CHAPTER I

HISTORICAL INTRODUCTION

Thailand has enjoyed a rich heritage of various systems of traditional medicine for a long time. The most tradition folklore medicine utilizing are medicinal herbs and plants. In this regard, there is no doubt that plants have provided and can continue to provide humans with useful drugs. Natural products derived from plants may continue to the search for new drugs. Therefore, research is urgently needed to explore the chemical constituents of these natural products before opportunistic become forever loss through adventing deforestation.

The plant used in this investigation was found in Chanthaburi province, eastern part of Thailand. The specimen of this plant was identified to be *Aglaia pyramidata* Hance, family Meliaceae. The preliminary studies of this plant were tested by the author and found that the leaves extract give a positive test for alkaloids, the result was later comfirmed by thin-layer chromatographic data.

Plants in family Meliaceae were composed of 50 genera 1000 species (Core (1955)), with genus *Aglaia* containing 250 species (Willis (1966)). In Thailand, according to Craib (1931) and Smitinand (1980), there are

about 25 species of *Aglaia*. 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* Gray
** *A. gigantea* Pelleg.
*** *A. hoaensis* Pierre.
* *A. kunsteri* King
* *A. marginata* Criab
*** *A. meliosmoides* Criab
* *A. merostela* Pelleg.
* *A. oblanceolata* Criab
*** *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.

Note : * reported by Craib

** reported by Smitinand

*** reported by Craib and Smitinand

The following pages contain literature survey about the medicinal uses and poisonous properties of plants in the family Meliaceae.

Volkonsky (1937) studied the leaves of *Melia azedarach* L. for insecticidal effect, it was noticed at some types of the insects have never touched the leaves of this plant. Other plants sprinkled with extract of *Melia* leaves are 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 symtoms.

Guevara (1940) studied the fruits of *Lansium domesticum* Corr. and found that the peel of the fruit contains a resin which checks diarrhoea and relieves 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, the marc was inactive.

Two years later, Berndt (1965) reported the use of margosa oil from *Azadirachta indica* Juss. in dermatological preparation in Indian pharmacy.

Martinez Nadal *et al.* (1973) investigated the toxicological effects of the active principles of *Swietenia mahagoni* Jacq. and found that the precipitates from the bark by diethyl ether extraction, petroleum ether extraction and and oil obtained from the seeds were sufficiently toxic to *Drosophila melanogaster* to warrant their use as pesticides. The active principles were apparently non-toxic to the human.

Four years later, Qadri and co-workers (1977) studied the effect of combining some indegenous plant seed extracts against household insects and found that neem (*Azadirachta indica* Juss.) extract showed synergistic action in combination with custard apple seed extract against pulse beetle, lesser grain borer and housefly. The combination was half as toxic against lesser grain borer and equitoxic to DDT against housefly.

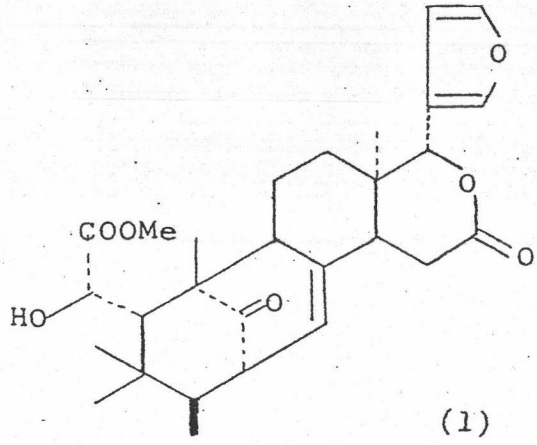
Hu, Yang and Chen (1983) performed the experiment on chinaberry seed oil (*Melia azedarach* L.) effect on rice insects. It was found that the oil acted as antifeedant to yellow rice borers, white-backed planthoppers and brown

planthoppers and showed some systemic effects. However it had insignificant antifeedant effects on striped rice borers and pink rice borers but showed no effect on leaf-hoppers and rice thrips.

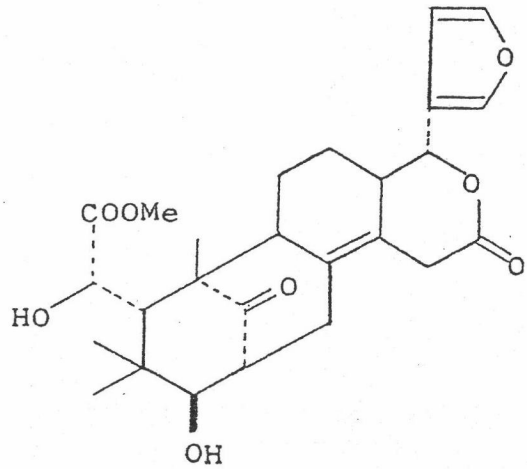
Chiu (1984) performed bioassay studies on the active priciples of Meliaceous plants including neem (*Azadirachta indica* Juss.) and chinaberry. (*Melia toosendan* Sieb. & Zucc.) It was found that, both azadirachtin (34) and toosendanin showed potential as strong antifeedants as demonstrated by the bioassays results with the larvae of *Spodoptera litura*.

Further phytochemical studies of Meliaceous plants were reported as follows :

Sircar and Chakravarty (1951) studied the seeds of *Swietenia macrophylla* King and isolated two crystallines one non-bitter which they named swietenine (1) , the other bitter named swietenolide (2). The structure and steriochemistry of 1 and 2 were determined later in 1965 by Connolly *et al.* (1965)

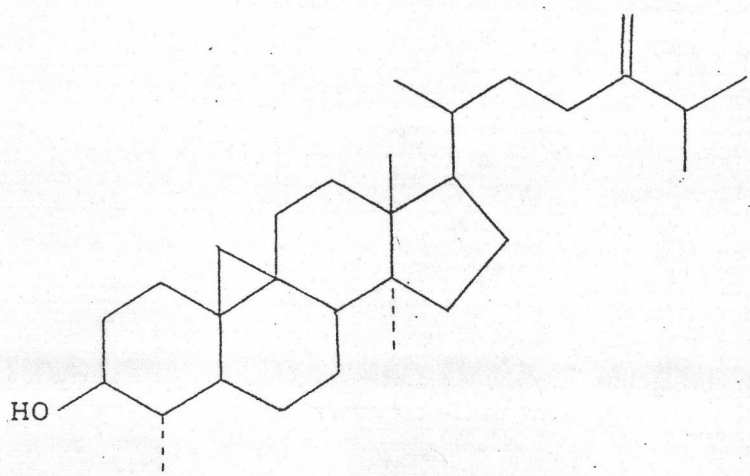


(1)



(2)

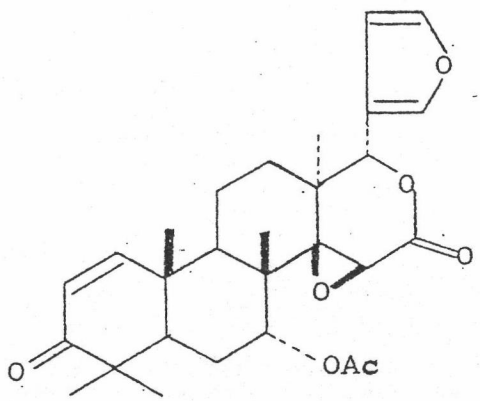
Marin et al. (1959) isolated cycoleuclalenol (3) from the unsaponifiable fraction of the oil from the wood of *Swietenia mahagoni* Jacq.



(3)

Akisanya and co-workers (1960) investigated some species of the genus *Entandrophragma* and the following results were reported. From the timber of *E. angolense* (Welw.) C.DC., two triterpenes, gedunin (4), the structure subsequently characterized by Akisanya *et al.* (1961), and

methyl angolensate (5) were reported. Another triterpene, entandrophragmin (6) was isolated from *E. cylindricum* Sprague, of which structure was characterized by Taylor and Wragg (1967).



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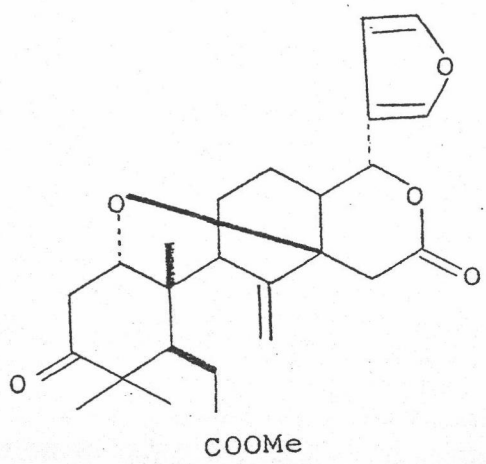

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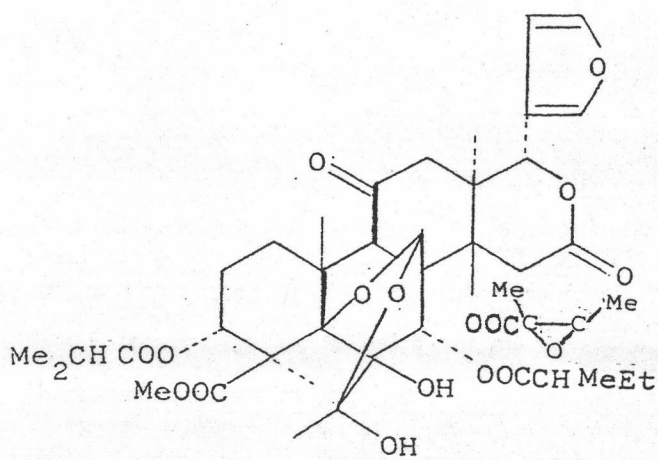
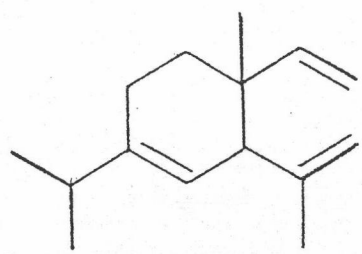


(6)

In addition, Gedunin (4) was also obtained from *Entandrophrazma delevoyi* De Wild. and *Xylocarpus granatum* as well (Koen (1965)). Besides these, there are some reports on the isolation of methyl angolensate (5) from the heartwood of *Cedrela odorata* L. (Chan, Magnus and

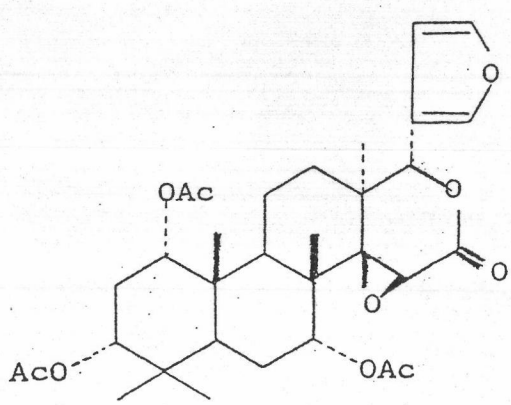
Mooto (1967)) and the seeds of *Swietenia mahagoni* Jacq. (Taylor (1969)).

Gough and Powell (1961) isolated the sesquiterpene from the wood oil of *Dysoxylum frazenarum* Benth and three years later Gough and Sutherland (1964) described this structure as δ-elemene (7).



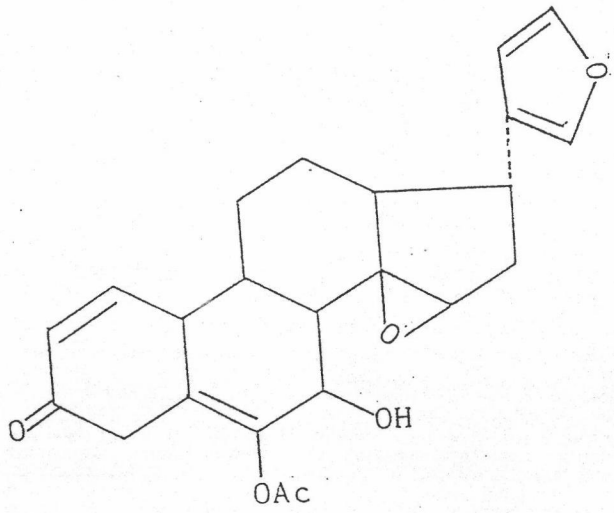
(7)

Bevan *et al.* (1962) isolated a furanoid lactone, khivorin (8), from the heart wood of *Khaya ivorensis* A. Chevalier.



