



PHYTOCHEMICAL SURVEY OF MALAYSIAN PLANTS

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Résumé: *la revue phytochimique de la flore de Malaisie a été entreprise, couvrant la recherche systématique des alcaloïdes, terpènes, saponines et flavones. Des études chimiques des Annonacées ont été réalisées. Ces études ont conduit à l'isolement de nombreux alcaloïdes connus ou nouveaux.*

Abstract : *the phytochemical surveys of Malaysian Flora were carried out, covering the systematic search for alkaloids, terpenoids, saponins and flavonoids. Some chemical studies on Annonaceous plants have been performed. The studies have led to the finding of many known and new alkaloids.*

Introduction

The flora of Malaysia is generally considered to be one of the richest in the world. This is due to the constantly warm and uniformly of maximum number of archaic species.

More than 6000 species of medicinal plants have been reported to occur in East and South-east Asia of which about 1230 species are found in Malaysia (1). One of the main objectives of our study is to search for natural compounds isolated from Malaysian Plants and to study the pharmacological properties of those compounds. This studies is urgently required because many of the plant species reported to have medicinal values are in danger of becoming extinct due to the loss of their natural habitats caused deforestation. To achieve these goals, we are carrying out the phytochemical screening, isolation, structural elucidation and pharmacological evaluation of natural products isolated from Malaysian Plants.

The phytochemical survey of Malaysian plants was started in 1957 by Douglas and Kiang (2), followed by Amarasingham (3), Nakanishi (4), Carrick (5) and Chan (6). A new phytochemical survey of Malaysian was performed by Hamid and Sévenet (7) under collaborative research programme between the Institut de Chimie des Substances Naturelles (CNRS-France) and the Department of Chemistry, University of Malaya, Kuala Lumpur, Malaysia.

Phytochemical screening

Field trips and plant collection have been carried out in various states of Malaysia Peninsula, Sabah and Sarawak. Herbarium specimens were prepared and deposited at the Chemistry Department Herbarium. All the plants collected have been tested for their alkaloids, saponins, terpenoids and flavonoids content.

The following table concerns the results of phytochemical screening of Annonaceous plants collected in various places in Malaysia.



Primary chemical screening of annonaceous plants

Genus	Species	Part	Alkaloid	Saponin	Flavonoid
Alphonsea	<i>cylindrica</i> King	L	3+		
		TB	2+		
	<i>kinabaluensis</i>	L	3+		
		TB	2+		
Artabotrys	<i>crassifolius</i>	TB	3+	+	2+
	<i>grandifolius</i>	TB	2+	+	3+
	<i>maingayi</i>	TB	3+	2+	2+
	<i>suaveolens</i>	TB	3+		3+
	<i>venustus</i>	TB	3+		2+
	<i>wrayi</i>	L	+/-		+
	<i>pleurocarpus</i>	L	3+		
	<i>maingay</i>	TB	4+		
Cyathocalyx	<i>pahangensis</i>	TB	3+		
	<i>scortechinii</i>	TB	+		
Cyathostemma	<i>excelsum</i>	TB	3+		
Desmos	<i>dasymachalus</i>	L/T	3+		
		<i>dasymachalus</i> var <i>wallichii</i>	L/TB	2+	3+
	<i>cochinchinensis</i>	TB	+		
	<i>dumosus</i>	L	2+		
		TB	3+		
Disepalum	<i>pulchrum</i>	TB	2+		
Enicosanthum	<i>congregatum</i>	TB	+		
	<i>fuscum</i>	L	2+		
	<i>magnoliiflorum</i>	L	4+		
		T	2+		
Fissistigma	<i>fulgens</i>	TB	4+		
	<i>lanuginosum</i>	L	3+		
		TB	2+		
	<i>latifolium</i>	TB	+		
	<i>manubriatum</i>	L/TB	+		
	<i>rubiginosum</i>	TB	1-2+		
		TB	3+		
Goniothalamus	<i>curtisii</i>	L/TB	+		
	<i>fulvus</i>	TB	3+		
	<i>malayanus</i>	TB	2+		
	<i>scortechinii</i>	L	+		
	<i>uvaroides</i>	TB	2+		
	<i>velutinus</i>	L	4+		
	<i>ridley</i>	L	+		
		TB	2+		
<i>suluensis</i>	TB	3+			
Miogyne	<i>virgata</i>	L/TB	3+		
Monocarpia	<i>marginalis</i>	L	3+		
		TB	+		
Oncodostigma	<i>monosperma</i>	TB	2+		
Orophea	<i>enterocarpa</i>	TB	3+		



