IRIDOIDS. A REVIEW

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ABSTRACT.—The review presents a glossary of the iridoid glycosides, secoiridoids, bis-iridoids, and non-glycosidic iridoids. The following information is present for each compound, when available: structural formula, molecular formula, molecular weight, mp and $[\alpha]_D$ values, uv, ir, ^{1}H-nmr, ^{13}C-nmr, and ms data, as well as mp and $[\alpha]_D$ values for the correspondent acetate derivative. The natural source, the family and generic name, is given as well as the reference. A cross index and molecular weight tables are presented.

Iridoids represent a large and still expanding group of cyclopentan-(c)-pyran monoterpenoids. They are found as natural constituents in a large number of plant families, usually, but not invariably, as glucosides. In some instances the presence of iridoids has been used to support a defined botanical classification (1).

The name iridoid is a generic term derived from the names iridomyrmecin, iridolactone, and iridodial, compounds isolated from some species of *Iridomyrmex*, a genus of ants, in which they occur as defensive secretions (2). Although the name iridoid is now generally accepted, these compounds have been referred to as pseudoindicans, due to the blue coloration that some of them develop upon hydrolysis. They have also been referred to as aucubin glucosides.

Iridoids were first isolated in the latter part of the nineteenth century, but it was not until 1958 that O. Halpern and H. Schmid (3) proposed the basic skeleton of the iridoids in their investigation of the structure of plumieride.

Several reviews which dealt with the iridoid group include those of Bobbitt and Segebarth (4), 1969, a comprehensive review which also included physicochemical data; Plouvier and Favre-Bonvin (5), 1971, which stressed the distribution, structure, properties and biosynthesis; Buchbauer (6), in 1974, discussed the pharmaceutical significance of the iridoids; Sticher and Junod-Busch (7), 1975, presented a study of their isolation proceedures; Jensen, Nielsen and Dahlgren (1), in 1975, dealt with their botanical distribution; the taxonomical significance of the iriodids of *Tubiflora* has been discussed by R. Hegnauer and P. Kooiman (217), furthermore, P. Kooiman has presented information on the distribution of iridoids in the families Rubiaceae (218), Scrophulariaceae (219), and Labiatae (220); Vand Der Sluis and Labadie (8), in 1978, reviewed the secoiridoids; and, finally, in 1978, Jahodar (9), Rimpler (10), and Sticher (11) presented three approaches dealing with the isolation and structure elucidation of the iridoid glucosides. From the biosynthetic point of view, Inouye and coworkers have discussed this subject on several occasions [1971 (12), 1978 (13, 14)].

The present review is a presentation of a listing of the iridoids and secoiridoids that have appeared in the literature through January, 1980, with their physical constants: melting point, specific rotation, ultraviolet, infrared, proton and carbon magnetic resonance, as well as mass spectral data. The intent of the review is to provide the researcher who has just managed to isolate an iridoid compound with a quick means of deciding whether his compound is known or new and to allow him to establish a structural hypothesis by comparison of the physical data.

Included in this listing are iridoid glycosides, secoiridoids, and non-glycosidic iridoids. We have chosen not to include nitrogen-containing iridoids, neither the

simple product of the substitution of oxygen with nitrogen (upon ammonia treatment of the iridoid) nor the large and important group of alkaloids with an iridoid part, i.e., ajmalicine, catharanthine and ibogamine type, which by themselves constitute a clear and defined group.

The material has been divided into ten groups. Iridoid glycosides with a C–8, C–9, and C–10 carbon skeleton constitute the first three groups. The C–9 group is separated into two subgroups, depending on the position of the ninth carbon, which is either on C–4 or C–8. Increasing oxidation state of carbons 10 and 11 marks the sequence in these groups. The secoiridoids constitute the next three groups. Group IV contains the simple secoiridoids; whereas, group V contains secoiridoids which are conjugated with a terpene type moiety; in group VI, secoiridoids which carry a phenolic moiety as a substituent are presented. Group VII contains the bis-iridoids and bis-secoiridoids. The non-glycosidic iridoids constitute the last three groups: miscellaneous structures in group VIII; tetracyclic non-glycosidic iridoids of plumiera type are in group IX; and, finally, the valeriana compounds constitute group X. In all cases, an increasing oxidation state was used as a guide for the presentation of the different structures.

The numbering of the skeleton is according to figure 1. If C–10 is not present, then C–11 takes its number. In the cases in which an aromatic ring is present, the numbering system of the ring is as pictured in figure 1, structure **c**. When bis-iridoid glycosides are presented, the iriodid part is denoted as **a**, and the secoiridoid part as **b**.

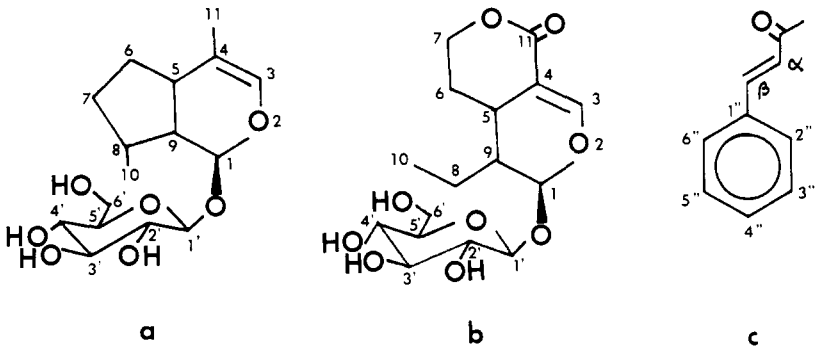


FIG. 1. Numbering systems for: **a**) iridoids, **b**) secoiridoids, and **c**) aromatic ring.

For each compound the following information is provided when available: the structure, molecular formula and calculated molecular weight (mass spectrum); melting point in °C; [α] (with concentration and solvent); for uv data the λ max is given in nm (log ϵ); the ir data is given in cm^{-1}; the ^{1}H-nmr and ^{13}C-nmr chemical shifts are in δ (ppm scale) units, and the coupling constants in Hz. The ^{1}H-nmr data have been rounded to the second decimal point; the ^{13}C-nmr data have been rounded to the first decimal. The *m/e* data of mass spectra are given. The data are followed by the corresponding reference number.

Because of the increasing number of compounds identified through the acetate derivative, the melting point and optical rotation for this derivative are stated when available. When more than one acetate was reported, the one with the highest number of acetates was chosen. Moreover, when the ^{1}H-nmr data was available only for the derivative, this data is then presented.

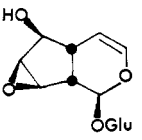
The family and, in some instances, the generic source from which the compound was characterized is stated; when possible other sources in which the compound is present are given.

Some abreviations used throughout the text are: Glu: glucose; Xyl: xylose; t: trans; Me: methyl; p: para; Ac: acetate; ϕ: phenyl.

A cross index and molecular weight tables are presented in tables 2 and 3 respectively.

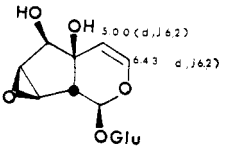
TABLE 1. Iridoid compounds.

I. Iridoid glycosides: Eight carbon basic skeleton



1 UNEDOSIDE

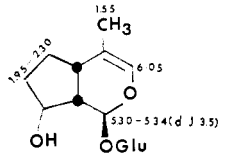
$C_{14}H_{20}O_9$: 332.1107
MP: 232–4° (15)
$[\alpha]_D$: −112.4° (4)
DERIVATIVES: Aglucon acetate:
^{1}H-NMR: 5.6 (d, J=9.5, H_1), 5.0 (H_3), 4.9 (q, H_6), 3.6 (d, J=2.8, H_7 & $_8$) (15)
SOURCES: Ericaceae: *Arbutus* (15)
Verbenaceae: *Stilbe* (16, 17)



2 STILBERICOSIDE

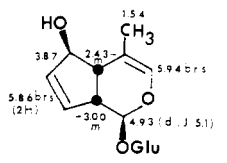
$C_{14}H_{20}O_{10}$: 348.1056
$[\alpha]^{20}_D$: −61.5 (c=0.2, H_2O) (16)
UV: (H_2O) 197 (3.97) (16)
IR: 1645 (16)
^{1}H-NMR: (16)
MS: *m/e*: 186, 185, 169, 168, 167, 163, 162, 157, 151, 150, 149, 145, 139, 134, 127, 123, 121, 114, 109, 97, 91, 87, 85, 83, 81, 73, 71, 69, 61, 60, 57, 55, 53, 51, 45, 43, 41, 39 (16)
DERIVATIVE: Hexaacetate:
MP: 144–6° (16)
SOURCES: Verbenaceae: *Stilbe* (16)

IIa. Iridoid glycosides: Nine carbon basic skeleton (C-9 in C-4)



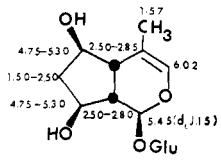
3 STRICTOSIDE

$C_{15}H_{24}O_8$: 332.1471
^{1}H-NMR: D_2O, 90 MHz (18)
^{13}C-NMR: D_2O, (1) 95.4, (3) 133.4, (4) 116.1, (5) 35.7, (6) 27.6, (7) 32.8, (8) 74.7, (9) 50.6, (10) 15.4, (1') 99.1, (2') 73.3, (3') 76.7, (4') 70.2, (5') 76.3, (6') 61.3 (18)
DERIVATIVE: Pentaacetate:
MP: 146–8° (18)
$[\alpha]^{22}_D$: −118° (c=3.7, $CHCl_3$) (18)
SOURCES: Loasaceae: *Mentzelia* (18)



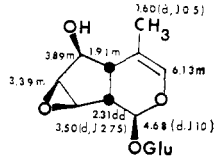
4 LOASASIDE

$C_{15}H_{22}O_8$: 330.1314
MP: 216–220° d (18)
$[\alpha]^{23}_D$: −150° (c=1.3, H_2O) (18)
UV: (CH_3OH) 207 (3.55) (18)
IR: KBr, 3400, 1650, 1610, 1350, 1150, 1050 (18)
MS: M−330, *m/e*: 168, 151, 133, 122, 85 (18)
^{1}H-NMR: D_2O, 90 MHz (18)
^{13}C-NMR: D_2O, (1) 97.7, (3) 135.7, (4) 114.5, (5) 48.4*, (6) 81.2, (7) 134.7, (8) 134.9, (9) 46.9*, (10) 15.4, (1') 99.3, (2') 73.5, (3') 77.0, (4') 70.4, (5') 76.5, (6') 61.5 (18)
DERIVATIVE: Pentaacetate:
MP: 153–6° (d, unstable) (18)
SOURCES: Loasaceae: *Mentzelia* (18)



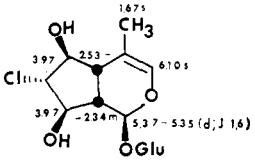
5 DEUTZIOL

$C_{15}H_{24}O_9$: 348.1420
MP: 108–110° (19)
$[\alpha]^{25}D$: −150° (c=0.6, CH_3OH) (19)
UV: (CH_3OH) 218 (2.97) (19)
IR: KBr, 1650 (19)
^1H-NMR: D_2O (19)
SOURCES: Saxifragaceae (Hydrangeaceae): *Deutzia* (19)



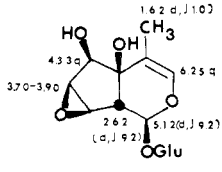
6 MENTZELOSIDE (DEUTZIOSIDE)

$C_{15}H_{22}O_9$: 346.1263
MP: 266–270° (20)
$[\alpha]^{23}D$: −101° (c=1.021, H_2O) (20)
UV: 205 (3.53) (20)
IR: KBr, 3420, 1665 (20)
^1H-NMR: DMSO-d_6, 100 MHz (20)
^{13}C-NMR: D_2O, (1) 96.7, (3) 135.6, (4) 113.4, (5) 42.5*, (6) 78.4, (7) 56.4, (8) 59.6, (9) 41.0*, (10) 15.8, (1′) 99.8, (2′) 73.4, (3′) 77.0, (4′) 70.2, (5′) 76.4, (6′) 61.2 (18)
DERIVATIVE: Pentaacetate:
MP: 199° (20)
$[\alpha]^{26}D$: −103.3° (c=0.974, $CHCl_3$) (20)
SOURCES: Loasaceae: *Mentzelia* (20)
Saxifragaceae: *Deutzia* (21, 216)



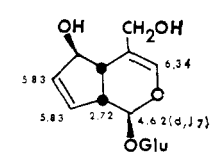
7 7-CHLORODEUTZIOL

$C_{15}H_{23}O_9Cl$: 382.1030
MP: 126–8° d (18)
$[\alpha]^{22}D$: −132° (c=1.0, H_2O) (18)
UV: (CH_3OH) 205 (3.5) (18)
IR: KBr, 3400, 1670, 1620, 1090, 890 (18)
^1H-NMR: D_2O, 90 MHz (18)
^{13}C-NMR: D_2O, (1) 95.2, (3) 135.3, (4) 115.7, (5) 46.4*, (6) 82.1, (7) 70.9, (8) 78.1, (9) 41.5*, (10) 16.8, (1′) 100.3, (2′) 74.6, (3′) 77.6, (4′) 71.6, (5′) 77.3, (6′) 62.8 (18)
DERIVATIVE: Hexaacetate:
MP: 124–5° (18)
$[\alpha]^{20}D$: −125° (c=2.6, $CHCl_3$) (18)
SOURCES: Loasaceae: *Mentzelia* (18)



8 SCABROSIDE

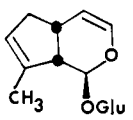
$C_{15}H_{22}O_{10}$: 362.1213
MP: 218–220 (22)
$[\alpha]^{15}D$: −80.5 (c=0.5, CH_3OH) (22)
UV: 208 (3.6) (22)
IR: 1670 (22)
^1H-NMR: D_2O (22)
SOURCES: Saxifragaceae: *Deutzia* (22)



9 DECALOSIDE

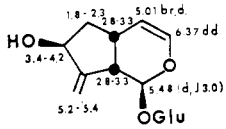
$C_{15}H_{22}O_9$: 346.1263
MP: 193° (23)
$[\alpha]^{23}D$: −137.9° (c=0.475, CH_3OH) (23)
UV: 204 (3.68) (23)
IR: 3390, 1658 (23)
^1H-NMR: DMSO-d_6 (23)
^{13}C-NMR: D_2O, (1) 97.7, (3) 139.0, (4) 116.4, (5) 47.5,* (6) 80.9, (7) 133.8, (8) 135.8, (9) 43.4*, (10) 61.3, (1′) 99.1, (2′) 73.3, (3′) 76.7, (4′) 71.9, (5′) 76.3, (6′) 61.2 (18)
DERIVATIVE: Hexaacetate:
MP: 162–4° (23)
$[\alpha]^{24}D$: −127.62° (c=1.144, $CHCl_3$) (23)
SOURCES: Loasaceae: *Mentzelia* (23)

IIb. Iridoid glycosides: Nine carbon basic skeleton (C-9 in C-8)



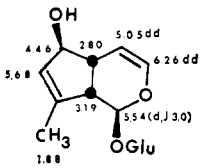
10 6,10 BISDEOXYAUCUBIN

$C_{15}H_{22}O_7$: 314.1365
^{1}H-NMR: D_2O (24)
DERIVATIVE: Tetraacetate:
MP: 137–8° (25)
$[\alpha]^{22}_D$: −142° (c=0.5, $CHCl_3$) (25)
SOURCES: Synthesis (24, 25)



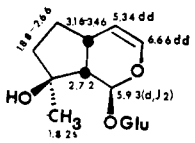
11 ANTIRRIDE

$C_{15}H_{22}O_8$: 330.1314
MP: 85–7° (26), 83–4° (27)
$[\alpha]^{23}_D$: −116° (c=0.42, Dioxane) (26), −124° (c=0.4, Dioxane) (27)
UV: 206 (3.6) (27)
IR: (KBr) 1665, 1670 (27)
^{1}H-NMR: D_2O, 100 MHz (27)
DERIVATIVE: Pentaacetate:
MP: 154–5° (26), 152–3° (27)
$[\alpha]^{23}_D$: −142° (c=0.64, Dioxane) (27), $[\alpha]^{13}_D$: −158° (c=1.05, Dioxane) (26)
SOURCES: Scrophulariaceae: *Linaria* (26), *Antirrhinum* (27)



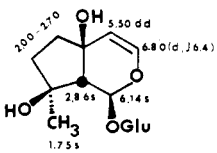
12 LINARIDE (10-DEOXYAUCUBIN)

$C_{15}H_{22}O_8$: 330.1314
Amorphous powder
UV: 204 (3.7) (28)
IR: KBr, 1660, 1650 (28)
^{1}H-NMR: D_2O, 90 MHz (28)
DERIVATIVE: Pentaacetate:
MP: 122–3° (28)
$[\alpha]^{18}_D$: −178° (c=3.3, Dioxane) (28)
SOURCES: Scrophulariaceae: *Linaria* (28)



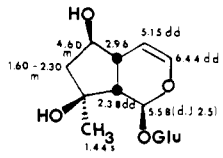
13 GLUROSIDE

$C_{15}H_{24}O_8$: 332.1471
Amorphous powder
$[\alpha]^{20}_D$: −178.5° (H_2O) (29)
UV: (H_2O) 190 (3.8) (29)
IR: KBr, 1653 (29)
^{1}H-NMR: D_2O, 100 MHz (29)
DERIVATIVE: Pentaacetate:
MP: 113–114° (29)
$[\alpha]^{20}_D$: −124.1° ($CHCl_3$) (29)
SOURCES: Labiatae: *Galeopsis* (29)



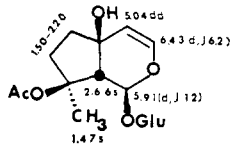
14 6-DESOXY-HARPAGIDE

$C_{15}H_{24}O_9$: 348.1420
Amorphous powder
$[\alpha]^{20}_D$: −158.4° (H_2O) (29)
UV: (H_2O) 189 (3.9) (29)
IR: KBr, 1655 (29)
^{1}H-NMR: D_2O, 100 MHz (29)
DERIVATIVES: Tetraacetate:
MP: 188–9° (29)
$[\alpha]^{20}_D$: −133.4° ($CHCl_3$) (29)
Pentaacetate:
MP: 127–8° (29)
$[\alpha]^{20}_D$: −112.7° (Acetone) (29)
SOURCES: Labiatae: *Galeopsis* (29)



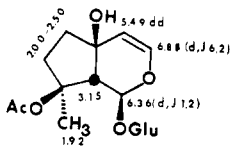
15 MIOPOROSIDE

$C_{15}H_{24}O_9$: 348.1420
Amorphous powder
$[\alpha]^{25}D$: −175° (c=1.0, CH_3OH) (30)
UV: (CH_3OH) 204 (3.51) (30)
IR: KBr, 1660 (30)
^1H-NMR: D_2O, 60 MHz (30)
DERIVATIVE: Hexaacetate:
MP: 174–5° (30)
SOURCES: Myoporaceae: *Myoporum* (30)



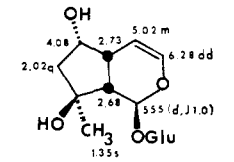
16 REPTOSIDE

$C_{17}H_{26}O_{10}$: 390.1526
Hygroscopic, Amorphous powder
$[\alpha]^{27}D$: −45° (c=0.7, CH_3OH) (31)
UV: (CH_3OH) 205 (3.7) (31)
IR: KBr, 1710, 1650 (31)
^1H-NMR: D_2O (31)
DERIVATIVE: Pentaacetate:
MP: 127–8° (31)
$[\alpha]^{27}D$: −114° (Acetone) (31)
SOURCES: Labiatae: *Ajuga*, *Galeopsis* (31)



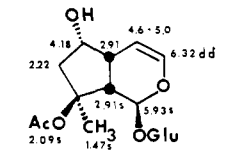
17 GLUCOSIDE VII

$C_{17}H_{26}O_{10}$: 390.1526
Amorphous powder
$[\alpha]^{20}D$: −42° (CH_3OH) (29)
UV: (H_2O) 205 (3.7) (29)
IR: KBr, 1710, 1650 (29)
^1H-NMR: D_2O, 100 MHz (29)
DERIVATIVE: Pentaacetate:
MP: 125–7° (29)
$[\alpha]^{20}D$: −105° (CH_3OH) (29)
SOURCES: Labiatae: *Galeopsis* (29)



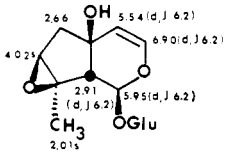
18 AJUGOL

$C_{15}H_{24}O_9$: 348.1420
Amorphous powder
$[\alpha]^{20}D$: −169° (c=2, CH_3OH) (32)
^1H-NMR: D_2O (32)
DERIVATIVE: Pentaacetate:
MP: 127–8° (32)
$[\alpha]^{18}D$: −168° (c=2, Acetone) (32)
SOURCES: Labiatae: *Ajuga*, *Melittis*, *Leonurus* (32)



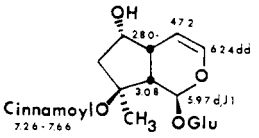
19 AJUGOSIDE (LEONURIDE)

$C_{17}H_{26}O_{10}$: 390.1526
Amorphous powder
$[\alpha]^{17}D$: −115° (c=2, CH_3OH) (32)
UV: (CH_3OH), 206 (3.6) (32)
IR: (KBr) 1705, 1655 (32)
^1H-NMR: D_2O (32)
DERIVATIVE: Hexaacetate:
MP: 172–3° (32)
$[\alpha]^{18}D$: −93° (c=2, Acetone) (32)
^{13}C-NMR: (1) 94.0, (3) 140.4, (4) 102.8, (5) 38.0, (6) 77.9, (7) 45.3, (8) 87.1, (9) 48.3, (10) 22.1, (1') 95.7, (2') 70.7, (3') 72.7, (4') 68.7, (5') 72.0, (6') 62.0 (33)
SOURCES: Labiatae: *Ajuga*, *Melittis*, *Leonurus* (32, 34)



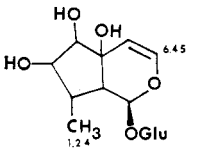
20 GALIRIDOSIDE

$C_{15}H_{22}O_9$: 346.1263
MP: 189–192° (35)
$[\alpha]^{23}D$: −78° (c=0.99, H_2O) (35)
UV: (H_2O) 189.5 (4.18) (36)
IR: KBr, 1663 (36)
^{1}H-NMR: D_2O, 100 MHz (36)
DERIVATIVE: Tetraacetate:
MP: 130–2° (36)
$[\alpha]^{23}D$: −60° (c=1.05, $CHCl_3$) (36)
SOURCES: Labiatae: *Leonurus* (31), *Galeopsis* (36), *Ajuga* (31).