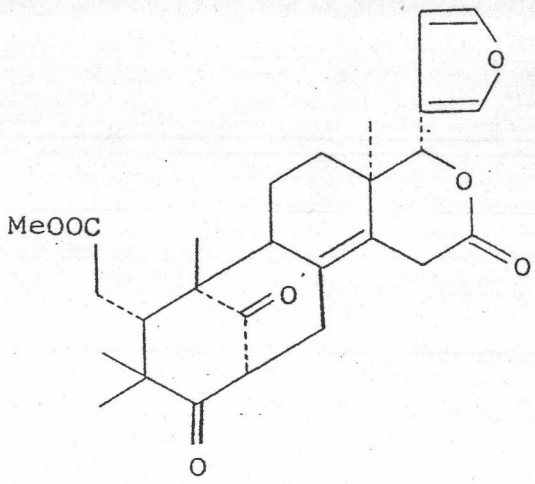
(8)

Henderson *et al.* (1962) investigated the seed oil of *Melia azedarach* L. and found the presence of triterpenoid, salannin (9). Five years later (1969), this compound was also found in the mature fruits of *Melia dubia* Cor. (Silva and co-workers (1969)).



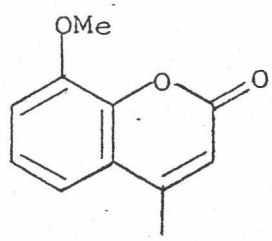
(9)

Connolly and co-workers (1965) isolated and characterized a crystalline lactone, mexicanolide (10), from *Cedrela mexicana* M.Roem.



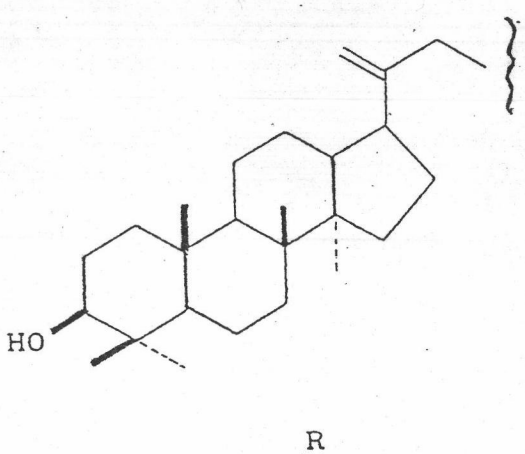
(10)

In the same year, Bevan and Ekong (1965) extracted two specimens of *Ekebergia senegalensis* A.Juss. from the Plateau province of northern Nigeria and noted that the major crystalline product was 8-methoxy-4-methyl coumarin. (11)



(11)

In addition, Shiengthong *et al.* (1965) studied the leaves of *Aglaia odorata* Lour. and reported the presence of a tetracyclic triterpene, aglaiol (12). The configuration of this compound was further determined by Boar *et al.* and Boar (1977). The leaves of the same plants were further investigated by Shiengthong et al. (1974) and the presence of two more tetracyclic triterpenes, aglaiondiol (13) and aglaitriol (14) were reported.



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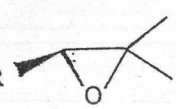

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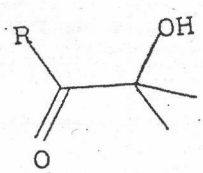

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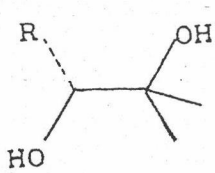
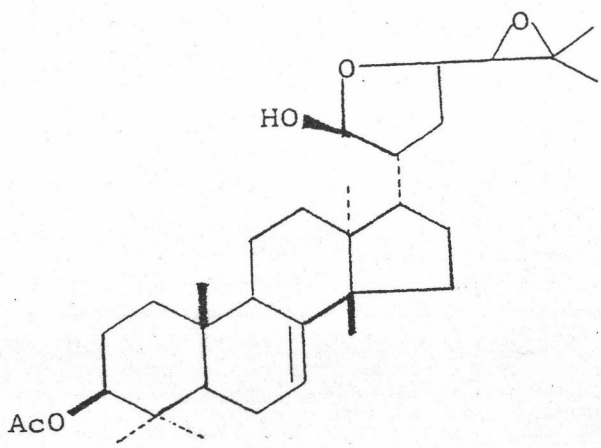


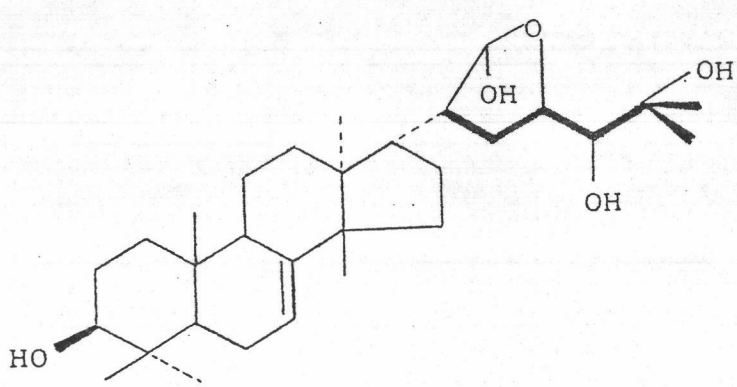
In 1967, serveral phytochemical studies Meliaceous plants were reported as follows :

Chatterjee and Kunda (1967) isolated a new triterpene, aphanamixin (15), from the petroleum extract of the fruits of *Aphanamixis polystachya* (Wall.) Parker.



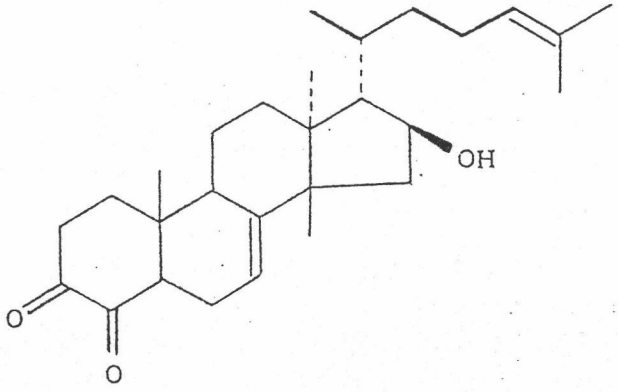
(15)

Lavie and co-worker (1967) reported the identification of crystalline substance with antifeedant activity from the fruits of *Azadirachta indica* Juss. as meliantriol (16).



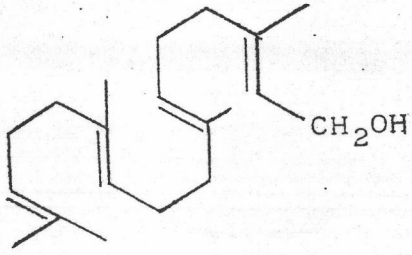
(16)

Chang and Chiang (1967) performed phytochemical studies on the bark of *Melia azedarach* and reported the isolation of a new triterpene named kulinone (17).



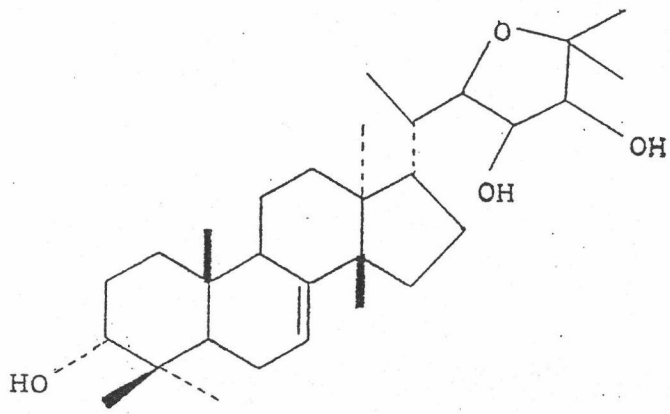
(17)

Nagasampagi *et al.* (1967) isolated geranylgeradiol (18), from the woods of *Cedrela toona* Roxb.



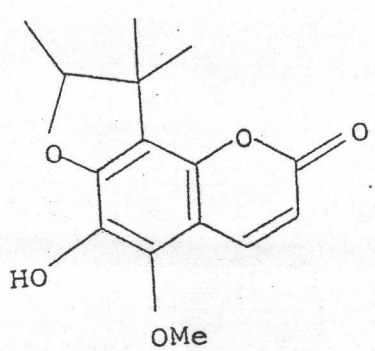
(18)

Connolly and co-workers (1967) isolated mixicanol (19) from the heartwood of *Cedrela glaziovii* C.DC. and *C. mexicana* M.Roem.



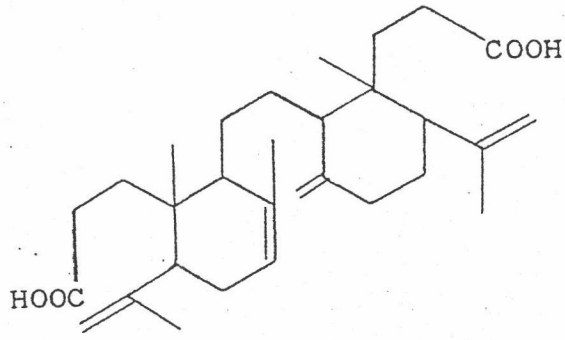
(19)

McCabe *et al.* (1967) reported the isolation of nieshoutol (20) from the heartwood of *Ptaeroxylon doliquum* Radlk and the structure was confirmed by Mary and Ballantyne (1969).



(20)

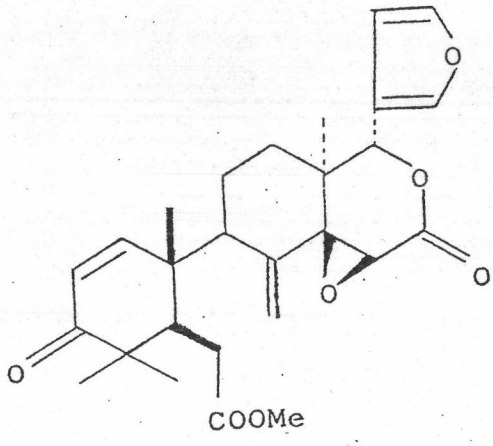
Kiang *et al.* (1967) examined the peel of the fruits of *Lansium domesticum* Corr. and reported the isoltation of triterpenoid acid, named Lansic acid (21).



(21)

In 1968, there are three phytochemical reports of Meliaceous plants as follows :

Okorie and Taylor (1968) examined the seeds of *Cedrela odorata* L. and reported that the seed of this plant contained the known limonoid, mexicanolide (10), andirobin (22) and 6-deoxy swietenolide (23), together with a new compound which had been identified as 6-hydroxy mexicanolide (24).



