CHAPTER II

HISTORICAL

Plants in the Family Meliaceae

Family Meliaceae comprises of 50 (or 51) genera with about 575 species. The family is best represented in the Malesian region for, although Africa is almost as diversified in terms of number of genera, Malaya alone has more species (91 in 16 genera) than the whole of Africa (84) and, furthermore, begins to approach the specific richness of the neotropics (122), which have merely eight genera. Almost half of the Malayan species are in the single genus *Aglaia*, which is restricted to Indomalesia and the western Pacific, and is the largest genus in the family. (Mabberley and Pannell, 1989)

According to Craib (1931) and Smitinand (1980), there are about 25 species of *Aglaia* in Thailand. These species are :

Aglaia andamanica Hiern ***

A. argentea Bl. **

A. caudata Hiern **

A. chaudocensis Pierre ***

A. cordata Hiern ***

A. domestica Pelleg. **

A. dookkoo Griff **

A. edulis A. Gray **

A. gigantea Pelleg. **

A. hoaensis Pierre ***

A. kunsteri King *

A. marginata Craib *

A. meliosmoides Craib ***

A. merostela Pelleg. *

A. oblanceolata Craib *

A. odorata Lour. ***

A. odoratissima Bl. ***

A. palembanica Miq. ***

A. paniculata Kurz *

A. pirifera Hance ***

A. pyramidata Hance ***

A. quocensis Pierre *

A. submonophylla Miq. *

A. tenuicaulis Hiern *

A. trichostemon DC. *

* reported by Craib

** reported by Smitinand

*** reported by both Craib and Smitinand

Chemical Constituents of the Meliaceous Plants

Plants in the Family Meliaceae are found to contain a wide range of chemical constituents : alkaloids, terpenoids and miscellaneous compounds. The following pages contain literature survey on the chemical constituents of this family.

2.1 Alkaloid Constituents of the Meliaceous Plants

The alkaloid chemistry of the Meliaceous plants came to the interest of researchers in 1979 when Shiengthong and his coworkers isolated 2 new bisamide alkaloids, odorine (1) and Odorinol (2), from the leaves of *Aglaia odorata* Lour. Further investigation on the alkaloids of Meliaceous plants were presented in Table 1.

Table 1 Alkaloid Constituents of the Meliaceous Plants

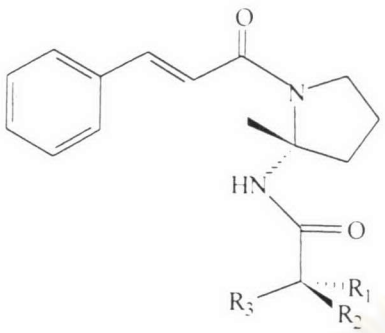
Plant Name	Part	Chemical Constituents	Category	References
Aglaia formosana (Hayata) Hayata	leaf	Dehydroodorin (3)	Bisamide	Duh *et al.* , 1993
A. odorata Lour.	leaf	Odorine (1)	Bisamide	Shiengthong *et al.* , 1979
		Odorinol (2)	Bisamide	Shiengthong *et al.* , 1979 ; Hayashi *et al.* , 1982
	flower	Odoram (4)	Piperidine	Techasauwapak, 1981
Aglaia pirifera Hance	leaf	Piriferine (5)	Bisamide	Saifah, Jongbunprasert and Kelley , 1988
A. pyramidata Hance	leaf	Pyramidatine (6)	Bisamide	Saifah *et al.* , 1993
A. roxburghiana Hiern	leaf	Roxburghilin (1)	Bisamide	Purushothaman *et al.* , 1979
A. roxburghiana Miq. var. Beddomei	leaf	(+)-Odorine (1) (+)-Odorinol (2)	Bisamide	Joshi *et al.* , 1986

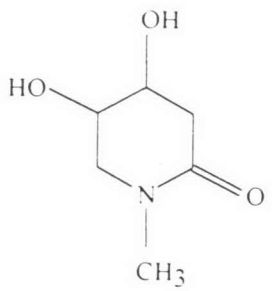
Table 1 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
Amoora rohituka Wight & Arn. (*Aphanamixis polystachya* (Wall) Parker)	leaf & stem	Rohitukine (7)	Chromone	Harmon and Weiss, 1979
Dysoxylum lenticellare Gillespie	leaf	Dysoxyline (8)	Isoquinoline	Aladesanmi, Kelley and Leary, 1983
		S-(+)-Homolaudanosine (9)	Isoquinoline	
		Dysazecine (10)	Isoquinoline	
		3-Epischelhammeicine (11)	Isoquinoline	
		2,7 Dihydrohomoerysotrine (12)	Isoquinoline	
	leaf	Deshomerythrine (13)	Isoquinoline	Aladesanmi *et al.* , 1984
		3-Epi-12-hydroxyschelhammericine (14)	Isoquinoline	

Table 1 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	stem	18-Methoxy-2,7-dihydrohomoerysotrine (15)	Isoquinoline	Aladesanmi, Kelley and Leary, 1986
		Lenticellarine (16)	Isoquinoline	
	stem	3-Epi-2,18-dimethoxy-schelhammericine (17)	Isoquinoline	Aladesanmi, 1988
		3-Epi-schilhammericine (18)	Isoquinoline	
		2,7-Dihydrohomoerysotrine (12)	Isoquinoline	
		3-Epi-18-methoxy-schelhammericine (19)	Isoquinoline	
D. binectariferum Hook. f.	bark & leaf	Rohitukine (7)	Chromone	Vasudev *et al.* , 1985 ; Naik *et al.* , 1988
D. grande Hiern	leaf	Rohitukine (7)	Chromone	Srivilai, 1993





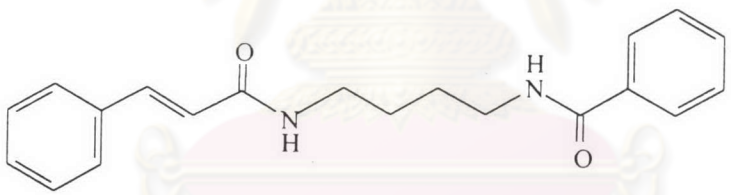
(4)

(1) $R_1 = CH_3 : R_2 = CH_3 : R_3 = CH_2CH_3$

(2) $R_1 = H : R_2 = CH_3 ; R_3 = CH_2CH_3$

(3) $R_1 = H ; R_2 = CH_3 ; R_3 = CHCH_3$

(5) $R_1 = H ; R_2 ,R_3 = CH_3$



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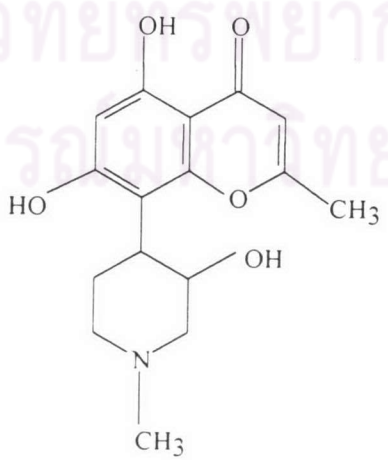

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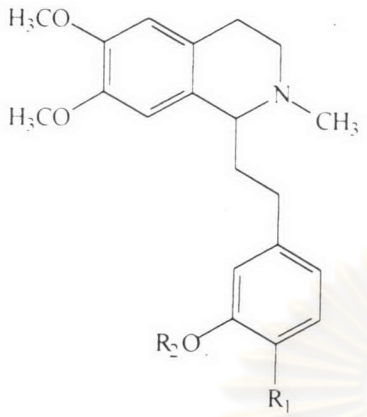
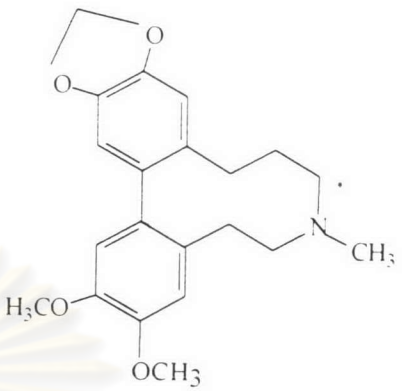


(8) R_1. $R_2 = CH_2$

(9) R_1,$R_2 = CH_3$



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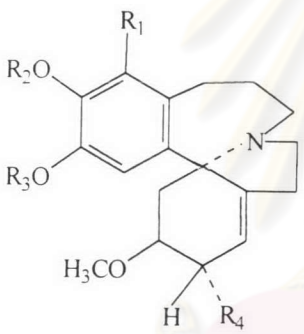


(11) R_1,R_4 = H ; R_2 , $R_3 = CH_2$

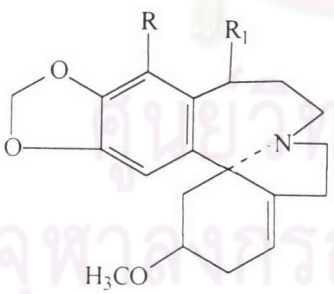
(12) R_1,R_4 = H ; R_2,$R_3 = CH_3$

(15) $R_1 = OCH_3$; R_2,$R_3 = CH_3$; R_4 = H

(17) R_1,$R_4 = OCH_3$; R_2,$R_3 = CH_2$

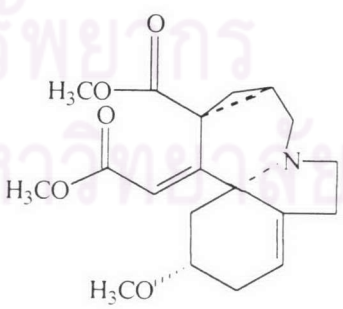
(18) R_1,R_4 = H ; R_2 , $R_3 = CH_2$

(19) $R_1 = OCH_3$; R_2 , $R_3 = CH_2$; R_4 = H



(13) R = OCH_3 ; R_1 = H

(14) R = H ; R_1 = OH



(16)

2.2 Terpenoid Constituents of the Meliaceous Plants

The earliest report of terpenoids studied in the Meliaceae wal by Guha-Sircar and Chakravarty (1951), investigating the seed of *Swietenia macrophylla* King. In this study, two limonoids were isolated, one of which was non bitter and was named swietenine (20), the other was bitter and named swietenolide (21). The structure and stereochemistry of these limonoids were later determined in 1965 by Connolly and his group. Further phytochemical studies on the terpenoids of the Meliaceous plants were summarized in Table 2.

Table 2 Terpenoid Constituents of the Meliaceous Plants.

Plant Name	Part	Chemical Constituents	Category	References
Aglaia argentea Bl.	leaf	Argenteanone A (22)	Triterpenoid	Omobuwajo *et al.* , 1996
		Argenteanone B (23)		
		Argenteanol (24)		
A. ferruginea	heart-wood	7-Deacetylglabretal-3-acetate (25)	Triterpenoid	Mulholland and Monkhe, 1993
		7-Deacetylglabretal-3-tiglate (26)	Triterpenoid	
A. leucophylla King	stem-bark	(24Z)-3,4-Secotirucalla-4(28),7,24-triene-3,26-dioic acid (27)	Triterpenoid	Benosman *et al.* , 1994
		(24Z)-3,4-Secotirucalla-4(28),7,24-triene-3,26-dioic acid-3-monomethyl ester (28)	Triterpenoid	
A. odorata Lour.	leaf	Aglaiol (29)	Triterpenoid	Shiengthong *et al.* , 1965 ; Boar and Damps, 1973

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Aglaiondiol (30)	Triterpenoid	Shiengthong *et* al. , 1974 ; Boar
		Aglaitriol (31)	Triterpenoid	and Damps, 1977
A. roxburghiana Miq.	leaf &	Roxburghiadiol A (32)	Triterpenoid	Purushothaman *et al.* , 1986
	fruit	Roxburghiadiol B (33)	Triterpenoid	
A. roxburghiana Miq. var.	aerial-	29-Nor-cycloartan-24,25-epoxy-	Triterpenoid	Vishnoi *et al.* , 1988
beddomei Gamble	part	3β-ol (34)		
		29-Nor-cycloartan-23-ene-	Triterpenoid	
		3β-25-diol (35)	Triterpenoid	
		29-Nor-cycloartenol (36)	Triterpenoid	
		28,29-Bis-nor-cycloartane-24-	Triterpenoid	
		methylene-3β-6-α-diol (37)		

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
Amoora rohituka Wall.	stem-bark	Amoorinin (38)	Limonoid	Agnihotri, 1987 ; Agnihotri, Srivastava and Srivastava,1987
A. grandifolia Bl.	dried-peel	Aphanamol I (39)	Sesquiterpenoid	Nishizawa *et al.* , 1984
		Aphanamol II (40)	Sesquiterpenoid	
Aphanamixis polystachya (Wall.) Parker	fruit	Aphanamixin (41)	Triterpenoid	Chatterjee and Kundu, 1967
Azadirachta indica A. Juss	fruit	Azadirachtol (42)	Triterpenoid	Siddiqui, Siddiqui and Faizi, 1985
	fruit	Deacetylazadirachtinol (43)	Limonoid	Kubo, Matsumoto and
		Azadirachtin (44)	Limonoid	Matsumoto (1986)
		Salannin (45)	Limonoid	Kraus *et al.* , 1985
		3-Desacetylsalanin (46)	Limonoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		6-O-Acetylnimbandiol (47)	Limonoid	
	bark	Nimbionone (48)	Diterpenoid	Siddiqui *et al.* , 1988
		Nimbionol (49)	Diterpenoid	
	root-	Margocin (50)	Diterpenoid	Ara *et al.* , 1990 a
	bark	Margocinin (51)	Diterpenoid	
		Margocillin (52)	Diterpenoid	
	stem-	Nimbosodione (53)	Diterpenoid	Ara *et al.* , 1990 b
	bark	Nimbisonol (54)	Diterpenoid	
		Demethylnimbionol (55)	Diterpenoid	
	root	Azadirinin (56)	Triterpenoid	Ara *et al.* , 1992
Carapa grandiflora	seed	Carapolide C 1 (57)	Limonoid	Ayafor *et al.* , 1994
Sprague		Carapolide D 3 (58)	Limonoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Carapolide E 4 (59)	Limonoid	
		Carapolide F 5 (60)	Limonoid	
		Carapolide G 6 (61)	Limonoid	
		Carapolide H 7 (62)	Limonoid	
		Carapolide I 8 (63)	Limonoid	
		Evodoulone 13 (64)	Limonoid	
Cedrela glaziovii C. DC.	heart-wood	Mexicanol (65)	Triterpenoid	Connolly *et al.* , 1967
C. mexicana M. Roem.	heart-wood	Mexicanolide (66)	Triterpenoid	Connolly, Mc Grindle and Overton, 1965
		Mexicanol (65)	Triterpenoid	Connolly *et al.* , 1967

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
C. odorata L.	heart-wood	Methyl angolensate (63)	Limonoid	Chan, Magnus and Mooto, 1967
	seed	Mexicanolide (66)	Triterpenoid	Okorie and Taylor, 1968
		Andirobin (68)	Limonoid	
		6-Deoxyswietenolide (69)		
		6-Hydroxymexicanolide (70)		
	heart-wood	Gedunin (71)	Limonoid	Burke *et al.* , 1969
		Photogedunin (72)		
	heart-wood	Odoratin (73)	Limonoid	Chan, Taylor and Aplin, 1972
C. toona Roxb.	wood	Geranylgeraniol (74)	Diterpenoid	Nagasampagi, Yankov and Dev, 1967

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	seed	Cedrelone (75)	Limonoid	Chatterjee, Chakrabortty and
		1,2-Dihydrocedrelone (76)	Limonoid	Chandrasekharan , 1971
Dysoxylum acutangulum	seed	(+)-8-Hydroxycalamenene (77)	Sesquiterpenoid	Nishizawa *et al.* , 1983
Miq.				
D. alliaceum Bl.	seed	(+)-8-Hydroxycalamenene (77)	Sesquiterpenoid	Nishizawa *et al.* , 1983
	dried-peel	Bicalamenene (78)	Sesquiterpenoid	Nishizawa *et al.* , 1985 b
D. binectariferum Hook. f.	fruit	Dysobinin (79)	Limonoid	Singh, Garg and Khanna, 1976
D. frazenarum Benth.	wood-oil	δ-Elemene (80)	Sesquiterpenoid	Gough, Powell and Sutherland, 1961 ; Gough and Sutherland, 1964
D. lenticellare Gillespie	leaf	Ferrubietolide (81)	Diterpenoid	Onan *et al.* , 1985