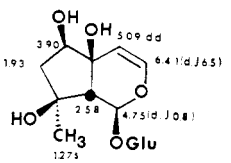
21 LATERIOSIDE

$C_{24}H_{30}O_{10}$: 478.1838
$[\alpha]^{20}D$: −68.9° (c=0.83, CH_3OH) (37)
UV: (EtOH) 207 (4.06), 218 (4.13), 224 (4.06), 279 (4.31) (37)
IR: KBr, 1690, 1655, 1635, 1580. 1495, 1450 (37)
^{1}H-NMR: CD_3OD (37)
^{13}C-NMR: CD_3OD, (1) 94.6, (3) 141.5, (4) 104.1, (5) 41.6, (6) 76.8[b], (7) 48.8, (8) 90.1, (9) 49.4, (10) 23.0, (1') 100.0, (2') 74.6, (3') 77.8[b], (4') 71.5, (5') 77.8[b], (6') 63.0, (1") 135.6, (2") 129.8[c], (3") 129.0, (4") 131.3, (5") 129.0, (6") 129.8, (α) 145.7, (β) 120.1, (CO) 168.5 (37)
DERIVATIVE: Pentaacetate:
MP: 157–9° (37)
$[\alpha]^{20}D$: −89.2 (c=0.56, $CHCl_3$) (37)
SOURCES: Scrophulariaceae: *Scrophularia* (37)



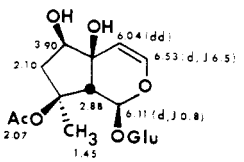
22 IRIDOID A

$C_{15}H_{24}O_{10}$: 364.1369
DERIVATIVE: Pentaacetate:
MP: 198–9° (38)
$[\alpha]^{20}D$: +10° ($CHCl_3$) (38)
UV: 218 (38)
IR: 1650 (38)
^{1}H-NMR: (38)
SOURCES: Gentianaceae: *Gentiana* (38)



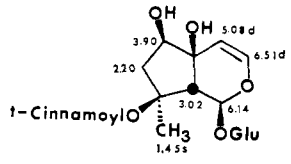
23 HARPAGIDE

$C_{15}H_{24}O_{10}$: 364.1369
Amorphous powder
$[\alpha]^{22}D$: −154° (c=1.135, EtOH) (39)
IR: 1655 (39)
^{1}H-NMR: D_2O (39)
DERIVATIVE: Heptaacetate:
MP: 185–190° (39)
$[\alpha]^{22}D$: −118° (c=0.99, $CHCl_3$) (39)
^{13}C-NMR: For Hexaacetate: (1) 94.1, (3) 141.7, (4) 107.3, (5) 71.5, (6) 77.7, (7) 43.6, (8) 86.1, (9) 54.8, (10) 22.2, (1') 96.5, (2') 71.2, (3') 72.1, (4') 68.7, (5') 72.1, (6') 62.0 (33)
SOURCES: Labiatae: *Ajuga, Galeopsis, Melittis, Stachys, Teucrium* (4), Pedaliaceae: *Harpagophytum* (1), Scrophulariaceae: *Scrophularia* (40)



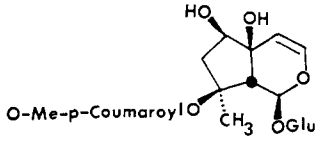
24 8-ACETYL HARPAGIDE

$C_{17}H_{26}O_{11}$: 406.1475
MP: 154–6° (41)
$[\alpha]^{17}D$: −132° (c=1.04, CH_3OH) (41)
UV: 210 (3.6) (4)
^{1}H-NMR: D_2O, 60 MHz (41)
DERIVATIVE: Heptaacetate:
MP: 185–190° (39)
$[\alpha]^{22}D$: −118° (c=0.99, $CHCl_3$) (41)
SOURCES: Labiatae: *Melittis, Ajuga, Galeopsis, Stachys, Teucrium* (4, 41)



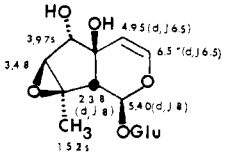
25 HARPAGOSIDE

$C_{24}H_{30}O_{11}$: 494.1788
Amorphous powder
$[\alpha]^{21}D$: −42.6 (c=0.99, CH_3OH) (39)
UV: 216 (4.19), 222 (4.12), 276 (4.36) (39)
IR: 1690, 1635, 1580, 1500 (39)
^1H-NMR: D_2O (39)
DERIVATIVES: Pentaacetate:
MP: 213–4° (39)
$[\alpha]^{22}D$: −60.2° (c=0.76, $CHCl_3$) (39)
^{13}C-NMR: (1) 94.1, (3) 141.5, (4) 107.3 (5) 71.5, (6) 77.6, (7) 43.3, (8) 86.2, (9) 54.9, (10) 22.2, (1′) 96.4, (2′) 71.0, (3′) 72.1, (4′) 68.7, (5′) 72.1, (6′) 61.9, (1″) 134.5, (2″) 128.8, (3″) 127.9, (4″) 130.2, (5″) 127.9, (6″) 128.8, (β) 119.1, (α) 144.5, (CO) 166.0 (33)
SOURCES: Labiatae: *Lamium* (4), Pedaliaceae: *Harpagophytum* (1), Scrophulariaceae: *Scrophularia* (40)



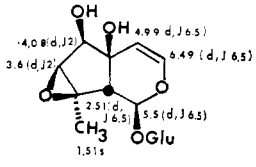
26 8-(O-METHYL-p-COUMAROYL) HARPAGIDE

$C_{25}H_{32}O_{13}$: 540.1842
Isolated as a mixture with harpagoside, structure determined by hydrolysis, and analysis of the acetylated hydrolyzate (42)
SOURCES: Scrophulariaceae: *Scrophularia* (42)



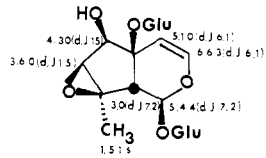
27 PROCUMBIDE

$C_{15}H_{22}O_{10}$: 362.1213
MP: 210–1° (43)
$[\alpha]^{20}D$: −78° (c=1.0, EtOH) (43)
^1H-NMR: D_2O (43)
^{13}C-NMR: CD_3OD, (1) 95.6, (3) 144.1 (4) 104.5, (5) 80.0, (6) 77.7 (7) 65.8, (8) 66.8, (9) 52.9 (10) 17.6 (46)
DERIVATIVE: Hexaacetate:
MP: 173–4° (43)
$[\alpha]^{30}D$: −59° (c=0.57, $CHCl_3$) (43)
SOURCES: Pedaliaceae: *Harpagophytum* (43)

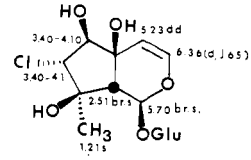


28. ANTIRRINOSIDE

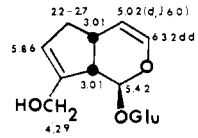
$C_{15}H_{22}O_{10}$: 362.1213
Amorphous powder
$[\alpha]^{16}D$: −78° (c=0.5, Dioxane) (45)
UV: (EtOH) 207 (3.4) (45)
IR: (KBr) 3487 (br), 2900 (br), 1658, 1230 (26)
^1H-NMR: D_2O, 60 MHz (45)
^{13}C-NMR: CD_3OD, (1) 94.6, (3) 142.9, (4) 107.5, (5) 74.5, (6) 77.3, (7) 66.0, (8) 64.2, (9) 52.7, (10) 17.5 (46)
DERIVATIVE: Hexaacetate:
MP: 173–4° (45)
$[\alpha]^{16}D$: −170° (Dioxane) (45)
SOURCES: Scrophulariaceae: *Linaria* (26), *Antirrhinum* (45)



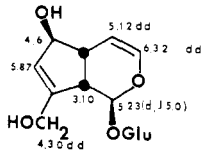
29 5-O-β-GLUCOSYL-ANTIRRINOSIDE
$C_{21}H_{32}O_{15}$: 524.1741
$[\alpha]_D$: −35° (c=0.7, CH_3OH) (47)
UV: 208 (3.5) (47)
^{1}H-NMR: D_2O (47)
DERIVATIVE: Acetate:
$[\alpha]_D$: −73° (c=0.5, Dioxane) (47)
SOURCES: Scrophulariaceae: *Antirrhinum* (47)



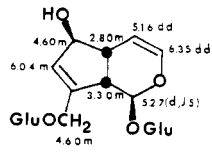
30 LINARIOSIDE
$C_{15}H_{23}O_{10}Cl$: 398.0980
Unstable, hygroscopic
$[\alpha]^{11}_D$: −51° (c=0.98, Dioxane) (26)
IR: KBr, 3450, 2960, 1663, 1238 (26)
^{1}H-NMR: D_2O, 60 MHz (26)
DERIVATIVES: Heptaacetate:
MP: 148–150° (26)
$[\alpha]^{11}_D$: −107° (c=0.62, Dioxane) (26)
SOURCES: Scrophulariaceae: *Linaria* (26), *Cymbalaria* (48)



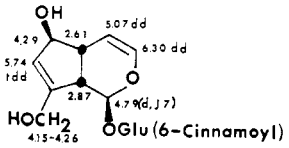
31 BARTSIOSIDE
$C_{15}H_{22}O_8$: 330.1314
MP: 118–120° (24)
$[\alpha]^{25}_D$: −89° (c=0.3, CH_3OH) (24)
UV: (EtOH), 209 (3.2) (24)
IR: (KBr) 1660 (24)
^{1}H-NMR: D_2O, 90 MHz (24)
DERIVATIVE: Pentaacetate:
MP: 108–9° (24)
$[\alpha]^{25}_D$: −105° (c=0.14, Acetone) (24)
SOURCES: Scrophulariaceae: *Bartsia* (24)



32 AUCUBIN (AUCUBOSIDE, RHINANTHIN)
$C_{15}H_{22}O_9$: 346.1263
MP: 180–2° (25)
$[\alpha]^{15}_D$: −162° (c=1.98, H_2O (4)
UV: (H_2O), 210 (3.4) (4)
IR: Nujol, 1655 (25)
^{1}H-NMR: D_2O (49)
^{13}C-NMR: D_2O, (1) 99.2, (3) 140.5, (4) 106.0, (5) 43.7, (6) 81.6, (7) 129.5, (8) 147.5, (9) 47.2, (10) 60.4, (1′) 96.5, (2′) 73.7, (3′) 77.1, (4′) 70.5, (5′) 76.6, (6′) 61.7, (50)
DERIVATIVE: Hexaacetate:
MP: 128° (25)
$[\alpha]^{15}_D$: −156.6 (c=3.012, $CHCl_3$) (49)
SOURCES: Apocynaceae, Buddleiaceae, Callitrichaceae, Cornaceae, Globulariaceae, Hippuridaceae, Lentibulariaceae, Loganiaceae, Orobanchaceae, Plantaginaceae, Scrophulariaceae, Eucommiaceae, Verbenaceae (51, 1, 25)

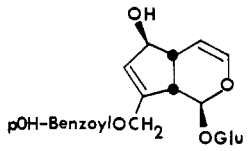


33 10-O-β-GLUCOSYL-AUCUBIN
$C_{21}H_{32}O_{14}$: 508.1792
MP: 248–250°d (52)
$[\alpha]^{21}_D$: −122° (c=1.0, H_2O) (52)
^{1}H-NMR: (52)
SOURCES: Scrophulariaceae: *Linaria* (52)



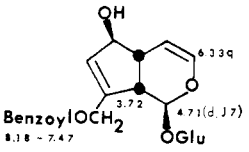
34 SCROPHULARIOSIDE

$C_{24}H_{28}O_{10}$: 476.1682
$[\alpha]^{20}D$: −93° (c=0.74, CH_3OH) (210)
UV: (CH_3OH) 204 (4.26), 216 (4.19), 222 (4.11), 277 (4.29) (210)
IR: KBr, 3400, 1710, 1655, 1640, 1580, 1495, and 1450 (210)
^{1}H-NMR: CD_3OD, 360 MHz (210)
^{13}C-NMR: CD_3OD, (1) 98.2, (3) 141.6, (4) 105.8, (5) 46.5, (6) 82.9, (7) 130.7, (8) 147.8, (9) 47.9, (10) 61.5, (1′) 100.0, (2′) 74.8, (3′) 77.7, (4′) 71.7, (5′) 75.6, (6′) 64.6, (1″) 135.6, (2″) 130.1*, (3″) 129.3*, (4″) 131.6, (5″) 129.3, (6″) 130.1, (α) 146.5, (β) 118.7, (CO) 168.4 (210)
DERIVATIVES: Pentaacetate:
MP: 173–5° (210)
SOURCES: Scrophulariaceae: *Scrophularia* (37)



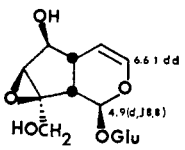
35 AGNUSIDE

$C_{21}H_{26}O_{10}$: 438.1525
MP: 145–6° (53)
$[\alpha]^{20}D$: −91.5° (EtOH) (53)
UV: (H_2O), 258 (4.15), (OH^-) 299 (53)
IR: (Nujol) 1708 (53)
DERIVATIVE: Hexaacetate:
MP: 126° (53)
SOURCES: Verbenaceae: *Vitex* (53)



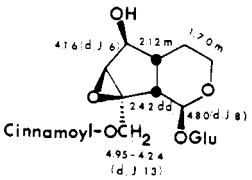
36 MELAMPYROSIDE

$C_{22}H_{26}O_{10}$: 450.1525
MP: 108–110° (54); 84–5° (55)
$[\alpha]^{23}D$: −50° (c=0.3, Acetone) (55)
^{1}H-NMR: Acetone-d_6, 60 MHz (55)
^{13}C-NMR: (1) 97.8, (3) 141.6, (4) 105.5, (5) 46.0, (6) 82.7, (7) 132.6, (8) 142.4 (9) 48.4, (10) 64.0, (1′) 100.1, (2′) 74.7, (3′) 78.0*, (4′) 71.3, (5′) 77.7*, (6′) 62.6, (1″) 131.0, (2″) 130.5, (3″) 129.6, (4″) 134.4, (5″) 129.6, (6″) 130.5, (CO) 167.7 (211)
DERIVATIVE: Pentaacetate:
MP: 74–5° (55)
$[\alpha]^{24}D$: −94° (c=0.33, Acetone) (55)
SOURCES: Scrophulariaceae: *Melampyrum* (55), *Odontites*, *Euphrasia* (54)



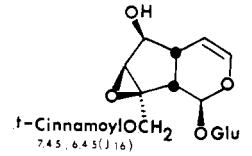
37 CATALPOL

$C_{15}H_{22}O_{10}$: 362.1213
MP: 203–5° (56)
$[\alpha]^{22.5}D$: −102° (c=0.98, 90% EtOH) (56)
UV: (H_2O) 193 (3.9) (4)
IR: 1665 (4)
^{1}H-NMR: D_2O, 60 MHz (56)
^{13}C-NMR: (1) 93.2, (3) 140.2, (4) 103.2, (5) 36.6, (6) 76.3, (7) 60.6, (8) 64.7, (9) 42.0, (10) 58.9, (1′) 97.7, (2′) 73.3, (3′) 77.3, (4′) 70.1, (5′) 77.1, (6′) 61.2 (57)
DERIVATIVE: Hexaaceatate:
MP: 140° (56)
$[\alpha]^{22}D$: −88° (c=1.46, $CHCl_3$) (56)
SOURCES: Bignoniaceae, Buddleiaceae, Callitrichaceae, Globulariaceae, Hippuridaceae, Lentibulariaceae, Plantaginaceae, Scrophulariaceae (4)



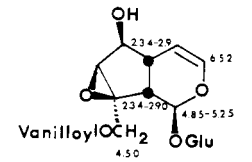
38 GLOBULARIDIN

$C_{24}H_{36}O_{11}$: 494.1788
$[\alpha]^{20}D$: −57.65 (c=0.51, CH_3OH) (58)
UV: (CH_3OH) 216 (4.02), 221sh, 278 (4.46) (58)
IR: KBr, 3410, 1705, 1635, 1580, 1500, 1450 (58)
^1H-NMR: CD_3OD, 100 MHz (58)
^{13}C-NMR: (1) 98.1, (4) 62.8*, (4) 23.8, (5) 38.1, (6) 73.0, (7) 62.2*, (8) 63.3, (9) 43.3, (10) 64.3, plus glucose and cinnamoyl signals (58)
SOURCES: Globulariaceae: *Globularia* (58)



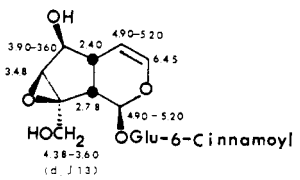
39 GLOBULARIN (SCUTELLAROSIDE-I)

$C_{24}H_{28}O_{11}$: 492.1631
Amorphous powder
$[\alpha]D$: −73° (c=1.0, EtOH) (59)
UV: 278 (4.30) (59)
IR: Nujol, 1686, 1634 (59)
^1H-NMR: D_2O, 60 MHz (59)
DERIVATIVE: Pentaacetate:
MP: 147–9° (58)
$[\alpha]^{20}578$: −103.3 (c=1.0, $CHCl_3$) (59)
^{13}C-NMR: (1) 94.2, (3) 140.9, (4) 101.9, (5) 35.0, (6) 79.6, (7) 58.6, (8) 63.0, (9) 41.9, (10) 61.3, (1') 96.7, (2') 70.7, (3') 72.5, (4') 68.2, (5') 72.2, (6') 61.3, (1") 134.5, (2") 128.7, (3") 128.0, (4") 130.0, (5") 128.0, (6") 128.7, (α) 144.5, (β) 117.7, (CO) 165.9 (59)
SOURCES: Globulariaceae: *Globularia* (58); Labiatae: *Scutellaria* (59)



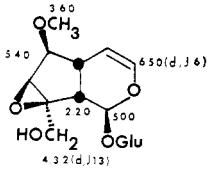
40 KUTKOSIDE

$C_{23}H_{28}O_{13}$: 512.1530
Amorphous powder
$[\alpha]D$: −145° (c=1.0, EtOH) (60)
IR: KBr, 3600–3200, 1700, 1630, 1655, 1590, 1500 (60)
^1H-NMR: Acetone-d_6 (60)
DERIVATIVE: Hexaacetate:
MP: 173° (60)
SOURCES: Scrophulariaceae: *Picrorhiza* (60)



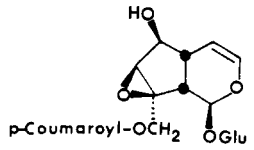
41 PICROSIDE-I

$C_{24}H_{28}O_{11}$: 492.1631
Hygroscopic unstable compound.
$[\alpha]D$: −82° (c=1.0, CH_3OH) (61)
IR: Nujol, 3400–3200, 1705, 1636, 1660, 1605, 1580, 1495 (61)
^1H-NMR: D_2O, 100 MHz (61)
DERIVATIVE: Pentaacetate:
$[\alpha]D$: −83° (c=1.0, $CHCl_3$) (61)
^{13}C-NMR: (1) 94.1, (3) 141.0, (4) 101.9, (5) 34.9, (6) 79.6, (7) 58.6, (8) 62.6, (9) 41.6, (10) 61.5, (1') 96.6, (2') 70.7, (3') 72.5, (4') 68.5, (5') 72.3, (6') 62.1, (1") 134.2, (2") 128.2, (3") 128.7, (4") 130.3, (5") 128.7, (6") 128.2, (α) 145.5, (β) 117.3, (CO) 166.2 (33)
SOURCES: Scrophulariaceae: *Picrorhiza* (61)



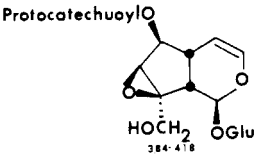
42 O-METHYL-CATALPOL

$C_{16}H_{24}O_{10}$: 376.1369
MP: 236–8° (56)
$[\alpha]^{22.5}D$: −122° (c=1.64, EtOH) (56)
IR: 1650 (56)
^1H-NMR: D_2O, 60 MHz (56)
DERIVATIVE: Hexamethyl ether:
MP: 79° (56)
$[\alpha]^{23.5}D$: −91° (c=1.96, $CHCl_3$) (56)
X-RAY: (56)
SOURCES: Buddleiaceae: *Buddleia* (56)



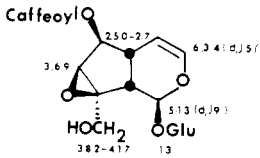
43 SCUTELLARIOSID-II

$C_{24}H_{28}O_{12}$: 508.1580
Amorphous powder
$[\alpha]^{20}578$: −80.1 (c=0.5, EtOH) (57)
DERIVATIVE: Hexaacetate:
MP: 153–4° (57)
$[\alpha]^{20}578$: −94° (c=1.0, $CHCl_3$) (57)
^{13}C-NMR: (1) 94.1, (3) 141.0, (4) 102.0 (5) 34.9, (6) 79.6, (7) 58.6, (8) 62.8, (9) 41.9, (10) 61.3, (1′) 96.7, (2′) 70.7, (3′) 72.5, (4′) 68.2, (5′) 72.2, (6′) 61.3 (1″) 132.3, (2″) 129.3, (3″) 121.9, (4″) 152.0, (5″) 121.9, (6″) 129.3, (α) 143.8, (β) 118.0, (CO) 165.8 (57)
SOURCES: Labiatae: *Scutellaria* (57)