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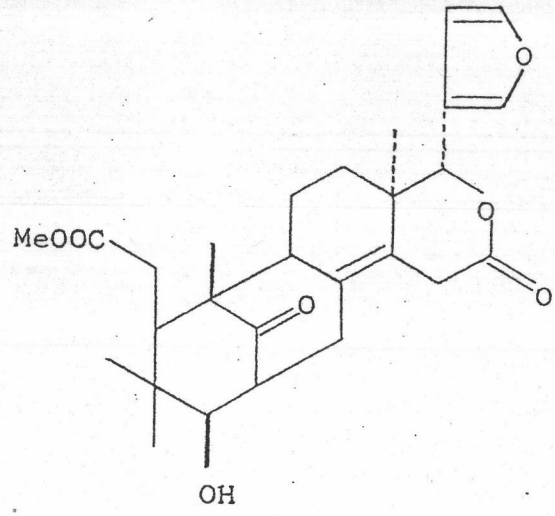

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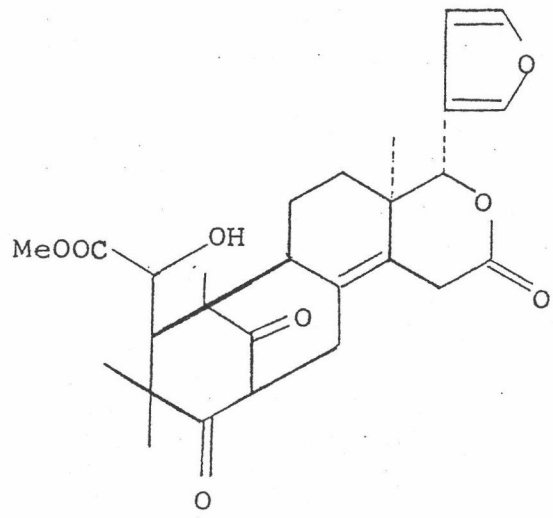
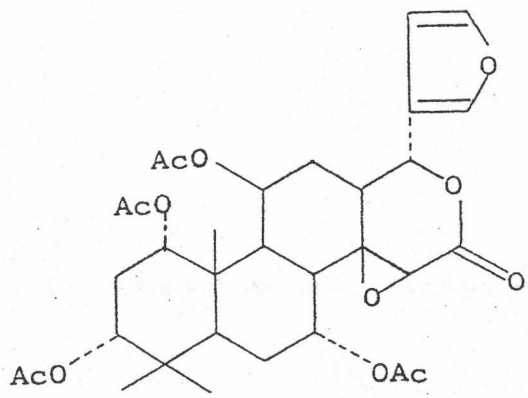


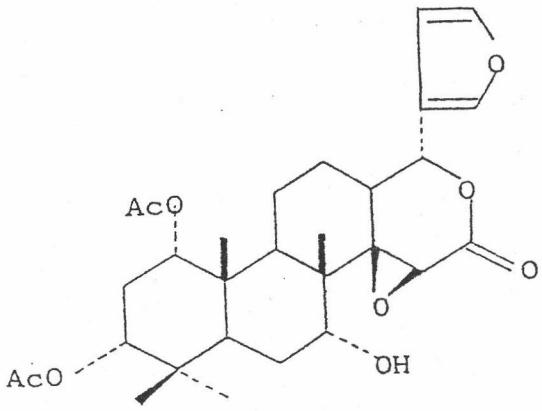
(24)

Taylor (1968) isolated main constituent of the extract of timber of *Khaya madaguscariensis* Jumelle et Perrier and identified as 11β-acetoxykhivorin (25).



(25)

Connolly *et al.* (1968) obtained grandifolione (26) from the trunk wood of *Khaya grandifoliola* C.DC. Three years later, grandifoliolenone (27) was isolated together with compound 26 from the same part and plant by Connolly and McCrindle (1971).



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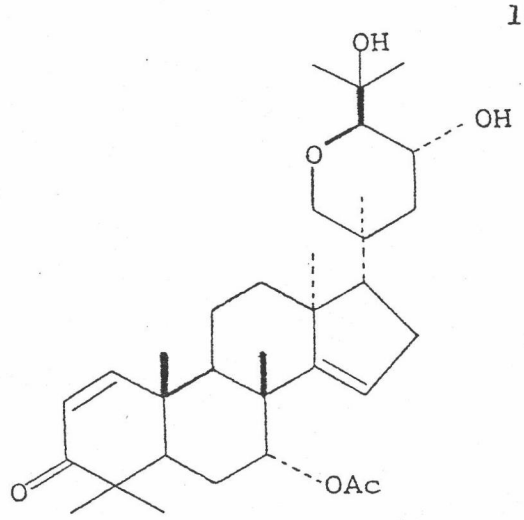
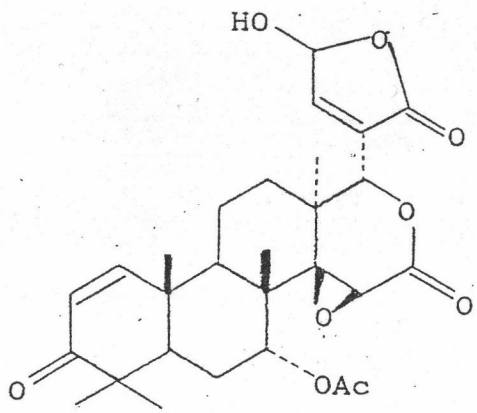


(27)

In 1969, John and Lamberton (1969) performed phytochemical screening of some New Guinea plants for alkaloid and found positive result in serveral species of *Aglaia*. The leaves of one species were then further investigated but the result showed the presence of tiglamide as a major constituent in the crude alkaloid fraction.

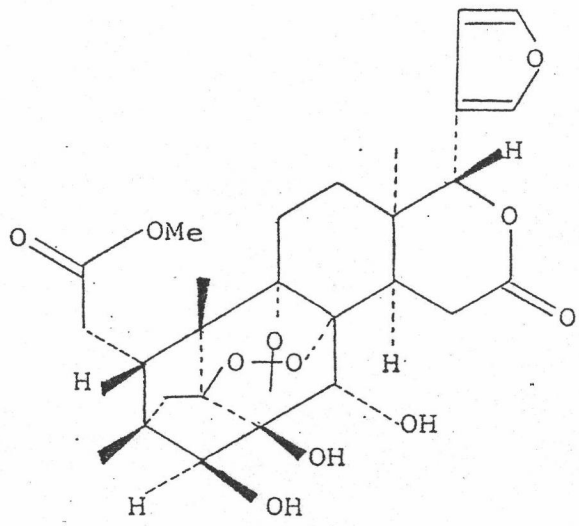
Buke and co-worker (1969) examined the benzene extract of *Cedrela odorata* L. and isolated gedunin (4) and a non-furanoid tetranortriterpenoid, photogedunin (28).



(28)

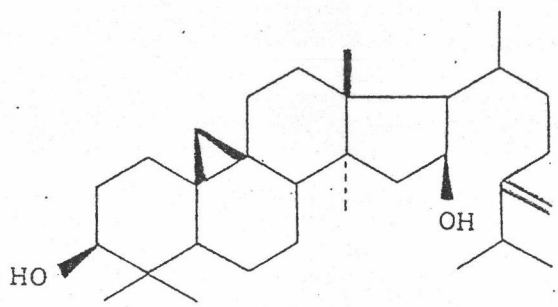
In 1971, serveral phytochemical studies of some Meliaceous plants were done and the results were reported as follows :

Arndt and Baarschers (1971) extracted the bark of *Entandrophragma caudatum* Sprague. by the conventional alkaloid extraction method and obtained a meliacin named phragmalin (29)



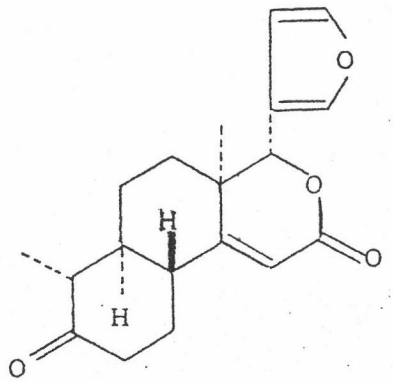
(29)

Chakraborty and Basak (1971) isolated cyclomahogenol (30) from the leaves of *Swietenia mahagoni* Jacq.



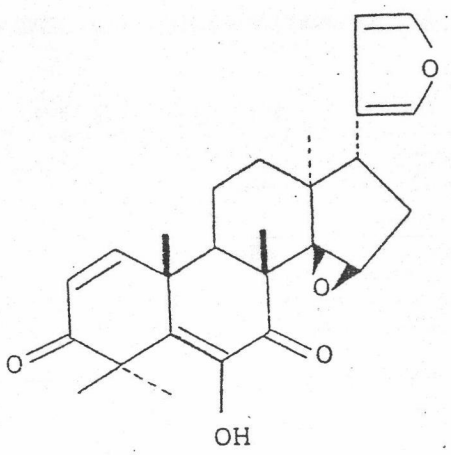
(30)

Chan *et al.* (1971) investigated the specimen of *Cedrela odorata* L., obtained from St. Elizabeth, Jamaica and reported the presence of a new compound odoratin (31).



(31)

Chatherjee and co-workers (1971) isolated cedrelone (32) and 1, 2-dihydrocedrelone (33), from the seeds of *Credela toona* Roxb.



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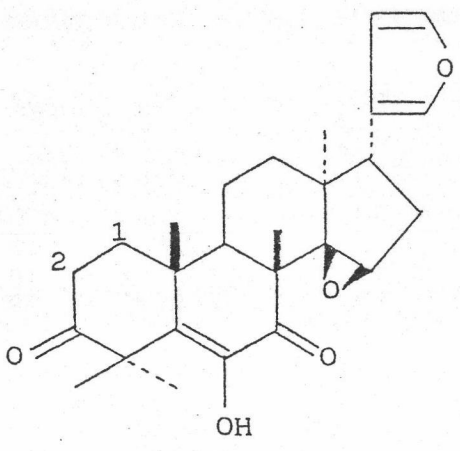
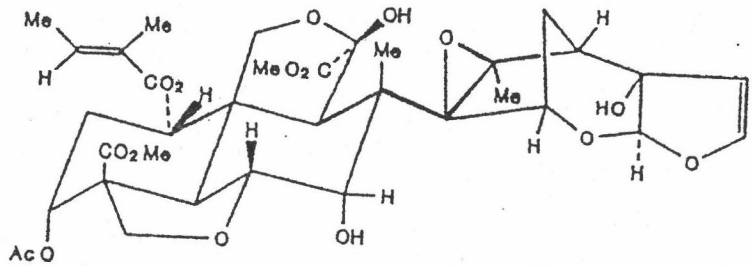


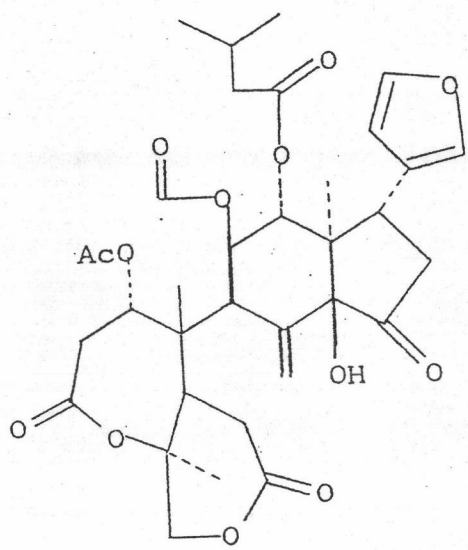
(33)

Morgan and Thornton (1973) isolated an insecticidal active compound, azadirachtin (34) from the fruits of *Melia azedarach* L.



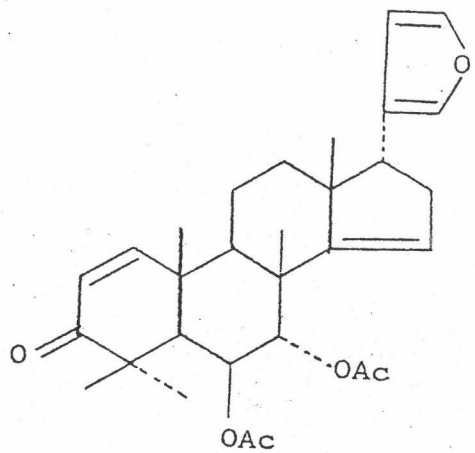
(34)

Connolly (1976) investigated the seeds of *Aphanamixis polystacha* (Wall.) Parker and reported the presence of limonoid compound called rohitukin (35).