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	leaf	Phyllocladene (82)	Diterpenoid	Aladesanmi and Ilesanmi, 1987
		8β-Hydroxysandaracopiamarene (83)	Diterpenoid	
	stem	8β-Methoxysandaracopimarene (84)	Diterpenoid	Aladesanmi , 1988
		8β-Hydroxysandaracopiamarene (83)	Diterpenoid	
		Phyllocladene (82)	Diterpenoid	
D. pettigrewianum	bark &	Masticaidenonic acid (85)	Triterpenoid	Mulholland and Nair, 1994
	wood	3-Oxo-7,24E-tirucalladien-26-oic acid (86)	Triterpenoid	
		3α-Hydroxy-7,24Z-tirucalladien-26-oic acid (87)	Triterpenoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Dysoxylic acid A (88)	Triterpenoid	
		Dysoxylic acid B (89)	Triterpenoid	
D. richii (A. Gray) C. DC.	fresh - leaf	Dysoxylin (90)	Limonoid	Jogia and Andersen, 1987
	leaf	Dysoxylin (90)	Limonoid	Jogia and Andersen, 1989
		Tigloyldysoxylin (91)	Limonoid	
		Dysoxylone (92)	Limonoid	
		6α-Acetoxyobacunol acetate (93)	Limonoid	
	fruit	Methyl richenoate (94)	Triterpenoid	Albersberg and Singh, 1991
		Richenoic acid (95)	Triterpenoid	
		Richenone (96)	Triterpenoid	
		Richenol (97)	Triterpenoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Ocotillone (98)	Triterpenoid	
		Cabraleone (99)	Triterpenoid	
		Shoreic acid (100)	Triterpenoid	
		Eicherianic acid (101)	Triterpenoid	
D. roseum C. DC.	leaf	Dysorone A (102)	Triterpenoid	Adesanya, Pais and Sevenet,
		Dysorone B (103)	Triterpenoid	1991
		Dysorone C (104)	Triterpenoid	
		Dysorone D (105)	Triterpenoid	
		Dysorone E (106)	Triterpenoid	
Ekebergia pterophylla (C.	seed	E.P. 1 (107)	Limonoid	Taylor and Taylor, 1984
DC.) Holm.		E.P. 2 (108)	Limonoid	
		E.P. 3 (109)	Limonoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	seed	E.P. 1 (107)	Limonoid	Kehrli, Taylor and Niven, 1990
		E.P. 3 (109)	Limonoid	
		E.P. 4 (110)	Limonoid	
		E.P. 5 (111)	Limonoid	
		E.P. 6 (112)	Limonoid	
Entandrophragma	timber	Gedunin (71)	Limonoid	Akisanya *et al.* , 1960
angolense (Welw.) C.DC.		Methyl angolensate (67)	Limonoid	Akisanya *et al.* , 1961
E. caudatum Sprague	bark	Phragmalin (113)	Limonoid	Arndt and Baarschers, 1972
E. delevoyi De Wild.	timber	Gedunin (71)	Limonoid	Taylor, 1965
	bark	3,4-Secotirucalla-4(28),7,24-triene-	Limonoid	Mulholland *et al.* , 1994
		3,21-dioic acid (114)		
		Azadirone (115)	Limonoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		6α-Acetoxyazadirone (116)	Limonoid	
		14β, 15β-Epoxyazadirone (117)	Limonoid	
		6α-Acetoxy-14β, 15β -epoxy azadirone (118)	Limonoid	
		6α-Acetoxy-14β, 15β–epoxy azadiradione (119)	Limonoid	
		Delevoyin A (120)	Limonoid	
		Delevoyin B (121)	Limonoid	
E. utile	bark	Utilin C (122)	Limonoid	Daniewske *et al.* , 1994
Heynea trijuga Roxb.	leaf &	Heynic acid (119)	Triterpenoid	Purushothaman and
	fruit	24-Methylenecycloartane-3-β-21-diol (123)	Triterpenoid	Venkatanarasimhan, 1983

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	leaf	Trijugins A (125)	Limonoid	Purushothaman,
		Trijugins B (126)	Limonoid	Venkatanarasimhan and Sarada, 1987
Khaya grandifoliola C.	heart-	Grandfolione (127)	Limonoid	Connolly *et al.* , 1968
DC.	wood	Grandifoliolenone (128)	Limonoid	Connolly and McCrindle 1971
K. ivorensis A. Chevaleir.	heart-	Khivorin (129)	Limonoid	Bevan *et al.* , 1962
	wood			
K. madagascariensis	timber	11-β-Acetoxykhivorin (130)	Triterpenoid	Taylor, 1968
Jumella *et* Perrier				
Lansium domesticum Corr.	fruit	Lansic acid (131)	Triterpenoid	Kiang *et al.* , 1967
L. domesticum Jack v.	seed	Dukunolide A (132)	Limonoid	Nishizawa *et al.* , 1985 a
Dudu		Dukunolide B (133)	Limonoid	Nishizawa *et al.* , 1985 b

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Dukunolide C (134)	Limonoid	Nishizawa *et al.* , 1988
		Dukunolide D (135)	Limonoid	
		Dukunolide E (136)	Limonoid	
		Dukunolide F (137)	Limonoid	
Melia azadirachta	seed	Salannin (45)	Limonoid	Henderson, McCrindle and
	oil			Overton, 1964
Melia azedarach L.	bark	Kulinone (138)	Triterpenoid	Chang and Chiang, 1968
	fruit	Azadirachtin (44)	Limonoid	Morgan and Thornton, 1973
	root	Salanin (45)	Limonoid	Srivastava and Gupta, 1985
		Sendanin (139)	Limonoid	
		6-Acetoxy-7α-hydroxy-3-oxo-14β,	Limonoid	
		15β-Epoxymeliac-1,5-diene (140)		

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		6-Acetoxy-3β-hydroxy-7-oxo-14β,15β-Epoxymeliac-1,5-diene-3-O-β-D-glucoronopyranoside (141)	Limonoid	
	bark	Isochuanliansu (142)	Triterpenoid	Xie and Yuan, 1985
	seed	6-Acetoxy-11α-hydroxy-7-oxo-14β,15β-epoxymeliacin-1,5-diene-3-O-α-L-rhamnopyranoside (143)	Limonoid	Srivastava , 1986
		Meldenin (144)	Limonoid	
		Salannin (45)	Limonoid	
		Meliantriol (145)	Triterpenoid	
	fruit	1-Cinnamoylmelianolone (146)	Limonoid	Lee, Klock and Balandrin, 1987

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	seed	6-Acetoxy-3β-hydroxy-7-oxo-14β-epoxymeliac-1,5-diene-3-O-β-D-xylopyranoside (147)	Limonoid	Rusia and Srivastava, 1988
	root-bark	Azedarachin C (148)	Limonoid	Huang *et al.* , 1995
M. azedarach L. var. *japonica* Makino	bark	Sendanin (139)	Limonoid	Ochi and Kotsuki , 1976
M. dubia Cav.	fruit	Salannin (45)	Limonoid	Silva, Stocklin and Geissman , 1969
	leaf & seed	Compositin (149) Compositolide (150)	Limonoid Limonoid	Purushothaman, Duraiswamy and Connolly, 1984

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
M. toosendan Sieb. *et* Zucc.	bark	Isochuanliansu (142)	Triterpenoid	Xie and Yuan, 1985
	fruit	21-O-Acetyl- toosendantriol (151)	Triterpenoid	Nakanishi *et al.* , 1986 b
	fruit	Lipomelianol (152)	Triterpenoid	Nakanishi, Inada and Lavie, 1986
		Melianone (148)	Triterpenoid	a
M. volkensii Giirke	fruit	Salannin (45)	Limonoid	Rajab and Bentley ,1988a, 1988 b
		Volkensin (154)	Limonoid	
		1-Cinnamoyltrichilinin (155)	Limonoid	
		1-Tigloyltrichilinin (156)	Limonoid	
		1-Acetyltrichilinin (157)	Limonoid	
		Ohchinin-3-acetate (158)	Limonoid	
	root	Meliavolen (159)	Triterpenoid	Lu *et al.* , 1995

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	bark	Melianinone (160)	Triterpenoid	
Sandoricum indicum Cav.	fruit	Bryonolic acid (161)	Triterpenoid	Sim and Lee, 1972
		Bryononic acid (162)	Triterpenoid	
Swietenia macrophylla	seed	Swietenine (20)	Limonoid	Connolly *et al.* , 1965 a
King.		Swietenolide (21)	Limonoid	Connolly *et al.* , 1965 b
S. mahagoni Jacq.	wood-	Cycloeucalenol (163)	Triterpenoid	Amoros-Marin, Torres and
	oil			Asenjo, 1959
	seed	Methyl angolensate (67)	Triterpenoid	Taylor, 1969
	leaf	Cyclomahogenol (164)	Triterpenoid	Chakraborty and Basak, 1971
	seed	Swietenine (20)	Limonoid	Ekimoto *et al.* , 1991
		Swietenolide (21)	Limonoid	
		Swietemahonin A (165)	Limonoid	

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Swietemahonin D (166)	Limonoid	
		Swietemahonin E (167)	Limonoid	
		Swietemahonin G (168)	Limonoid	
		3-O-Acetylswietenolide (169)	Limonoid	
		6-O-Acetylswietenolide (170)	Limonoid	
		3,6-O,O-Diacetyl-swietenolide (171)	Limonoid	
Toona ciliata	seed	Toonacilin (172)	Limonoid	Neto *et al.* , 1995
		12-Deacetoxytoonacilin (173)	Limonoid	
		6α-Acetoxy-14β,15β-epoxyazadirone (117)	Limonoid	
Trichilia havanensis Jacq.	fruit	Havanensin triacetate (174)	Limonoid	Chan, Gibbs and Taylor, 1973

Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Havanensin-3,7-diacetate (175)	Limonoid	
		Havanensin-1,7-diacetate (176)	Limonoid	
		Trichilenone acetate (177)	Limonoid	
T. heudelotii planchex Oliv.	timber	Heudelottin (178)	Limonoid	Okorie and Taylor, 1967
	bark	Heudebolin (179)	Limonoid	Adesida and Okorie, 1973
T. hirta	friut	Hirtin (180)	Limonoid	Cortez *et al.* , 1992
		Deacetylhirtin (181)	Limonoid	
		Methyl-11-β-acetoxy-6-hydroxy-12α -(2-methylpropionyloxy)-3,7-dioxo-1,5,14,20,22meliacapentaen-29-oate (182)	Limonoid	

Table 2 (Continued)

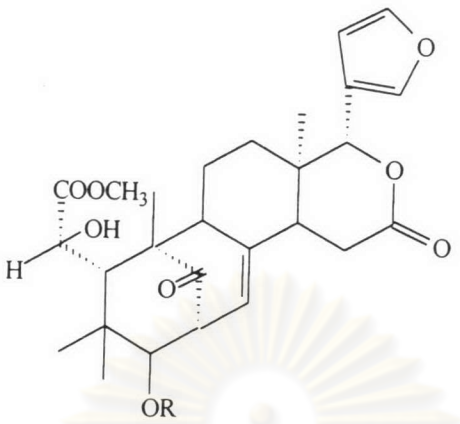
Plant Name	Part	Chemical Constituents	Category	References
		Methyl-11-β-acetoxy-6- hydroxy1 2	Limonoid	
		α(2-methylpropionyloxy)-3,7di- oxo	Limonoid	
		-1,5,14,20,22meliacapentaen		
		29-oate 23-γ–hydroxybutenol(183)	Limonoid	
		Melianone (153)	Limonoid	
		Melianodiol (184)	Limonoid	
		Bourjotinolone A (185)	Limonoid	
T. hispida Penning.	leaf	Hispidone (186)	Limonoid	Jolad, Hoffmann and Cole, 1980
		Bourjotinolone A (185)	Limonoid	
T. prieuriana A.Juss	leaf	Prieurone (187)	Limonoid	Olugbade , 1991
		29-Hydroxy-prieurone (188)	Limonoid	

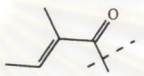
Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
T. roka P.Br.	root-bark	Trichilin A (189)	Limonoid	Nakatani, James and Nakanishi, 1981
		Trichilin B (190)	Limonoid	
		Trichilin C (191)	Limonoid	
		Trichilin D (192)	Limonoid	
		Trichilin E (193)	Limonoid	
		Trichilin F (194)	Limonoid	
		Aphanastatin (195)	Limonoid	
	fruit	Sendanin (139)	Limonoid	Kubo and Klocke, 1982
	root-bark	7-Acetyltrichilin A (196)	Limonoid	Nakatani *et al.* , 1985 a
	root-bark	Trichilin A (189)	Limonoid	Nakatani and Nakanishi , 1993
		Trichilin F (194)	Limonoid	

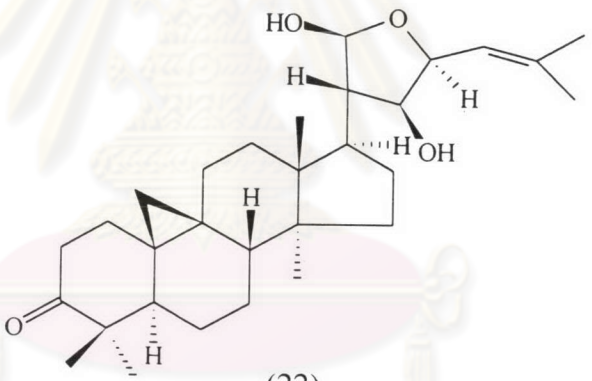
Table 2 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Trichilin G (197)	Limonoid	
Turraea nilotica Kotschy	wood	Niloticin (198)	Limonoid	Mulholland and Taylor, 1988
and Peyr.	&bark	Dihydroniloticin (199)	Limonoid	
		Triolniloticin (200)	Limonoid	
Xylocarpus granatum Koen	timber	Gedunin (71)	Limonoid	Taylor , 1965



(20) R = 

(21) R = H



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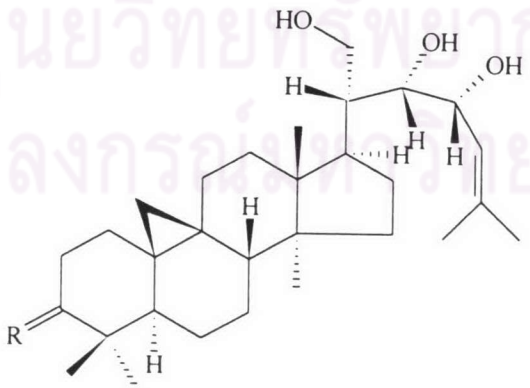
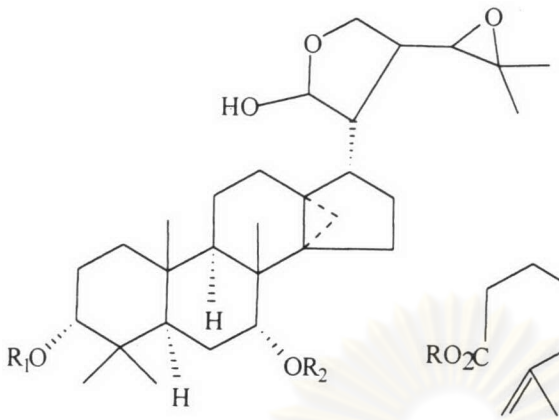