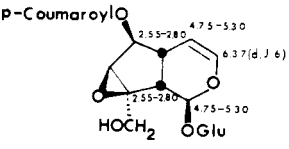
44 VERPROSIDE

$C_{22}H_{26}O_{13}$: 498.1373
IR: KBr, 1655 (62)
^1H-NMR: (62)
DERIVATIVE: Heptaacetate:
MS: M^+ 792 (62)
SOURCES: Scrophulariaceae: *Veronica* (62)



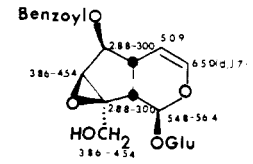
45 VERMINOSIDE

$C_{24}H_{28}O_{13}$: 524.1530
Amorphous substance
$[\alpha]^{20}D$: −180.8° (c=0.7, CH_3OH) (63)
UV: (CH_3OH), 328 (4.02), 295 (3.90) sh, 245 (3.81), 215 (3.93) (63)
IR: KBr, 3400, 1700, 1655, 1632 (63)
^1H-NMR: CD_3OD (63)
^{13}C-NMR: (1) 95.1, (3) 142.1, (4) 102.9 (5) 36.5, (6) 81.0, (7) 60.2, (8) 66.7, (9) 42.9, (10) 61.2, (1′) 99.6, (2′) 74.6, (3′) 78.1, (4′) 71.4, (5′) 77.3, (6′) 62.7, (1″) 127.4, (2″) 115.3, (3″) 146.4, (4″) 149.3, (5″) 114.4, (6″) 116.5, (α) 147.5, (β) 123.2, (CO) 168.8 (63)
DERIVATIVE: Heptaacetate:
MP: 93.6° (63)
$[\alpha]^{20}D$: −101.97 (c=0.71, $CHCl_3$) (63)
SOURCES: Scrophulariaceae: *Veronica* (63)



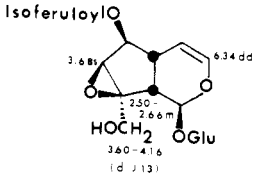
46 SPECIOSIDE

$C_{24}H_{28}O_{12}$: 508.1580
MP: 244–5° (64)
$[\alpha]^{21}D$: −203.3° (c=0.4, CH_3OH) (64)
UV: (CH_3OH) 230 (3.82), 315 (4.15) (64)
IR: KBr, 3415, 1715, 1615, 1520, 1500, 1080 (64)
PMR: CD_3OD, 90 MHz (64)
^1H-NMR: CD_3OD, 90 MHz (64)
^{13}C-NMR: CD_3OD (1) 95.2, (3) 142.4 (4) 103.0, (5) 36.8, (6) 81.4, (7) 60.3, (8) 66.9, (9) 43.3, (10) 61.3, (1′) 99.9, (2′) 74.9, (3′) 78.7, (4′) 71.8, (5′) 77.8, (6′) 63.0, (1″) 136.8, (2″) 131.3, (3″ & 5″) 117.0, (4″) 161.7, (6″) 131.3 (α) 147.3, (β) 114.5 (CO) 161.8 (64)
DERIVATIVE: Acetate:
MP: 174–5° (64)
$[\alpha]^{24}D$: −113° (c=2.0, $CHCl_3$) (64)
SOURCES: Bignoniaceae: *Catalpa* (64)



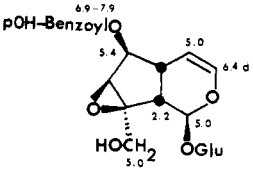
47 VERONICOSIDE

$C_{22}H_{26}O_{11}$: 466.1475
MP: 167–9° (65)
UV: (CH_3OH) 205 (4.09), 232 (4.18), 275 (3.02) (65)
IR: KBr, 3380, 1715, 1655 (65)
^{1}H-NMR: Pyridine-d_5 (65)
^{13}C-NMR: Pyridine-d_5: (1) 94.4, (3) 141.4, (4) 102.0, (5) 36.2 (6) 81.0, (7) 59.2, (8) 66.8 (9) 42.9, (10) 60.0, (1′) 99.8, (2′) 74.6, (3′) 78.5, (4′) 71.2, (5′) 77.9, (6′) 62.4, (1″) 133.4, (2″) 129.8, (3″) 128.6, (4″) 129.9, (5″) 128.6, (6″) 129.8, (CO) 166.2 (65)
DERIVATIVE: Hexaacetate:
MP: 172° (65)
$[\alpha]^{20}D$: −104.96 (c=0.64, $CHCl_3$) (65)
SOURCES: Scrophulariaceae: *Veronica* (65)



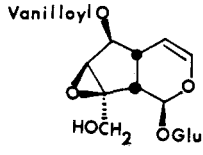
48 MINECOSIDE

$C_{23}H_{30}O_{13}$: 538.1686
MP: 142° (63)
$[\alpha]^{20}D$: −182° (c=0.64, CH_3OH) (63)
UV: (CH_3OH), 204 (4.15), 244 (3.98), 298 (4.09), 328 (4.18) (63)
IR: KBr, 3320, 1720, 1655, 1635 (63)
^{1}H-NMR: CD_3OD (63)
^{13}C-NMR: (1) 95.1, (3) 142.5, (4) 103.0 (5) 36.8, (6) 81.4, (7) 60.3, (8) 66.9, (9) 43.3, (10) 61.4), (1′) 99.8, (2′) 74.9, (3′) 78.7, (4′) 71.9, (5′) 77.8, (6′) 63.0, (1″) 128.9, (2″) 114.9, (3″) 148.1, (4″) 151.7, (5″) 112.6, (6″) 114.9, (OCH_3) 56.5, (α) 147.3, (β) 123.0, (CO) 168.8 (63)
DERIVATIVE: Hexaacetate:
MP: 105.5° (63)
$[\alpha]^{20}D$: −101.27 (c=0.31, $CHCl_3$) (63)
SOURCES: Scrophulariaceae: *Veronica* (63)

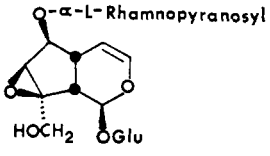


49 CATALPOSIDE

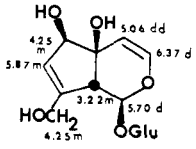
$C_{22}H_{26}O_{12}$: 482.1423
MP: 215–7° (4)
$[\alpha]^{28.2}D$: −184° (c=0.87, CH_3OH) (4)
UV: (EtOH), 260 (4.27) (OH^-) 303 (4)
IR: (KBr) 1655, 1705 (4)
^{1}H-NMR: D_2O, 60 MHz (66, 67)
^{13}C-NMR: Acetone-d_6, (1) 99.8, (3) 142.4, (4) 103.0, (5) 36.8, (6) 81.6, (7) 60.3, (8) 66.9, (9) 43.3, (10) 61.3, (1′) 95.2, (2′) 74.9, (3′) 78.6, (4′) 71.8, (5′) 77.8, (6′) 62.9, (1″) 121.9, (2″, 6″) 132.9, (3″, 5″) 116.2, (4″) 136.7, (7″) 167.9 (64)
DERIVATIVE: Hexaacetate:
MP: 142–3° (66)
$[\alpha]^{21.7}D$: −106 (c=0.75, $CHCl_3$) (4)
SOURCES: Bignoniaceae, Scrophulariaceae, Globulariaceae (66, 4)



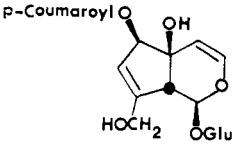
50 AMPHICOSIDE (PICROSIDE II)
$C_{23}H_{28}O_{13}$: 512.1530
MP: 214–5° (68)
$[\alpha]^{20}D$: −115° (EtOH) (68)
UV: (EtOH), 223, 268 (68)
IR: (KBr) 3400, 1725, 1280, 1655, 1230, 1610, 1530, 1460, 765 (68)
DERIVATIVE: Hexaacetate:
MP: 168–170° (68)
^{1}H-NMR: $CDCl_3$, 60 MHz, 7.74 (ArH), 7.69 (ArH), 7.13 (ArH), 6.36 (H_3), 3.9 (OCH_3), 2.70 (H_5, H_9) 2.34–2.04 (Ac), (68)
^{13}C-NMR: (1) 94.3, (3) 141.2, (4) 102.0, (5) 35.3, (6) 80.2, (7) 58.9, (8) 62.7, (9) 41.8, (10) 61.2, (1′) 96.3, (2′) 70.7, (3′) 72.7, (4′) 68.3, (5′) 72.4, (6′) 62.3, (1″) 128.1, (2″) 113.6, (3″) 151.2, (4″) 144.1, (5″) 122.9, (6″) 122.9, (CO) 165.7, (OCH_3) 56.2 (33)
SOURCES: Bignoniaceae: *Amphicome* (68)



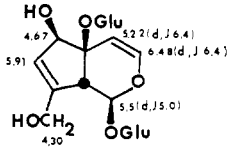
51 6-α-L-RHAMNOPYRANOSYL CATALPOL
$C_{21}H_{32}O_{14}$: 508.1792
$[\alpha]^{20}589$: −124.5° (c=0.1, CH_3OH) (40)
^{13}C-NMR: (1) 93.2, (3) 140.4, (4) 102.5, (5) 35.7, (6) 81.5, (7) 57.5, (8) 65.3, (9) 41.2, (10) 58.9, (1′) 97.9, (2′) 73.5, (3′) 77.4, (4′) 70.3, (5′) 76.5, (6′) 61.4, (1″) 98.9, (2″) 70.6, (3″) 70.3, (4″) 72.0, (5″) 68.9, (6″) 17.9 (40)
DERIVATIVE: Octaacetate:
MP: 217° (40)
$[\alpha]^{20}589$: −7.2° (c=0.1, $CHCl_3$) (40)
SOURCES: Scrophulariaceae: *Scrophularia* (40)



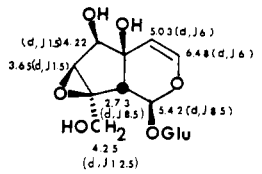
52 MONOMELITTOSIDE
$C_{15}H_{22}O_{10}$: 362.1213
Amorphous powder
$[\alpha]^{18}D$: −180° (c=0.7, H_2O) (69)
^{1}H-NMR: D_2O, 60 MHz (69)
^{13}C-NMR: (1) 93.6, (3) 142.4, (4) 108.4, (5) 72.8, (6) 80.5, (7) 127.7, (8) 148.3, (9), 53.6, (10) 60.8, (1′) 99.4, (2′) 74.4, (3′) 78.2, (4′) 71.6, (5′) 77.4, (6′) 62.6 (211)
DERIVATIVE: Hexaacetate:
MP: 169–170° (69)
SOURCES: Labiatae: *Melittis* (69)



53 ODONTOSIDE
$C_{24}H_{28}O_{12}$: 508.1580
MP: 145–7° (70)
$[\alpha]^{20}D$: −92° (c=0.1, EtOH) (70)
UV: 232 (3.66), 273 (2.61), 282 (2.56) (70)
SOURCES: Scrophulariaceae: *Odontites* (70)

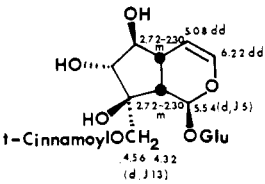


54 MELITTOSIDE
$C_{21}H_{32}O_{13}$: 524.1741
MP: 167–8° (49)
$[\alpha]^{17}D$: −29° (c=1.6, H_2O) (49)
UV: (EtOH) 209 (3.57) (49)
IR: 1655 (49)
^{1}H-NMR: D_2O, 60 MHz (49)
DERIVATIVE: Decaacetate:
MP: 149–150° (49)
SOURCES: Labiatae: *Melittis* (49)



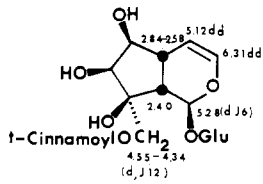
55 MACFADIENOSIDE

$C_{15}H_{22}O_{11}$: 378.1161
Hygroscopic substance
$[\alpha]^{28}D$: −30° (c=0.2, CH_3OH) (71)
UV: (CH_3OH) 204 (3.4) (71)
IR: KBr, 1650 (71)
^1H-NMR: D_2O, 100 MHz (71)
DERIVATIVE: Hexaacetate:
MP: 155–6° (71)
$[\alpha]^{28}D$: −55° (c=0.2, Acetone) (71)
SOURCES: Bignoniaceae: *Macfadyena* (71)



56 GLOBULARIMIN

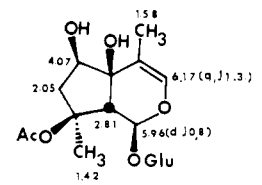
$C_{24}H_{30}O_{12}$: 510.1736
$[\alpha]^{20}D$: −105.97 (c=0.64, CH_3OH) (72)
UV: (CH_3OH) 217 (4.08), 223sh, 278 (4.38) (72)
IR: KBr, 3400, 1702, 1638, 1580, 1495, 1450 (72)
^1H-NMR: CD_3OD, 100 MHz (72)
^{13}C-NMR: CD_3OD, (1) 93.5, (3) 140.5 (4) 105.8, (5) 38.4, (6) 83.8, (7) 85.4, (8) 80.2, (9) 48.9, (10) 66.4 (72)
DERIVATIVE: Hexaacetate:
$[\alpha]^{20}D$: −81.08 (c=0.63, $CHCl_3$) (72)
SOURCES: Globulariaceae: *Globularia* (72)



57 GLOBULARININ

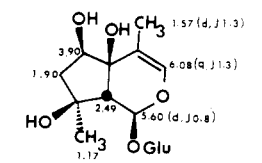
$C_{24}H_{30}O_{12}$: 510.1736
$[\alpha]^{20}D$: −84.47 (c=0.64, CH_3OH) (72)
UV: (CH_3OH) 217 (4.08), 223sh, 278 (4.38) (72)
IR: KBr, 3400, 1702, 1638, 1580, 1495, and 1450 (72)
^1H-NMR: CD_3OD, 100 MHz (72)
^{13}C-NMR: CD_3OD, (1) 96.3, (3) 141.6, (4) 106.4, (5) 38.9, (6) 78.6, (7) 78.6, (8) 81.4, (9) 44.6, (10) 69.0 (72).
DERIVATIVE: Hexaacetate:
$[\alpha]^{20}D$: −97.06 (c=0.61, $CHCl_3$) (72)
SOURCES: Globulariaceae: *Globularia* (72)

III. Iridoid glycosides: Ten carbon basic skeleton



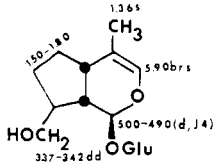
58 LAMIOSIDE

$C_{18}H_{26}O_{11}$: 420.1631
Amorphous powder
$[\alpha]^{27}D$: −133° (c=0.5, CH_3OH) (73)
$[\alpha]^{16}D$: −125° (c=0.5, Dioxane) (73)
UV: 208 (3.6) (73)
^1H-NMR: D_2O, 60 MHz (73)
DERIVATIVE: Isopropylidene:
MP: 194–5° (73)
SOURCES: Labiatae: *Lamium* (73)



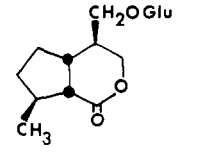
59 LAMIOL

$C_{16}H_{26}O_{10}$: 378.1526
Amorphous powder
$[\alpha]^{26}D$: −153 (c=0.46, Dioxane) (73)
^1H-NMR: D_2O, 60 MHz (73)
DERIVATIVE: Pentaacetate:
MP: 168–170° (73)
$[\alpha]^{27}D$: −119° (c=0.78, Dioxane) (73)
SOURCES: Labiatae: *Lamium* (73)



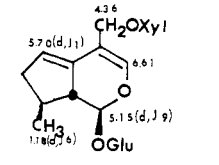
60 DECAPETALOSIDE

$C_{16}H_{26}O_8$: 346.1627
^{1}H-NMR: D_2O, 90 MHz (18)
^{13}C-NMR: D_2O, (1) 97.0, (3) 133.9, (4) 115.8, (5) 44.7, (6) 29.8, (7) 27.4, (8) 38.4, (9) 42.8, (10) 65.9, (11) 15.6, (1') 99.1, (2') 73.3, (3') 76.7, (4') 70.1, (5') 76.3, (6') 61.2, (18)
DERIVATIVE: Pentaacetate:
MP: 114–5° (18)
$[\alpha]^{22}$D: −90° (c=3.7, $CHCl_3$) (18)
SOURCES: Loasaceae: *Mentzelia* (18)



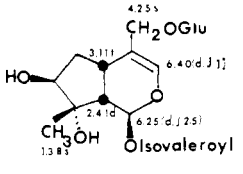
61 VILLOSIDE

$C_{16}H_{26}O_8$: 346.1627
IR: 3350, 1740, 1720, 1150 (74)
DERIVATIVE: Tetraacetate:
MP: 112–3° (74)
$[\alpha]^{31}$D: 0° (c=0.5, CH_3OH) (74)
$[\alpha]^{31}$405: +36° (c=0.5, CH_3OH) (74)
^{1}H-NMR: $CDCl_3$, 1.18 (d, J=6, CH_3) (74)
SOURCES: Valerianaceae: *Patrinia* (74)



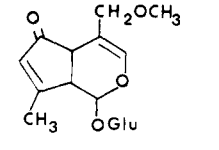
62. MONTINIOSIDE

$C_{21}H_{32}O_{12}$: 476.1893
$[\alpha]^{20}$D: −44° (c=1.2, CH_3OH) (75)
UV: (CH_3OH) 251 (4.0) (75)
^{1}H-NMR: D_2O, 90 MHz (76)
^{13}C-NMR: D_2O, (1) 103.6, (3) 145.0, (4) 110.2, (5) 135.3, (6) 123.1, (7) 40.7, (8) 38.1, (9) 53.1, (10) 19.3, (11) 67.4, (1') 99.5, (1") 102.3, (2, 3, 4 of both glucosyl units) 73.4, 76.4, 70.1 respectively; (5') 76.7, (5") 65.7, (6') 61.3 (76)
SOURCES: Montiniaceae: *Montinia* (76)



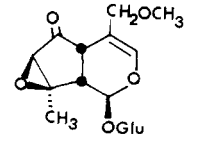
63 VALEROSIDATE

$C_{21}H_{34}O_{11}$: 462.2101
MP: 152° (77), 78–80° (78)
$[\alpha]^{20}$D: −93° (c=1.0, CH_3OH) (77)
$[\alpha]^{20}$D: −102° (H_2O) (78)
IR: 3400–3350, 1748, 1670, 1455, 1375, 1255, 1100 (77)
^{1}H-NMR: D_2O, 60 MHz (77)
SOURCES: Valerianaceae: *Valeriana* (78)



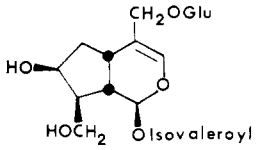
64 SYRINGENONE

$C_{17}H_{24}O_9$: 372.1420
MS: M 372, *m/e*: 210, 192, 182 (79)
SOURCES: Oleaceae: *Syringa*, *Phyllinea* (79)



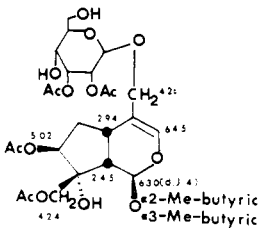
65 SYRINGOXIDE

$C_{17}H_{24}O_{10}$: 388.1369
SOURCES: Oleaceae: *Syringa*, *Phyllinea* (79)



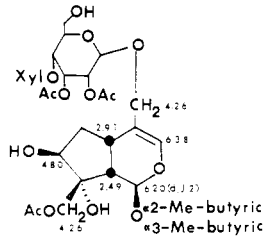
66 PATRINOSIDE

$C_{21}H_{34}O_{11}$: 462.2101
Colorless prisms
MP: 97–8° (80)
$[\alpha]^{25}D$: −45.4° (c=1.63, CH_3OH) (80)
IR: KBr, 3370, 1740, 1660 (80)
X-RAY: (80)
DERIVATIVE: Hexaacetate:
MP: 130–2° (81)
$[\alpha]D$: −45.7° (EtOH) (81)
^{1}H-NMR: 6.25 (d, J=1.5, H_3), 5.86 (d, J=6, H_1), 4.05–4.20 (H_{10}, H_{11}), 2.7–3.2 (H_5), 2.2 (H_6) 1.95–2.10 (Ac), 0.96 (d, J=6, CH_3) (81)
SOURCES: Valerianaceae: *Patrinia, Valeriana* (81)



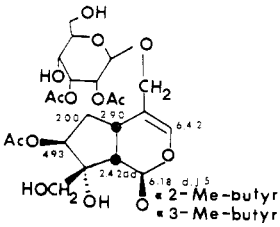
67 OPULUS IRIODID I

Isolated as a mixture
^{1}H-NMR: 90 MHz (82)
^{13}C-NMR: $CDCl_3$, (1) 89.5, (3) 139.9, (4) 113.4, (5) 31.9, (6) 34.8, (7) 80.5, (8) 81.1, (9) 44.8, (10) 67.0, (11) 68.6, (1') 97.0, (2') 70.2, (3'), 71.4, (4') 66.2, (5') 74.1, (6') 62.2 (82)
SOURCES: Caprifoliaceae: *Viburnum* (82)