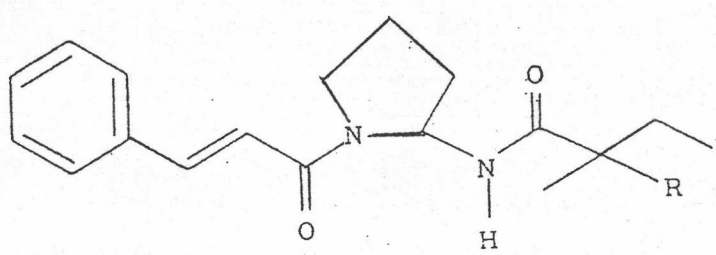
(35)

Singh *et al.* (1976) extracted the fruits of *Dysoxylum binectariferum* Hook. f. and obtained a new tetranortriterpene of the meliacin group, dysobinin (36). This substance showed general CNS-depressant action and mild antiinflammatory activity.



(36)

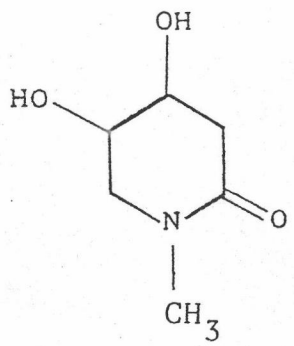
The chemistry of Meliacenous plants became more interesting in 1979 when Shiengthong *et al.* (1979) isolated 2 new alkaloids, odorine (37) and odorinol (38) from the leaves of *Aglaia odorata* Lour.



(37) R = H

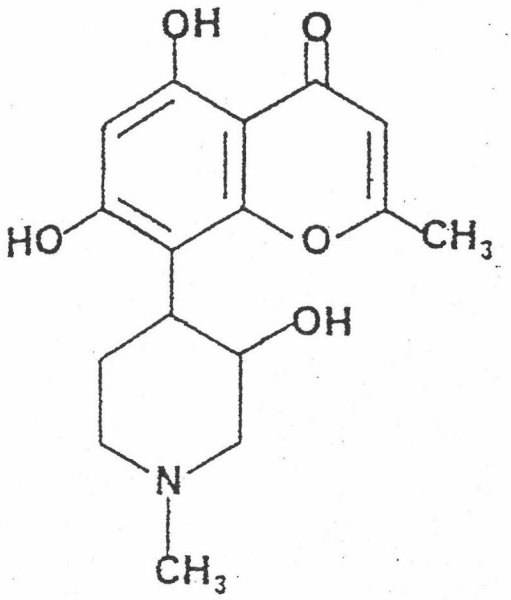
(38) R = OH

This result was supported by Purushothaman *et al.* (1979) on the isolation of roxburghiline (37) which found to be identical with odorine (37), from the close related species *Aglaia roxburghiana* Hiern. Two years later, Techasauwapak (1981) isolated a new alkaloid, odoram (39) from the flower specimen of *Aglaia odorata* Lour.



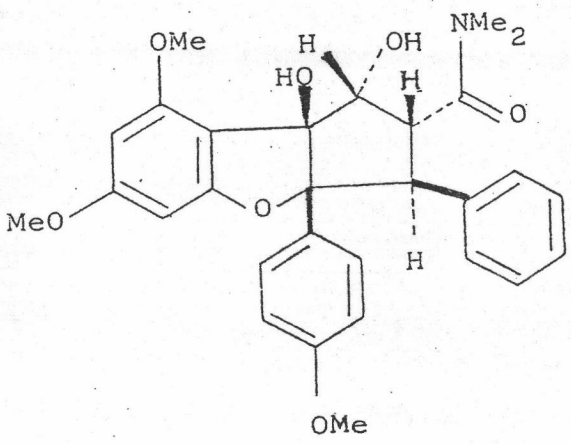
(39)

Harmon and co-workers (1979) reported the isolation and structure determination of a novel alkaloid, rohitukine (40), from the dried leaves and stems of *Amoora rohituka* Wight & Arn. (Syn. *Aphnamixis polystachya* (Wall). Parker.)



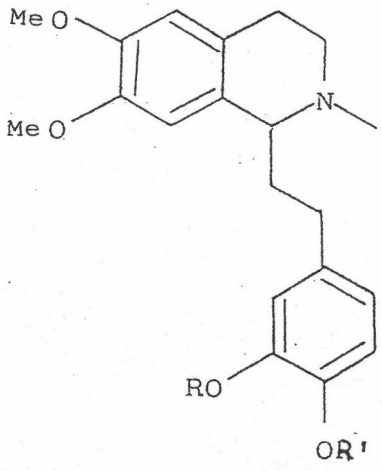
(40)

King *et al.* (1982) isolated a novel 1H-2,3,3a, 8b-tetrahydrocyclopenta (b) benzofuran, rocaglamide (41), from *Aglaia elliptifolia* Merrill, which showed significant antileukemic activity against P-388 lymphocytic leukemia in CDF_1-mice.



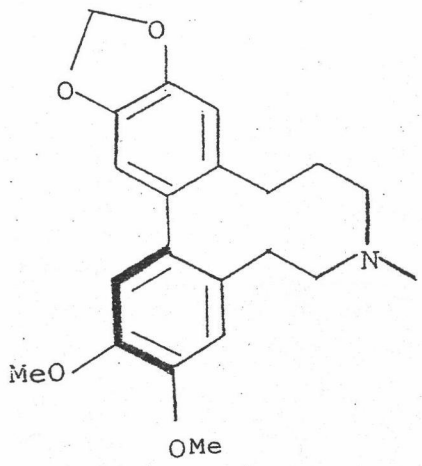
(41)

Aladesanmi *et al.* (1983) reported the isolation of three new alkaloids dysoxyline (42), S-(+)-homolaudanosine (43) and dysazecine (44) and the two known alkaloids, 3-epischelhammeicine (45) and 2,7-dihydrohomoerysotrine (46) from the leaves of Fiji plant, *Dydoxylum lenticellare* Gillespie.

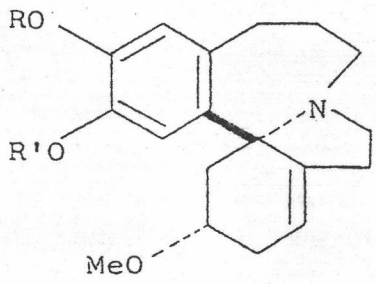


(42) R , R' = $-CH_2-$

(43) R , R' = -Me



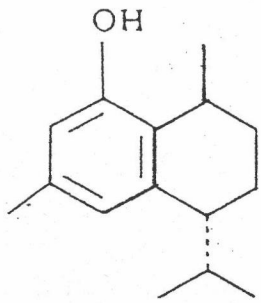
(44)



(45) R, R' = $-CH_2-$

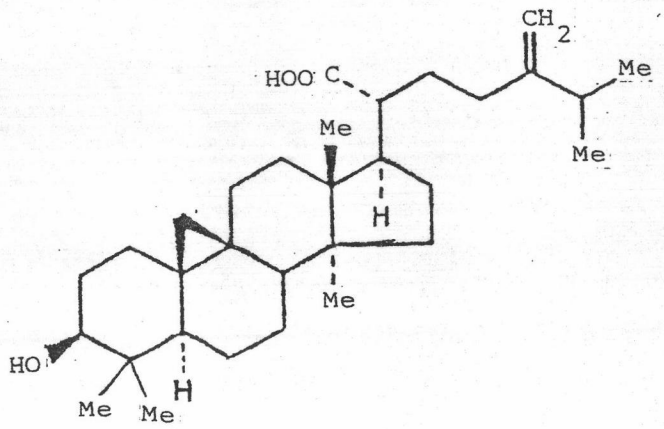
(46) R = R' = -Me

Nishisawa *et al.* (1983) reported that a fish-posion priciple of *Dysoxylum acutminatum* and *D. alliaceum* has been identified as (+)-8-hydroxycalamenene (47), a new natural sesquiterpene phenol. This compound showed not only siginificant toxicity against fish but also antibacterial activity.



(47)

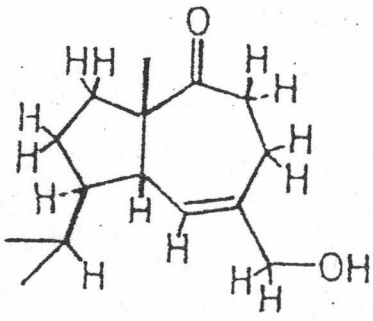
In the same year, heynic acid (48), a new tetracylic triterpene was isolated from fruits of *Heynea trijuga* Roxb. (Purushothaman and co-workers (1983)).



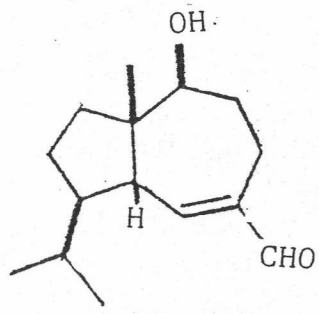
(48)

In 1984, five reports on phytochemical studies of the plants in the family Meliaceae were summerized as follows :

Nishisawa *et al.* (1984) isolated and identified, from dried peels of *Aphanamixis grandifolia*, a unique sesquiterpeniods, named aphanamol I (49) and II (50) that were minor toxic principles.

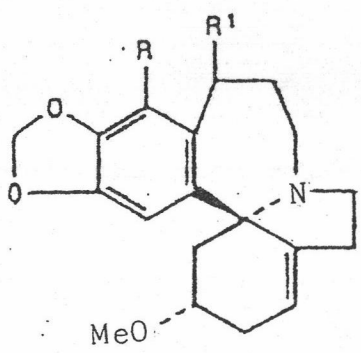


(49)



(50)

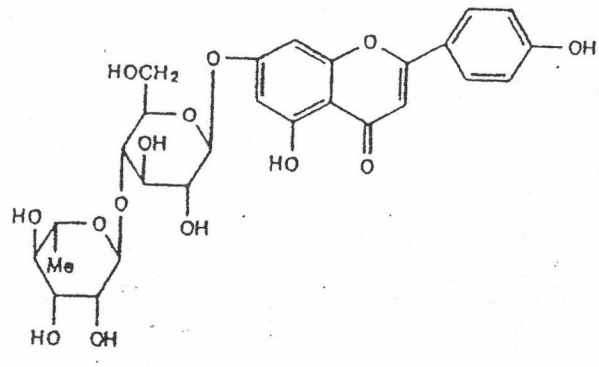
Aladesanmi *et al.* (1984) isolated two new homoerythrina alkaloids, deshomerythrine (51) and 3-epi-12-hydroxyschelhammericine (52) from the leaves of *Dysoxylum lenticellare* Gillespie.



(51) R = OMe , R' = H

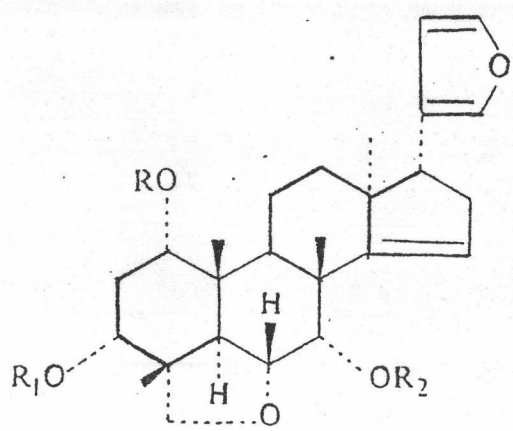
(52) R = H , R' = OH

Mishra and Srivastava (1984) investigated the stem barks of *Melia azedarach* Linn. and isolated the flavone glycoside, 4,5-dihydroxy flavone-7-O- α -L-rhamnopyranosyl -(1->4) -B-D-glucopyranoside (53).