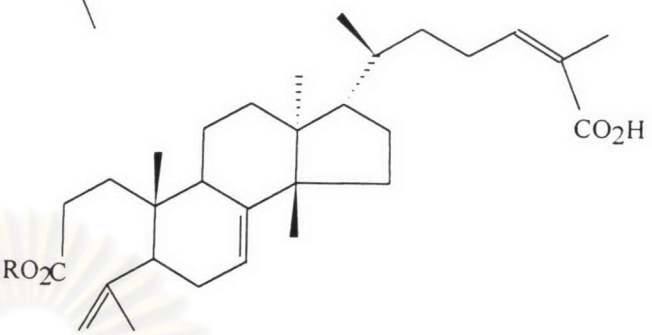
(23) R = O

(24) R = H, OH



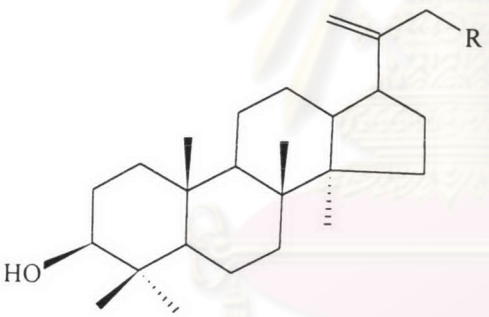
(25) R_1 = Ac ; R_2 = H

(26) R_1 = Tig ; R_2 = H



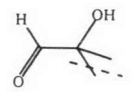
(27) R = H

(28) R = CH_3

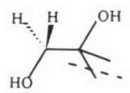


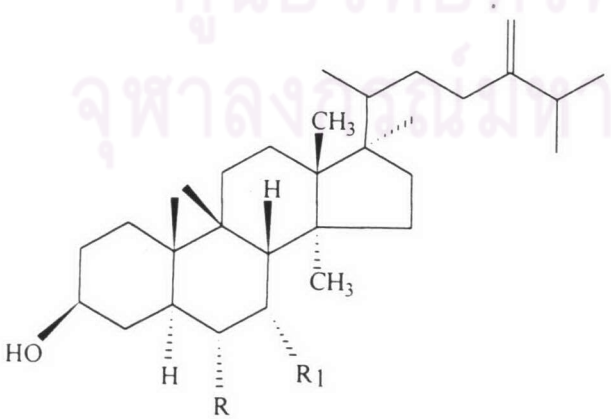
(29) R =

(30) R =



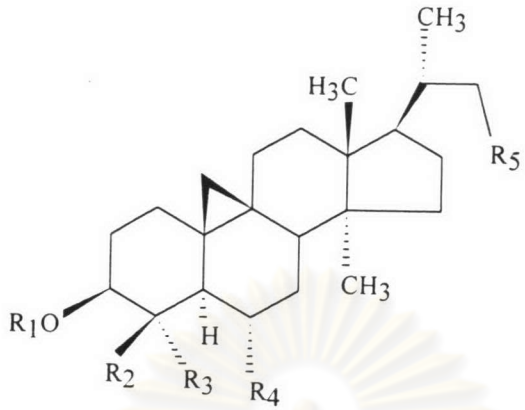
(31) R =

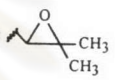


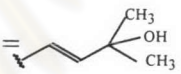


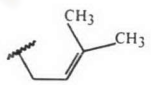
(32) R = H ; R_1 = OH

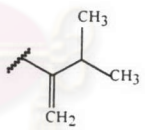
(33) R = OH ; R_1 = H

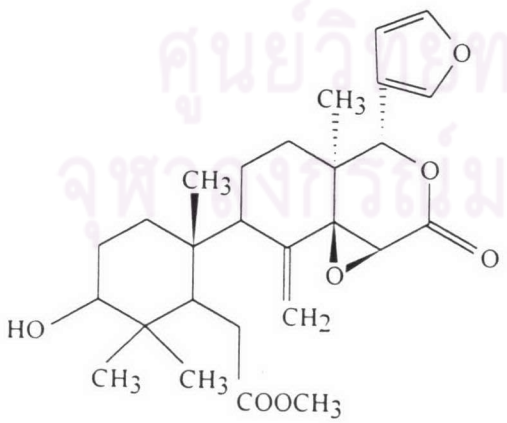


(34) R_1, R_2, R_4 = H ; $R_3 = CH_3$; R_5 = 

(35) R_1, R_2, R_4 = H ; $R_3 = CH_3$; R_5 = 

(36) R_1, R_2, R_4 = H ; $R_3 = CH_3$; R_5 = 

(37) R_1, R_2, R_3 = H ; R_4 = OH ; R_5 = 



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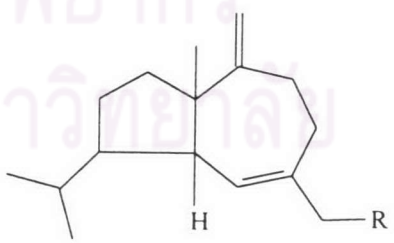
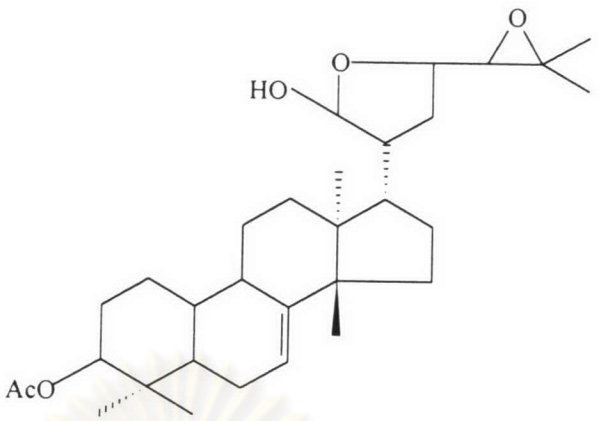


(39) R = OH

(40) R = CHO



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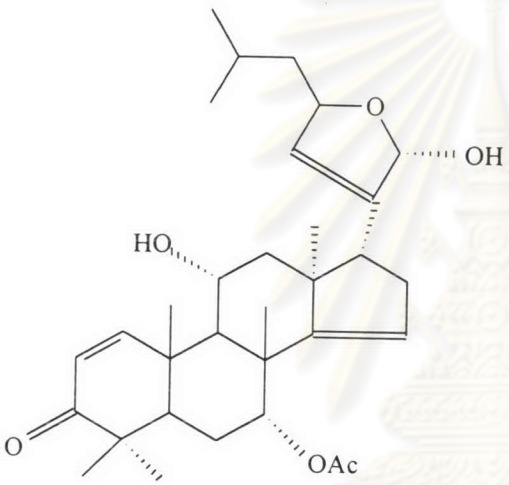

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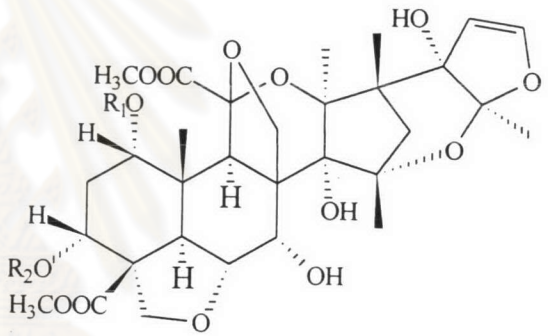
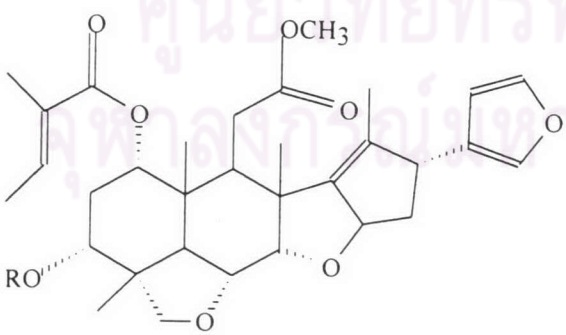


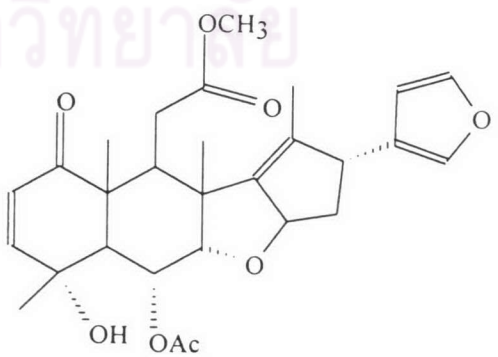
(43) R_1 = Tiglate ; R_2 = H

(44) R_1 = Tiglate ; R_2 = Ac



(45) R = Ac

(46) R = H



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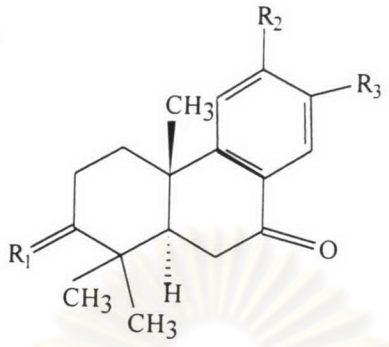
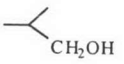


(48) R_1 = O ; R_2 = OH ; R_3 = OCH_3

(49) R_1 = H, OH ; R_2 = OH ; R_3 = OCH_3

(50) R_1 = O ; R_2 = H ; R_3 = 

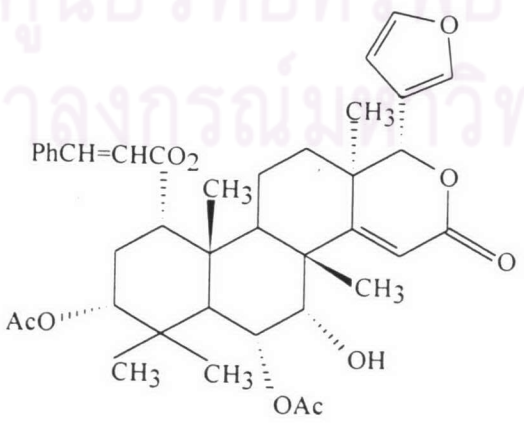
(51) R_1 = O ; R_2 = OH ; R_3 = 

(52) R_1 = H, OH ; R_2 = OH ; R_3 = 

(53) R_1 = H ; R_2 = OH ; R_3 = $COCH_3$

(54) R_1 = H, OH ; R_2 = OH ; R_3 = CH_3

(55) R_1= H, OH; R_2,R_3 = OH



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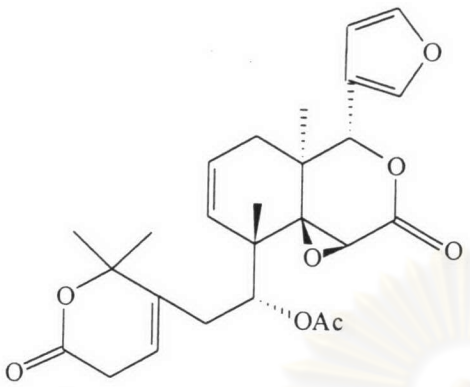

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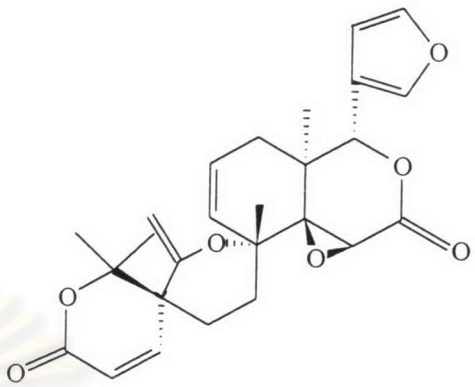

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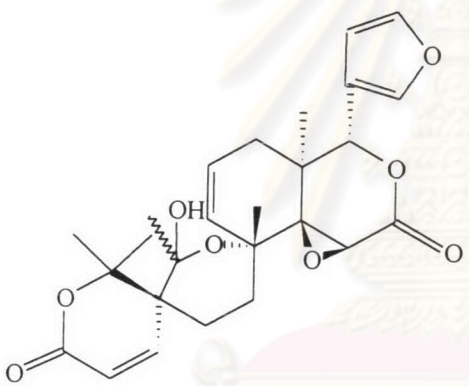

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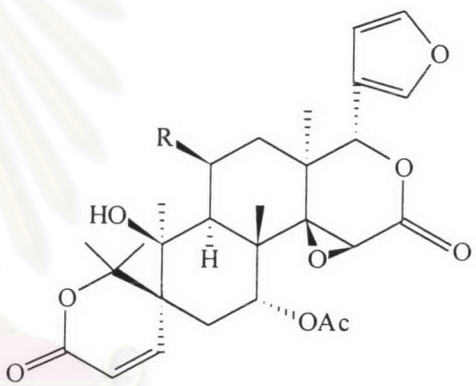
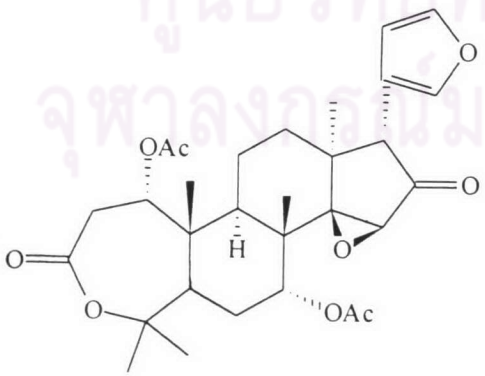


(60) R = OH

(61) R = H



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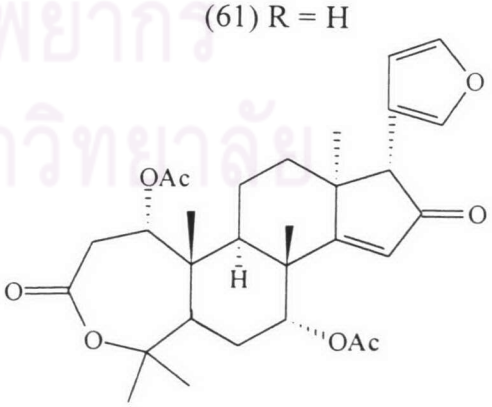

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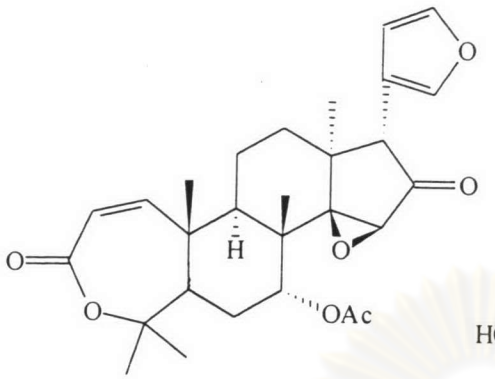

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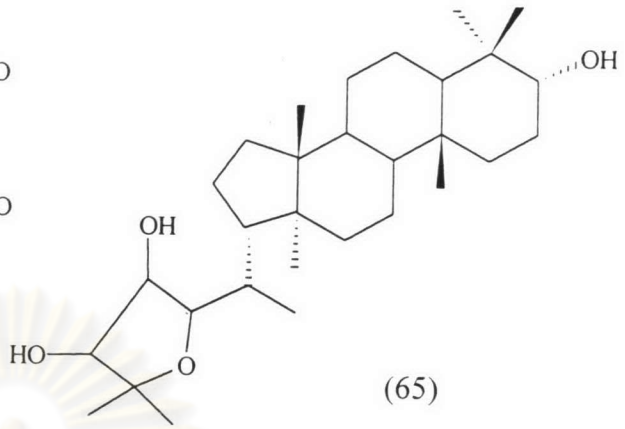

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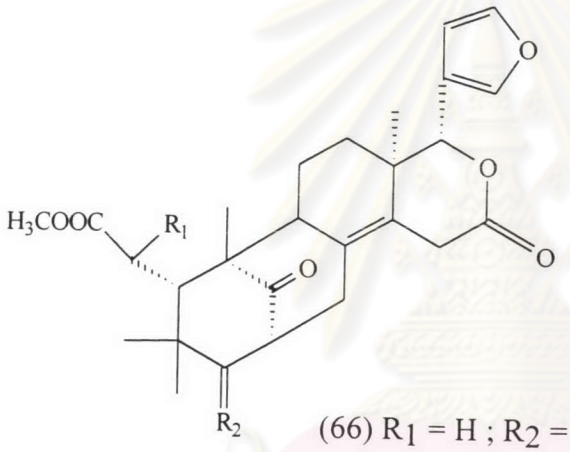
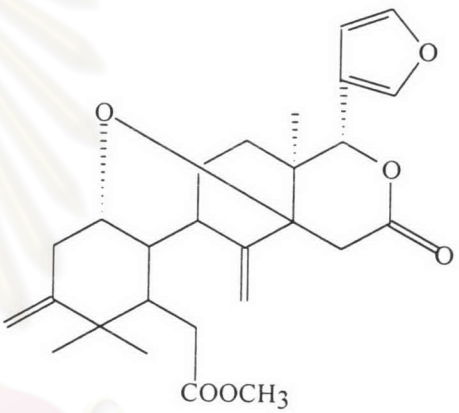


(66) R_1 = H ; R_2 = O

(69) R_1 = H ; R_2 = OH

(70) R_1 = OH ; R_2 = O



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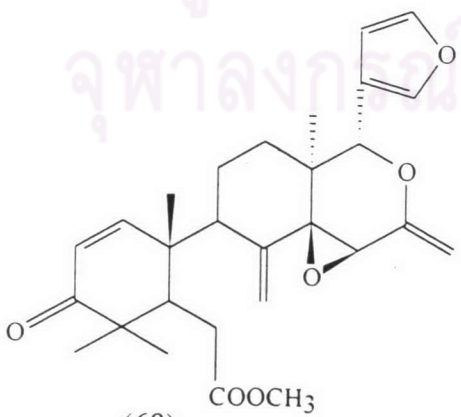