Genus	Species	Part	Alkaloid	Saponin	Flavonoid
Oxymitra	<i>filipes</i>	L	3+		
		TB	4+		
	<i>kingii</i>	TB	3+		
	<i>latifolia</i>	L	2+		
		TB	3+	3+	
Pheanthus	<i>crassipetala</i>	LB	3+		
	<i>opthalmicus</i>	L/TB	3+		
Polyalthia	<i>cauliflora</i>	L	+		
		TB	3+		
	<i>cinnamomea</i>	L	2+		
		TB	3+		
	<i>hookeriana</i>	L/TB	3+		
	<i>insignis</i>	L	3+		
	<i>cf. dumosa</i>	TB	+		
	<i>sclerophylla</i>	L	2+		
		TB	3+		
		<i>stenopetala</i>	TB	3+	
Popowia	<i>odoardoi</i>	L	+		
		TB	3+		
	<i>pisocarpa</i>	TB	4+		
	<i>tomentosa</i>	L	2+		
	<i>mainga</i>	TB	3+		
Pseuduvaria	<i>macrophylla</i>	TB	2+		
	<i>monticola</i>	TB	2+		
Trivalvaria	<i>pumila</i>	L	2+		
	<i>macrophylla</i>	TB	3+		
Uvaria	<i>cf. cordata</i>	TB	3+		
	<i>grandiflora</i>	L/TB	+/-		
	<i>lobbiana</i>	TB	2+		
Xylophia	<i>cordata</i>	TB	4+		
	<i>ferruginea</i>	L	2+		
		TB	+		
	<i>ferruginea var.</i>	TB	3+		
	<i>oxyantha</i>				

Abbreviations : L, Leaves ; TB, Trunk bark

Chemical studies

Chemical studies carried out on the following species have led to the finding of many alkaloids and other natural compounds.

Artabotrys species: The genus *Artabotrys* comprises over a hundred species of climbers and scandent shrubs distributed in Tropical Africa and East Asia, of which only thirteen species are found in Malaysia. All *Artabotrys* species are rich in alkaloid and flavonoid. Some of *Artabotrys* species have been studied in detail for their alkaloid contents.

Most alkaloids belong to the aporphinoid alkaloid (noraphorphine and oxoaporphine) and also protoberberine alkaloid.

Artabotrys grandifolius gave atherospermidine, liriodenine, norstephalagine, xylopinine and pseudopalmitine ; *Artabotrys mangayi* gave nine alkaloids : norstephalagine, 3-hydroxynornuciferine, anonaine, normuciferine, unshisunine, atherospermidine, liriodenine, lysicamine and discretamine. Norstephalagine and atherospermidine showed relaxing activity on rat uterine contraction induced by KCl or rhythmic contractions induced by oxytocin in the presence of Ca, but only atherospermidine can relax oxytocin or vanadate-induced contractions in Ca-free medium (8).



Artabotrys suaveolens has been found to contain the known suaveoline, isocorydine and neutral compounds like polycarpol and sitosterol whereas *A. crassifolius* gave atherospermidine, liriodenine and lysicamine. A new catecholic berbine, artavenustine has been isolated from *A. venustus* (9).

Desmos species: Two species from genus *Desmos* so far have been studied. *Desmos dasymachalus* (10) contained dicentrinone and dasymachaline, a new 7-hydroxy aporphine.

The second *Desmos* species was initially thought to be the same as *D. dasymachalus*. However, due to the different alkaloid constituents of the two plants, the reexamination of the botanical features revealed that the second species was in fact a variety of *D. dasymachalus*. Their botanical features are basically the same except that the branches of the second species was brown-tomentose, contrary to the glabrous branches of *D. dasymachalus*. Chromatographic separation of the dichloromethane extracts from leaves and stem bark of *Desmos, dasymachalus* var. *walichii* resulted in the isolation of six isoquinoline type alkaloids belonging predominantly to the oxoaporphine skeleton (11). O-Methylmoschatoline, oxobuxifoline, lanuginosine, liriodenine and isolaurine were isolated from the leaves and lanuginosine, liriodenine and oxocrebaine were isolated from the stem bark of *D. dasymachalus* var. *walichii*.

Goniothalamus species: *Goniothalamus suluensis* have been found to contain liriodenine and oxostephanine whereas *Goniothalamus macrophaylla* gave goniothalamine. Goniothalamine has been shown to have antifertility and cytotoxicity activity whereas liriodenine has been claimed to have antitumor activity.

Meiogyne virgata: The new azafluorene alkaloid, kinabaline (12) was isolated from *Meiogyne virgata*, together with liriodenine and cleistopholine. This species was collected on Mount Kinabalu, Sabah, Malaysia.