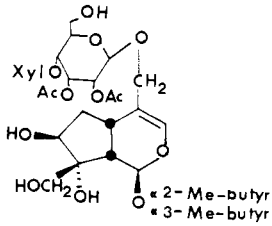
68 OPULUS IRIDOID III

Isolated as a mixture
^{1}H-NMR: D_2O, 90 MHz (82)
^{13}C-NMR: D_2O, (1) 91.3, (3) 139.8, (4) 115.8, (5) 30.7, (6) 36.9, (7) 78.6, (8) 82.3, (9) 44.5, (10) 68.5, (11) 70.0, (1') 97.8, (2') 71.2, (3') 71.2, (4') 74.5* (5') 74.2,* (6') 61.1, (1") 104.7, (2") 73.8, (3") 76.5, (4") 70.0 (,(5") 66.0 (82)
SOURCES: Caprifoliaceae: *Viburnum* (82)



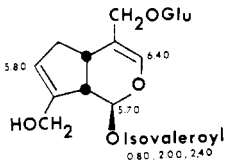
69 OPULUS IRIDOID II

Isolated as a mixture
^{1}H-NMR: $CDCl_3$, 90 MHz (82)
^{13}C-NMR: $CDCl_3$, (1) 90.0, (3) 139.8, (4) 113.7, (5) 32.3, (6) 34.8, (7) 80.5, (8) 82.3, (9) 43.9, (10) 64.2, (11) 68.4, (1') 97,0, (2') 70.0, (3') 71.1, (4') 65.7, (5') 73.9, (6') 62.1 (82)
SOURCES: Caprifoliaceae: *Viburnum* (82)



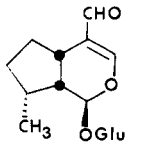
70 OPULUS IRIDOID IV

Isolated as a mixture
^{13}C-NMR: D_2O, (1) 91.4, (3) 139.6, (4) 115.8, (5) 31.0, (6) 37.1, (7) 78.6, (8) 83.6, (9) 44.0, (10) 65.2, (11) 70.0, (1') 97.8, (2') 71.1, (3') 71.1, (4') 74.2, (5') 74.2, (6') 61.2, (1") 104.7, (2") 73.8, (3") 76.6, (4") 70.0, (5") 66.0 (82)
SOURCES: Caprifoliaceaes: *Viburnum* (82)



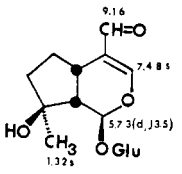
71 PENSTEMIDE

$C_{21}H_{30}O_{10}$: 442.1838
UV: 214 (4.33) (83)
IR: 1750, 1665 (83)
^{1}H-NMR: D_2O, 60 & 100 MHz (83)
^{13}C-NMR: (1) 102.1, (3, 10) 140.4, 130.4, (4) 115.8, (5, 9, β) 46.4, 36.8, 26.1, (6, 7) 43.7, 37.3, (8) 69.1, (11) 60.5, (α) 142.0, ($2CH_3$) 22.5 (83)
SOURCES: Scrophulariaceae: *Penstemon* (83)
Revised structre: (212)



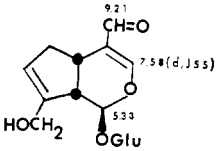
72 BOSCHNALOSIDE

$C_{16}H_{24}O_8$: 344.1471
$[\alpha]^{22}D$: −104° (c=1.01, CH_3OH) (229)
UV: 249 (4.08) (229)
IR: film, 3360, 2875, 1665, 1630 (229)
^{1}H-NMR: Pyr-d_5 (229)
^{13}C-NMR: Pyr-d_5, (1) 100.1, (3) 161.8, (4) 124.8, (5) 35.8, (6) 32.8, (7) 30.5, (8) 31.4, (9) 43.0, (10) 16.3, (11) 190.1, (1') 96.5, (2') (3') (4') (5') 78.7, 78.2, 74.5, 71.4, (6') 62.6 (229)
DERIVATIVE: Tetraacetate:
MP: 134-5° (229)
$[\alpha]^{22}D$: −114 (c=108, CH_3OH) (229)
SOURCES: Scrophulariaceae: *Leucocarpus* (229)
Orobanchaceae: *Boschniakia* (12)



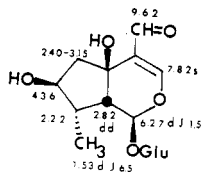
73 IXOROSIDE

$C_{16}H_{24}O_9$: 360.1420
Amorphous powder
$[\alpha]^{22}D$: −102.6 (c=0.64, CH_3OH) (84)
UV: (CH_3OH) 249 (4.09) (84)
IR: KBr, 3400, 1730, 1640 (84)
^{1}H-NMR: D_2O (84)
DERIVATIVE: Pentaacetate:
MP: 95-6° (84)
$[\alpha]^{36}D$: −102.2 (c=0.69, $CHCl_3$) (84)
SOURCES: Rubiaceae: *Ixora* (84)



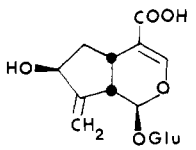
74 TARENNOSIDE

$C_{16}H_{22}O_9$: 358.1263
$[\alpha]^{25}D$: +42.1 (c=1.06, CH_3OH) (85)
UV: (CH_3OH) 250 (4.10) (85)
IR: KBr, 3400, 1660-1630 (85)
^{1}H-NMR: D_2O, 60 MHz (85)
DERIVATIVE: Pentaacetate:
MP: 127-9° (85)
$[\alpha]^{25}D$: −2.3 (c=0.6, $CHCl_3$) (85)
SOURCES: Rubiaceae: *Tarenna* (85)

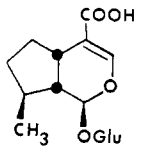


75 TECOMOSIDE

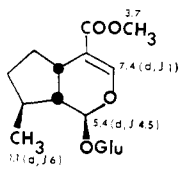
$C_{16}H_{24}O_{10}$: 376.1369
Amorphous powder
$[\alpha]^{25}D$: −118° (c=0.2, CH_3OH) (86)
UV: (EtOH) 241 (4.01) (86)
IR: KBr, 2760, 1670, 1630 (86)
^{1}H-NMR: D_2O, 100 MHz (86)
DERIVATIVE: Pentaacetate:
MP: 124-5° (86)
SOURCES: Bignoniaceae: *Tecoma* (86)



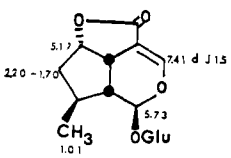
76 GARDOSIDE
$C_{16}H_{22}O_{10}$: 374.1213
$[\alpha]^{22}D$: −33.6° (c=0.4, CH_3OH) (87)
UV: (CH_3OH) 235.5 (3.98) (87)
IR: KBr, 3300, 1675, 1625 (87)
^1H-NMR: D_2O (87)
DERIVATIVE: Pentaacetate:
MP: 209–211° (87)
$]\alpha]^{22}D$: −54.4 (c=0.57, $CHCl_3$) (87)
SOURCES: Rubiaceae: *Gardenia* (87)



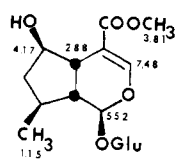
77 BISDESOXYDIHYDROMONOTROPEIN (DESOXYLOGANIC ACID)
$C_{16}H_{24}O_9$: 360.1420
MP: 113–5° (88)
UV: 231 (3.29) (88)
IR: 1683, 1678, 1635 (88)
MS: 198 (m*) (88)
^1H-NMR: For Methyl Ester: Deoxyloganin (88)
SOURCES: Labiatae: *Physostegia* (88)



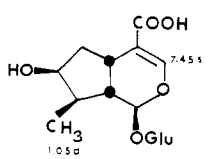
78 DEOXYLOGANIN (BISDESOXYDIHYDRO-MONOTROPEIN METHYL ESTER)
$C_{17}H_{26}O_9$: 374.1577
MP: 157–8° (88)
$[\alpha]^{20}D$: −90° (c=0.295, EtOH) (88)
UV: 236 (4.03) (88)
IR: 2940b, 1710, 1690b, 1640 (88)
^1H-NMR: CD_3OD, 60 MHz (88)
DERIVATIVE: Tetraacetate:
MP: 115–6° (89)
SOURCES: Loganiaceae: *Strychnos* (89), Apocynaceae: *Vinca* (89), Menyantheaceae: *Menyanthes* (89)



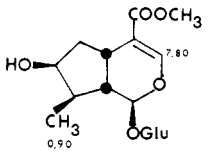
79 BRASOSIDE
$C_{16}H_{22}O_9$: 358.1263
$[\alpha]^{22}D$: −170° (c=0.97, EtOH) (90)
UV: (CH_3OH) 233 (90)
IR: 1735 (90)
^1H-NMR: D_2O, 90 MHz (90)
DERIVATIVE: Tetraacetate:
MP: 185–7° (91)
SOURCES: Verbenaceae: *Verbena* (91)



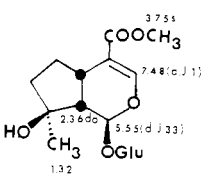
80 DIHYDROCORNIN
$C_{17}H_{26}O_{10}$: 390.1526
MP: 90–100° (92)
$[\alpha]^{20}D$: −126° (c=0.5, EtOH) (92)
UV: (EtOH) 238 (4.05) (92)
^1H-NMR: D_2O, 100 MHz (92)
DERIVATIVE: Pentaacetate:
MP: 166–8° (92)
$[\alpha]^{20}D$: −115° (c=0.5, EtOH) (92)
SOURCES: Cornaceae: *Cornus* (92)



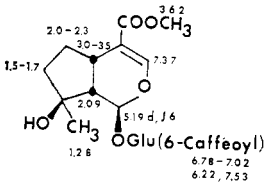
81 LOGANIC ACID
$C_{16}H_{24}O_{10}$: 376.1369
Amorphous compound
DERIVATIVE: Pentaacetate:
MP: 168° (93)
UV: (EtOH) 230 (4.2), 234 (3.97) (93)
IR: $CHCl_3$, 1750, 1715, 1645 (93)
^1H-NMR: 7.45 (s, H_3), 1.05 (d, J=7, H_{10}) (93)
SOURCES: Loasaceae: *Mentzelia* (94), *Loganiaceae*: *Strychnos* (95), Gentianaceae: *Swertia* (93)



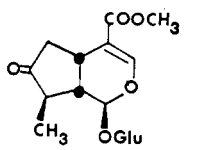
82 LOGANIN (LOGANOSIDE)
$C_{17}H_{26}O_{10}$: 390.1526
MP: 220–2° (96)
$[\alpha]_D$: −82.8° (4)
UV: 237–8 (4.03) (4)
^{1}H-NMR: D_2O (96)
^{13}C-NMR: D_2O, (1) 97.6, (3) 151.8, (4) 113.9, (5) 30.7, (6) 41.3, (7) 74.9, (8) 41.0, (9) 45.8, (10) 12.9, (11) 170.6, (OCH_3) 52.6, (1') 99.5, (2') 73.6, (3') 76.6, (4') 70.5, (5') 77.2, (6') 61.6 (97)
DERIVATIVE: Pentaacetate:
MP: 140–1° (96)
$[\alpha]_D$: −79.6° ($CHCl_3$) (96)
IR: 1750, 1705, 1640 (96)
X-RAY: (98)
SOURCES: Apocynaceae: *Vinca*, Caprifoliaceae: *Lonicera*, Cornaceae: *Mastixia*, Loganiaceae: *Strychnos*, *Menyanthes* (4)



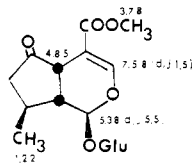
83 MUSSAENOSIDE
$C_{17}H_{26}O_{10}$: 390.1526
Amorphous powder
$[\alpha]^{30}_D$: −106° (c=0.61, CH_3OH) (99)
UV: (CH_3OH) 238 (4.04) (99)
IR: KBr, 3400, 1695, 1640 (99)
^{1}H-NMR: D_2O, 60 MHz (99)
DERIVATIVE: Tetraacetate:
MP: 124–6° (99)
$[\alpha]^{30}_D$: −92.5 (c=1.18, $CHCl_3$) (99)
SOURCES: Rubiaceae: *Mussaenda* (99)



84 LADROSIDE
$C_{26}H_{32}O_{13}$: 552.1842
$[\alpha]^{20}_D$: −68.93 (c=0.72, CH_3OH) (100)
UV: (CH_3OH) 221 (4.07), 236 (4.09), 328 (3.99) (100)
IR: KBr, 1635, 1642, 3400 (100)
^{1}H-NMR: CD_3OD (100)
^{13}C-NMR: CD_3OD, (1) 95.6, (3) 152.0 (4) 112.7, (5) 32.9, (6) 30.6, (7) 39.6, (8) 81.0, (9) 51.6, (10) 25.0, (11) 169.3, (1') 99.4, (2') 74.5, (3') 77.4, (4') 71.4, (5') 75.3, (6') 64.0, (1") 127.3, (2") 115.1, (3") 146.3, (4") 149.2, (5") 116.4, (6") 123.0, (OCH_3) 51.8, (α) 147.1, (β) 114.6, (CO) 168.9, 169.3 (100)
DERIVATIVE: Hexaacetate:
MP: 106–8° (100)
$[\alpha]^{20}_D$: −12.5° (c=0.62, $CHCl_3$) (100)
SOURCES: Scrophulariaceae: *Veronica* (100)

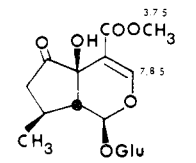


85 KETOLOGANIN (7-OXOLOGANIN)
$C_{17}H_{24}O_{10}$: 388.1369
MP: 194–7° (101)
UV: (EtOH) 234 (4.02) (101)
IR: Nujol, 3500–3000, 3080, 1745, 1680, 1615, 1300 (101)
DERIVATIVE: Tetraacetate:
MP: 107–9°, and 145–7° (101)
$[\alpha]^{25}_D$: −147 (c=1.0, $CHCl_3$) (101)
^{1}H-NMR: 1.13 (d, J=10, H_{10}), 2.57 (m, H_6), 3.67 (OCH_3), 7.35 (d, J=2, H_3), 2.06–1.88 (Ac) (101)
SOURCES: Gentianaceae: *Swertia* (101), Loganiaceae: *Strychnos* (102)



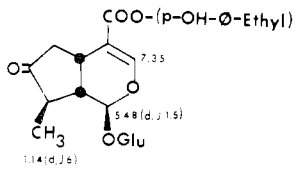
86 VERBENALIN (VERBENALOSIDE) (CORNIN)

$C_{17}H_{24}O_{10}$: 388.1369
MP: 182–3° (103)
$[\alpha]_D$: −173° (c=3.98, H_2O) (103)
UV: (EtOH) 290 (2.02) (4)
IR: KBr, 1730, 1685, 1640 (103)
^{1}H-NMR: D_2O (103)
^{13}C-NMR: D_2O, (1) 99.9, (3) 154.3, (4) 104.6, (5) 43.4*, (6) 218.9, (7) 43.8, (8) 29.6, (9) 44.9*, (10) 19.9, (11) 169.7, (1') 97.0, (2') 73.5, (3') 77.1, (4') 70.4, (5') 76.6, (6') 61.5, (OCH_3) 52.9 (50)
DERIVATIVE: Tetraacetate:
MP: 133° (103)
SOURCES: Cornaceae: *Cornus* (1), Verbenaceae: *Verbena* (103)



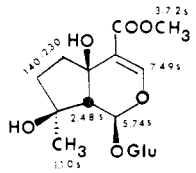
87 HASTATOSIDE

$C_{17}H_{24}O_{11}$: 404.1318
$[\alpha]^{20}_D$: −320° (H_2O) (104)
UV: (H_2O) 234 (3.98) (104)
IR: KBr, 1620 (104)
^{1}H-NMR: D_2O (104)
^{13}C-NMR: D_2O, (1) 95.0, (3) 157.0, (4) 105.6, (5) 74.4, (6) 215.4, (7) 40.7, (8) 26.3, (9) 52.1, (10) 19.4, (11) 168.2, (OCH_3) 52.7, (1') 100.1 (105)
DERIVATIVE: Tetraacetate:
MP: 180–2° (104)
MS: M− 572 (104)
SOURCES: Verbenaceae: *Verbena* (91)



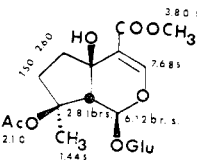
88 SYRINGOPICROSIDE

$C_{24}H_{30}O_{11}$: 494.1788
Amorphous powder
$[\alpha]^{14.8}_D$: −115° (c=1.0, H_2O) (106)
IR: 3400, 1730, 1685, 1630, 850 (106)
^{1}H-NMR: D_2O (106)
DERIVATIVE: Pentaacetate:
MP: 156° (106)
$[\alpha]^{20.6}_D$: −116.5 (c=1.0, $CHCl_3$) (106)
SOURCES: Oleaceae: *Syringa* (106)



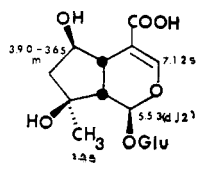
89 IPOLAMIIDE

$C_{17}H_{26}O_{11}$: 406.1475
MP: 144–5° (107)
$[\alpha]^{13}_D$: −136° (c=0.5, Dioxane) (107)
UV: (CH_3OH) 229 (4.03) (107)
IR: KBr, 1700, 1640 (107)
^{1}H-NMR: D_2O (107)
^{13}C-NMR: D_2O, (1) 99.3, (3) 152.9, (4) 114.0, (5) 71.5, (6) 39.4,* (7) 38.0,* (8) 61.6, (9) 55.2, (10) 22.8, (11) 169.1, (OCH_3) 52.5, (1') 94.5, (2') 73.3, (3') 77.1, (4') 70.5, (5') 76.2, (6') 60.7 (108)
DERIVATIVE: Pentaacetate:
MP: 143–5° (107)
$[\alpha]^{27}_D$: −77° (c=0.6, Dioxane) (107)
SOURCES: Labiatae: *Lamium* (107), Verbenaceae: *Stachytarpheta* (108)



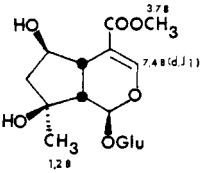
90 IPOLAMIIDOSIDE

$C_{19}H_{28}O_{12}$: 448.1580
$[\alpha]^{16}_D$: −60° (c=0.7, Dioxane) (109)
UV: (CH_3OH) 229 (3.90) (109)
IR: KBr, 1720sh, 1705, 1630 (109)
^{1}H-NMR: (109)
DERIVATIVE: Pentaacetate:
MP: 144–5° (109)
$[\alpha]^{16}_D$: −76° (c=0.5, Dioxane) (109)
SOURCES: Labiatae: *Lamiium* (109)



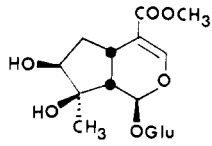
91 SHANZHISIDE

$C_{16}H_{24}O_{11}$: 392.1318
MP: 82–90° (110)
$[\alpha]_D$: −81.7° (EtOH) (110)
UV: 229 (4.04) (110)
IR: 3600–3200, 1650, 1510 (110)
^{1}H-NMR: D_2O (110)
DERIVATIVE: Pentaacetate:
MP: 111–2° (110)
$[\alpha]_D$: −82.4° (EtOH) (110)
SOURCES: Rubiaceae: *Gardenia* (110)



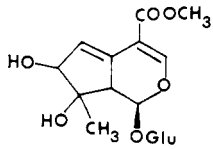
92 SHANZHISIDE METHYL ESTER

$C_{17}H_{26}O_{11}$: 406.1475
Amorphous powder
$[\alpha]^{30}_D$: −110.8° (c=0.42, CH_3OH) (99)
UV: (CH_3OH) 238 (3.93) (99)
IR: 3400, 1690, 1640 (99)
^{1}H-NMR: D_2O (99)
DERIVATIVE: Pentaacetate:
MP: 173–5° (99)
$[\alpha]^{30}_D$: −111.9 (c=0.67, $CHCl_3$) (99)
SOURCES: Rubiaceae: *Mussaenda* (99)



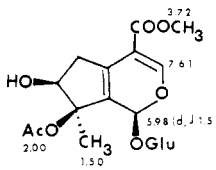
93 CARYOPTOSIDE (5-DESOXY-LAMIIDE)

$C_{17}H_{26}O_{11}$: 406.1475
DERIVATIVE: Pentaacetate:
MP: 137–9° (111)
MS: *m/e* 269, 139 (111)
^{1}H-NMR: $CDCl_3$, 60 MHz: 1.20 (CH_3), 3.68 (OCH_3), 7.30 (H_3), 1.90–2.05 (Ac) (111)
SOURCES: Verbenaceae: *Caryopteris* (1)



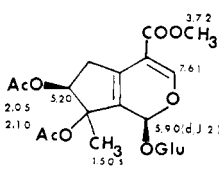
94 GENTIOSIDE

$C_{17}H_{24}O_{11}$: 404.1318
DERIVATIVE: Pentaacetate:
MP: 191–2° (38)
$[\alpha]^{20}_D$: −102° ($CHCl_3$) (38)
UV: 209, 219, 243, 251, and 269 (38)
IR: 3500, 1715, 1615 (38)
^{1}H-NMR: 3.75 (OCH_3), 5.60 (H_6), 7.40 (H_3), 1.26 (H_{10}) (38)
SOURCES: Gentianaceae: *Gentiana* (38)



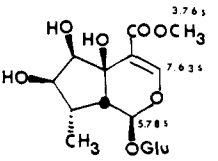
95 BARLERIN

$C_{18}H_{26}O_{12}$: 446.1424
MP: 180° (112)
$[\alpha]^{20}_D$: −102° (CH_3OH) (112)
UV: 235 (3.76) (112)
IR: 1695, 1640 (112)
^{1}H-NMR: (112)
DERIVATIVE: Hexaacetate:
MP: 182° (112)
$[\alpha]^{20}_D$: −96° ($CHCl_3$) (112)
SOURCES: Acanthaceae: *Barleria* (112)