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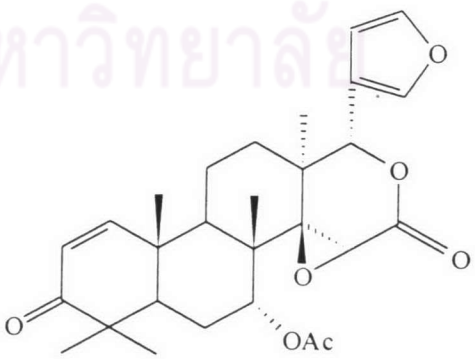

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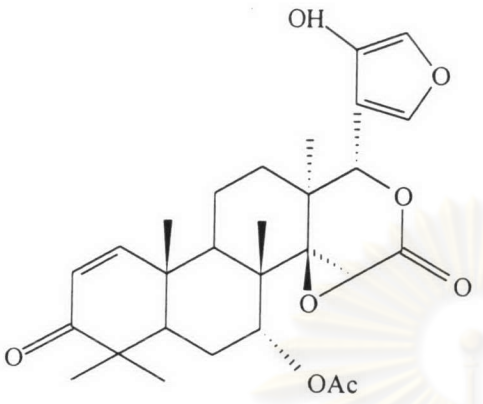

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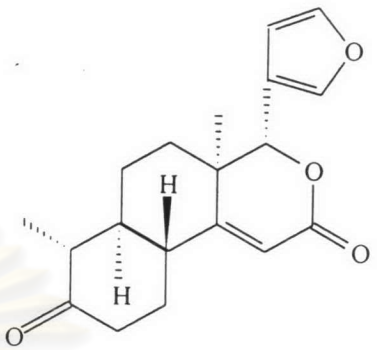

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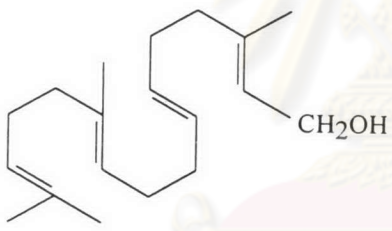

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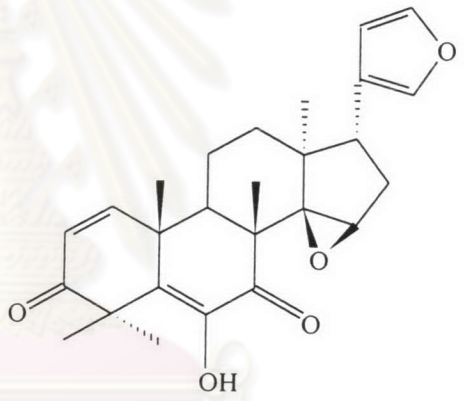

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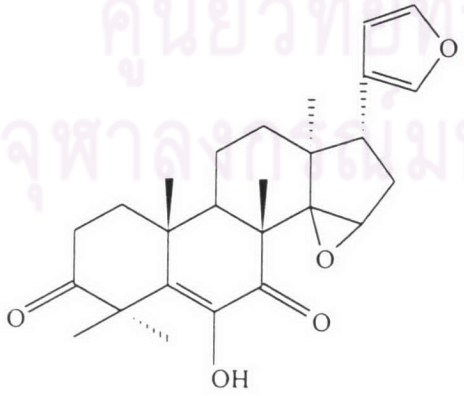

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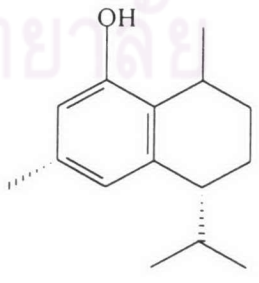

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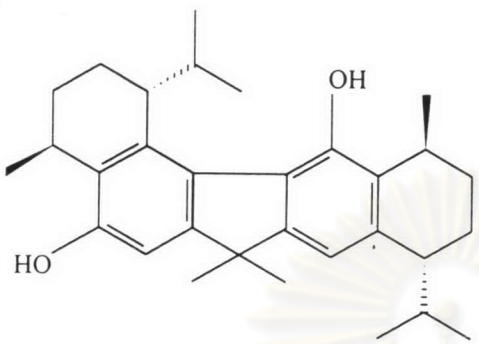

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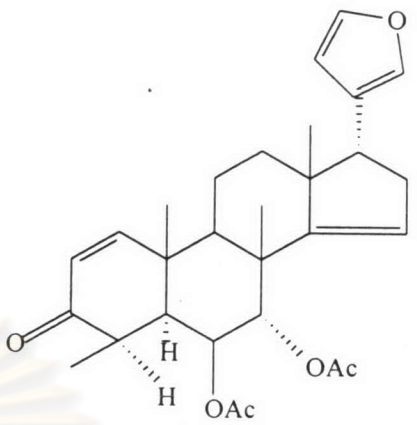

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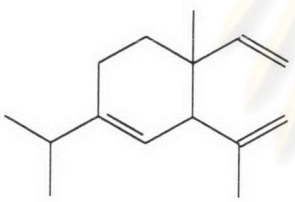
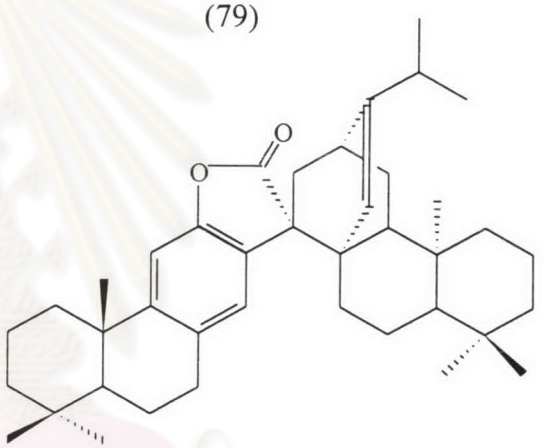
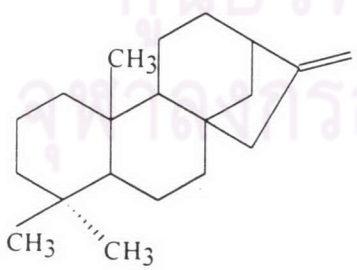


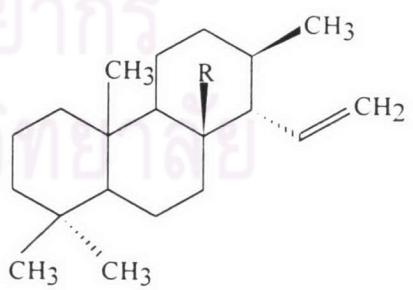
(80)



(81)

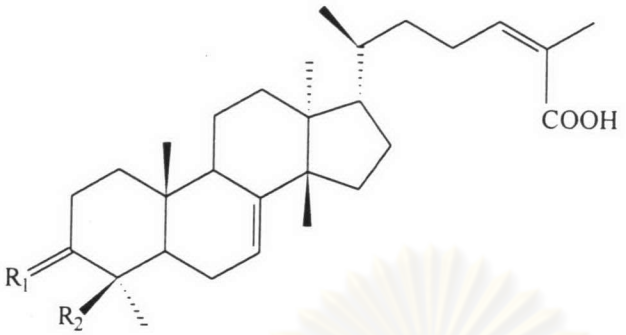


(82)



(83) R = OH

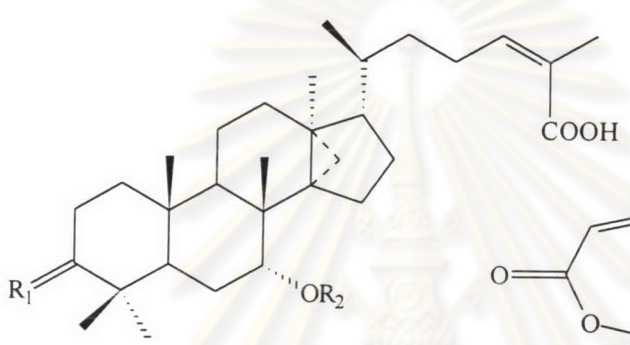
(84) R = OCH3



(85) R_1 = H, H ; R_2 = O

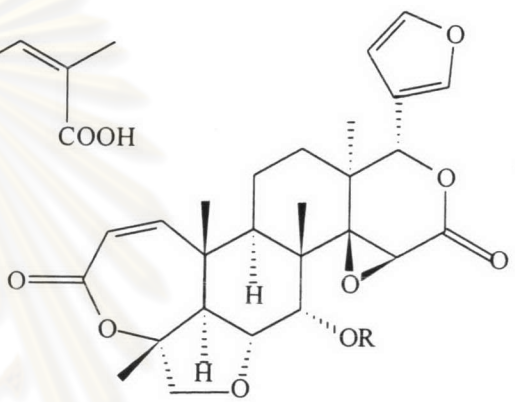
(86) R_1 = O ; R_2 = H

(87) R_1 = H, H ; R_2 = H

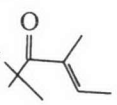


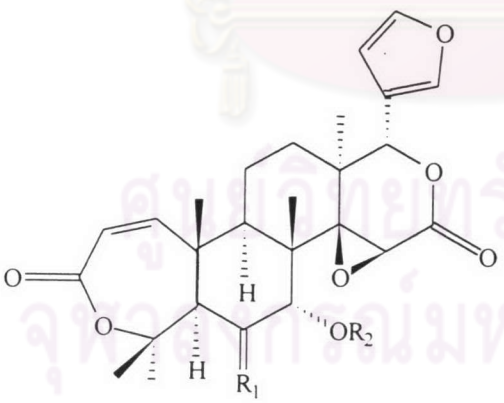
(88) R_1 = H, OAc ; R_2 = H

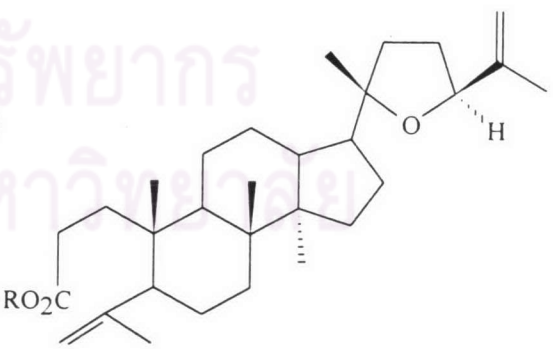
(89) R_1 = O ; R_2 = Ac



(90) R = H

(91) R = 



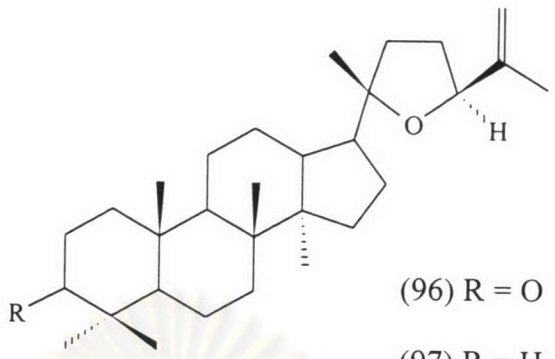


(92) R_1 = H, OAc ; R_2 = Ac

(93) R_1 = H, H ; R_2 = H

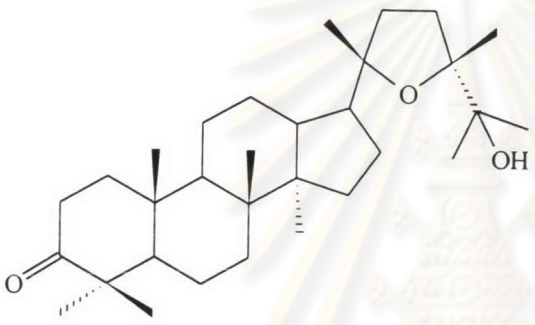
(94) R = CH_3

(95) R = H

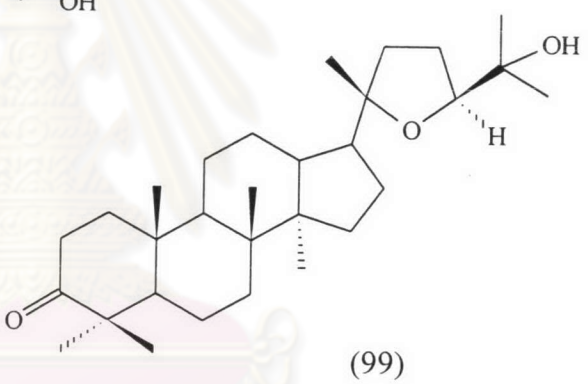


(96) R = O

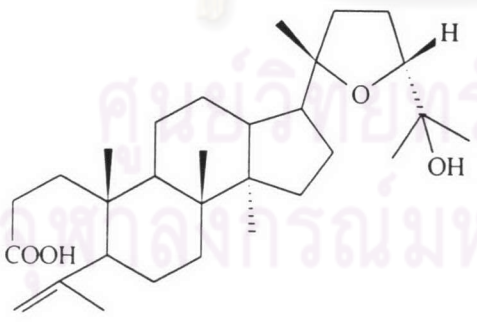
(97) R = H, OH



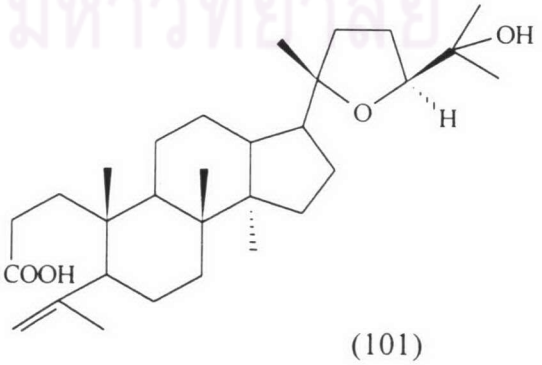
(98)



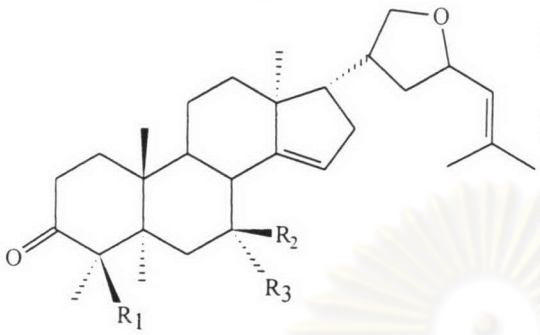
(99)



(100)



(101)



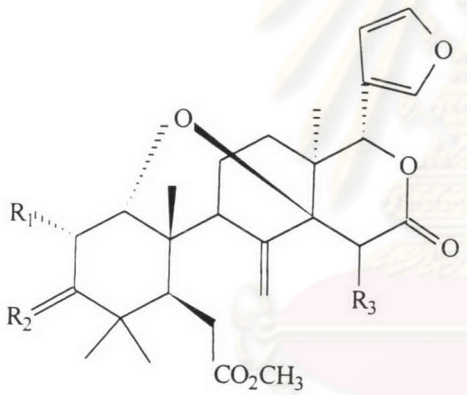
(102) $R_1 = CH_2OH$; $R_2,R_3 = O$

(103) $R_1 = CH_2OH$; $R_2 = H$; $R_3 = OH$

(104) $R_1 = CH_3$; $R_2,R_3 = O, \Delta^1$

(105) $R_1 = CH_3$; $R_2 = H$; $R_3 = OH, \Delta^1$

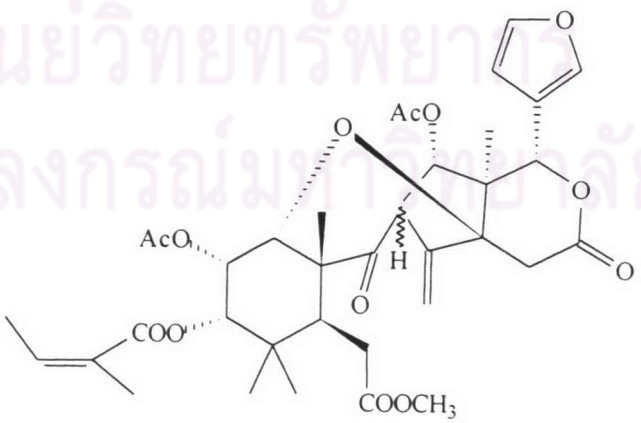
(106) $R_1 = CH_2OH$, $R_2,R_3 = O, \Delta^1$



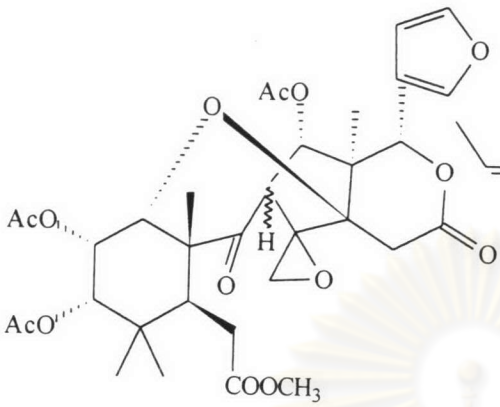
(107) $R_1 = H$, $R_2 = H, OAc$, $R_3 = OH$