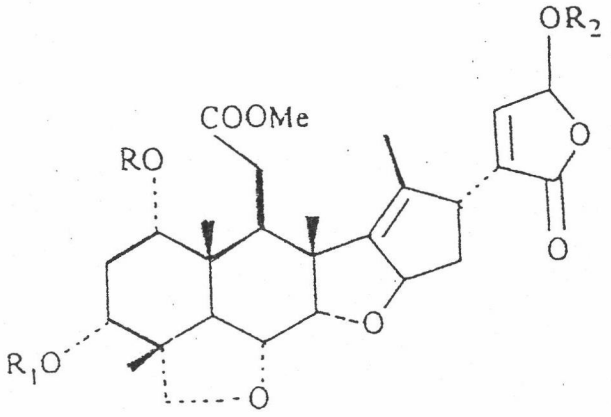


(53)

Purashothaman *et al.* (1984) isolated 2 new tetranortriterpenoids, compositin (54) and compositolide (55) from the leaves and seeds of *Melia dubia* Cov., the structures of which were determined by spectroscopic methods and chemical reactions.

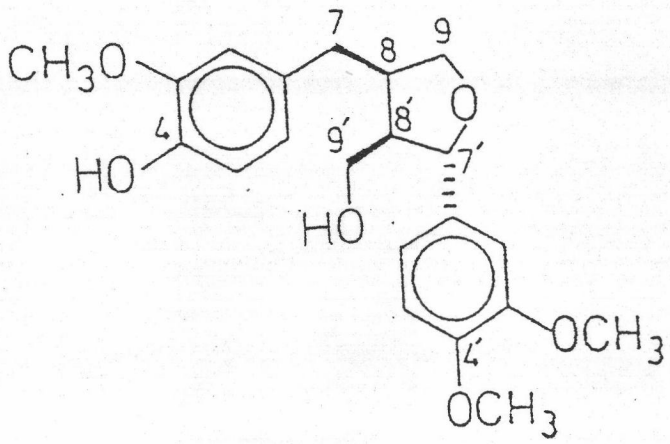


(54) R , R_2 = COC_4H_7 ; R_1 = H



(55) R = COC_4H_7
R_1 = COMe
R_2 = H

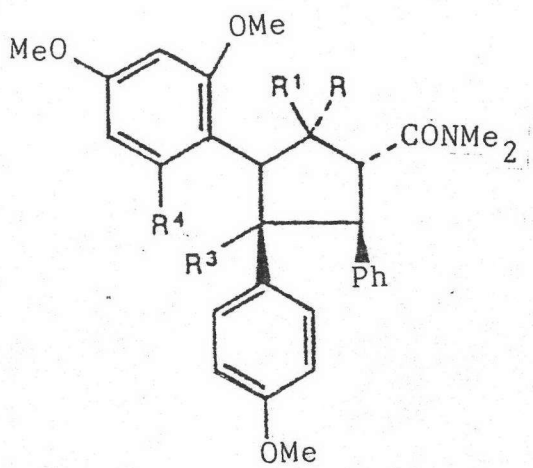
Ayoub and Kingston (1984) investigated Sudanese plants for anticancer activity and reported the isolation of a natural product identified as lariciresinol 4-mono-ethyl ether (56) from the seeds of *Turrea nilotica* Kotschy and Peyr.



(56)

In 1985, there were ten reports on phytochemical studies of some meliaceous plants summerized as follows :

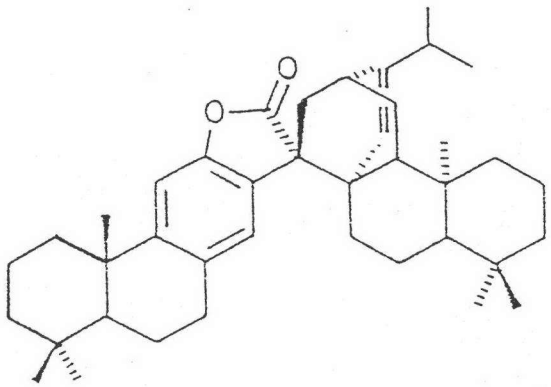
King *et al.* (1985) isolated rocaglamide (57) from stem and root bark of *Aglaia elliptifolia*. This compound have antileukemic activity against P-388 lymphocytic leukemia in mice and inhibitory activity in vitro against cell derived from human epidermoid carcinoma of the nasopharynx (ICB cell).



(57)

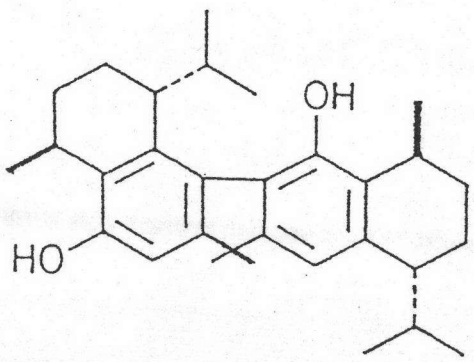
Kraus *et al.* (1985) isolated azadirachtin (34) from *Azadirachta indica* Juss. and the structure was revised based on extended reinvestigation of NMR data.

Onanm *et al.* (1985) isolated a new bis-diterpene ferrubietolide (58) from *Dysoxylum lenticellare* Gillesie.



(58)

Nishisawa *et al.* (1985) isolated bicalamenene (59), from the hexane extract of the dried peels of *Dysoxylum alliaceum.*

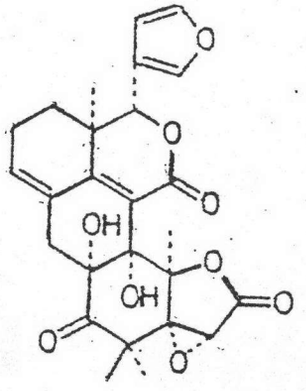


(59)

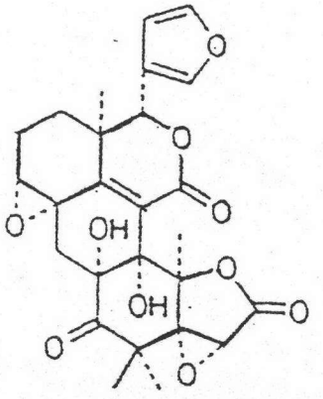
Vasudev and co-workers (1985) investegated the trunk and root bark of *Dysoxylum binectariferum* Hook. f. and reported the isolation of a chromone alkaloid identified as 5,7-dihydroxy-8-(3-hydroxy-1-methyl-4-piperidinyl)

-2-methyl-4H-1-benzopyran-4-one, structure of which was identical to that of rohitukine (37) previously isolated from *Amoora rohituka*. The alkaloid and its salt showed excellent analgesic and immunomodulating activity *in vivo* and *in vitro*.

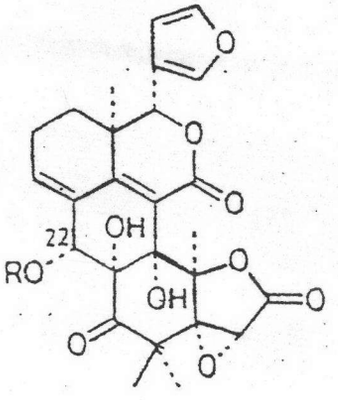
Nishizawa *et al.* (1985) isolated five tetranor-triterpenes of novel skeletal ,dukonolide A (60), B (61), C (62), D (63) and E (64), as bitter principle, from the seeds of *Lansium domesticum* Corr.



(60)



(61)

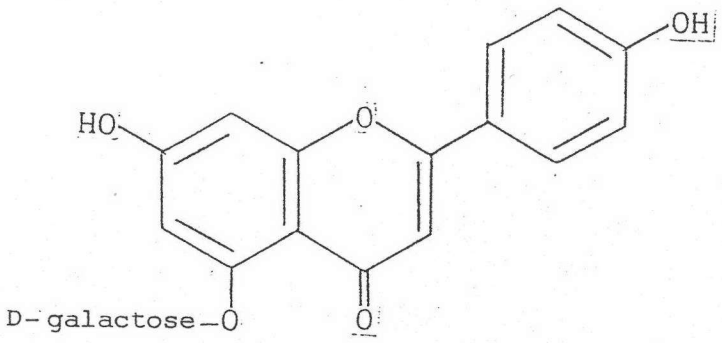


(62) R = CH_3CO

(63) R = H

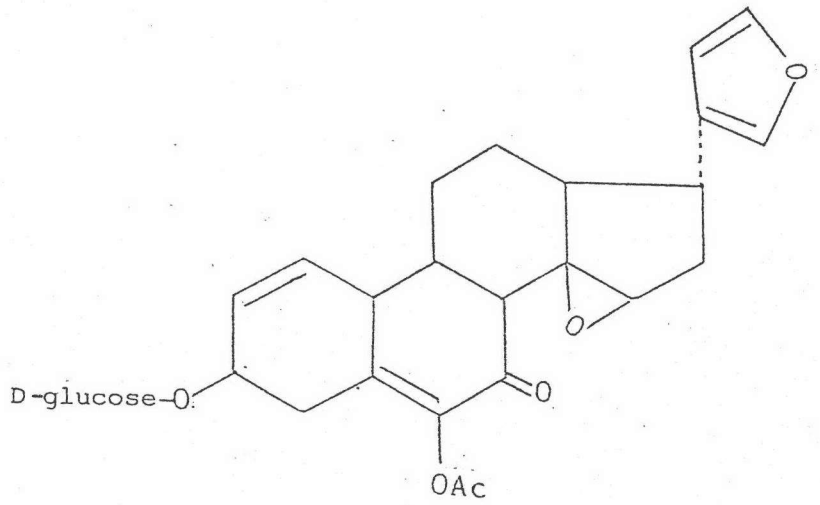
(64) R = $-BrC_6H_4CO$

Gupta and Srivastava (1985) isolated apigenin-5-O-β-D-galactopyranoside (65) from the ethanol extract of the roots of *Melia azedarach* Linn.



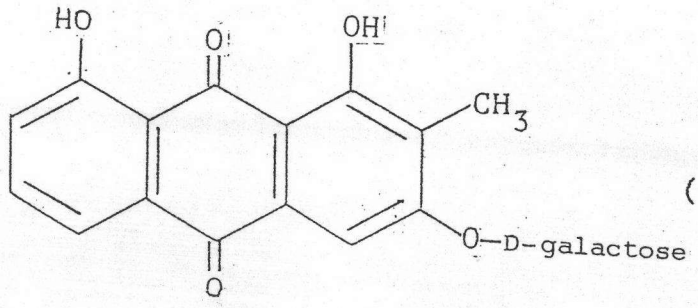
(65)

Srivastava and Gupta (1985) isolated limonoid, salannin (9) and a new limonoid glycoside form the root of *Melia azedarach* Linn. The structures of 6-acetoxy-7-hydoxy-3-oxo-14β,15β-epoxymeliac-1,5-diene and 6-acetoxy-3-hydroxy-7-oxo-14β,15β-epoxymeliac-1,5-diene-3-O-β-D-glucoronopyranoside (66) were presented for salannin and a limonoid glycoside respectively by means of chemical and spectral evidences.

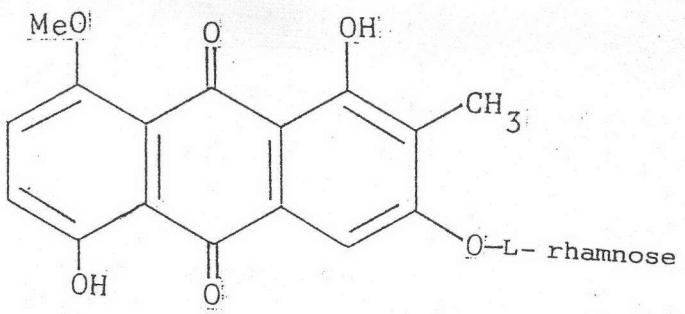


(66)

Srivastava and Mishra (1985) isolated two new anthraquinoue glycosides characterized as 1,8-dihydroxy -2-methylanthraquinone-3-O-β-D-galactopyranoside (67) and 1,5 dihydroxy-8-methoxy-2-methylanthraquinone-3-O-L-rhamno pyranoside (68) from the stem bark of *Melia azedarach* Linn.