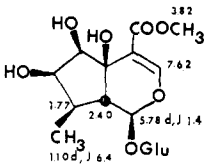
96 ACETYL BARLERIN

$C_{21}H_{28}O_{13}$: 488.1530
IR: 1695, 1640 (112)
UV: 235 (3.76) (112)
^{1}H-NMR: (112)
DERIVATIVE: Hexaacetate:
MP: 182° (112)
$[\alpha]^{20}_D$: −96° ($CHCl_3$) (112)
SOURCES: Acanthaceae: *Barleria* (112)



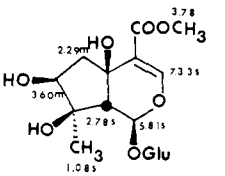
97 PULCHELLOSIDE I

$C_{17}H_{26}O_{12}$: 422.1424
Amorphous powder
$[\alpha]^{21}D$: −148° (c=0.97, EtOH) (113)
UV: (CH_3OH) 233 (113)
IR: KBr, 1687, 1625 (113)
^1H-NMR: D_2O, 60 MHz (113)
DERIVATIVE: Hexaacetate:
MP: 166–9° (113); 171–4° (90)
$[\alpha]^{21}D$: −91.5° (c=0.5, EtOH) (90)
SOURCES: Verbenaceae: *Verbena* (113)



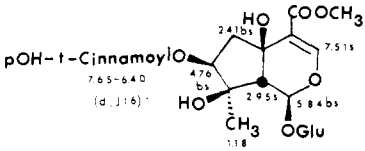
98 PULCHELLOSIDE-II

$C_{17}H_{26}O_{12}$: 422.1424
MP: 150–3° (114)
$[\alpha]^{21}D$: −95° (c=1.01, EtOH) (114)
UV: (CH_3OH) 233 (114)
IR: KBr, 1687, 1625 (114)
^1H-NMR: (90)
DERIVATIVE: Hexaacetate:
MP: 132° (114)
$[\alpha]^{21}D$: −88.7° (c=0.56, EtOH) (90)
SOURCES: Verbenaceae: *Verbena* (114)



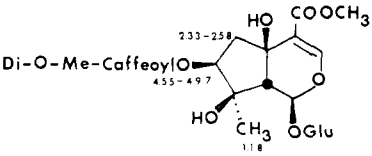
99 LAMIIDE

$C_{17}H_{26}O_{12}$: 422.1424
Amorphous powder
$[\alpha]^{22}D$: −127 (c=1.1, CH_3OH) (107)
UV: (EtOH) 229 (4.02) (107)
IR: KBr, 1700 (107)
^1H-NMR: D_2O (107)
DERIVATIVE: Pentaacetate:
MP: 186–8° (107)
$[\alpha]^{11}D$: −83° (c=0.8, Dioxane) (107)
SOURCES: Labiatae: *Lamium* (107), *Phlomis* (115), Verbenaceae: *Chascanum* (116), *Duranta* (117)



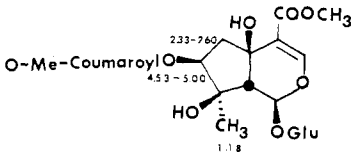
100 LAMIIDOSIDE

$C_{26}H_{32}O_{14}$: 568.1792
Amorphous powder
$[\alpha]^{18}D$: −80° (c=0.34, CH_3OH) (115)
UV: (CH_3OH) 311 (4.18), 227 (4.22, 212sh) (115)
IR: KBr, 1710–1690, 1635, 1605, 1595, 1520, 1440, 840 (115)
^1H-NMR: D_2O, 60 MHz (115)
DERIVATIVE: Pentaacetate:
MP: 199–200° (115)
SOURCES: Labiatae: *Phlomis* (115)



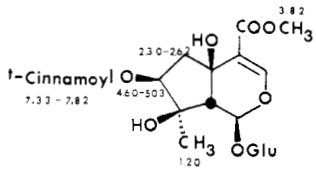
101 DURANTOSIDE-III

$C_{28}H_{36}O_{15}$: 612.2053
Amorphous substance
UV: (H_2O) 311 (4.16), 226 (4.31), 191 (4.34) (117)
IR: KBr, 1700, 1630, 1510 (117)
^1H-NMR: CD_3OD, 60 MHz (117)
DERIVATIVE: Pentaacetate:
MS: 822 (117)
SOURCES: Verbenaceae: *Duranta* (117)



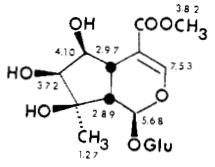
102 DURANTOSIDE-II

$C_{27}H_{34}O_{14}$: 582.1948
Amorphous substance
UV: (H_2O) 310 (4.30), 228 (4.29), 189 (4.29) (117)
IR: KBr, 1700, 1630, 1600, 1510, 1040, 840 (117)
^1H-NMR: CD_3OD, 60 MHz (117)
DERIVATIVE: Pentaacetate:
MP: 161–6° (117)
MS: 792 (117)
SOURCES: Verbenaceae: *Duranta* (117)



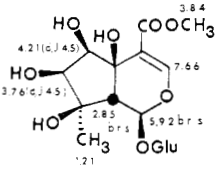
103 DURANTOSIDE-I

$C_{26}H_{32}O_{13}$: 552.1842
Amorphous substance
UV: (H_2O) 282 (4.29), 224 (4.24) (117)
IR: 3010, 1700, 1630, 1600, 1500, 1290, 875, 780, 695 (117)
PMR: CD_3OD, 60 MHz (117)
DERIVATIVE: Pentaacetate:
MP: 199–204° (117)
MS: 762 (117)
SOURCES: Verbenaceae: *Duranta* (117)



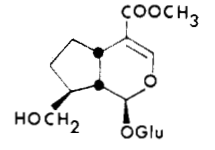
104 LAMALBID (LAMIRIDOSIDE)

$C_{17}H_{26}O_{12}$: 422.1424
$[\alpha]^{20}D$: −124° (H_2O) (118)
UV: (CH_3OH) 235 (3.96) (118)
IR: KBr, 1695, 1635 (118)
^1H-NMR: D_2O, 60 MHz (118)
DERIVATIVE: Heptaacetate:
MP: 189–190° (119), 195° (118)
SOURCES: Labiatae: *Lamium* (118)



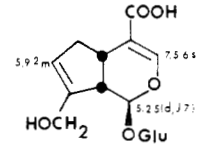
105 PHLOMIOL

$C_{17}H_{26}O_{13}$: 438.1373
MP: 150–1° (120)
$[\alpha]^{25}D$: −112° (c=0.5, CH_3OH) (120)
UV: (CH_3OH) 231 (3.83) (120)
IR: 1705, 1635, 1300 (120)
^1H-NMR: D_2O (120)
DERIVATIVE: Heptaacetate:
MP: 202–3° (120)
SOURCES: Labiatae: *Phlomis* (120)



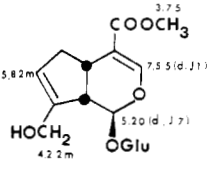
106 ADOXOSIDE

$C_{17}H_{26}O_{10}$: 390.1526
DERIVATIVE: Pentaacetate:
MP: 140.5–141.5° (121)
$[\alpha]^{22}D$: −63° (c=2.0, $CHCl_3$) (121)
^1H-NMR: $CDCl_3$, 90 MHz, 7.40 (br. s. H_3), 3.73 (OCH_3), 2.90 (m, H_5), 5.18 (d, J=4.0, H_1), 1.95–210 (Ac) (121)
SOURCES: Adoxaceae: *Adoxa* (121)



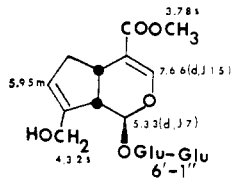
107 GENIPOSIDIC ACID

$C_{16}H_{22}O_{10}$: 374.1213
$[\alpha]^{24}D$: +19.3 (c=1.01, CH_3OH) (84)
UV: (CH_3OH) 237 (3.64) (84)
IR: KBr, 3500, 1680, 1630 (84)
^1H-NMR: D_2O (84)
SOURCES: Rubiaceae: *Ixora* (84), *Genipa* (122)

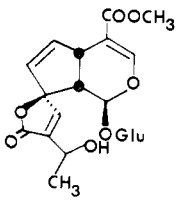


108 GENIPOSIDE

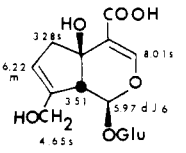
$C_{17}H_{24}O_{10}$: 388.1369
MP: 163–4° (123)
$[\alpha]^{20}D$: +7.5° (EtOH) (123)
UV: (EtOH) 236.5 (4.08) (123)
IR: KBr, 3400, 1710, 1700, 1640 (123)
^1H-NMR: D_2O, 60 MHz (123)
DERIVATIVE: Pentaacetate:
MP: 137–8° (123)
$[\alpha]^{20}D$: +11° (EtOH) (123)
SOURCES: Rubiaceae: *Gardenia* (123), Cornaceae: *Cornus* (124)



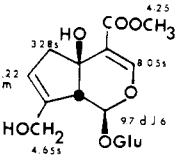
109 GENIPIN-1-O-β-GENTIOBIOSIDE
$C_{26}H_{34}O_{15}$: 550.1897
MP: 227–9° (123)
$[\alpha]^{22}D$: 0 (c=1.0, CH_3OH) (123)
UV: (EtOH) 238 (4.11) (123)
IR: KBr, 1710, 1690, 1640 (123)
^1H-NMR: D_2O, 100 MHz (123)
DERIVATIVE: Ocatacetate:
MP: 167–9° (123)
$[\alpha]^{21}D$: 0 (c=0.5, CH_3OH) (123)
SOURCES: Rubiaceae: *Gardenia* (123)



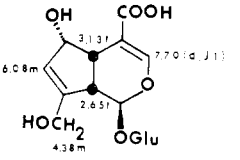
110 PLUMIERIDE
$C_{21}H_{26}O_{12}$: 470.1423
MP: 224–5° (3)
$[\alpha]^{16}D$: −114° (c=0.54, H_2O) (3)
$[\alpha]D$: −80° (CH_3OH) (3)
UV: (EtOH) 216 (4.2) (3)
IR: 1700, 1650, 1630 (3)
DERIVATIVE: Pentaacetate:
MP: 149–150° (3)
$[\alpha]^{20}D$: −138° (c=0.9, $CHCl_3$) (3)
SOURCES: Apocynaceae: *Plumieria* (3)



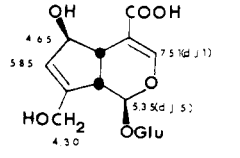
111 THEVESIDE
$C_{16}H_{22}O_{11}$: 390.1161
Amorphous powder
UV: (EtOH) 231 (3.85) (125)
IR: KBr, 2700–2300, 1690, 1634 (125)
^1H-NMR: D_2O, 100 MHz (126)
DERIVATIVE: Hexaacetate:
$[\alpha]^{2i}D$: −34.3 (c=2.18, $CHCl_3$) (125)
SOURCES: Apocynaceae: *Thevetia* (125), *Cerbera* (127)



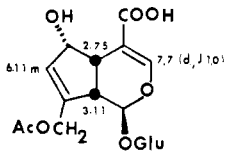
112 THEVIRIDOSIDE
$C_{17}H_{24}O_{11}$: 388.1369
$[\alpha]D$: −23° (H_2O) (128)
UV: 233–4 (3.9) (128)
IR: KBr, 1698, 1678, 1621 (128)
^1H-NMR: D_2O, 100 MHz (128)
DERIVATIVE: Pentaacetate:
MP: 122–123° (128)
$[\alpha]^{21}D$: −15.5° (c=2.28, $CHCl_3$) (128)
SOURCES: Apocynaceae: *Thevetia* (128), *Cerbera* (127)



113 DEACETYL-ASPERULOSIDIC ACID
$C_{16}H_{22}O_{11}$: 390.1161
MP: 138–145° (softening) (129)
$[\alpha]D$: −33.5 (H_2O) (129)
IR: 2700–2400, 1700b, 1640 (44)
^1H-NMR: D_2O (44)
^{13}C-NMR: CD_3OD, (1) 101.5, (3) 155.6, (4) 108.3, (5) 42.6, (6) 75.3, (7) 129.9, (8) 151.3, (9) 45.7, (10) 61.6, (11) 170.9 (46)
SOURCES: artifact formed during extraction of asperuloside (44), Rubiaceae (129)

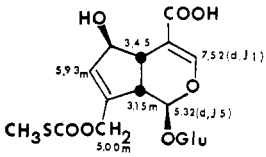


114 SCANDOSIDE
$C_{16}H_{22}O_{11}$: 390.1161
MP: 139–143° (130)
$[\alpha]^{30}D$: −53.3 (H_2O) (130)
UV: 235 (4.16) (130)
IR: 3350–3200, 1680, 1635 (130)
^1H-NMR: D_2O (130)
^{13}C-NMR: CD_3OD, (1) 98.8, (3) 154.0 (4) 111.0, (5) 47.0, (6) 82.4, (7) 129.9, (8) 147.3, (9) 45.9, (10) 61.1, (11) 172.1 (46)
DERIVATIVE: Methyl-ester:
MP: 134° (130)
SOURCES: Rubiaceae: *Paederia* (130)



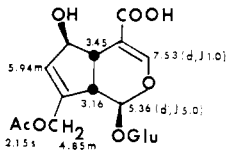
115 ASPERULOSIDIC ACID

$C_{18}H_{24}O_{12}$: 432.1267
MP: 127–131° (44)
$[\alpha]^{22}D$: +8.6 (c=0.98, CH_3OH) (44)
UV: (EtOH), 234 (3.95) (44)
IR: (KBr) 2700–2400, 1700, 1630 (44)
^1H-NMR: D_2O, 60 MHz (44)
SOURCES: Product obtained from hydrolysis of Asperuloside (44), Rubiaceae: *Galium* (213)



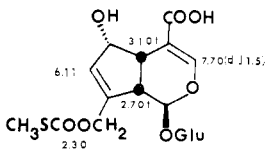
116 6-EPI-PAEDEROSIDIC ACID

$C_{18}H_{24}O_{11}S$: 448.1039
MP: 85–91° (44)
$[\alpha]^{23}D$: +26.4 (c=0.58, CH_3OH) (44)
UV: (EtOH) 233 (3.91) (44)
IR: KBr, 2700–2350, 1700, 1640 (44)
^1H-NMR: D_2O, 60 MHz (44)
SOURCES: Product obtained upon heating Paederoside (44). Structure (214)



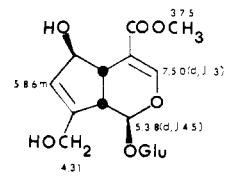
117 10-ACETYL SCANDOSIDE

$C_{18}H_{24}O_{12}$: 432.1267
MP: 133–7° (44)
$[\alpha]^{22}D$: −17.1° (c=1.02, CH_3OH) (44)
UV: (EtOH), 235 (3.97) (44)
IR: (KBr), 2700, 2400, 1700, 1672, 1630 (44)
^1H-NMR: D_2O, 60 MHz (44)
DERIVATIVE: Pentaacetate Methyl Ester:
MP: 133–5° (44)
SOURCES: Product obtained upon extraction of Asperuloside (44)



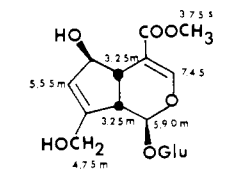
118 PAEDEROSIDIC ACID

$C_{18}H_{24}O_{11}S$: 448.1039
MP: 124–9° (44)
$[\alpha]^{24}D$: +28.2 (CH_3OH) (130)
$[\alpha]^{23}D$: +54.4 (CH_3OH) (44)
UV: 233 (4.04) (130)
IR: 3550, 2750, 2450, 1690, 1635 (130)
^1H-NMR: D_2O (130)
SOURCES: Rubiaceae: *Paederia* (130). Also reported as an artifact formed upon extraction of Paederoside (44). Structure (214).



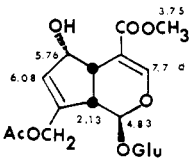
119 SCANDOSIDE METHYL ESTER

$C_{17}H_{24}O_{11}$: 404.1318
$[\alpha]^{34}D$: −56.11 (c=2.42, CH_3OH) (87)
UV: (CH_3OH) 238 (3.89) (87)
IR: Nujol, 1695, 1635 (87)
^1H-NMR: D_2O (87)
DERIVATIVE: Hexaacetate:
MP: 132–4° (87)
$[\alpha]^{33}D$: −87.6 (c=1.01, $CHCl_3$) (87)
SOURCES: Rubiaceae: *Gardenia* (87)



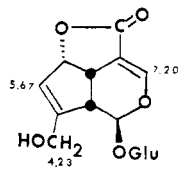
120 FERETOSIDE

$C_{17}H_{24}O_{11}$: 404.1318
DERIVATIVE: Hexaacetate:
MP: 133–4° (50)
$[\alpha]^{20}D$: −78° (CH_3OH) (50)
UV: (CH_3OH) 235 (3.8) (50)
IR: KBr, 1745, 1700, 1645 (50)
^1H-NMR: $CDCl_3$, 1.90–2.10 (Ac), 3.25 (m, H_5, H_9), 3.75 (OCH_3), 4.75 (m, H_{10}), 5.55 (m, H_7), 5.90 (m, H_1), 7.45 (m, H_3) (50)
^{13}C-NMR: $CDCl_3$, (1) 95.5, (3) 151.5, (4) 109.4, (5) 39.8, (6) 81.6, (7) 129.0, (8) 142.9, (9) 46.3, (10) 61.2, (11) 166.7, (OCH_3) 51.4, (1') 96.7, (2') 70.9, (3') 72.6, (4') 68.5, (5') 72.6, (6') 61.8 (50)
SOURCES: Rubiaceae: *Feretia* (50)



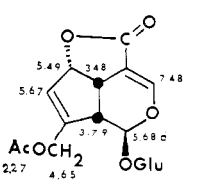
121 DAPHYLLOSIDE

$C_{19}H_{26}O_{12}$: 446.1424
MP: 94–8° (131)
$[\alpha]^{18}D$: +19.7° (c=1.42, H_2O) (131)
UV: (CH_3OH), 235 (3.95) (131)
IR: (KBr), 1730, 1710, 1635 (44)
^1H-NMR: D_2O, 60 MHz (131)
DERIVATIVE: Pentaacetate:
MP: 58° (131)
$[\alpha]^{16}D$: +51.3 (c=0.78, EtOH) (131)
SOURCES: Daphniphyllaceae: *Daphniphyllum* (131), artifact formed upon methanolysis of asperuloside (44).



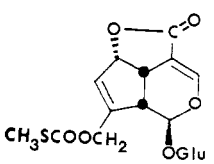
122 DEACETYL-ASPERULOSIDE

$C_{16}H_{20}O_{10}$: 372.1056
MP: 118–120° (44)
$[\alpha]^{25}D$: −88.3° (EtOH) (130)
$[\alpha]^{24}D$: −119.4° (c=0.5, CH_3OH) (44)
UV: 239 (3.66) (130)
IR: 1655, 1735 (130)
^1H-NMR: D_2O (130)
DERIVATIVE: Tetraacetate:
MP: 154–5° (130)
$[\alpha]^{17}D$: −128.6° (c=0.65, EtOH) (130)
SOURCES: Rubiaceae: *Paederia* (130), *Asperula* (132), also formed as an artifact upon extraction of asperuloside (44)



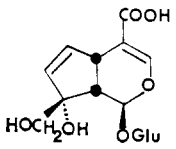
123 ASPERULOSIDE

$C_{15}H_{22}O_{11}$: 414.1161
MP: 131–2° (4)
$[\alpha]^{18}D$: −200 (c=1.4, H_2O) (4)
UV: (EtOH) 234.5 (3.83) (4)
IR: (KBr) 1664, 1757, 1745 (4)
^1H-NMR: D_2O, 60 MHz (133)
^{13}C-NMR: D_2O, (1) 99.4, (3) 150.6, (4) 105.6, (5) 36.8, (6) 86.9, (7) 128.8, (8) 143.2, (9) 44.5, (10) 62.1, (11) 173.8, (1') 93.6, (2') 73.6, (3') 77.2, (4') 70.6, (5') 76.6, (6') 61.8, (CO) 174.0 (50)
DERIVATIVE: Tetraacetate:
MP: 154–5° (4)
$[\alpha]^{17}D$: −128.6° (c=0.65, EtOH) (4)
SOURCES: Daphniphyllaceae, Ericaceae, Globulariaceae, Hammamelidaceae, Rubiaceae (133, 134, 4)



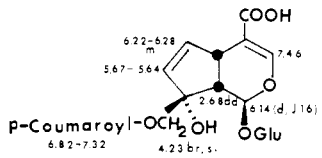
124 PAEDEROSIDE

$C_{15}H_{22}O_{10}S$: 430.0933
MP: 122–3° (130)
$[\alpha]^{24}D$: −195.6 (CH_3OH) (130)
UV: 235 (4.02) (130)
IR: 3350, 1740, 1710, 1650 (130)
DERIVATIVE: Tetraacetate:
MP: 153–5° (130)
^1H-NMR: $CDCl_3$, 7.23 (d, J=2, H_8), 5.72 (d, J=2, H_1), 5.80 (H_7) 4.82 (H_{10}), 2.36 (Ac-S), 2.11–2.00 (Ac) (130)
SOURCES: Rubiaceae: *Paederia* (130), Structure (214)



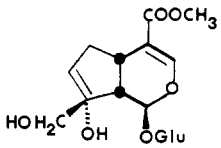
125 MONOTROPEIN

$C_{16}H_{22}O_{11}$: 390.1161
MP: 161–3° (CH_3OH), 170–3° (H_2O) (135)
$[\alpha]^{16}D$: −130.7 (c=1.04, H_2O) (135)
UV: (EtOH) 235 (3.98) (135)
IR: 3580, 2800–2500, 1700, 1675, 1645, 1615 (135)
X-RAY: (136)
DERIVATIVE: Pentaacetate-methyl-ester
MP: 147–8° (135)
$[\alpha]^{26}D$: −17.8 (c=0.43, EtOH) (135)
^1H-NMR: $CDCl_3$, 7.32 (H_3), 6.2 (dd, H_6), 5.61 (H_7), 4.52 (d, J=3, H_1) 4.15 (H_{10}), 3.70 (OCH_3), 3.50 (H_5), 2.66 (q, H_9) (135)
SOURCES: Ericaceae: *Vaccinium*, Globulariaceae: *Globularia*. Hammamelidaceae: *Liquidambar*. Monotropaceae: Monotropastum. Pyrolaceae: *Chimaphila*, *Pyrola*, *Monotropa*, Rubiaceae: *Galium*, *Asperula* (4).