(108) $R_1 = OAc$, $R_2 = H, H$, $R_3 = OAc$

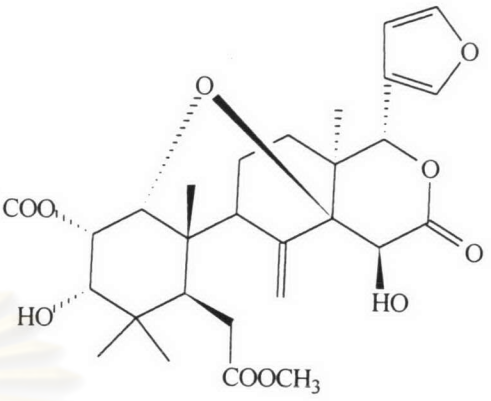
(109) $R_1 = OAc$, $R_2 = H, OAc$, $R_3 = OH$



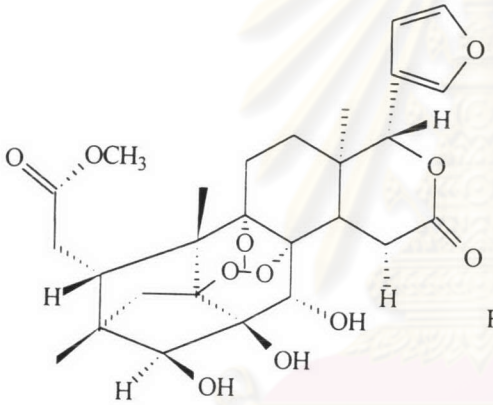
(110)



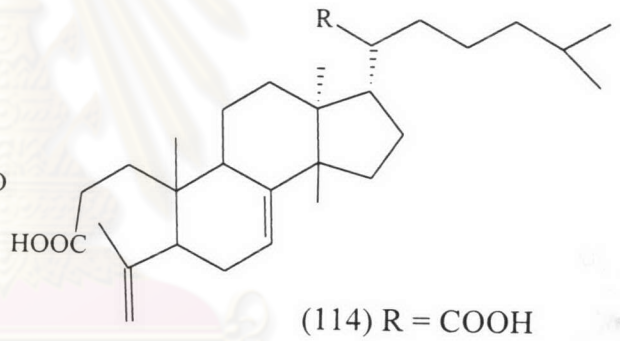
(111)



(112)

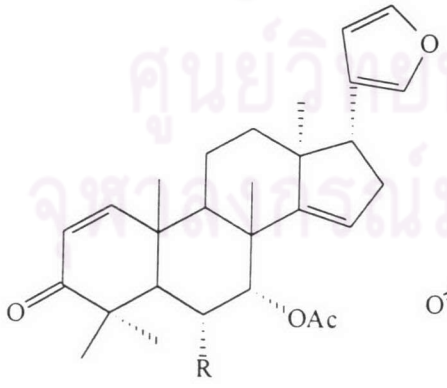


(113)



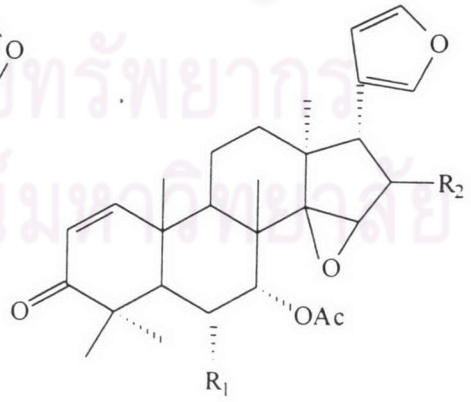
(114) R = COOH

(120) R = CH_3



(115) R = H

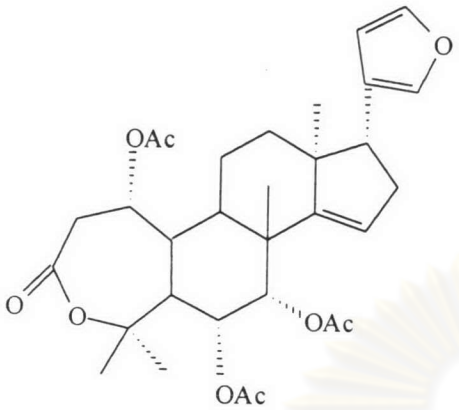
(116) R = OAc



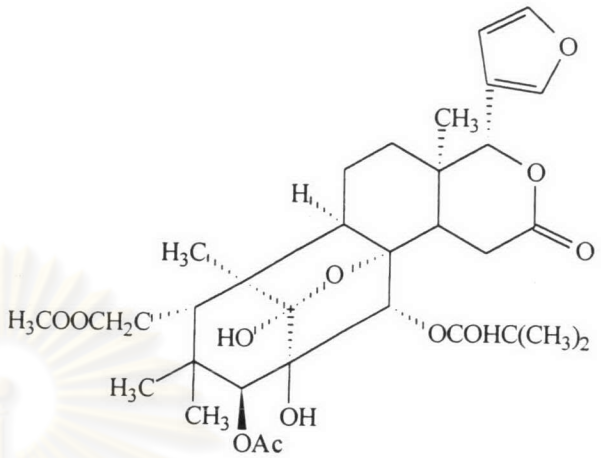
(117) R_1 , R_2 = H, H

(118) R_1 = OAc ; R_2 = H, H

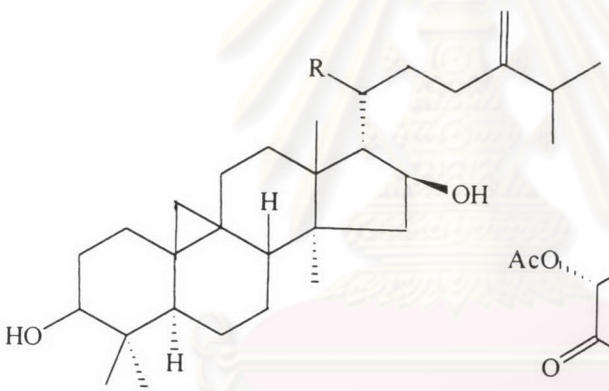
(119) R_1 = OAc ; R_2 = O



(121)

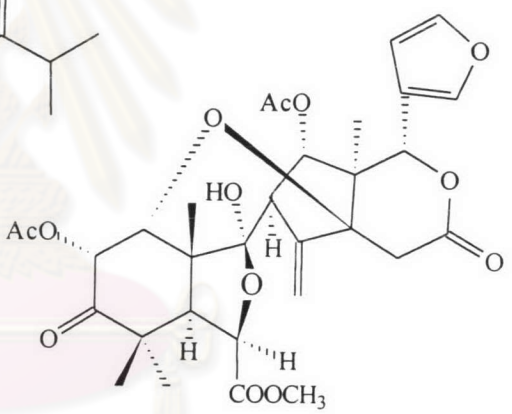


(122)

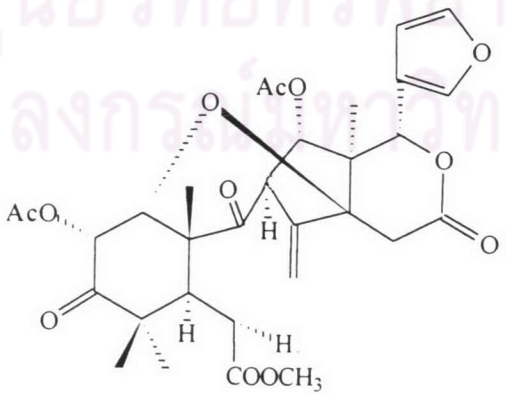


(123) R = COOH

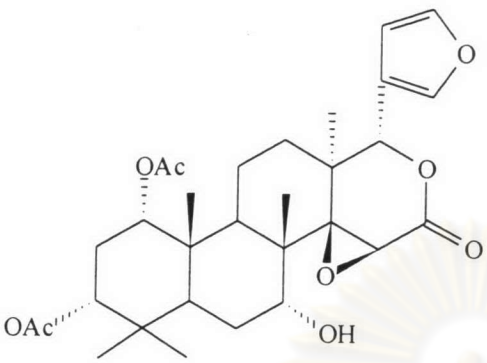
(124) R= CH_2OH



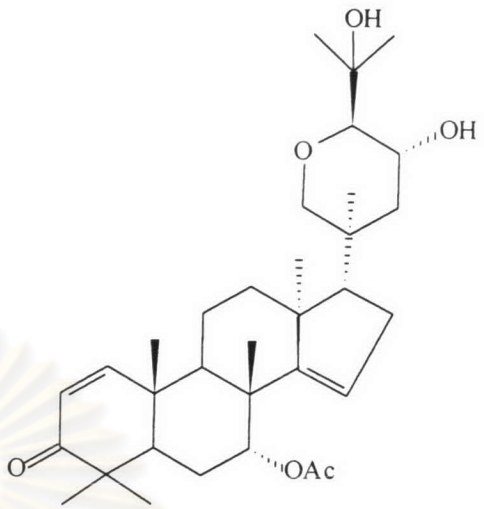
(125)



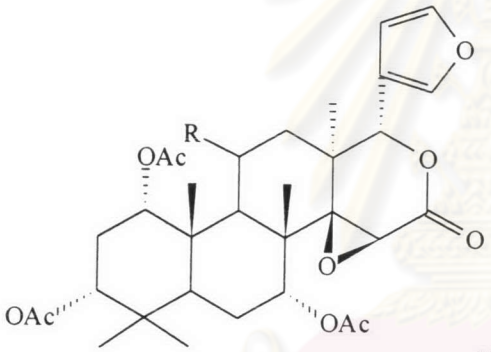
(126)



(127)

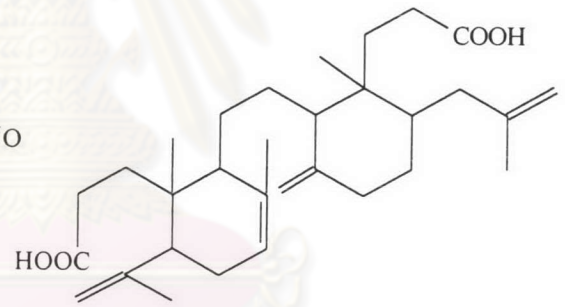


(128)

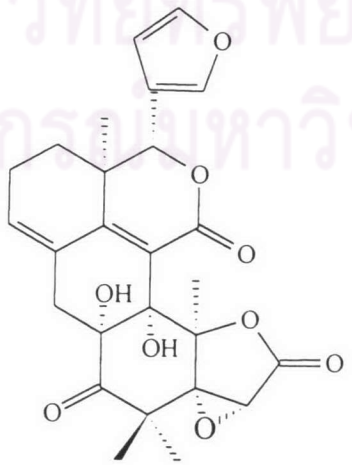


(129) R = H

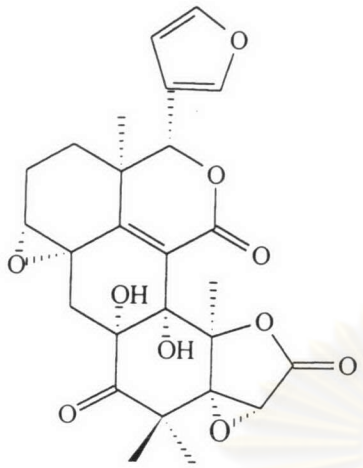
(130) R = β–OAc



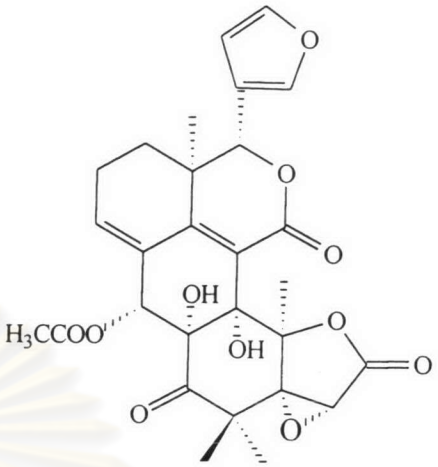
(131)



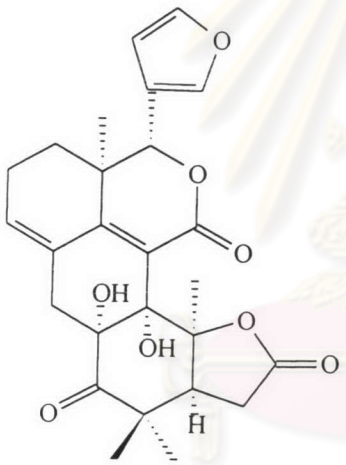
(132)



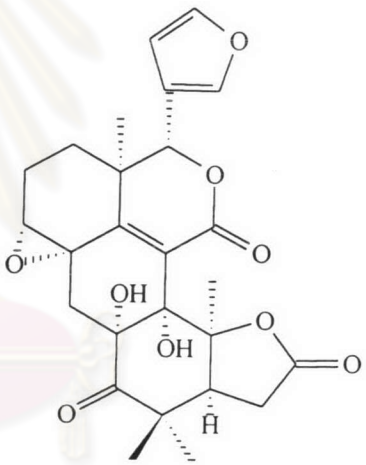
(133)



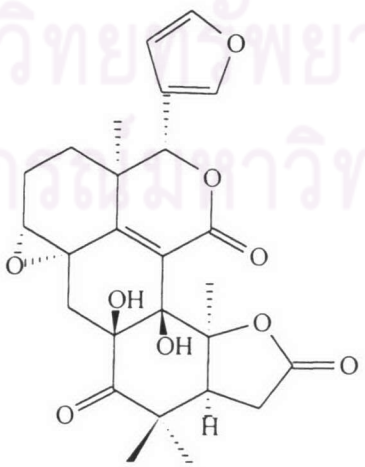
(134)



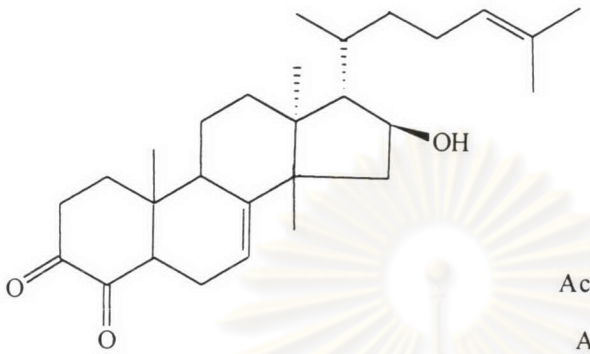
(135)



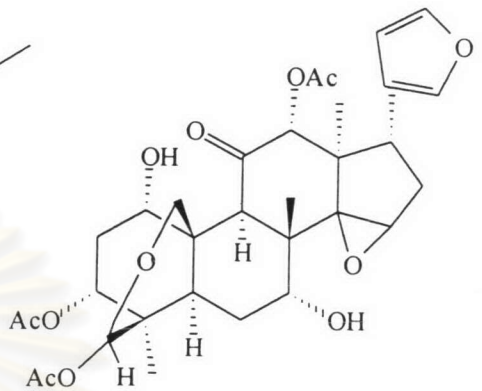
(136)



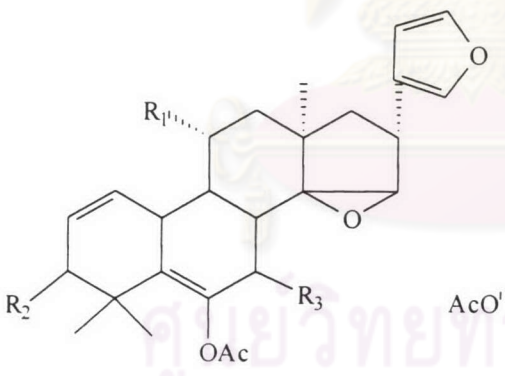
(137)

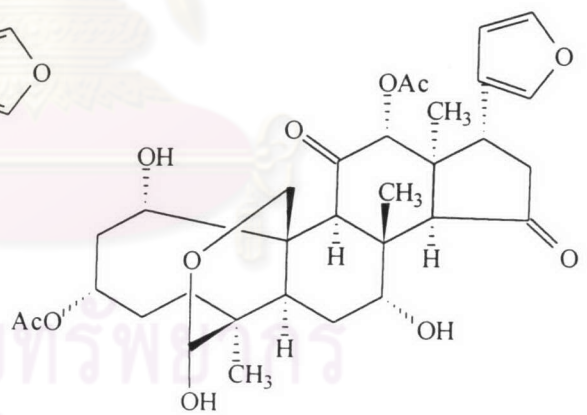


(138)