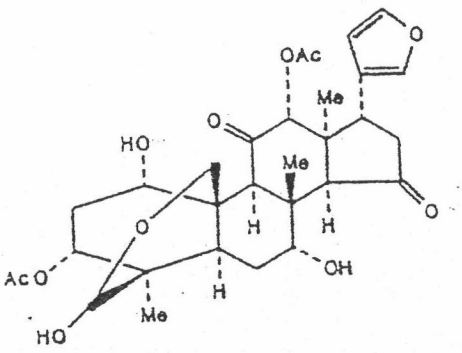


(67)



(68)

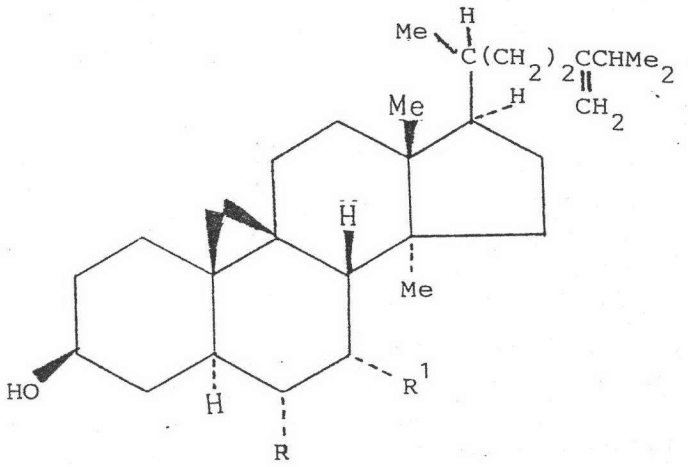
Xie and Yuan (1985) isolated a new compound, isochuanliansu (69) from the bark of *Melia toosendan* Sieb & Zuec. and *Melia azedarach* Linn., traditional Chineses medicines.



(69)

In 1986, there were five reports on phytochemical studies of the plants in the family Meliaceae as follows :

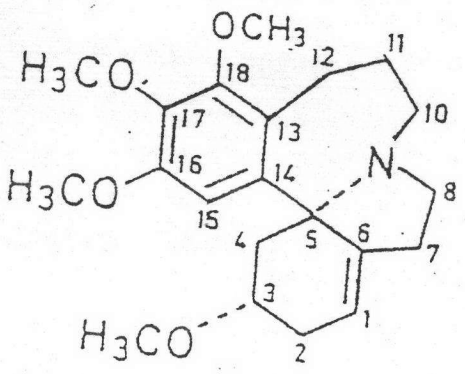
Purushothman *et al.* (1986) isolated roxburghiadiol A (70) and B (71), two new triterpenes, from the leaves and fruits of *Aglaia roxburghiana* Hiern. Their structures were estabished on the basis of chemical and spectroscopic evidences.



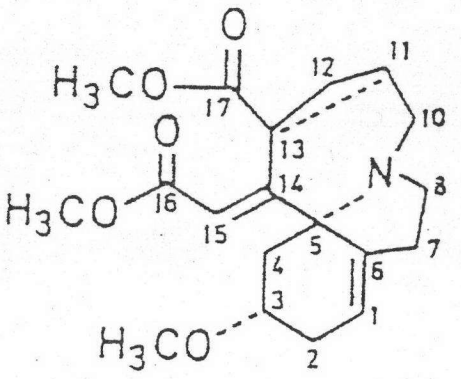
(70) R = H , R^1 = OH

(71) R = OH , R^1 = H

Aladesanmi, Kelley and Leary (1986) reported three alkaolids, 2,7-dihydrohomoerysothrine (46), 18-methoxy-2,7-dihydrohomoerysotrine (72) and lenticellarine (73), from the methanol extracted of the leaves of *Dysoxylum lenticellare* Gillespie, of these lenticellarine was found to be a novel natural product with unusal carbon skeletal.

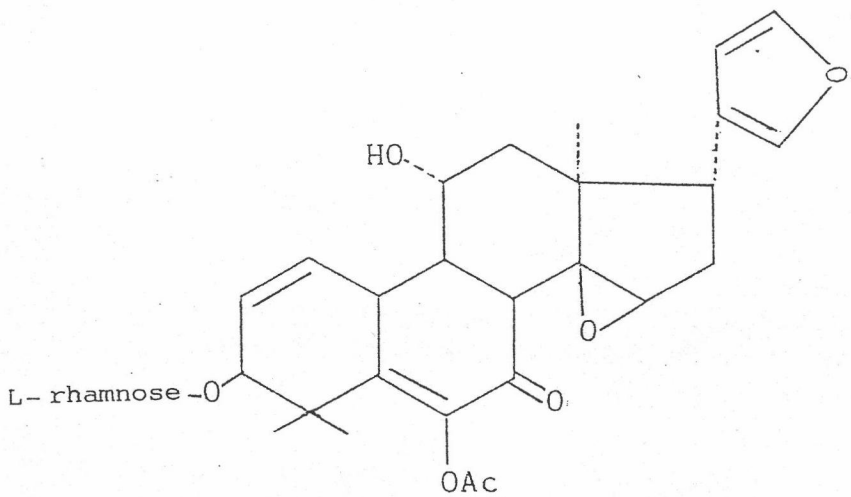


(72)



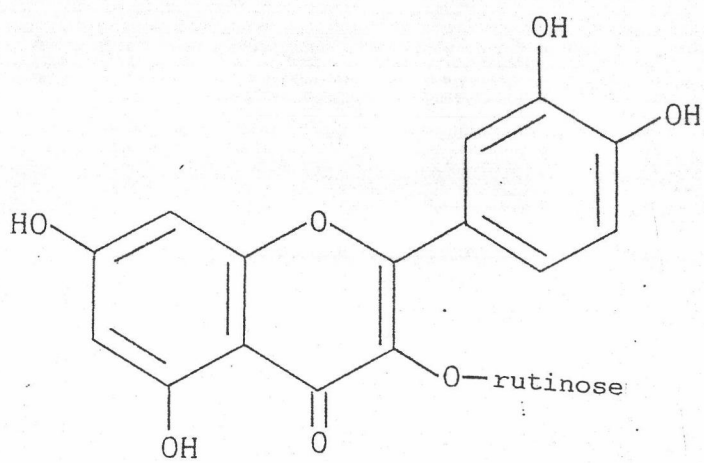
(73)

Srivastava (1986) reported the isolation and characterization of a new limonoid glycoside, 6-acetoxy-11 hydoxy-7-oxo-14,15β-epoxymeliacin-1,5-diene-3-O-α-L-rhamno pyranoside (74) together with salannin (9) from the seed of *Melia azedarch* L. The glycoside showed antibacterial activity.

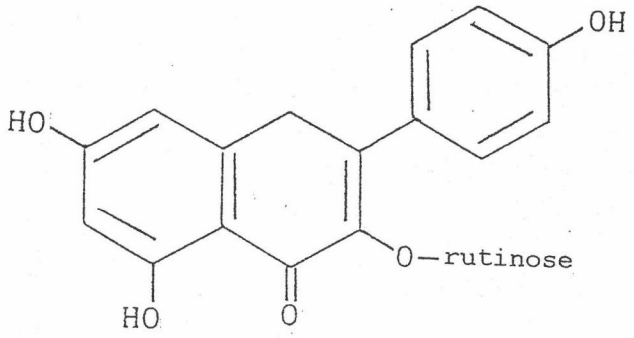


(74)

Marco *et al.* (1986) reported the isolation and charecterization of two flavonol glycosides, rutin (75) and kaempferol-3-O-β-rutinoside (76) from the leaves of *Melia azedarach* L.

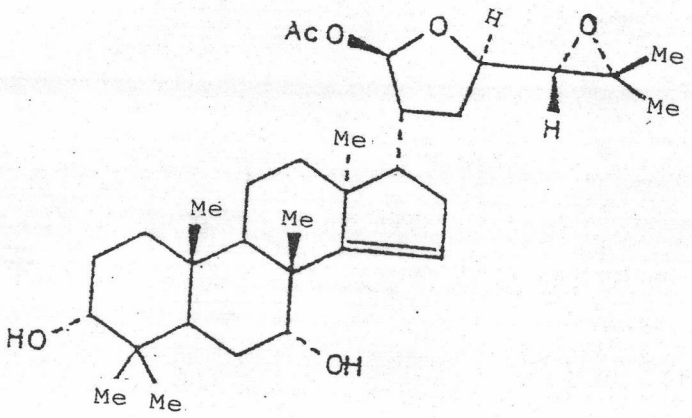


(75)

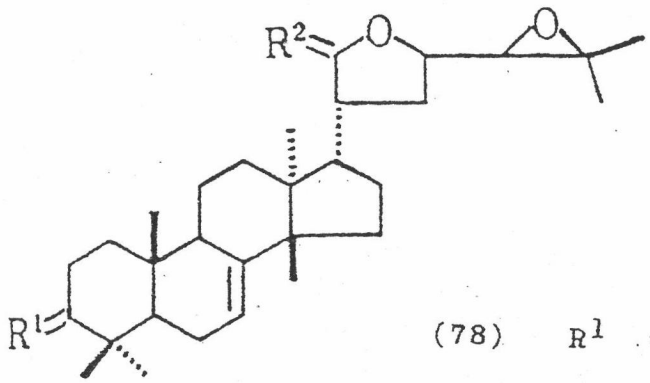


(76)

Nakanishi *et al.* (1986) isolated a new apotirucallane-type triterpene, 21-O-acetyltoosendantriol (77), and a new tirucallane-type triterpenoid derivative, lipomelianol (78) from the fruits of *Melia toosendan* Sieb & Zucc..



(77)



(78) R^1 = -H , $-OCO(CH_2)_nCH_3$

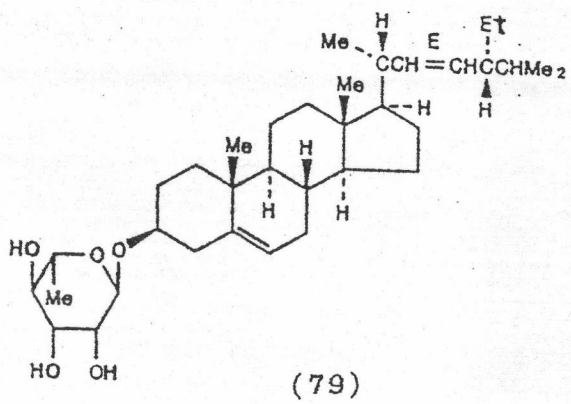
n = 10, 12, 14, 16

R^2 = H , OH

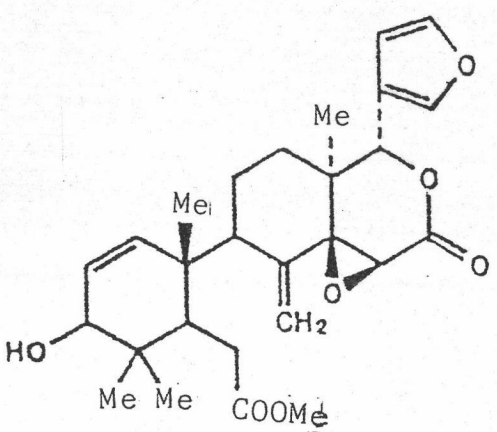
C_{21} epimeric mixture

In 1987, there were four phytochemical reports on the plants in family Meliaceae listed as follows :

Two consecutive reports were done by Agnihotri (1987) and Agnihotri and co-workers (1987) on the isolation and charecterization of a saponin, poriferasterol-3-rhamnoside (79) and a new limonoid, amoorinin (80) from the stem bark of *Amoora rohituka* Wall.

