and found that the whole plant extract was not toxic to the experiment mice and also displayed anti-leukemic activities, especially the roots extract showed excellent activities (Table I).

Table I Rate of survival of Swiss mice that had leukemia and then had been fed with the crude extract of A. illicifolius for 11 weeks

Inject the following extracts to leukemia mice for 11 days	No. of mice	No. of mice survived after injection (week)											rate of survival (%)
		1	2	3	4	5	6	7	8	9	10	11	
1 water	20	20	20	20	20	18	16	14	11	7	2	0	
2 Stems extract	20	20	20	20	19	19	19	19	16	13	9	8	40
3 Leaves extract	20	20	20	20	20	20	19	18	17	15	10	8	40
4 Roots extract	20	20	20	20	20	20	19	19	19	18	18	18	90
5 Whole plant extract	20	20	20	20	20	18	17	16	11	10	8	7	35

The goal of this thesis is to examine the chemical constituents of the root of A. illicifolius for the understanding of their chemical roles in the environment and to search for some chemical components which might be useful to mankind.