(139)





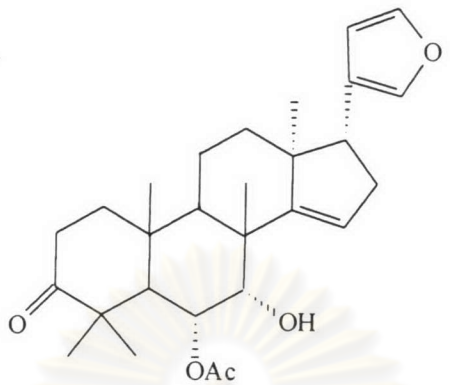
(142)

(140) R_1 = H ; R_2 = O ; R_3 = H, OH

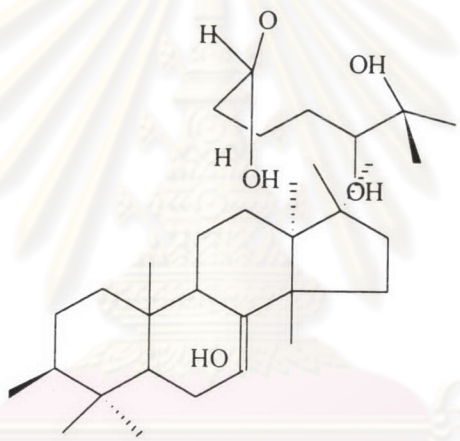
(141) R_1 = H ; R_2 = H, O-glucoronic acid ; R_3 = O

(143) R_1 = OH ; R_2 = H, O-rhamnose ; R_3 = O

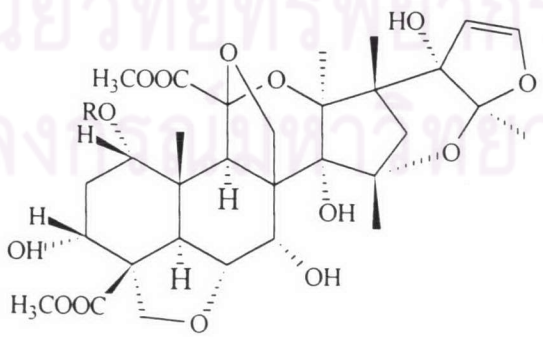
(147) R_1 = H ; R_2 = H, O-xylose ; R_3 = O



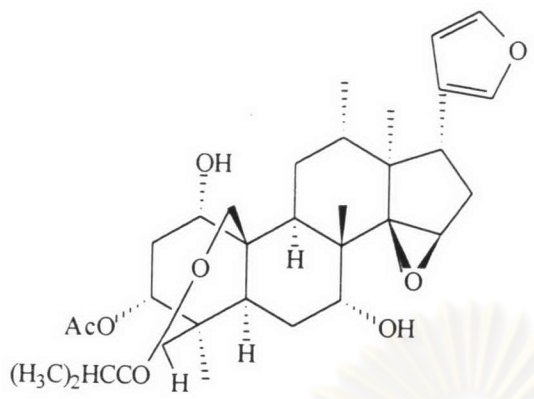
(144)



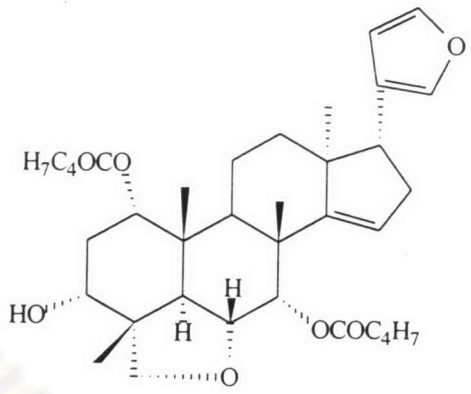
(145)



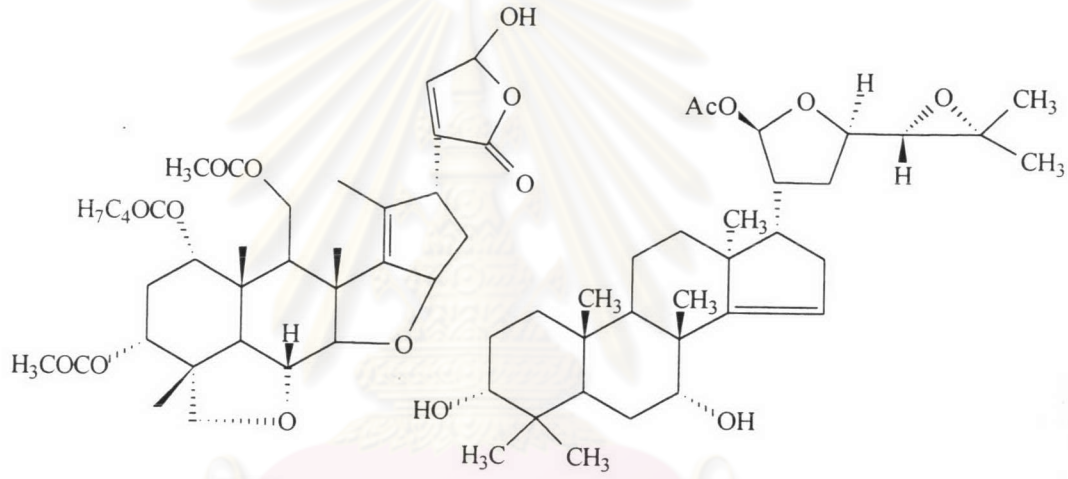
(146) R = Cinnamate



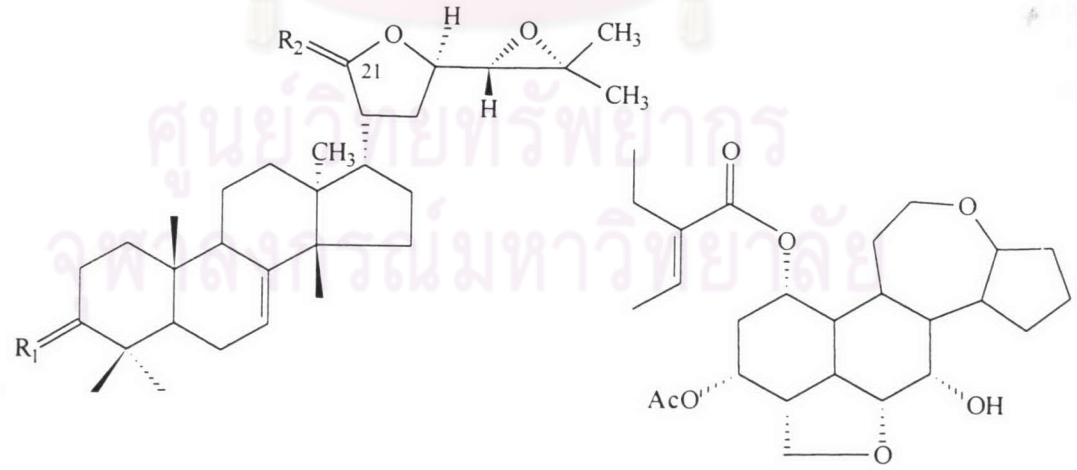
(148)



(149)



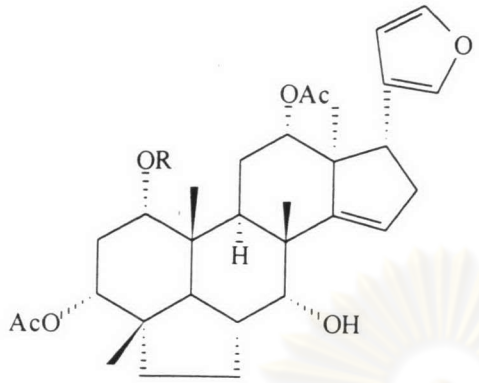
(150) (151)

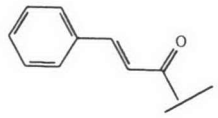


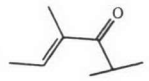
(152) R_1 = α-H,β–OCO$(CH_2)nCH_3$, n = 10, 12, 14, 16 (154)

R_2 = H, OH ; C21 epimeric mixture

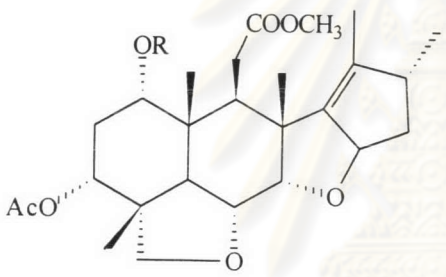
(153) R_1 = O ; R_2 = H, OH ; C21 epimeric mixture

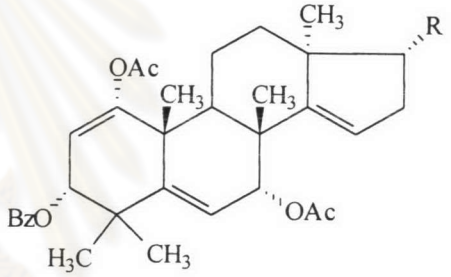


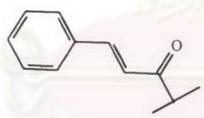
(155) R = 

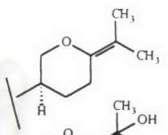
(156) R = 

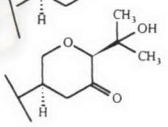
(157) R = Ac

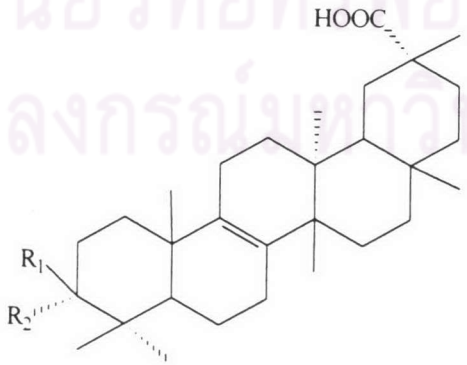




(158) R = 

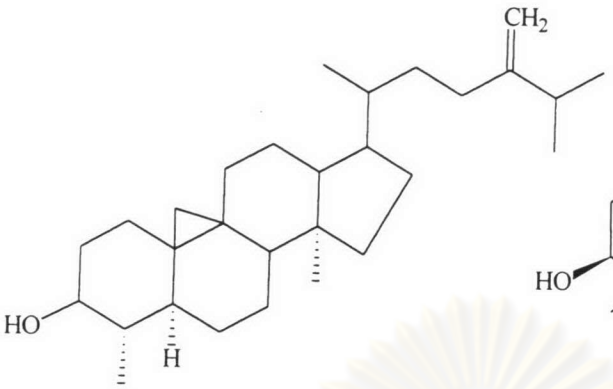
(159) R = 

(160) R= 



(161) R_1 = OH ; R_2 = H

(162) R_1,R_2 = O



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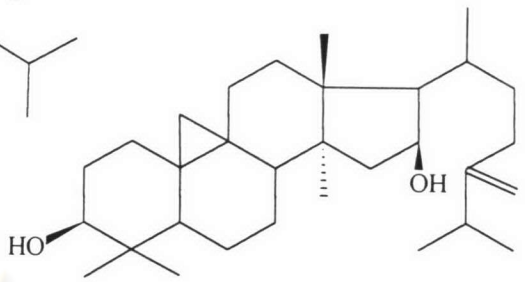

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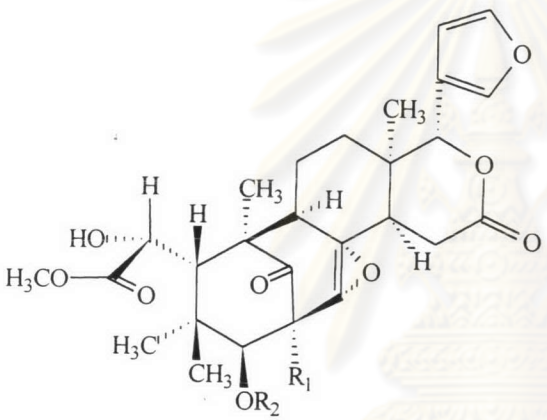
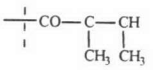
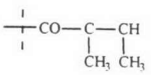
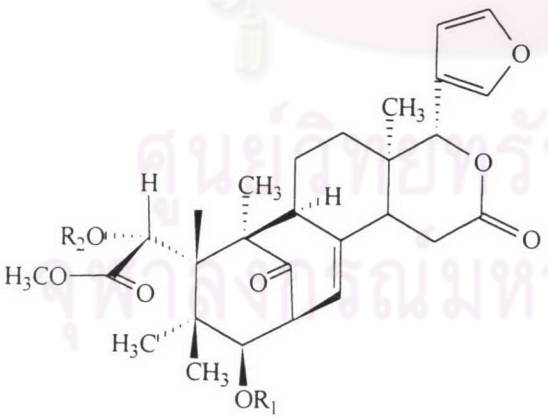


(165) R_1 = H ; R_2 = COC_2H_5

(166) R_1 = H ; R_2 = $COCH_3$

(167) R_1 = H ; R_2 = 

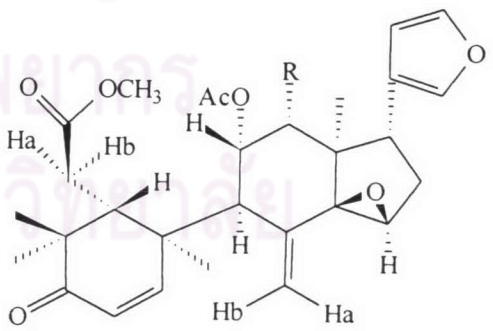
(168) R_1 = OH ; R_2 = 



(169) R_1= $COCH_3$; R_2 = H

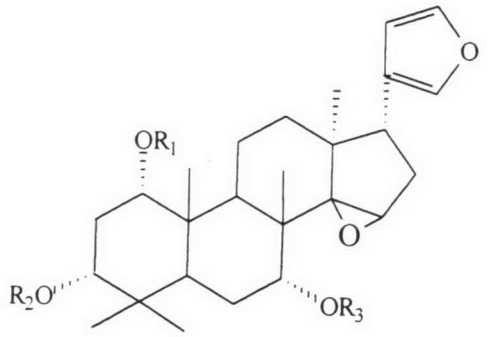
(170) R_1 = H ; R_2 = $COCH_3$

(171) R_1,R_2 = $COCH_3$



(172) R = OAc

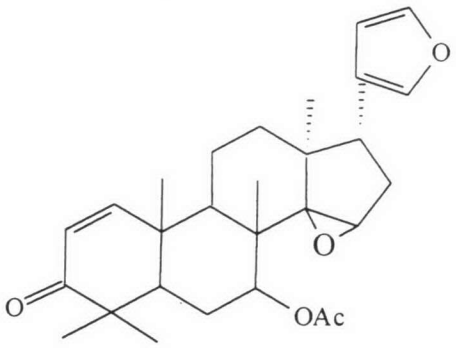
(173) R = H



(174) R_1,R_2,R_3 = Ac

(175) R_1 = H ; R_2,R_3 = Ac

(176) R_2 = H ; R_1,R_3 = Ac



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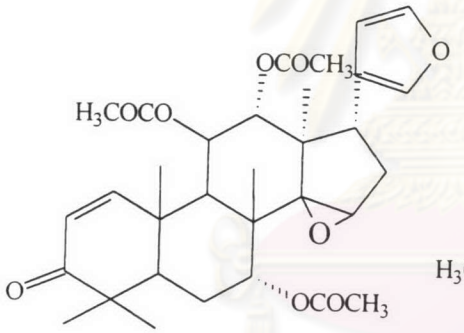

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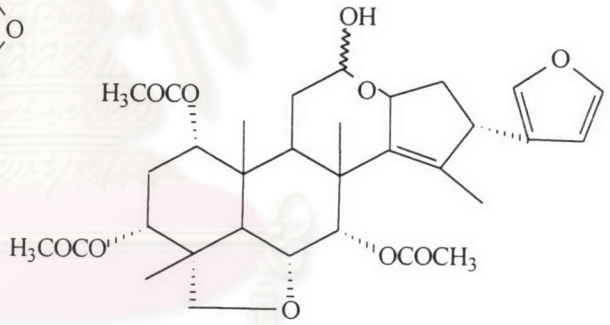