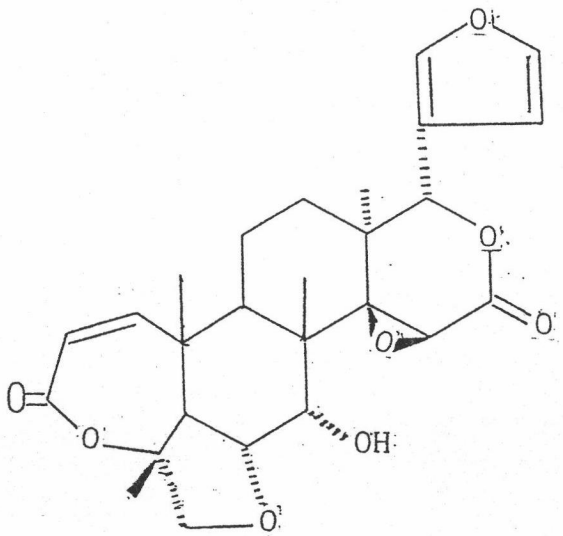


(79)



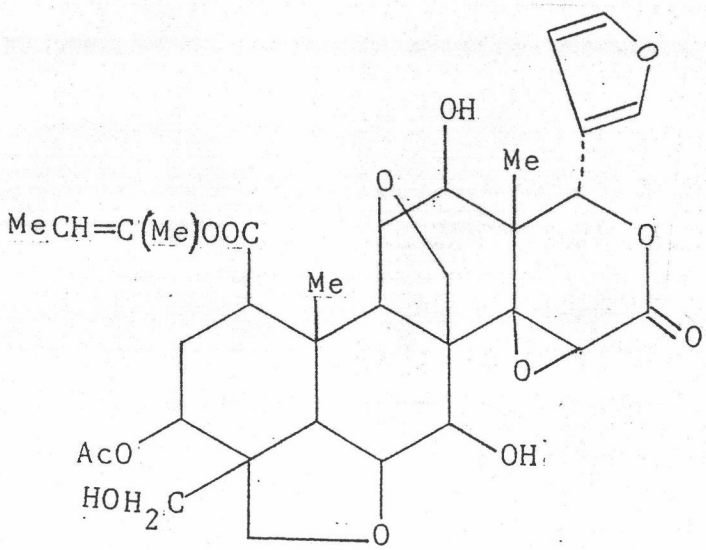
(80)

Jogia and Andersen (1987) isolated dysoxylin (81), a new limonoid, from the fresh leaves of *Dysoxylum richii* (Gray) C.DC. The purposed structure was based on spectral assignments and chemical interconversion.

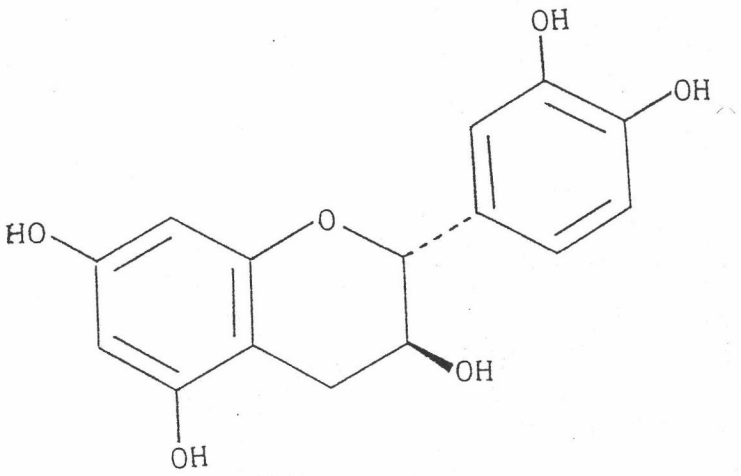


(81)

A novel tetranortriterpenoid (82) and catechin (83) were isolated from the fruits of *Melia azedarach* Linn. (Sabri *et al.* (1987))

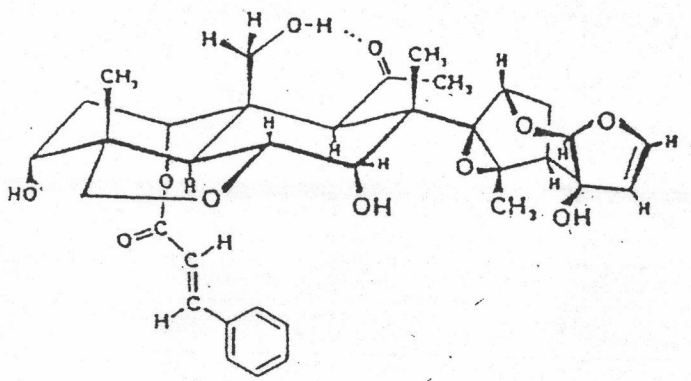


(82)



(83)

Lee *et al.* (1987) isolated a new insectididal tetranortriterpenoid, 1-cinnamoylmelianolone (84) from methanolic extracted of the fruits of *Melia azedarach* L.

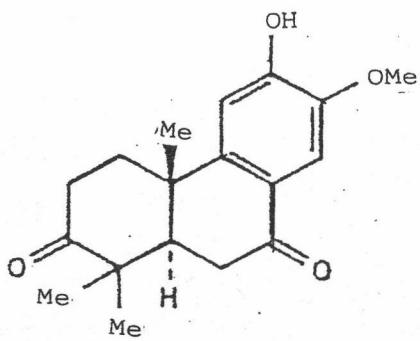


(84)

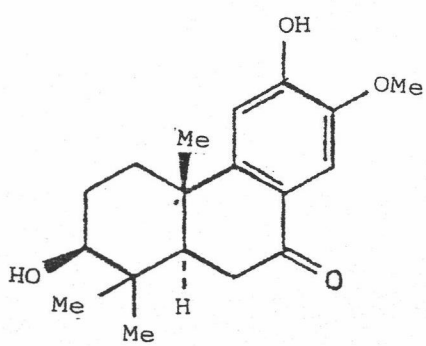
The year 1988 was one of the most exciting year in phytochemical studies of Meliaceous plants, thirteen phytochemical studies were carried out and reported as

follows :

Siddiqui *et al.* (1988) isolated two new triterpenoids, nimbionone (85) and nimbionol (86) , from the acidic fraction of the barks of *Azadirachta indica* A.Juss. and the two compounds showed significant antibacterial activity.

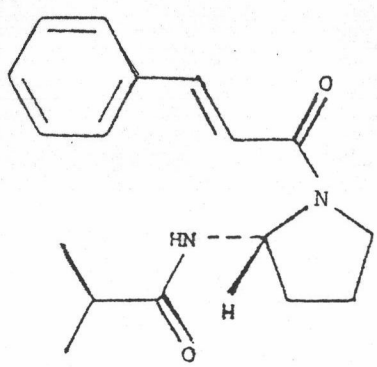


(85)



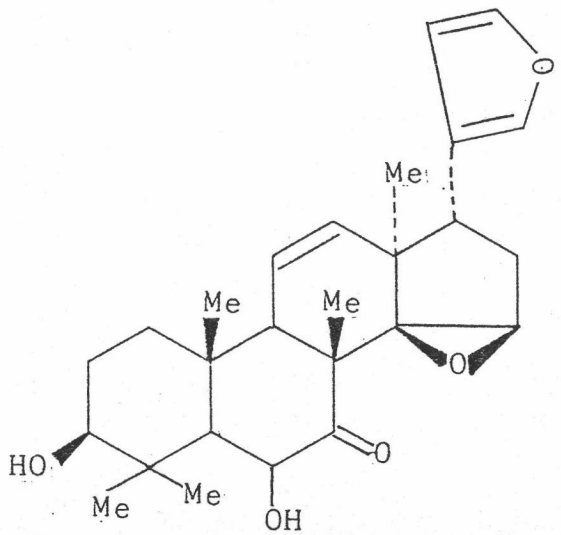
(86)

Saifah and Jongbunprasert isolated a new pyrrolidine alkaloid, piriferine (87), from the leaves of *Aglaia pirifera* Hance. The new alkaloid was identified as N-cinnamoyl-2-(2-methyl-propanoylamino)-pyrollidine by analysis of spectral data.



(87)

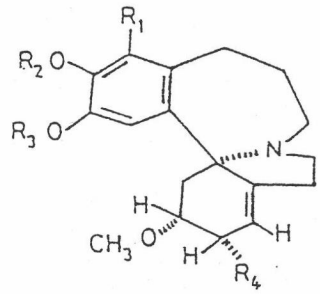
El-Shabrawy and co-workers (1988) isolated a new tetranortriterpenenoid (88) from the leaves of *Cedrela odorata*.



(88)

Aladesanmi *et al.* (1988) isolated a new, homoerythrina-derived alkaloid with molluscidal activity, lenticellarine (73) from the leaves of *Dysoxylum lenticellare* Gillespie.

Aladesanmi (1988) investigated the stem of *Dysoxylum lenticellare* Gillespie and reported the isolation and characterization of two new alkaloids, lenticellarine (73) , 3-epi-2,18-dimethoxyschelhammericine (89); one new diterpene, 8 β-methoxysandaracopimarene (90) and six known compounds, 8β-hydroxysandaracopimarane (91), phyllocladene (92), 3-epi-schelhammericine (93) ,2,7-dihydrohomo erysothrine (94) p-hydroxyacetophenone (95) and 3-epi-18-methoxyschelhammericine (96).

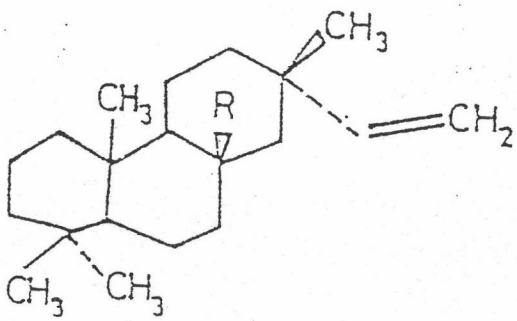


(89) $R_1 = R_4 = OCH_3$, R_2, $R_3 = CH_2$

(93) $R_1 = R_4 = H$, R_2, $R_3 = CH_2$

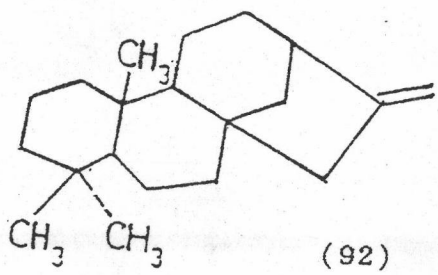
(94) $R_1 = R_4 = H$, $R_2 = R_3 = OCH_3$

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

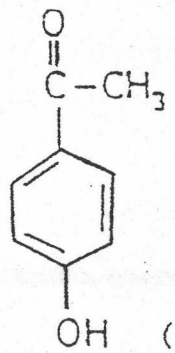


(90) R = OCH_3

(91) R = OH

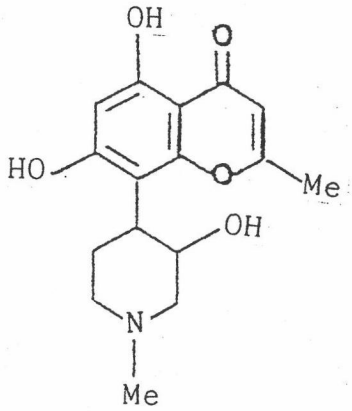


(92)



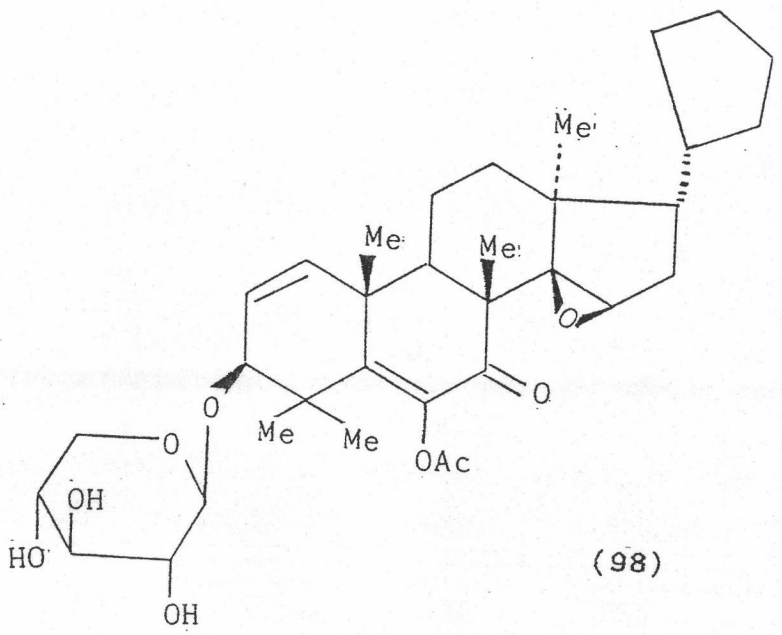
(95)

Naik *et al.* (1988) isolated piperidinylbenzo pyranone, (+)-cis-5,7-dihydroxy-2-methyl-8-[4-(3- hydroxy-1-methyl) piperidinyl]-4H-1-bezopyran-4-one (97) from the stem barks of *Dysoxylum binectariferum* Hook. f. This compound was found to be the aniti-inflamatory and immuno-modulatory principle.