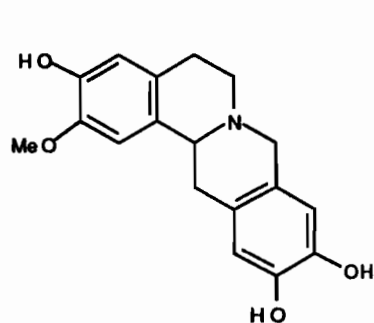
Oncodostigma monosperma: Six aporphinoid alkaloid have been isolated from *Oncodostigma monosperma* (13) and one of them is norcepharadione A, a new alkaloid with two oxo groups at position 4 and 5. There is only one species of genus *Oncodostigma* found in Malaysia. Other alkaloids found in *O. monosperma* were asimilobine, norushinsunine, nornuceferine, anonaine and liriodenine.

Orophea species: Only one *Orophea* species has been studied in Malaysia. Two new aristolactams name as enterocarpam-I and enterocarpam-II have been isolated from the stem bark of *Orophea enterocarpa*. The acetate derivatives have also been prepared (14). The genus *Orophea* have been known to possess some medicinal properties such as anticough agent and remove fever.

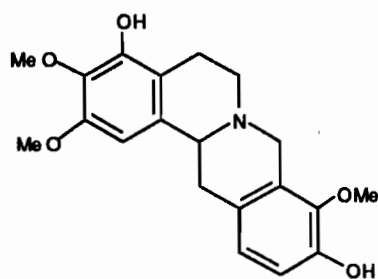
Polyalthia species: A new alkaloid, (-) thaipetaline, was isolated from *Polyalthia stenopetala*. This new alkaloid belongs to the very small group of C-4 substituted tetraprotoberberines. Other alkaloids were liriodenine, oxostephanine, discretamine and isoursuline.

Polyalthia macropoda has been found to contain oliveroline, N-oxyoliverine, liriodenine and coclaurine (15).

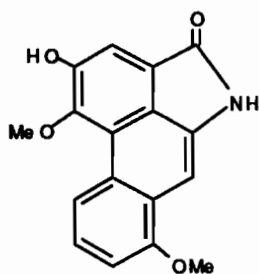
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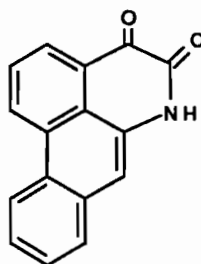
Artavenustine



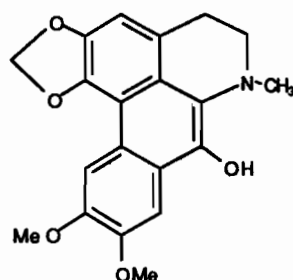
Thaipetaline



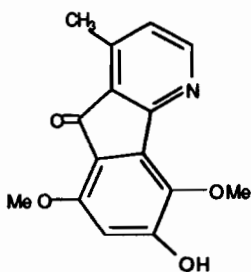
Enterocarpam -I



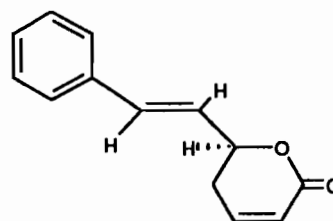
Norcepharadione A



Dasymaschaline



Kinabaline



Goniotalamin

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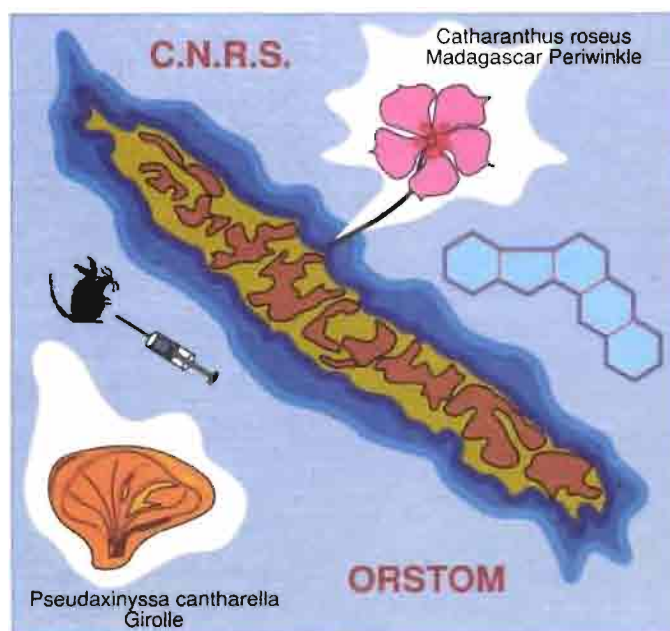


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