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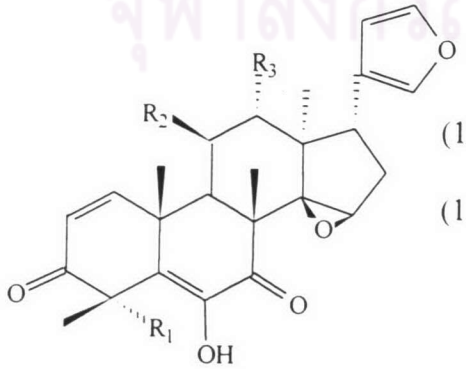
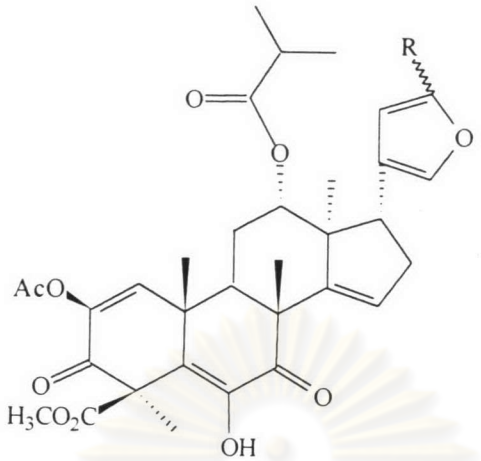


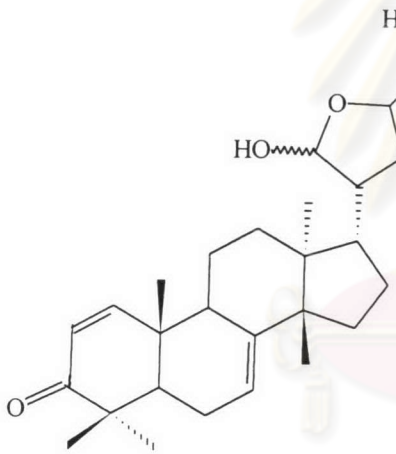
(180) R_1 = CO_2CH_3 ; R_2 = OAc ; R_3 = OCOEt

(181) R_1 = CO_2CH_3 ; R_2 = OH ; R_3 = OCOEt



(182) R = H

(183) R = OH



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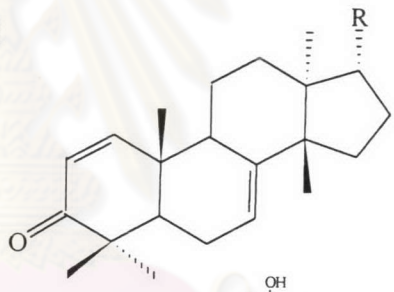
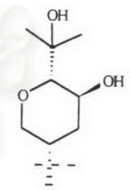
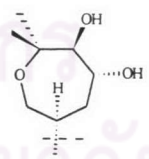
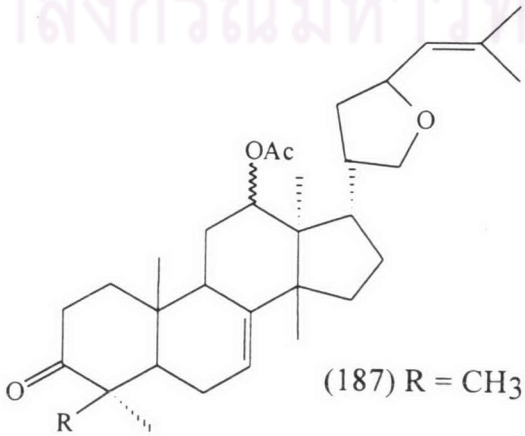


(185) R =



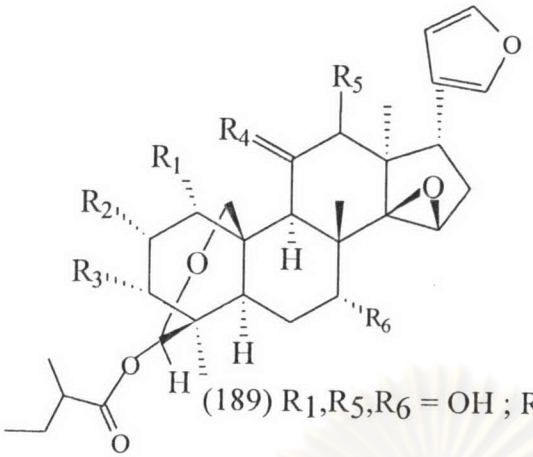
(186) R=





(187) R = CH_3

(188) R = CH_2OH



(189) R_1,R_5,R_6 = OH ; R_2,R_3 = OAc ; R_4 = O

(190) R_1,R_6 = OH ; R_2,R_3 = OAc ; R_4 = O ; R_5 = H, α-OH

(191) R_1,R_6 = OH ; R_2,R_3 = OAc ; R_4 = H, OH ; R_5 = O

(192) R_1,R_6 = OH ; R_2,R_3 = OAc ; R_4 = O ; R_5 = H, H

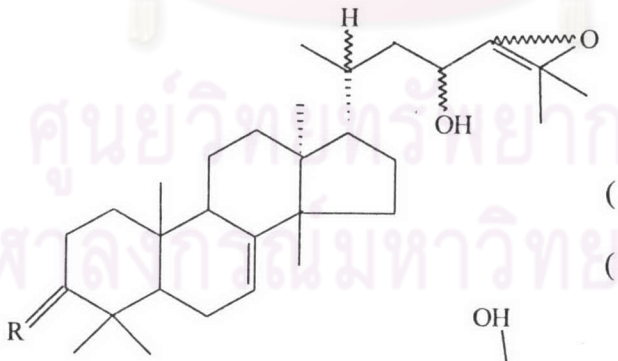
(193) R_1,R_6 = OH ; R_2 = OAc ; R_3,R_4 = O ; R_5 = H, OH

(194) R_1,R_2 = OAc ; R_3,R_6 = OH ; R_4 = O ; R_5 = H, OH

(195) R_1,R_3 = OAc ; R_2,R_6 = OH ; R_4 = O ; R_5 = H, OH

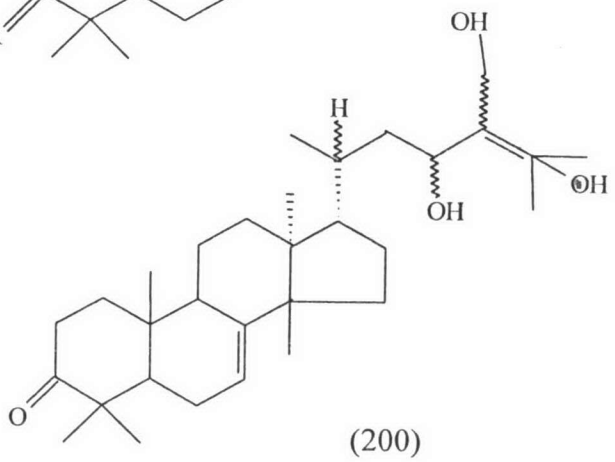
(196) R_1 = OH ; R_2,R_3,R_6 = OAc ; R_4 = O ; R_5 = H, OH

(197) R_1,R_2,R_6 = OH ; R_3 = OAc ; R_4 = O ; R_5 = H, OH



(198) R = O

(199) R = H, OH



(200)

2.3 Miscellaneous Chemical Constituents of the Meliaceous Plants

Up to now, several Meliaceous plants have been studied for their chemical constituents other than alkaloids and terpenoids. The results were summarized in Table 3.

Table 3 Miscellaneous Chemical Constituents of the Meliaceous Plants.

Plant Name	Part	Chemical Constituents	Category	References
Aglaia elliptifolia Merr.	root &	Rocaglamide (201)	Benzofuran	King *et al.* , 1982
	stem	Dehydrorocaglamide (202)	Benzofuran	
	stem-bark	Rocaglamide (201)	Benzofuran	King *et al.* , 1985
	stem-bark	Aglafoline (203)	Benzofuran	Ko *et al.* , 1992
A. ferruginea	bark	Ferrugin (204)	Isoflavane	Dean *et al.* , 1993
A. odorata Lour.	twig	Rocaglamide (201)	Benzofuran	Janprasert *et al.* , 1993
	leaf	Rocaglamide (201)	Benzofuran	Ishibashi *et al.* , 1993
		Desmethylrocaglamide (205)	Benzofuran	
		Methylrocaglate (203)	Benzofuran	
		Rocaglaol (206)	Benzofuran	

Table 3 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
		Methylrocaglate (203)	Benzofuran	
		Rocaglaol (206)	Benzofuran	
A. oligophylla Miq.	twig	Rocaglamide (201)	Benzofuran	Hwunseng, Wiriyachitra and
		Desmethylrocaglamide (205)	Benzofuran	Sukumalnand, 1995
A. pirifera Hance	stem-bark	Grandisin (207)	Lignan	Ngowgarmratana and Saifah, 1987
A. pyramidata Hance	leaf	*N*-Methyl-*trans*-4-hydroxy-L-proline (208)	Amino acid	Saifah and Puripattanavong, 1992
A. roxburghiana Hance	leaf & fruit	Roxburghiadiol A (32)	Steroid	Balakrishna and Kundu, 1990
		Roxburghiadiol B (33)	Steroid	
Amoora rohituka Wall.	stem bark	Poriferasterol 3-O-α-L-rhamnopyranoside (209)	Saponin glycoside	Agnihotri, 1987

Table 3 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
Azadirachta indica A. Juss	leaf	8-Prenyl-5,7-dihydroxy-3′(3-hydroxy-3,3-dimetyl-butyl)-4′-methoxy flavanone (210) 8,3′-Diisoprenyl-5,7-dihydroxy-4′-methoxy flavanone (211)	Flavanone	Balasubramanian *et al.* , 1993
Dysoxylum lenticellare Gilles	stem	p-Hydroxyacetophenone (212)	Phenol	Aladesanmi, 1988
D. richii (Gray) C.D.C.	leaf	Dysoxysulfone (213)	Sulfur	Jogia *et al.* , 1989
Ekebergia senegalensis A. Juss		8-Methoxy-4-methyl-coumarin (214)	Coumarin	Bevan and Ekong, 1965
Entandrophragma cylindricum	wood	Ergosta-5,24(28)-diene-7α-methoxy-3β-ol (215)	Steroid	Ngnoam *et al.* , 1994

Table 3 (Continued)

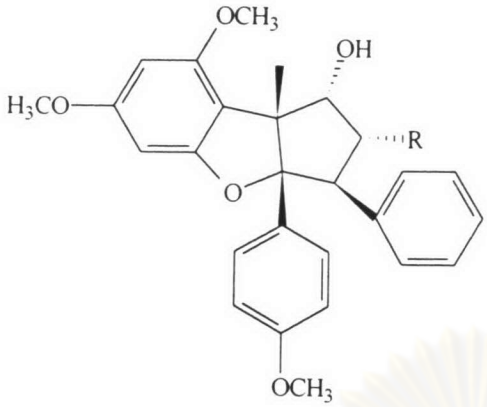
Plant Name	Part	Chemical Constituents	Category	References
E. utile	stem-bark	3β,7α,20β-Trihydroxyergosta-5,24 (24')diene (216)	Steroid	Tchouankeu *et al.* , 1992
Melia azedarach L.	stem-bark	4,5-Dihydroxyflavone-7-O-α-L-rhamnopyranosyl-(1-4)-β-D-glucopyranoside (217)	Flavone glycoside	Mishra and Srivastava , 1984
	stem-bark	1,8-Dihydroxy-2-methyl-anthraquinone-3-O-β-D-galactopyranoside (218)	Anthraquinone glycoside	Srivastava and Mishra, 1985
		1,5-Dihydroxy-8-methoxy-2-methyl-anthraquinone-3-O-α-L-rhamnopyranoside (219)	Anthraquinone glycoside	

Table 3 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
	root	Apigenin-5-O-β-D-galactopyranoside (220)	Flavonol glycoside	Gutpa and Srivastava (1985)
	leaf	Rutin (221)	Flavonol glycoside	Marco, Sanz and Sanchez-Paraseda, 1986
		Kaempferol-3-O-β-rutinoside (222)		
M. azedarach var. *japonica* Makino	root - bark	Azedarachol (223)	Steroid	Nakatani *et al.* , 1985 b
M. toosendan Sieb. *et* Zucc	leaf	Toosendanoside (224)	Steroid glycoside	Nakanishi *et al.* , 1988
Ptaeroxylon obliquum Radlk.	heart-wood	Nieshoutol (225)	Coumarin	Murry and Ballantyne, 1969
P. obliquum (Thumb.) Radlk.	leaf & twig	Methylalloptaeroxylin (226)	Chromone	McCabe, McCrindle and Murry, 1967

Table 3 (Continued)

Plant Name	Part	Chemical Constituents	Category	References
Sandoricum indicum Cav.	Fruit-hull	Mesoinositol (227)	Sugar derivative	Sim and Lee, 1972
		Mucic acid (228)	Acid	
Swietenia mahogani Jacq.	wood	α-Hexyl-3-(6-hydroxy-2,4-octadienyl) oxiranemerthanol (229)	Polyacetylene	Wakabayashi, Spencer and Waterx, 1991
Turrea nilotica Kotschy and Peyr.	leaf	Lariciresinol-4′-monomethyl ether (230)	Lignan	Ayoub and Kingston, 1984
		Lariciresinol diacetate ether (231)	Lignan	
		Lariciresinol dimethyl ether (232)	Lignan	

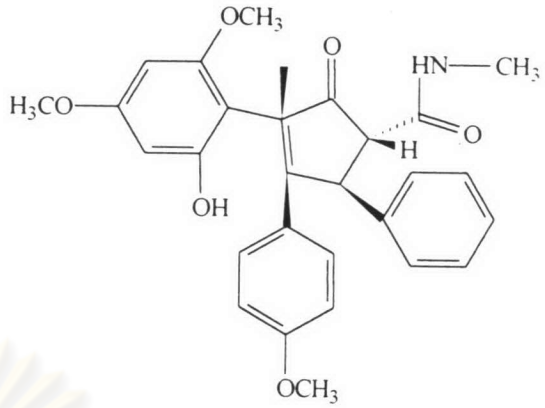


(201) R = $CON(CH_3)_2$

(203) R = $COOCH_3$

(205) R = $CONHCH_3$

(206) R = H



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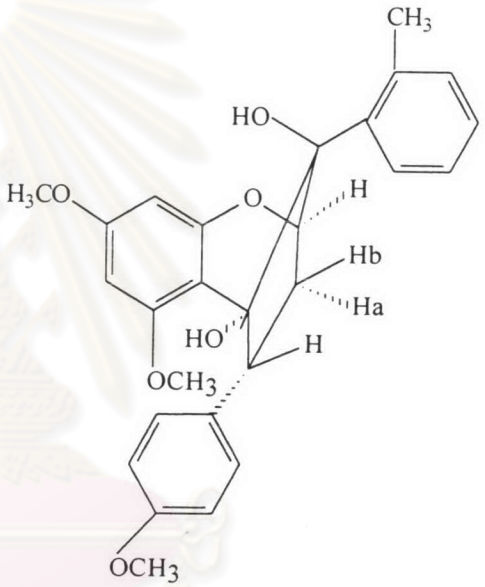

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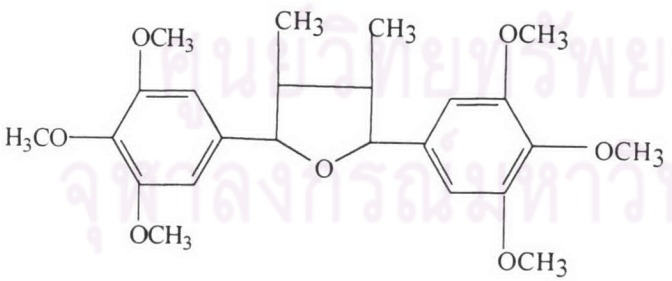

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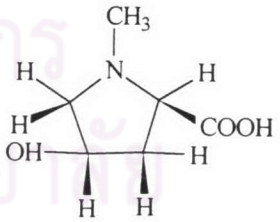