(97)

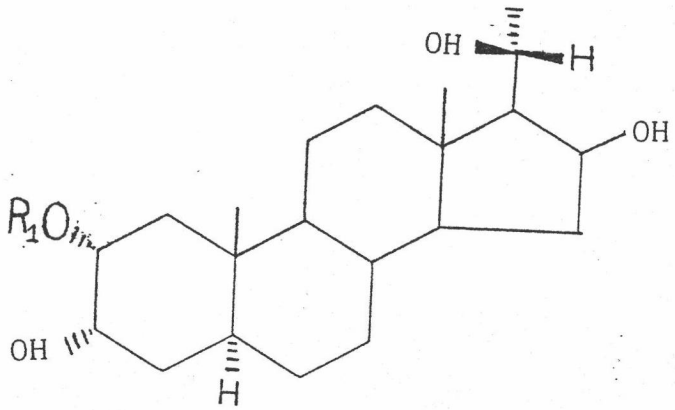
Rusia and Srivastava (1988) isolated a new limonoid glycoside (98) , 6-acetoxy-3β-hychoxy-7-oxo-14β-epoxy meliac-1,5-diene-3-O-β-D-xylopyranoside from the seeds of *Melia azedarach* Linn.

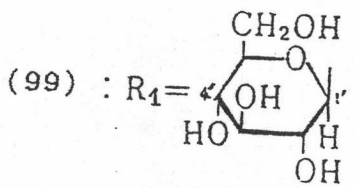


(98)

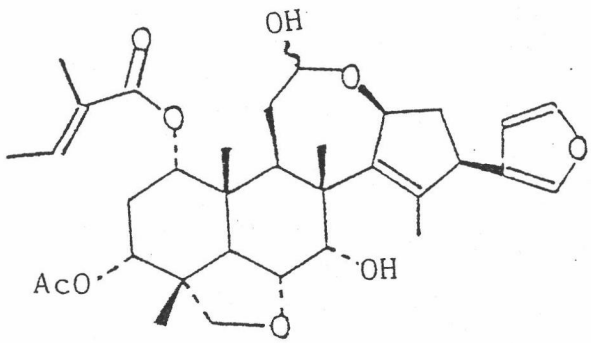
Nakanishi *et al.* (1988) isolated a new pregnane glycoside, toosendanoside (99), from the leaves of *Melia toosendan* Sieb et Zuce. Its structure has been assigned as (20R)-5-α-pregnane-2A,3A,16B,20-tetrol-2-O-β-D-gluco-

pyranoside, based on lines of chemical and spectral evidence.

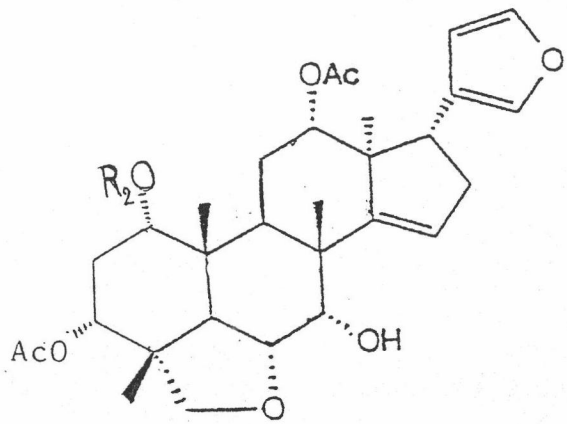


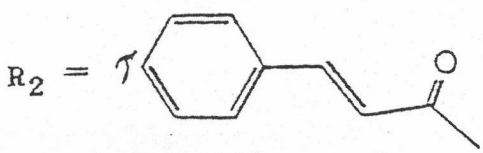


Rajab and Bentley (1988) published two papers on phytochemical studies of the fruits of *Melia volkensii* Giirke and reported the isolation and characterization of a new limonoid, volkensin (100) together with a known limonoid salannin (9) and three new tetranortriterpenoids, 1-cinnamogltrichilinin (101), 1-tigloyltrichilinin (102) and 1-acetyltrichlinin (103), together with ochinin-3-acetate. A new limonoid showed its high activity as an antifeedant against lavae of the fall army-worm, *Spodoptera frugiperda*.

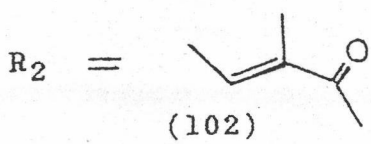


(100)





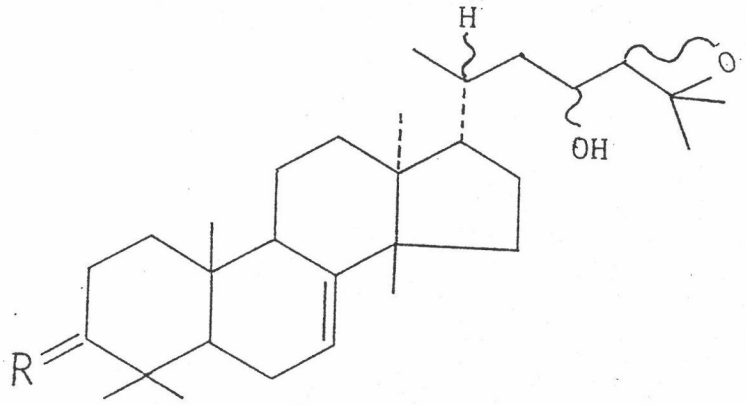
(101)



(102)

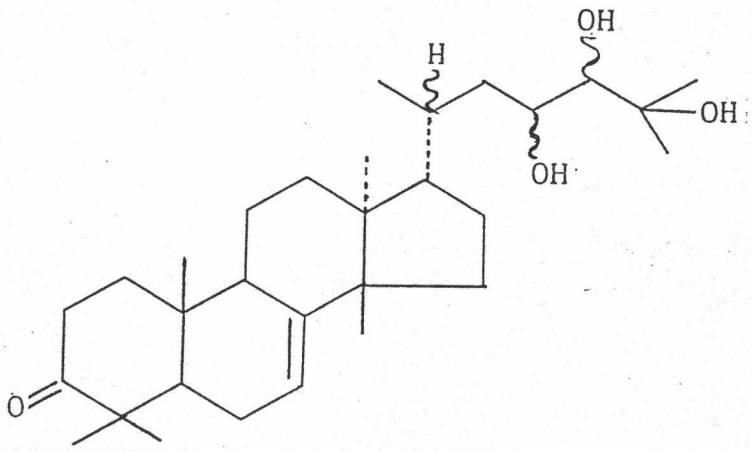
(103) R_2=Ac

Mulholland and Taylor (1988) studied wood and bark of *Turraea nilotica* and reported the presence of a new protolimonoid, 24, 25 epoxy-23-hydroxy-7-tirucallen-3-one named niloticin (104), together with two closely related compounds, dihydroniloticin (105) and the triol derivative of niloticin (106).



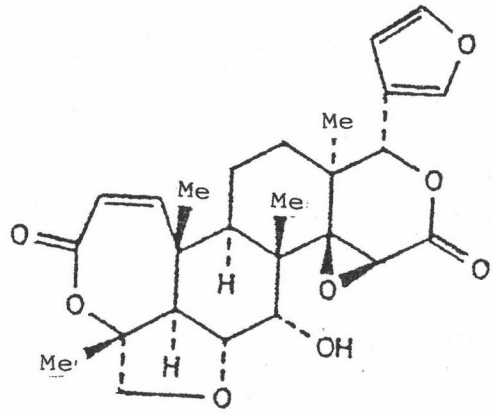
(104) R = O

(105) R = H , OH



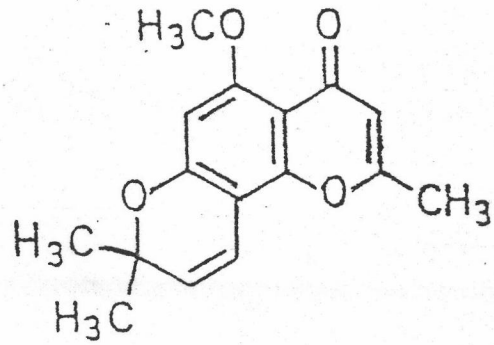
(106)

Jogia and Andersen (1989) reported the isolation and charecterization of three new limonoids, dysoxylone (107), tigloyldysoxylin and 6-acetoxybacunol acetate together with a known limonoid dysoxyline (42) from dried leaves of *Dysoxylum richii* (Gray) C. DC.



(107)

Langenhoven *et al.* (1989) investegated the leaves and twigs of *Ptaeroxylon obliquum* (Thumb) Radlk. and obtained an antihypertensive chromone, methylalloptaeroxylin (108) from benzene fraction.



(108)

The pharmacological activities of the Meliaceous plants were listed according to the literature survey in alplabetical order (Table 1).

Table 1 : Pharmacological activities of the Meliaceous plants.

Plant Name	Chemical Constituent	Pharmacological Activity	Reference
Aglaia elliptifolia Merrill.	rocaglamide (41)	anti-leukemic	King *et al.* (1982)
Aphanamixis grandifolia	aphanamol I (49)	toxic principle	Nishisawa *et al.* (1984)
	aphanamol II (50)		
Azadirachta indica	meliantriol (16)	antifeedant	Lavie and co-worker (1967)
Juss.	nimbionone (80)	antibacterial	Siddiqui *et al.* (1988)
	nimbionol (81)		
Dysoxylum acutminatum	(+)-8-hydroxycalamenene (47)	antibacterial	Nishisawa *et al.* (1983)
Dysoxylum alliaceum	(+)-8-hydroxycalamenene (47)	antibacterial	Nishisawa *et al.* (1983)
Dysoxylum binectariferum	dysobinin (36)	CNS-depressant	Singh *et al.* (1976)
Hook. f.	rohitukine (37)	analgesic and immunomodulatory	Vasudev and co-worker (1985)
	piperidinylbenzopyranone (92)	activity	Naik *et al.* (1988)

Table 1 (cont.)

Plant Name	Chemical Constituent	Pharmacological Activity	Reference
Dysosylum lenticellare Gillespie.	dysoxyline (42)	caridac effect	Aladesanmi and Adesanmi (1987)
	homolaudanosine		
	3-epi-12-hydroxyschelhammericine (52)		
	methanolic extract	cardiodepressant	Adesanmi and Aladesanmi (1988)
Melia azedarch L.	N9GI	anti-turmor	Termo (1985)
	limonoid glycoside (71)	antibacterial	Srivastava (1986)
	meliatoxin	acute nervous symthom	Oelriches *et al.* (1988)
Melia volkeinsii Gurke	volkensin (95)	antifeedant	Rajab and Bentley (1988)
Turrea nilotica	lariciresinol 4 monoethyl ether (56)	anti-cancer	Ayoub and Kingston (1984)

From the above informations, chemistry of meliaceous plants is very interesting especially the chemistry of alkaloid in genus *Aglaia* and *Dysoxylum*. It is the purpose of this investigation to studies, the nature of alkaliod in the leaves of *Aglaia pyramidata* Hance. The results may serve as a piece of support to disclose the alkaloids in this family. Moreover, some isolated compounds would provided information to clarify their structures which lead to the valuable information in the field of chemotaxonomy.