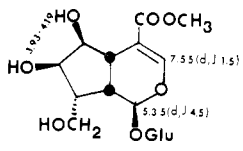
126 VACCINIOSIDE

$C_{25}H_{28}O_{13}$: 536.1530
MP: 150–3° (137)
$[\alpha]^{17}D$: −75.2 (c=1.0, H_2O) (137)
^1H-NMR: D_2O (138)
IR: KBr, 3400–3200, 1685, 1605 (138)
DERIVATIVE: Pentaacetate:
MP: 110–2° (138)
SOURCES: Ericaceae: *Vaccinium* (138)



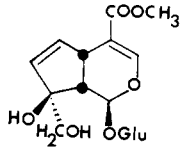
127 MONOTROPEIN-METHYL ESTER

$C_{17}H_{24}O_{11}$: 404.1318
^{13}C-NMR: CD_3OD, (1) 95.2, (3) 152.5, (4) 110.5, (5) 38.8, (6) 137.5, (7) 133.7, (8) 85.9, (9) 45.4, (10) 68.3, (11) 169.0, (OCH_3) 51.6 (46)
DERIVATIVE: Pentaacetate:
MP: 147–8° (135)
$[\alpha]^{18}D$: −76.25° (c=0.8, EtOH) (135)
SOURCES: (135)



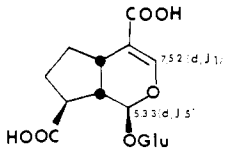
128 NYCTANTHOSIDE

$C_{17}H_{26}O_{12}$: 422.1424
$[\alpha]^{20}D$: −65.1° (CH_3OH) (139)
UV: (H_2O) 237 (3.84) (139)
IR: KBr, 1695, 1635 (139)
^1H-NMR: D_2O (139)
SOURCES: Verbenaceae: *Nycthantes* (139)



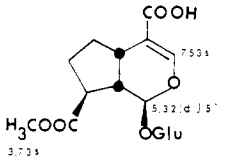
129 GARDENOSIDE

$C_{17}H_{24}O_{11}$: 404.1318
DERIVATIVE: Hexaacetate:
MP: 64–5° (50)
$[\alpha]^{20}D$: −70.5° (c=1.0, CH_3OH) (50)
UV: (CH_3OH) 233 (3.5) (50)
IR: KBr, 1760, 1720, 1650 (50)
^1H-NMR: $CDCl_3$, 1.80–2.05 (Ac), 2.80 (dd, H_9), 3.68 (OCH_3), 5.90 (d, H_7), 6.07 (d, H_1), 6.36 (dd, H_6), 7.35 (H_3) (50)
^{13}C-NMR: (Free Compound); CD_3OD, (1) 94.4, (3) 152.0, (4) 111.6, (5) 38.9, (6) 135.8*, (7) 135.9*, (8) 86.3, (9) 52.4, (10) 67.2, (11) 169.7, (OCH_3) 51.6 (46)
SOURCES: Rubiaceae: *Feretia* (50), *Gardenia* (87)



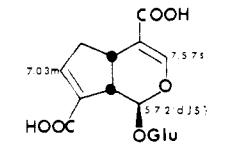
130 FORSYTHIDE

$C_{16}H_{22}O_{11}$: 390.1161
Amorphous powder
$[\alpha]^{30}D$: $-64.7°$ (c=1.0, CH_3OH) (140)
UV: (CH_3OH) 234 (4.06) (140)
IR: Nujol, 3500–3100, 2800–2500, 1685, 1630 (140)
^1H-NMR: D_2O, 60 MHz (140)
DERIVATIVE: Tetraacetate:
MP: 253–5° (140)
SOURCES: Oleaceae: *Forsythia* (140)



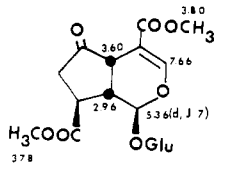
131 FORSYTHIDE METHYL ESTER

$C_{17}H_{24}O_{11}$: 404.1318
Amorphous powder
$[\alpha]^{32}D$: -51.9 (c=1.0, CH_3OH) (140)
UV: (CH_3OH) 233.5 (4.05) (140)
IR: KBr, 3500–3000, 2800–2500, 1710, 1690, 1630 (140)
^1H-NMR: D_2O, 60 MHz (140)
DERIVATIVE: Tetraacetate:
MP: 191–3° (140)
$[\alpha]^{32}D$: -54.7 (c=1.0, $CHCl_3$) (140)
SOURCES: Oleaceae: *Forysthia* (140)



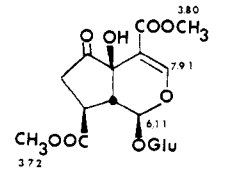
132 IXOSIDE

$C_{16}H_{20}O_{11}$: 388.1005
Amorphous powder
$[\alpha]^{34}D$: $+33.6$ (c=1.15, H_2O) (84)
UV: (H_2O) 219 (4.16) (84)
IR: KBr, 3400, 1700, 1620 (84)
^1H-HMR: D_2O (84)
DERIVATIVE: Tetraacetate:
MP: 236–7° (84)
$[\alpha]^{35}D$: $-3.2°$ (c=0.28, CH_3OH) (84)
SOURCES: Rubiaceae: *Ixora* (84)



133 GRISELINOSIDE

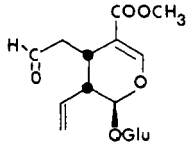
$C_{15}H_{24}O_{12}$: 432.1267
$[\alpha]^{21}D$: $-117°$ (c=0.3, CH_3OH) (105)
UV: (CH_3OH) 235 (4.0) (105)
^1H-NMR: D_2O, 90 MHz (105)
^{13}C-NMR: D_2O (1) 96.9, (3) 154.6, (4) 104.0, (5) 40.7, (6) 215.5, (7) 37.9, (8) 39.8, (9) 44.0, (10) 176.3 (11) 169.2, (OCH_3) 53.9, (1') 100.3 (105)
DERIVATIVE: Tetraacetate:
MP: 188–9° (105)
$[\alpha]^{21}D$: $-122°$ (c=0.3, $CHCl_3$) (105)
DERIVATIVE: Enol-pentaacetate:
MP: 174–6° (105)
$[\alpha]^{24}D$: 9.4° (c=0.6, $CHCl_3$) (105)
SOURCES: Cornaceae: *Griselinia* (105)



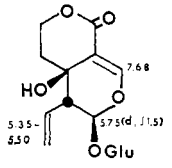
134 ARALIDIOSIDE

$C_{18}H_{24}O_{13}$: 448.1216
$[\alpha]^{24}D$: $-211°$ (c=0.3, CH_3OH) (105)
UV: (CH_3OH) 232 (3.99) (105)
^1H-NMR: D_2O, 90 MHz (105)
^{13}C-NMR: D_2O, (1) 95.3, (3) 157.5, (4) 105.4, (5) 74.0, 212.0, (7) not recorded, (8) 36.2, (9) 47.1, (10) 175.4, (11) 167.9, (OCH_3) 53.9, 52.8, (1') 100.2 (105)
DERIVATIVE: Pentaacetate:
MP: 188–190° (105)
$[\alpha]^{25}D$: $-232°$ (c=0.5, $CHCl_3$) (105)
SOURCES: Cornaceae: *Aralidium* (105)

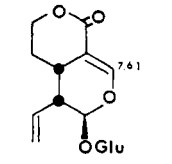
IV. Secoiridoid glycosides: Simple



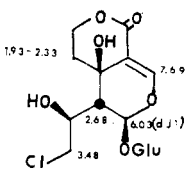
135 LONICEROSIDE (SECOLOGANIN)
$C_{17}H_{24}O_{10}$: 388.1369
$[\alpha]_D$: −105° (c=1.1, CH_3OH) (141)
UV: (EtOH) 236 (3.99) (141)
IR: Neat, 3400, 1700, 1623 (141
^{13}C-NMR: D_2O, (1) 97.6, (3) 154.0, (4) 109.6, (5) 27.5, (6) 44.6, (7) 206.8, (8) 133.8, (9) 44.6, (10) 121.6, (11) 169.8, (OCH_3) 52.6, (1') 99.6, (2') 73.5, (3') 76.6, (4') 70.5, (5') 77.2, (6') 61.6 (97)
DERIVATIVE: Tetraacetate:
MP: 115–6° (141)
$[\alpha]_D$: −102° (c=1.0, $CHCl_3$) (141)
^1H-NMR: $CDCl_3$, 9.67 (H_7), 7.38 (H_3), 3.66 (OCH_3) (141)
SOURCES: Caprifoliaceae: *Lonicera* (141), Synthesis (142)



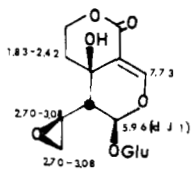
136 SWERTIAMARIN (SWERTIAMAROSIDE)
$C_{16}H_{22}O_{11}$: 390.1161
^1H-NMR: D_2O, 60 MHz (143)
DERIVATIVE: Tetraacetate:
MP: 190–1° (143)
UV: 206 (3.2), 234 (4.0) (143)
IR: 3508, 1697, 1618, 840 (143)
^{13}C-NMR: $CDCl_3$, (1) 97.7, (3) 150.7, (4) 109.9, (5) 63.1, (6) 32.6, (7) 64.6, (8) 131.5, (9) 50.8, (10) 121.3, (11) 164.8, (1') 97.0, (2') 70.7, (3') 72.4, (4') 68.2 (5') 71.9, (6') 61.6 (50)
SOURCES: Gentianaceae: *Swertia* (12)



137 SWEROSIDE
$C_{16}H_{22}O_9$: 358.1263
Amorphous powder
$[\alpha]^{26}_D$: −236° (H_2O) (144)
UV: 246 (3.92) (144)
^1H-NMR: D_2O, 60 MHz (144)
^{13}C-NMR: D_2O, (1) 98.4, (3) 154.2, (4) 105.6, (5) 27.3, (6) 24.8, (7) 70.4, (8) 132.2, (9) 42.5, (10) 121.5, (11) 170.2, (1') 99.2, (2') 73.5, (3') 76.4, (4') 70.4, (5') 72.1, (6') 61.6 (97)
DERIVATIVE: Tetraacetate:
MP: 167–8° (144)
$[\alpha]^{27}_D$: −250° ($CHCl_3$) (144)
$[\alpha]_D$: −173° ($CHCl_3$) (145)
SOURCES: Gentianaceae: *Swertia* (144), Loganiaceae; *Anthocleista* (4), Stereochemistry (146), Loasaceae: *Mentzelia* (18)

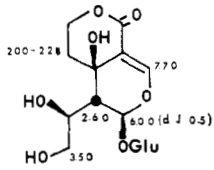


138 EUSTOSIDE
$C_{16}H_{23}O_{11}Cl$: 426.0928
Hygroscopic, bitter tasting, white powder
$[\alpha]^{23}_D$: −100° (c=1.0, CH_3OH) (147)
UV: (CH_3OH) 237 (3.86) (147)
IR: KBr, 3350, 1685, 1610 (147)
^1H-NMR: D_2O, 60 MHz (147)
DERIVATIVE: Pentaacetate:
MP: 158–160° (147)
$[\alpha]^{20}_D$: −81° (c=1.0, $CHCl_3$) (147)
^{13}C-NMR: $CDCl_3$, (1) 94.7, (3) 150.5, (4) 110.5, (5) 62.9, (6) 31.5, (7) 64.2, (8) 69.9, (9) 46.8, (10) 43.6, (11) 164.0, (1') 96.9, (2') 70.6, (3') 71.6, (4') 68.2, (5') 72.3, (6') 61.6 (147)
SOURCES: Gentianaceae: *Eustoma* (147)



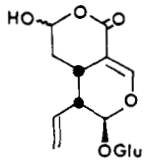
139 EUSTOMOSIDE

$C_{16}H_{22}O_{11}$: 390.1161
Amorphous, colorless bitter principle
$[\alpha]^{23}D$: −123.2° (c=1.01, CH_3OH) (147)
UV: (CH_3OH) 235.5 (3.94) (147)
IR: KBr, 3400, 1695, 1620 (147)
^1H-NMR: D_2O, 60 MHz (147)
DERIVATIVE: Tetraacetate:
MP: 201–3° (147)
$[\alpha]^{20}D$: −101.8° (c=1.01, $CHCl_3$) (147)
^{13}C-NMR: $CDCl_3$, (1) 95.8, (3) 150.0, (4) 110.0, (5) 63.5, (6) 32.0, (7) 64.6, (8) 49.1, (9) 49.0, (10) 45.0, (11) 164.4, (1') 96.7, (2') 70.6, (3') 71.6, (4') 68.0, (5') 72.3, (6') 61.4 (147)
SOURCES: Gentianaceae: *Eustoma* (147)



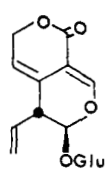
140 EUSTOMORUSSIDE

$C_{16}H_{24}O_{12}$: 408.1267
Hygroscopic, bitter tasting, white powder
$[\alpha]^{20}D$: −72.9° (c=1.1, CH_3OH) (147)
UV: (CH_3OH) 236.5 (3.76) (147)
IR: KBr, 3350, 1690, 1615 (147)
^1H-NMR: D_2O, 60 MHz (147)
DERIVATIVE: Hexaacetate:
MP: 142–4° (147)
$[\alpha]^{23}D$: −67.9° (c=1.0, $CHCl_3$) (147)
^{13}C-NMR: $CDCl_3$, (1) 94.5, (3) 150.3, (4) 110.6, (5) 62.6, (6) 31.1 (7) 64.3, (8) 68.5, (9) 47.0 (10) 62.4, (11) 164.0, (1') 96.8, (2') 70.6, (3') 71.6, (4') 68.1, (5') 72.4, (6') 61.4 (147)
SOURCES: Gentianaceae: *Eustoma* (147)



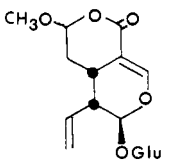
141 SECOLOGANIC ACID

$C_{16}H_{22}O_{10}$: 374.1213
Amorphous powder
UV: (CH_3OH) 241 (148)
DERIVATIVE: Pentaacetate:
UV: 241.5 (3.9) (148)
^1H-NMR: $CDCl_3$, 7.58 (d, J 2.5, H_3), 6.64–6.40 (m, H_7), 5.46–4.94 ($H_{5,10}$), 5.35 (d, H_1), 2.17–1.95 (Ac) (148)
MS: *m/e*: 584, 526, 525, 524, 482, 395, 331, 237, 177, 169, 139, 127, 109, 97, 81 (148)
SOURCES: Loganiaceae: *Anthocleista* (148).



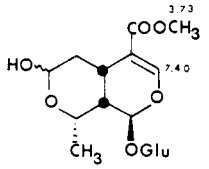
142 GENTIOPICROSIDE

$C_{16}H_{20}O_9$: 356.1107
MP: 122° (118–121 hydrated) (149)
$[\alpha]D$: −196° (H_2O) hydrated (149)
MP: 190° (anhydrous) (149)
$[\alpha]^{25}D$: −217.6° (c=1.0, CH_3OH) (149)
UV: (EtOH) 247sh (3.84), 255sh (3.93), 270 (3.97) (149)
IR: Nujol, 3533, 3460, 3267, 1712, 1677, 1612, 931, 772 (149)
^{13}C-NMR: D_2O, (1) 98.5, (3) 150.4, (4) 104.4, (5) 125.2, (6) 117.8, (7) 71.2, (8) 133.9, (9) 45.4, (10) 119.5, (CO) 167.5, (1') 99.6, (2') 73.3 (3') 76.5, (4') 70.3, (5') 77.1, (6') 61.6 (150)
DERIVATIVE: Tetraacetate:
MP: 140° (149)
$[\alpha]^{25}D$: −159.1 (c=1.0, $CHCl_3$) (149)
SOURCES: Gentianaceae: *Swertia* (151), Stereochemistry (152)



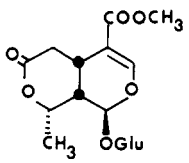
143 VOGELOSIDE

$C_{17}H_{26}O_{10}$: 390.1526
Amorphous powder
UV: (CH_3OH) 241 (148)
DERIVATIVE: Tetraacetate:
MP: 153° (148)
^{1}H-NMR: 7.58 (d, J 2.5, H_3), 5.31 (d, H_1), 5.37 (H_7), 5.52–4.90 (H_8, H_{10}) 3.54 (OCH_3), 1.96–2.10 (Ac) (148)
MS: 556, 526, 525, 496, 483, 482, 394, 361, 331, 269, 209, 169, 139, 127, 109, 97, 81 (148)
SOURCES: Loganiaceae: *Anthocleista* (148)



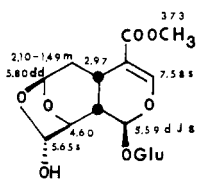
144 MORRONISIDE

$C_{17}H_{26}O_{11}$: 406.1475
$[\alpha]_D$: −72° (c=1.0, EtOH) (153)
IR: 1700, 1640 (153)
^{13}C-NMR: D_2O, 7α and 7β Morroniside: (1) 96.2, (3) 154.9, (4) 110.2α. 110.9β, (5) 31.1α, 26.8β, (6) 36.1α, 33.4β, (7) 95.9α, 91.6β, (8) 73.8α, 65.9β, (9) 38.7α, 39.3β, (10) 19.6, (CO) 169.8, (OCH_3) 52.6, (1') 99.5, (2') 73.6, (3') 76.8, (4') 70.5, (5') 77.1, (6') 61.6 (150)
DERIVATIVE: Pentaacetate:
MP: 148–151° (153)
$[\alpha]_D$: −73.5° (c=0.97, $CHCl_3$) (153)
^{1}H-NMR: $CDCl_3$, 7.40 (H_3), 3.73 (OCH_3) (153)
SOURCES: Caprifoliaceae: *Lonicera* (153), *Sambucus* (154)



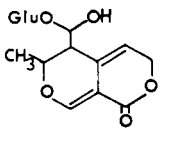
145 KINGISIDE

$C_{17}H_{24}O_{11}$: 404.1318
$[\alpha]_D$: −91° (c=0.7, EtOH) (153)
IR: 3350, 1740, 1640 (153)
DERIVATIVE: Tetraacetate:
^{1}H-NMR: $CDCl_3$, 7.44 (H_3), 3.73 (OCH_3) 1.96–2.10 (Ac) (153)
SOURCES: Caprifoliaceae: *Lonicera* (153), Configuration (155)



146 SECOGALIOSIDE

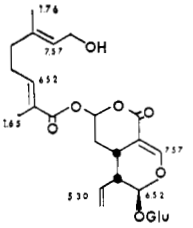
$C_{17}H_{24}O_{12}$: 420.1267
Amorphous foam
$[\alpha]^{21}_D$: −82° (c=0.2, EtOH) (150)
UV: (EtOH) 238 (4.05) (150)
^{1}H-NMR: D_2O, 90 MHz (150)
^{13}C-NMR: D_2O, (1) 96.3, (3) 151.1, (4) 109.8, (5) 25.2, (6) 34.6, (7) 103.3, (8) 78.9, (9) 37.2, (10 96.7, (CO) 169.5, (OCH_3) 52.7, (1') 100.4, (2') 73.6, (3') 76.7, (4') 70.4, (5') 77.1, (6') 61.6 (150)
DERIVATIVE: Pentaacetate:
MP: 171–172.5° (150)
$[\alpha]^{24}_D$: −73° (c=0.3, $CHCl_3$) (150)
SOURCES: Rubiaceae: *Galium* (150)



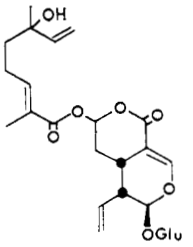
147 GENTIOFLAVOSIDE

$C_{16}H_{22}O_{10}$: 374.1213
DERIVATIVE: Pentaacetate:
MP: 126-8° (156)
$[\alpha]^{20}_D$: −108° ($CHCl_3$) (156)
IR: 3080, 1755, 1715, 1615 (156)
UV: 210, 219, 243, 252, 269 (156)
^{1}H-NMR: 5.60 (H_6), 7.45 (H_3), 1.20 (d, CH_3) (156)
SOURCES: Gentianaceae: *Gentiana* (156)

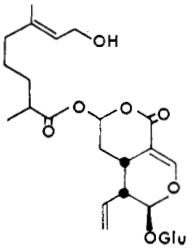
V. Secoiridoid glycosides: terpene conjugated