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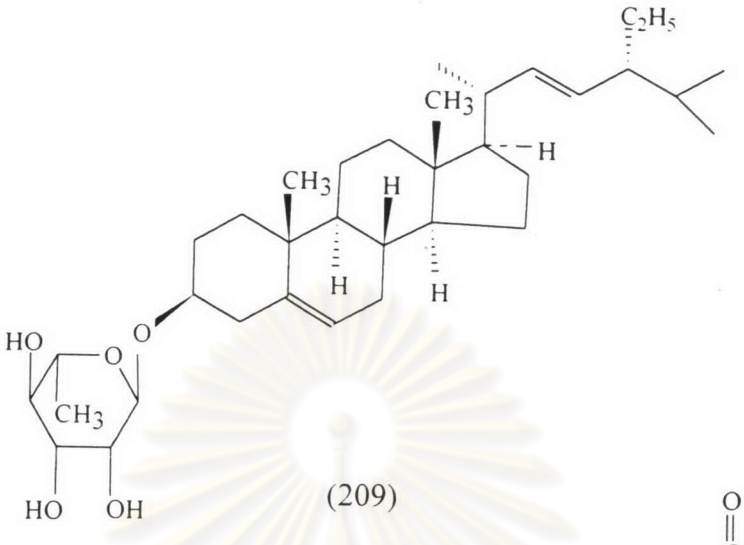

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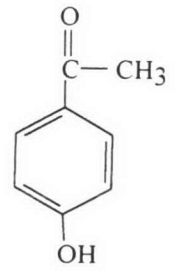

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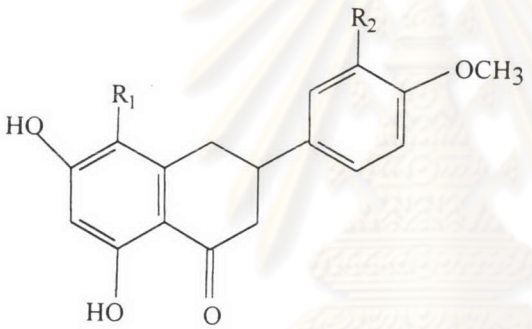
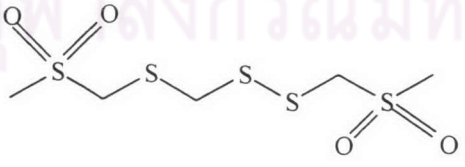


(210) R_1 = prenyl ; R_2 =$CH_2CH_2C(OH)(CH_3)_2$

(211) R_1, R_2 = prenyl



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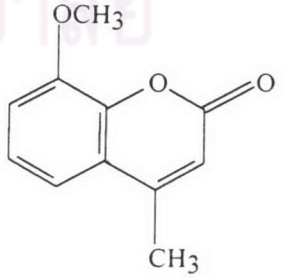

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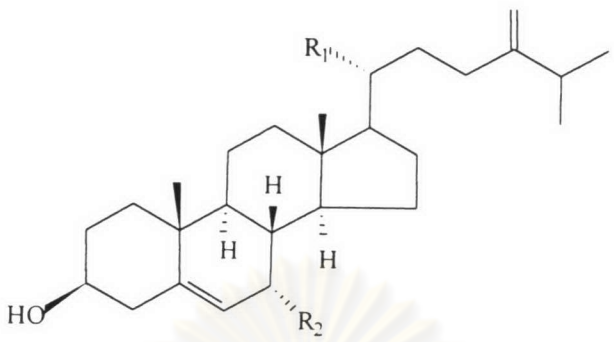
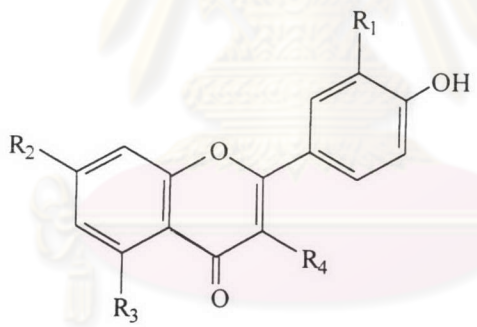


(215) R_1 = H, CH_3 ; R_2 = OCH_3

(216) R_1 = H, OH ; R_2 = OH

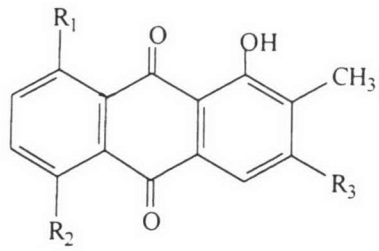


(217) R_1,R_4 = H ; R_2 = O-α-L-rhamnopyranosyl-(1-4)-β-D-glucopyranoside ; R_3 = OH

(220) R_1,R_4 = H ; R_2 = OH ; R_3 = O-D-galactose

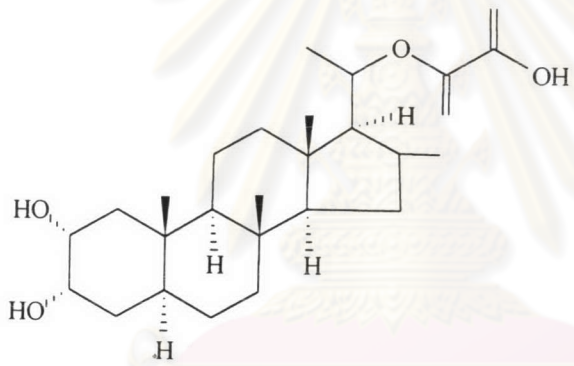
(221) R_1,R_2,R_3 = OH ; R_4 = O-rutinose

(222) R_1 = H ; R_2,R_3 = OH ; R_4 = O-rutinose



(218) R_1 = OH ; R_2 = H ; R_3 = O-D-galactose

(219) R_1 = OCH_3 ; R_2 = OH ; R_3 = O-L-rhamnose



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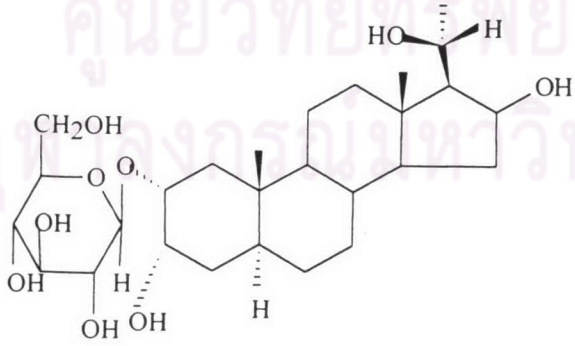
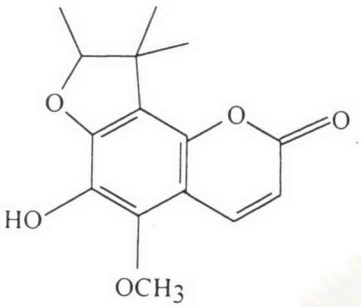
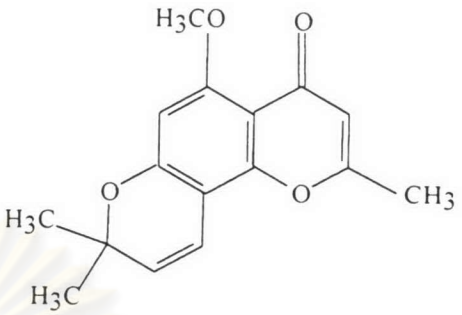


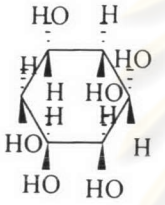
(224)



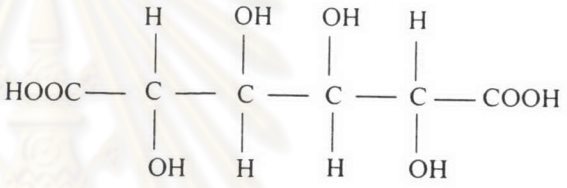
(225)



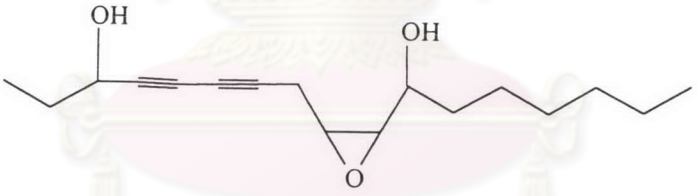
(226)



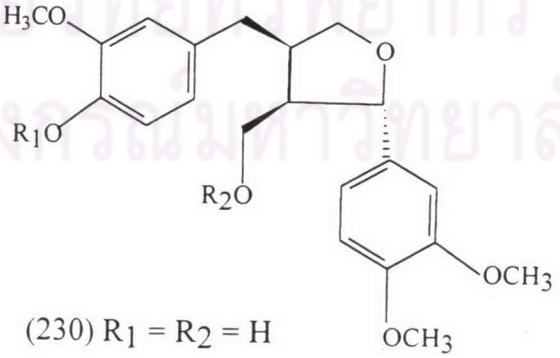
(227)



(228)



(229)



(230) $R_1 = R_2 = H$

(231) $R_1 = R_2 = CH_3CO$

(232) $R_1 = CH_3$, $R_2 = H$

Medicinal Uses and Toxicity of the Meliaceous Plants

Volkonsky (1937) studied the leaves of *Melia azedarach* L. for insecticidal effect based on the observation that some types of insects never touched the leaves of this plant. Other plants sprinkled with extract of *Melia* leaves were equally protected against locust.

Two years later, Carratala (1939) reported the death of a 3 year-old child some days after eating the fruits of *Melia azedarach* L. An aqueous extract of the fruits when injected into the rabbit (1 ml sc.) produced dyspnea, tremor, convulsion and death on the following day. When given by mouth, the extract also produced gastrointestinal symptoms.

Guevara (1940) studied the fruits of *Lansium domesticum* Corr. and found that the peel of the fruit contained a resin which checked diarrhoea and relieved intestinal spasm.

Sinha and Gulati (1963) studied the seed cake of *Azadirachta indica* Juss. and found that the alcoholic extract of seed cake left after the oil expression shown repellant action against migratory locusts where as the marc was inactive.

Berndt (1965) reported the use of margosa oil from *Azadirachta indica* A Juss. in dermatological preparations in Indian pharmacy.

Several species of *Dysoxylum* were reported to be used as medicinal plants in many Asian countries. In Indo-China, the essential oil of *D. loureiroi* Pierre (*Epicharis loureiroi*) was used in native medicine. In the Malay Peninsula, a poultice of the fruits of *D. cauliflorum* Hiern was used to treat rheumatism, and a plaster of the boiled roots was applied to treat abdominal pain. In Indonesia, the nauseous juice of the bark of *D. gaudichaudianum* (A. Juss.) Miq. was used internally as emetic and externally as astringent (Perry, 1980).

Pharmacological Activities of Extracts and Active Constituents of the Meliaceous Plants

Several reports on pharmacological activities of the extracts and active constituents of the Meliaceous plants were summarized in Table 4.

Table 4 Pharmacological Activities of Extracts and Active Constituents of the Meliaceous Plants.

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
Aglaia formosana (Hayata) Hayata	leaf	Dehydroodorin (3)	Anticancer	Duh *et al.* , 1993
A. elliptifolia Merrill.	root & stem	Rocaglamide (201) Dehydrorocaglamide (202)	Antileukemic	King *et al.* , 1982
	stem-bark	Aglafoline (203)	PAF antagonism	Ko *et al.* , 1992
A. odorata Lour.	leaf & twig	(-)-Odorinol (2)	Antileukemic	Hayashi *et al.* , 1982
	twig	Rocaglamide (201)	Insecticidal	Janprasert *et al.* , 1993
A. odoratissima Bl.	plant exudate	-	Anticancer	Dhar *et al.* , 1973

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
	leaf	Rocaglamide (201)	Insecticidal	Ishibashi *et al.* , 1993
		Methylrocaglate (203)	Insecticidal	
A. oligophylla Miq.	twig	Rocaglamide (201)	Insecticidal	Hwunseng *et al.* , 1995
		Desmethylrocaglamide (205)	Insecticidal	
A. roxburghiana Miq. var. Beddomei	ethanolic extract	-	Antiviral	Vishnoi *et al.* , 1988
	leaf	(+)-Odorine (1)	Antiviral	Joshi *et al.* , 1986
		(+)-Odorinol (2)	Antiviral	
A. pirifera Hance.	leaf	Piriferine (5)	Cytotoxic to vinblastin-resistant KB cell	Saifah *et al.* , 1993

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
Amoora wallichi King	stem	-	Anthelmintic Anticancer Antiviral	Dhar *et al.* , 1968
Aphanamixis grandifolia Bl	fruit peel	Aphanamol (39)	Toxic principle	Nishisawa *et al.* , 1984
		Aphanamol (40)	Toxic principle	
Azadirachta indica A. Juss	fruit oil	Azadirachtin (44)	Insecticidal	Kubo, Matsumato and
		Salannin (45)	Insecticidal	Matsumoto, 1986
		6-O-acetylnimbandiol (46)	Insecticidal	
	bark	Nimbionone (47)	Antibacterial	Siddiqui *et al.* , 1988
		Nimbionol (45)		

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
Dysoxylum acutangulum Miq.	seed	(+)-8-Hydroxycalamenene (77)	Antibacterial	Nishizawa *et al.* , 1983
D. alliaceum Bl.	-	(+)-8-Hydroxycalamenene (77)	Antibacterial	Nishizawa *et al.* , 1983
D. binectariferum Hook.f.	plant-exudate	-	CNS effect	Dhar *et al*, 1973
	fruit	Dysobinin (79)	CNS-depressant Mild anti-inflammatory	Singh *et al.* , 1976
	leaf, trunk & root bark	Rohitukine (7)	Analgesic Anti-inflammatory Immunomodulatory	Vasudev *et al.* , 1985 de Souza (1993)

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
D. cyrtobotryum Miq.	leaf	Rohitukine (7)	Anticancer Anti-inflammatory Muscle relaxant Cardiovascular Bronchodilator Inh. contraction of renal and coronary artery effect	Jermviwatkul, 1993 Sangamnadech, 1991 Lermanon, 1991 Chanleur, 1993 Dulchuprapha, 1994
D. lenticellare Gillespie	leaf	Dysoxylin (8) *S*-(+)-Homoaudanosine (9)	Cardiac effect	Aladesanmi *et al.* , 1987

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
		3-Epi-12-hydroxyschelhammericine (14)		
D. richii (Gray) C. DC.	leaf	Dysoxysulfone (213)	Antibacterial	Jogia *et al.* , 1989
D. roseum C. DC.	leaf	Dysorone E (106)	Anticancer	Adesanya *et al.* , 1991
Melia. azedarach L.	stem-bark	-	Antiviral Spasmogenic Anticancer	Bhakuni *et al.* , 1969
	fruit	Azadirachtin (44)	Insecticidal	Morgan and Thornton, 1973
	-	Sendanin (139)	Anticancer	Pettit *et al.* , 1983
	seed oil	-	Antifeedant	Hu, Yang and Chen, 1983
	root bark	Azedarachin C (148)	Antifeedant	Huang *et al.* , 1995

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituent	Pharmacological activity	Reference
M. azedarach L. var	root bark	Azedarachol (223)	Antifeedant	Nakatani *et al.* , 1985 b
japonica Makino	root	6-Acetoxy-7α-hydroxy-3-oxo-14β,15β-epoxymeliac-1,5-diene	Antibacterial	Srivastava and Gupta, 1985
		(140)	Antibacterial	
		6-Acetoxy-3β-hydroxy-7-oxo-14β,15β-epoxymeliac-1,5-diene-3-O-β-D-glucoronopyranoside (141)		
	fruit	1-Cinnamoylmelianolone (146)	Insecticidal	Lee *et al.* , 1987
M. volkeinsii Giirke	fruit	Salannin (45)	Antifeedant	Rajab and Bentley, 1988
		Volkensin (154)	Antifeedant	
	root bark	Meliavoen (159)	Anticancer	Lu *et al.* , 1995

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
Ptaeroxylon obliquum (Thumb.) Radlk.	leaf & twig	Melianinone (160) Methylalloptaeroxylin (226)	Anticancer Antihypertensive	Langenhoven *et al.* , 1989
Swietenia mahogani Jacq.	seed	Swietemahonin A (165) Swietemahonin D (166) Swietemahonin E (167) Swietemahonin G (168)	Platelet Aggregation Inhibitor	Ekimoto *et al.* , 1991
Turrea nilotica Kotschy and Peyr.	leaf	Lariciresinol-4-mono methyl ether (230)	Anti-cancer	Ayoub and Kingston, 1984 b
Trichilia roka P. Br.	root bark	Trichilin A (189)	Antifeedant	Nakatani *et al.* , 1981

Table 4 (Continued)

Plant Name	Part	Extracts / Chemical Constituents	Pharmacological activity	References
	fresh-fruit	Sendanin (139)	Antifeedant	Kubo and Klocke, 1982
	root bark	7-Acetyltrichilin A (196)	Antifeedant	Nakatani *et al.* , 1985 a
	root bark	Trichilin F (194)	Antifeedant	Nakatani and Nakanishi, 1993
		Trichilin G (197)	Antifeedant	