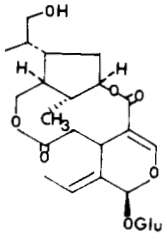
148 FOLIAMENTHIN
$C_{26}H_{36}O_{12}$: 540.2206
MP: 194–6° (157)
$[\alpha]_D$: −63° (CH_3OH) (157)
^1H-NMR: CD_3OD, 100, 220 MHz (145)
DERIVATIVE: Pentaacetate:
$[\alpha]_D$: −55° (145)
UV: 228 (4.24), 245sh (145)
SOURCES: Menyanthaceae: *Menyanthes* (145)



149 MENTHIAFOLIN
$C_{26}H_{36}O_{12}$: 540.2206
MP: 186° (157)
$[\alpha]_D$: −68° (CH_3OH) (157)
UV: 228, 245sh (157)
IR: 1740–1685 (157)
DERIVATIVE: Tetraacetate:
MS: M^+ 708, and *m/e* 693, 525, 361, 331 (157)
^1H-NMR: $CDCl_3$, 100–200 MHz, 7.60 (H_3), 6.65 (H_7), 5.91 ($H_{7'}$), 6.94 ($H_{3'}$), 1.87 ($H_{10'}$), 1.32 ($H_{9'}$), 2.30–2.10 (Ac) (157)
SOURCES: Menyanthaceae: *Menyanthes* (157)

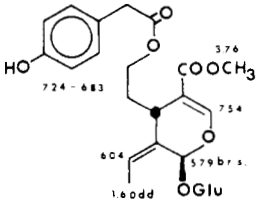


150 DIHYDROFOLIAMENTHIN
$C_{26}H_{38}O_{12}$: 542.2363
$[\alpha]_D$: −65° (CH_3OH) (157)
UV: 245 (157)
IR: 1740, 1710 (157)
DERIVATIVE: Pentaacetate:
MS: 752 (157)
^1H-NMR: $CDCl_3$, 7.60 (d, H_3), 6.60 (m, H_7) 4.51 (d, H_8), 1.75 (m, H_9), 1.22 (d, $H_{10'}$) (157)
SOURCES: Menyanthaceae: *Menyanthes* (157)

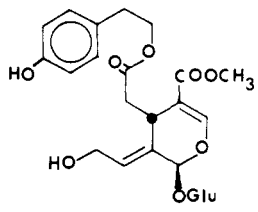


151 JASMININ
$C_{16}H_{38}O_{12}$: 542.2363
DERIVATIVE: Aglucone ethyl ether:
MP: 139–141° (158)
$[\alpha]^{26}_D$: −49.1° (c=2.18, $CHCl_3$) (158)
UV: 238 (4.0) (158)
IR: CCl_4, 3550, 1730, 1710, 1630, 825 (158)
SOURCES: Oleaceae: *Jasminum* (158)

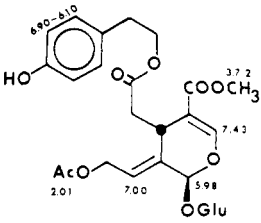
VI. Secoiridoid glycosides: phenolic conjugated



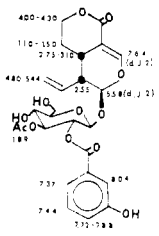
152 LIGSTROSIDE
$C_{25}H_{32}O_{12}$: 524.1893
$[\alpha]^{25}_D$: −180° (c=0.23, 95% EtOH) (159)
^1H-NMR: D_2O (159)
DERIVATIVE: Pentaacetate:
$[\alpha]^{25}_D$: −127° (C=0.3, $CHCl_3$) (159)
SOURCES: Oleaceae: *Fraxinus* (159), *Ligustrum* (160)



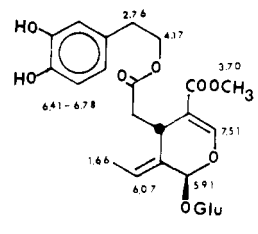
153 10-HYDROXY-LIGSTROSIDE
$C_{23}H_{25}O_{13}$: 512.1530
DERIVATIVE: Pentaacetate:
^{13}C-NMR: (1) 92.5, (4) 152.2, (4) 108.1, (5) 30.8, (6) 39.8, (7) 170.0, (8) 124.0, (9) 130.9, (10) 60.4, (CO) 165.9, (OCH_3) 51.4, (1') 96.8, (2') 70.6, (3') 72.3, (4') 68.0, (5') 72.1, (6') 61.5 (150)
SOURCES: Oleaceae: *Ligustrum* (161)



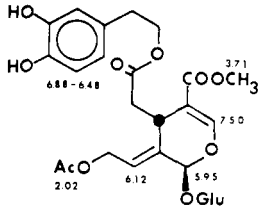
154 10-ACETOXY-LIGUSTROSIDE
$C_{27}H_{34}O_{14}$: 582.1948
$[\alpha]^{18}D$: −143.9 (CH_3OH) (162)
UV: (CH_3OH) 228 (4.26), 279 (3.37), 285 sh (3.32) (162)
IR: Nujol, 1730, 1705, 1635 (162)
^{1}H-NMR: CD_3OD (162)
DERIVATIVE: Hexaacetate:
$[\alpha]^{24}D$: −128.6° (c=1.0, $CHCl_3$) (162)
SOURCES: Oleaceae: *Osmanthus* (162)



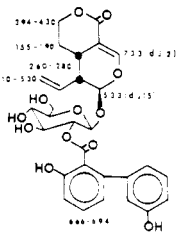
155 CENTAPICRIN
$C_{25}H_{28}O_{12}$: 520.1581
MP: 234-7° (163)
$[\alpha]^{28}D$: −213° (c=0.5, Pyridine) (163)
UV: (CH_3OH) 237 (4.32), 303 (3.55) (163)
IR: KBr, 3500-3300, 1750, 1725, 1705, 1620, 1460, 995, 905 (163)
^{1}H-NMR: Pyr-d_5, 100 MHz (163)
DERIVATIVE: Triacetate
$[\alpha]^{25}D$: −135° (c=3.05, $CHCl_3$) (163)
SOURCES: Gentianaceae: *Erythrea* (163)



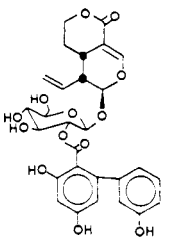
156 OLEUROPEIN
$C_{25}H_{32}O_{13}$: 540.1842
MP: 87-9° (164)
$[\alpha]^{26}D$: −168° (c=0.67, CH_3OH) (155)
$[\alpha]^{20}D$: −147° (c=1.0, H_2O, EtOH, or Acetone) mutarotation: $[\alpha]^{20}D$: −127° (after 9 hours) (164)
UV: (CH_3OH) 233.5 (4.20), 284 (3.48) (155)
IR: 3420, 1710, 1640, 1450, 1390, 920, 1075, 862 (164)
^{1}H-NMR: CD_3OD, 60 MHz (155)
DERIVATIVE: Hexaacetate:
MP: 58-9° (164)
$[\alpha]D$: −62° (c=1.0, AcOH) (164)
SOURCES: Oleaceae: *Olea* (165), Stereochemistry (166)



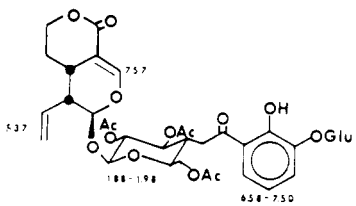
157 10-ACETOXY-OLEUROPEIN
$C_{27}H_{34}O_{15}$: 598.1897
$[\alpha]^{21}D$: −191° (CH_3OH) (162)
UV: (CH_3OH) 235.5 (4.2), 283.5 (3.47) (162)
IR: Nujol, 1740, 1705, 1635 (162)
^{1}H-NMR: CD_3OD (162)
DERIVATIVE: Heptaacetate:
$[\alpha]^{23}D$: −117.4° (c=1.0, $CHCl_3$) (162)
SOURCES: Oleaceae: *Osmanthus* (162)



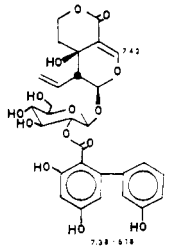
158 AMAROPANIN (DEOXYAMAROGENTIN)
$C_{29}H_{30}O_{12}$: 570.1737
MP: 178° (167)
$[\alpha]^{26}D$: −101.25 (c=0.474, CH_3OH) (167)
UV: (CH_3OH) 210 (4.39), 315 (3.48), 240sh (167)
IR: KBr, 3400, 1680, 1580, 1430, 980, 930, 890, 810, 783, 700 (167)
^1H-NMR: Acetone-d_6 (167)
DERIVATIVE: Pentaacetate:
MP: 79° (167)
MS: M^+ 780, *m/e*: 213, 109, 169, 229, 255, 289, 297, 501, 543, 585, 696, 738 (167)
SOURCES: Gentianaceae: *Gentiana* (167), *Radix* (168)



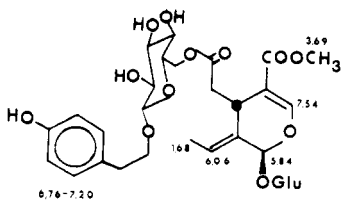
159 AMAROGENTIN
$C_{29}H_{30}O_{13}$: 586.1686
MP: 229–230° (169)
$[\alpha]^{20}D$: −116.6 (CH_3OH) (169)
UV: 230 (4.46), 266 (4.07), 306 (3.68) (169)
IR: 1655, 1580 (169)
^1H-NMR: (169)
DERIVATIVE: Dihydro-amarogentin:
MP: 177–9° (169)
SOURCES: Gentianaceae: *Swertia* (169), *Radix* (170), *Gentiana* (171, 168)



160 TRIFLOROSIDE
$C_{35}H_{42}O_{20}$: 782.2269
$[\alpha]^{28}D$: −122.8 (CH_3OH) (172)
UV: (CH_3OH) 249 (4.21), 325 (3.69) (172)
IR: $CHCl_3$, 3350, 1750, 1705, 1625, 1470, 995, 910 (172)
^1H-NMR: $CDCl_3$, 60 MHz (172)
SOURCES: Gentianaceae: *Gentiana* (172)

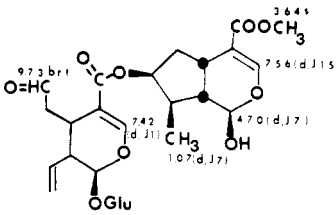


161 AMAROSWERIN
$C_{29}H_{30}O_{14}$: 602.1634
Amorphous powder
$[\alpha]D$: −13° (CH_3OH) (169)
IR: Nujol, 1685, 1640, 1610, 995, 900 (169)
UV: (CH_3OH) 227 (4.46), 271 (4.03), 307 (3.65) (169)
^1H-NMR: CD_3OD (169)
SOURCES: Gentianaceae: *Swertia* (169), *Radix* (170)



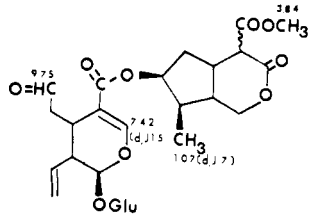
162 NUZHENIDE
$C_{31}H_{44}O_{17}$: 688.2578
$[\alpha]^{25}D$: −151° (c=1.7, CH_3OH) (159)
UV: (95% EtOH) 277 (3.34), 226 (4.13) (159)
^1H-NMR: D_2O (159)
^{13}C-NMR: D_2O, (1) 95.7, (3) 155.6, (4) 109.0, (5) 31.1, (6) 41.0, (7) 174.4, (8) 125.7, (9) 129.4, (10) 13.6, (11) 169.8, (OCH_3) 52.6, Tyrosol: (1b) 71.8, (2b) 35.3, (3b) 131.1, (4b) 131.1, (5 & 7b) 116.3, (6b) 155.2, (8b) 131.1, Glucose: (1') 100.5, 103.1, (2') 73.8, 73.6, (3') 76.6, 76.6 (4') 70.3, 70.7, (5') 77.2, 74.1, (6') 61.5, 64.8 (159)
SOURCES: Oleaceae: *Fraxinus* (159)

VII. Bisglycosidic iridoids and secoiridoids



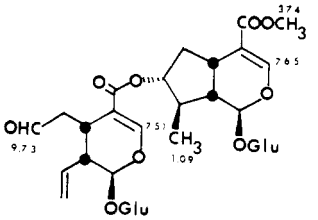
163 SYLVESTROSIDE-III

$C_{27}H_{36}O_{14}$: 584.2104
$[\alpha]^{20}D$: −85° (c=0.4, CH_3OH) (97)
UV: (CH_3OH) 237 (4.25) (97)
^1H-NMR: Acetone-d_6 (97)
^{13}C-NMR: Acetone-d_6, b) (1) 96.9, (3) 153.0, (4) 109.9, (5) 27.3, (6) 44.8, (7) 201.7, (8) 134.7, (9) 44.8, (10) 120.4, (11) 166.9, (1') 99.7, (2') 74.2, (3') 77.5, (4') 71.2, (5') 77.5, (6') 62.6.a), (1) 96.4, (3) 153.0, (4) 111.4, (5) 33.1, (6) 40.2, (7) 77.5, (8) 41.1, (9) 47.9, (10) 14.3, (11) 168.2, (OCH_3) 51.4 (97)
DERIVATIVE: Pentaacetate:
$[\alpha]^{20}D$: −81° (c=0.5, $CHCl_3$) (97)
SOURCES: Dipsacaceae: *Dipsacus* (97)



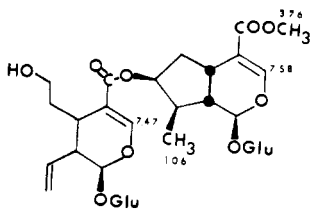
164 SYLVESTROSIDE-IV

$C_{27}H_{36}O_{14}$: 584.2104
DERIVATIVE: Tetraacetate:
MP: 137-9° (97)
$[\alpha]^{22}D$: −60° (c=0.4, $CHCl_3$) (97)
UV: (CH_3OH) 233 (3.97) (97)
^1H-NMR: $CDCl_3$ (97)
^{13}C-NMR: Acetone-d_6, b) (1) 96.9, (3) 153.3, (4) 109.8, (5) 27.2, (6) 44.9, (7) 201.4, (8) 134.7, (9) 44.9, (10) 120.2, (11) 166.8, (1') 99.7, (2') 73.4, (3') 76.5, (4') 70.3, (5') 77.1, (6'), 61.6, (a) (1) 69.9, (3) 169.8, (4) 52.2, (5) 37.2, (6) 41.8, (7) 79.2, (8) 38.7, (9) 42.7, (10) 13.4, (11) 169.5, (OCH_3) 52.8 (97)
SOURCES: Dipsacaceae: *Dipsacus* (97)



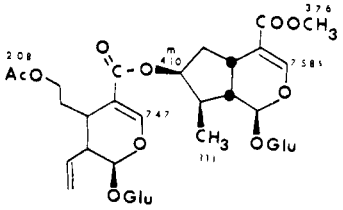
165 CANTLEYOSIDE

$C_{33}H_{46}O_{19}$: 746.2632
$[\alpha]^{22}D$: −93° (c=0.6, CH_3OH) (97)
UV: (CH_3OH), 235 (4.31) (97)
^1H-NMR: D_2O (173)
^{13}C-NMR: D_2O, (b) (1) 97.7, (3) 154.2, (4) 109.8, (5) 28.2, (6) 44.5* (7) 206.7, (8) 133.9, (9) 45.1, (10) 121.6, (11) 168.9, (a) (1) 97.4, (3) 152.2, (4) 113.1, (5) 31.3, (6) 40.1, (7) 78.8, (8) 39.3, (9) 46.3, (10) 13.2, (11) 170.3, (OCH_3) 52.7, (1') 99.6, (2') 73.5, (3') 76.6, (4') 70.5, (5') 77.2, (6') 61.6 (double intensity) (97)
DERIVATIVE: Octaacetate:
MP: 146-8° (97)
$[\alpha]^{22}D$: −89° (c=0.4, $CHCl_3$) (97)
SOURCES: Icacinaceaes: *Cantleya* (173), Dipsacaceae: *Dipsacus* (174)

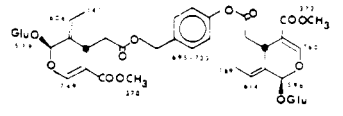


166 SYLVESTROSIDE-I

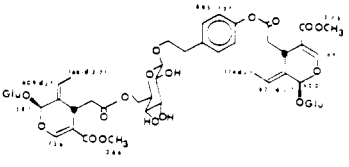
$C_{33}H_{48}O_{19}$: 748.2789
$[\alpha]^{21}D$: −106° (c=0.4, EtOH) (97)
UV: (EtOH) 236 (4.32) (97)
^1H-NMR: D_2O (97)
^{13}C-NMR: D_2O, (b) (1) 98.3, (4) 153.6, (4) 111.5, (5) 30.7, (6) 33.2, (7) 60.8, (8) 134.7, (9) 44.5, (10) 120.4, (11) 169.5, (1') 99.6, (2') 73.5, (3') 76.6, (4') 70.5, (5') 77.2, (6') 61.6 (sugar signals double intensity) (a) (1) 97.4, (3) 152.2, (4) 113.2, (5) 31.1, (6) 40.2, (7) 78.8, (8) 39.3, (9) 46.4, (10) 13.3, (11) 170.5, (OCH_3) 52.7 (97)
DERIVATIVE: Nonaacetate:
MP: 154-5° (97)
$[\alpha]^{20}D$: −85° (c=0.4, $CHCl_3$) (97)
SOURCES: Dipsacaceae: *Dipsacus* (97)



167 SYLVESTROSIDE-II
$C_{35}H_{50}O_{20}$: 790.2894
Colorless foam
$[\alpha]^{20}D$: −99° (c=1.5, CH_3OH) (97)
UV: (EtOH) 238 (4.38) (97)
^1H-NMR: D_2O (97)
^{13}C-NMR: D_2O, (b) (1) 98.0, (3) 153.7, (4) 111.2, (5) 29.6, (6) 31.1, (7) 64.3, (8) 134.6, (9) 44.4, (10) 120.6, (11) 168.9, (1') 99.6, (2') 73.5, (3') 76.6, (4') 70.4, (5') 77.2, (6') 61.6 (sugar signals double intensity (a) (1) 97.4, (3) 152.2, (4) 113.0, (5) 31.4, (6) 40.1, (7) 78.6, (8) 39.5, (9) 46.4, (10) 13.5, (11) 170.1, (OCH_3) 52.6 (97)
DERIVATIVE: Nonaacetate:
MP: 154–5° (97)
$[\alpha]^{20}D$: −85° (c=0.4, $CHCl_3$) (97)
SOURCES: Dipsacaceae: *Dipsacus* (97)

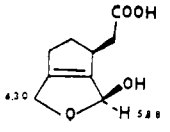


168 GI-5
$C_{42}H_{54}O_{22}$: 910.3107
$[\alpha]^{25}D$: −185° (c=3.4, CH_3OH) (159)
UV: (EtOH) 236 (4.30) (159)
IR: KBr, 3400, 1720, 1700, 1630, 1070 (159)
^1H-NMR: D_2O (159)
^{13}C-NMR: D_2O, a: (1) 95.7, (3) 155.6, (4) 108.9, (5) 31.2, (6) 40.9, (7) 174.1, (8) 125.8, (9) 129.7, (10) 13.8, (11) 169.3, (OCH_3) 52.6; b: (1) 95.5, (3) 155.6, (4) 108.9, (5) 31.2, (6) 40.7, (7) 172.5, (8) 125.6, (9) 129.4, (10) 13.3, (11) 169.3; Tyrosol (1b) 66.8, (2b) 34.4, (3b) 137.4 (4 & 8b) 131.2, (5 & 7b) 122.3, (6b) 150.0; Glucoses: (1') 100.7 (2') 73.7, (3') 77.3, (4') 70.4, (5') 76.7, (6') 61.7 sugar signal double intensity (159)
SOURCES: Oleaceae: *Fraxinus* (159)

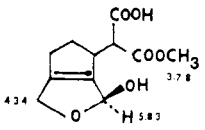


169 GI-3
$C_{45}H_{64}O_{22}$: 1072.3635
UV: (EtOH) 236 (4.36) (159)
IR: KBr, 3400, 1735, 1704, 1630, 1070 (159)
^1H-NMR: D_2O (159)
^{13}C-NMR: D_2O; a: (1) 95.3, (3) 155.1, (4) 108.4, (5) 30.5, (6) 40.3, (7) 173.7, (8) 125.7, (9) 128.9, (10) 13.2, (11) 169.0, (OCH_3) 52.1. b: (1) 95.1, (3) 155.0, (4) 108.4, (5) 30.5, (6) 40.2, (7) 172.4, (8) 125.2, (9) 128.9, (10) 13.1, (11) 169.0, Tyrosol: (1b) 70.8, (2b) 35.1, (3b) 137.2, (4b) 130.5, (5b & 7b) 121.7, (8b) 130.5, (6b) 149.0, Glucoses: (1') 100.1, 102.7, 103.1, (2') 73.3, 73.1, 73.1, (3') 76.6, 76.6, 76.6, (4') 70.0, 70.1, 69.8, (5') 76.0, 73.5, 76.0, (6') 61.0, 64.1, 61.0 (159)
SOURCES: Oleaceae: *Fraxinus* (159)

VIII. Non-glycosidic iridoids: miscellaneous

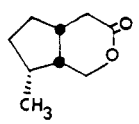


170 GENIPIC ACID
$C_9H_{12}O_4$: 184.0735
Amorphous powder
$[\alpha]^{27}D$: −105° (c=1.0, EtOH) (175)
UV: 203 (3.45) (175)
IR: $CHCl_3$, 1725 (175)
^1H-NMR: $CDCl_3$ (175)
DERIVATIVE: Ammonium salt:
MP: 125–130° (175)
SOURCES: Rubiaceae: *Genipa* (175)



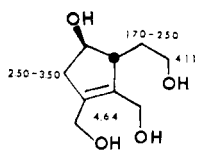
171 GENIPINIC ACID

$C_{11}H_{16}O_6$: 243.0868
Amorphous powder
$[\alpha]^{26}D$: −126° (c=1.0, EtOH) (175)
UV: 203 (3.5) (175)
IR: $CHCl_3$, 1750, 1725 (175)
^{1}H-NMR: $CDCl_3$ (175)
SOURCES: Rubiaceae: *Genipa* (175)



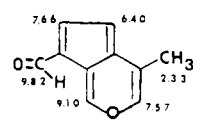
172 BOSHNIALACTONE

$C_9H_{14}O_2$: 154.0994
Colorless liquid
B.P.: 105–112°/6 mm (176)
$[\alpha]^{21}D$: −18.2° (c=2.10, $CHCl_3$) (176)
IR: Neat, 1743, 1275, 1245, 1058, 1033, 835 (176)
^{1}H-NMR: CCl_4, 60 MHz (175)
DERIVATIVE: 3R-cis-cis boshnialic acid:
MP: 85° (176)
$[\alpha]^{22}D$: −33.7 (c=1.1, $CHCl_3$) (176)
SOURCES: Orobanchaceae: *Boschniakia* (176), Synthesis (176)



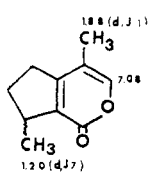
173 EUCOMMIOL

$C_9H_{16}O_4$: 188.1048
Hygroscopic liquid
$[\alpha]^{25}D$: −30.5 (c=1.08, CH_3OH) (177)
(UV): 206 (3.8) (177)
IR: 3340, 1665 (177)
MS: *m/e*: 170, 152, 139, 122, 121, 109, 106, 105, 95, 94, 93, 93, 91, 81, 80, 79, 77, 75, 73, 60, 43, 41, 39, 31 (177)
^{1}H-NMR: D_2O, 60 MHz (177)
DERIVATIVE: Tetraacetate: oil
$[\alpha]^{25}D$: −20.7, (c=1.53, CH_3OH) (177)
SOURCES: Eucommiaceae: *Eucommia* (177)



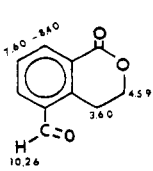
174 VIBURTINAL

$C_{10}H_8O_2$: 160.0524
MP: 93–5° (178)
UV: (CH_3OH) 228 (4.12), 243 (4.06), 251 (3.94), 287 (4.00), 424 (3.85) (178)
IR: 2780–2710, 1410, 1390, 1370, 1634, 1050, 1025, 1005, 780, 760, 580 (178)
^{1}H-NMR: (178)
SOURCES: Caprifoliaceae: *Viburnum, Sambucus* (178)



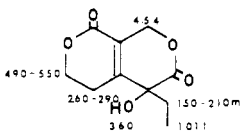
175 5–9 DEHYDRO-NEPETALACTONE

$C_{10}H_{12}O_2$: 164.0837
UV: (EtOH) 298 (179)
IR: 1710, 1640 (179)
^{1}H-NMR: $CDCl_3$ (179)
MS: *m/e* 164 (179)
SOURCES: Lamiaceae: *Nepeta* (179)



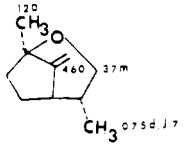
176 ERYTHROCENTAURINE

$C_{10}H_8O_3$: 176.0473
MP: 135–7° (180)
Substance turns red on exposure to sunlight (180)
UV: 223 (4.3), 290 (3.3) (180)
IR: KBr, 1720, 1690, 1580 (180)
MS: *m/e*: 176, 148, 131, 120, 119, 105, 91, 90, 63, 51, 39 (180)
^{1}H-NMR: (180)
SOURCES: Loganiaceae: *Anthocleista* (180)



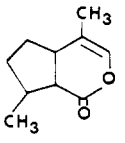
177 GENTIOLACTONE

$C_{10}H_{12}O_5$: 212.0684
$[\alpha]^{25}\lambda$: 0° (c=0.855, CH_3OH), λ: 365–589 (181)
UV: (CH_3OH) 225–230 (3.74) (181)
IR: KBr, 3500, 1725, 1715, 1600 (181)
MS: 212, 183, 168 (181)
^{1}H-NMR: $CDCl_3$ (181)
^{13}C-NMR: $CDCl_3$, (Ethyl) 7.7, 22.7, (allylic methylene) 31.0, (methylene esters) 66.7, (C=O) 172.6, 161.6, (α and β) 120, 153.4, (C-O) 72.3 (181)
X-RAY: (181)
SOURCES: Gentianaceae: *Gentiana* (181)



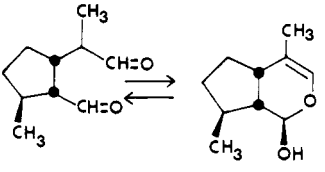
178 MATATABIETER

$C_{10}H_{16}O$: 152.1201
BP: 67°/16 mm (182)
n^{16}: 1.4771 (182)
$[\alpha]^{17}D$: −150° (182)
IR: 3100, 1675, 1085, 1045, 890 (182)
^{1}H-NMR: (182)
SOURCES: Actinidiaceae: *Actinidia* (182), Synthesis (182)



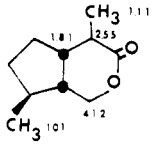
179 NEPETALACTONE

$C_{10}H_{14}O_2$: 166.0994
Oil
d_4^{25}: 1.0663 (183)
B.P.: 71–2° (183)
$[\alpha]^{23}D$: +3.6° (183)
n_b^{25}: 1.4878 (183)
DERIVATIVE: Nepetalic Acid:
MP: 73–75° (183)
$[\alpha]^{28}D$: +46.8 (c=1.16, $CHCl_3$) (183)
SOURCES: Labiatae: *Nepeta* (183)



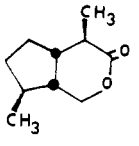
180 IRIDODIAL

$C_{10}H_{16}O_2$: 168.1150
BP: 90–2°/1 mm (184)
n_D^{19}: 1.4782 (184)
d_4^{19}: 1.001 (184)
$[\alpha]^{26}D$: +4.7 (c=1.15, Benzene) (184)
IR: CCl_4, 3610, 3050, 1675, 852 (184)
DERIVATIVE: Lactol acetate:
BP: 115–120°/3 mm (185)
DERIVATIVE: Bis-dinitrophenyl hydrazone:
MP: 224–5° (184)
SOURCES: ants: *Iridomyrmex* (185), plants: *Myoporum* (186), Synthesis (14)



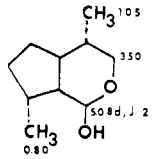
181 IRIDOMYRMECIN

$C_{10}H_{16}O_2$: 168.1150
BP: 104–8°/1.5 mm (184)
MP: 59–60 (184)
$[\alpha]^{17}D$: +205° (c=0.223, CCl_4) (184)
^{1}H-NMR: (187)
$[\alpha]D$: −199° (c=3.77, EtOH) (187)
SOURCES: ants: *Iridomyrmex* (184), Synthesis (187)

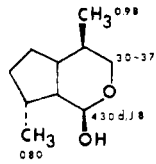


182 ISOIRIDOMYRMECIN (IRIDOLACTONE)

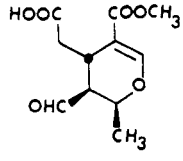
$C_{10}H_{16}O_2$: 168.1150
MP: 58–9° (184)
$[\alpha]^{17}D$: −62° (c=1.01, CCl_4) (184)
DERIVATIVE: Hydrazide:
MP: 118–9° (184)
SOURCES: ants: *Iridomyrmex* (184), Synthesis (187)



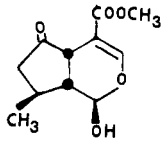
183 ISONEOMATATABIOL
$C_{10}H_{15}O_2$: 170.1306
^{1}H-NMR: (188)
SOURCES: Actinidiaceae: *Actinidia* (188).



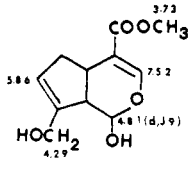
184 NEOMATATABIOL
$C_{10}H_{15}O_2$: 170.1306
BP: 95°/5 mm (188)
$[\alpha]^{15}D$: +21.3° (c=0.85) (188)
IR: 3400, 1070 (188)
^{1}H-NMR: (188)
SOURCES: Actinidiaceae: *Actinidia* (188)



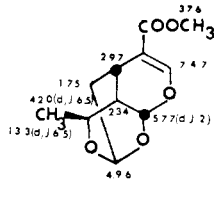
185 ELENOLIDE
$C_{11}H_{12}O_5$: 224.0684
MP: 155–6° (189)
$[\alpha]D$: +369 (Acetone) (189)
IR: CH_2Cl_2, 1792, 1684, 1656, 1645, 814, 708 (189)
^{1}H-NMR: $CDCl_3$, 60 MHz (189)
SOURCES: Oleaceae: *Olea* (189), Structure (215)



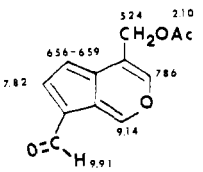
186 d-1 VERBENALOL
$C_{11}H_{14}O_5$:
MP: 134° (190)
$[\alpha]D$: −20° (EtOH) (190)
SOURCES: Synthesis (191)



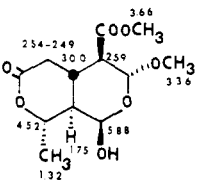
187 GENIPIN
$C_{11}H_{14}O_5$: 226.0841
MP: 120–1° (4)
$[\alpha]D$: +135° (CH_3OH) (4)
IR: $CHCl_3$, 1695, 1630 (192)
^{1}H-NMR: $CDCl_3$, 60 MHz (192)
SOURCES: Rubiaceae: *Genipa* (192)



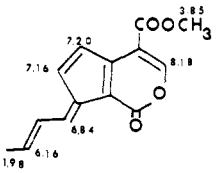
188 SARRACENIN
$C_{11}H_{14}O_5$: 226.0841
MP: 127–8° (193)
UV: (EtOH) 232 (3.98) (193)
IR: KBr, 2970, 1707, 1640, 1440, 1380, 920, 860, 818 (193)
^{1}H-NMR: $CDCl_3$ (193)
^{13}C-NMR: $CDCl_3$: 18.7, 22.1, 32.4, 35.1, 51.4, 69.0, 81.1, 91.7, 112.3, 150.1, 166.8 (193)
MS: M^+=226, *m/e*: 41, 69, 96, 109, 121, 137, 148, 165, 180, 226, 227 (193)
X-RAY: (193)
SOURCES: Sarraceniaceae: *Sarracenia* (193), Synthesis (194)



189 BALDRINAL
$C_{12}H_{10}O_4$: 218.0579
MP: 112–3° (195)
UV: 227 (4.2), 244 (4.18), 287 (4.08), VIS 425 (3.87) (195)
IR: KBr, 2800–2740, 1732, 1637 (195)
^{1}H-NMR: $CDCl_3$, 100 MHz (195)
SOURCES: Artifact formed from extraction of Valtrate (195)

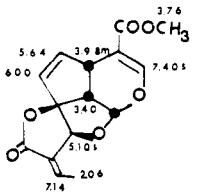


190 XYLOMOLLIN
$C_{12}H_{15}O_7$: 274.1052
MP: 138–9° (EtOH) (196)
$[\alpha]^{24}D$: −44.3 (CH_3OH) (197)
IR: $CHCl_3$, 3600, 1733, 1720 (196)
^{1}H-NMR: Pyr-d_5 (196)
^{13}C-NMR: spectra in ref. (196)
MS: M^{+1} 275, *m/e* 243 (196)
X-RAY: (197)
DERIVATIVE: Acetate:
MP: 162–4° (197)
SOURCES: Meliaceae: *Xylocarpus* (196)
Synthesis (197)

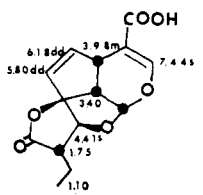


191 FULVOPLUMIERIN
$C_{14}H_{12}O_4$: 244.0735
MP: 151–2°d (4)
UV: (EtOH) 270 (3.70), 366 (4.56) (4)
^{1}H-NMR: $CDCl_3$, 60 MHz (4)
SOURCES: Apocynaceae: *Plumeria* (198)

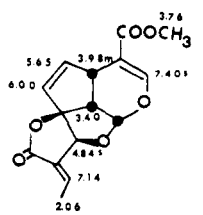
IX. Non-glycosidic iridoids: Plumiera type



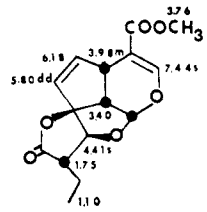
192 PLUMERICIN
$C_{15}H_{14}O_6$: 290.0790
MP: 211.5–212.5° (199)
$[\alpha]^{25}D$: +197.5° (c=0.982, $CHCl_3$) (199)
UV: (EtOH) 214–5 (4.24) (199)
IR: 1757, 1751, 1705, 1715, 1655, 1622 (199)
^{1}H-NMR: $CDCl_3$ (199)
DERIVATIVE: α-Dihydro:
MP: 191–2° (199)
$[\alpha]^{24}D$: +208.9 (c=0.892, $CHCl_3$) (199)
SOURCES: Apocynaceae: *Plumeria* (199)



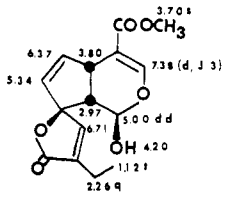
193 β-DIHYDRO PLUMERICINIC ACID
$C_{14}H_{14}O_6$: 278.0790
MP: 189–190° (199)
IR: KBr, 1780, 1680, 1648, 1630 (199)
^{1}H-NMR: $CDCl_3$, 60 MHz (199)
SOURCES: Apocynaceae: *Plumeria* (199)



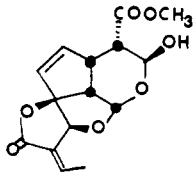
194 ISOPLUMERICIN
$C_{15}H_{14}O_6$: 290.0790
MP: 200.5–201.5° (199)
$[\alpha]^{25}D$: +216.4 (c=1.01, $CHCl_3$) (199)
UV: (EtOH) 214–15 (4.24) (199)
IR: Nujol, 1751, 1757, 1715, 1705, 1655, 1622 (199)
^{1}H-NMR: $CDCl_3$, 60 MHz (199)
SOURCES: Apocynaceae, *Plumeria* (199)



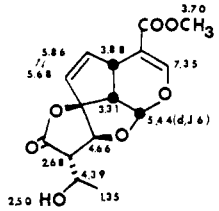
195 DIHYDROPLUMERICIN
$C_{15}H_{16}O_6$: 292.0947
MP: 150–1° (199)
$[\alpha]^{22.5}D$: +257.5 (c=1.293, $CHCl_3$) (199)
UV: (EtOH) 240 (3.97) (199)
IR: Nujol, 1780, 1700, 1655, 1622 (199)
^{1}H-NMR: $CDCl_3$, 60 MHz (199)
SOURCES: Apocynaceae: *Plumeria* (199)



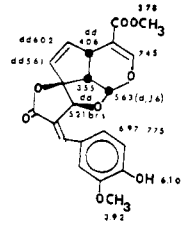
196 ALLAMDIN
$C_{15}H_{16}O_6$: 292.0947
MP: 131–2° d (200)
$[\alpha]^{21}D$: −35° (c=0.46, $CHCl_3$) (200)
UV: (EtOH) 238 (4.15), high end absorption (200)
IR: KBr, 3424, 3105, 3086, 2754, 1733, 1694, 1636, 1432, 1287, 1111, 1067 (200)
^{1}H-NMR: $CDCl_3$, 100 MHz (200)
X-RAY: (200)
SOURCES: Apocynaceae: *Allamanda* (200)



197 ALLAMANDIN
$C_{15}H_{16}O_7$: 308.0896
MP: 212–5° (200)
$[\alpha]^{21}D$: +15° (c=0.6, CH_3OH) (200)
UV: (CH_3OH) high end absorption (200)
IR: KBr, 3355, 2958, 1727, 1669, 1440, 1198, 1173, 1010 (200)
DERIVATIVE: Acetate:
MP: 173–7° (200)
$[\alpha]^{21}D$: +61° (c=0.36, $CHCl_3$) (200)
^{1}H-NMR: $CDCl_3$, 100 MHz: 5.51 (d, J 4.5, H_1), 6.88 (d, J 8, H_3), 2.89 (dd, H_4), 3.57 (m, H_5), 5.97 (dd, H_6) 5.86 (dd, H_7), 3.07 (dd, H_9), 5.12 (d, J 1.5, H_{10}), 7.22 (q, H_{13}) 2.00 (d, J 7, H_{14}), 3.70 (OCH_3), 2.01 (Ac) (200)
SOURCES: Apocynaceae: *Allamanda* (200)

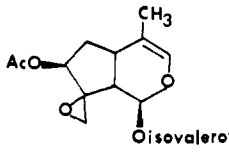


198 ALLAMANDICIN
$C_{15}H_{16}O_7$: 308.0896
MP: 117–8° (200)
$[\alpha]^{21}D$: +293° (c=0.42, $CHCl_3$) (200)
UV: (EtOH) 238 (4.06) (200)
IR: KBr, 3484, 3086, 2958, 1773, 1692, 1644, 1436, 1183, 1084 (200)
^{1}H-NMR: $CDCl_3$, 100 MHz (200)
SOURCES: Apocynaceae: *Allamanda* (200)

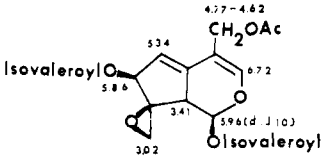


199 ORUWACIN
$C_{21}H_{18}O_8$: 398.1002
MP: 223° (201)
$[\alpha]^{25}D$: +193 ($CHCl_3$) (201)
UV: (EtOH) 205 (4.05), 241 (4.08), 317sh (3.84), 348 (4.13) (201)
IR: Nujol, 3550, 1755, 1710, 1660, 1602 (201)
^{1}H-NMR: $CDCl_3$, 100 MHz (201)
^{13}C-NMR: $CDCl_3$, (1) 104.4, (3) 147.2, (4) 112.7, (5) 38.7, (8) 102.4, (9) 51.7, (10) 82.3, (OCH_3) 54.3, ($ArOCH_3$) 56.1, (CO) 166.6, (12) 169.9, (Olefinic and aromatic C) 149.2, 152.9, 126.4, 126.5, 127.0, 141.0, 144.8, 115.2, 120.3, 126.0 (201)
MS: *m/e* 369, 367, 366, 338, 337, 310, 309 (201)
SOURCES: Rubiaceae: *Morinda* (201)

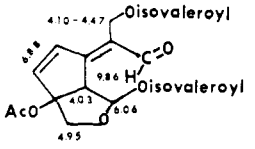
X. Non-glycosidic iridoids: Valeriana type



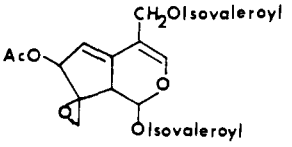
200 DESISOVALEROXYDIDROVALTRATUM
$C_{17}H_{24}O_6$: 324.1573
MP: 50° (202)
$[\alpha]^{20}D$: −88° (202)
SOURCES: Valerianaceae: *Valeriana, Centranthus* (202)



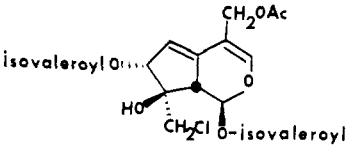
201 VALTRATE
$C_{22}H_{30}O_8$: 422.1940
Oil
$[\alpha]^{21}D$: +172.7 (CH_3OH) (195)
UV: (CH_3OH) 204 (3.0), 256 (4.2) (195)
IR: Nujol, 1766, 1740, 1640, 1610 (195)
^{1}H-NMR: $CDCl_3$, 60 MHz (195)
SOURCES: Valerianaceae: *Valeriana, Centranthus* (195), Stereochemistry (203)



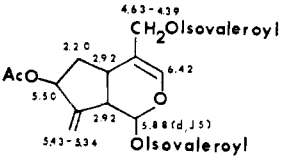
202 ISOVALTRAL
$C_{22}H_{30}O_8$: 422.1940
MP: 80–1° (204)
UV: (CH_3OH) 277 (204)
IR: KBr (204)
^{1}H-NMR: $CDCl_3$, 60 MHz (204)
MS: 39, 41, 43, 57, 60, 77, 85, 91, 120, 147, 149, 164, 165, 166, 167, 260, 261, 321, 422 (204)
^{13}C-NMR: C_6D_6: (1) 100.5, (3) 190.1, (4) 127.5, (5) 159.9, (6) 134.6, (7) 144.1, (8) 94.8, (9) 57.3, (10) 72.8, (11) 58.0, (CO-isoVal) 171.2, 172.4, (CH_3-Ac) 20.8, (CH_3isoVal) 22.3, (CH-isoVal) 25.7, (CH_2-isoVal) 43.0, 43.3, (Co-Ac) 169.8 (204)
SOURCES: Decomposition product of Isovaltrate (204)



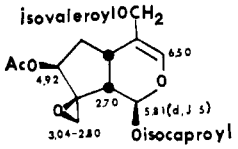
203 ISOVALTRATE
$C_{22}H_{30}O_8$: 422.1940
^{13}C-NMR: (1) 92.3, (3) 148.1, (4) 108.1, (5) 140.7, (6) 118.3, (7) 83.1, (8) 64.0, (9) 42.9, (10) 60.2, (11) 47.7, (CO-Ac) 169.6, (CO-isoVal) 172.2, (CH_3Ac) 20.8, (CH_3-isoVal) 22.1, (CH-isoVal) 25.5, 25.7, (CH_2-isoVal) 42.9, 43.2 (204)
SOURCES: Valerianaceae: *Valeriana* (204)



204 VALECHLORINE
$C_{22}H_{31}O_8Cl$: 458.1707
MP: 79–80° (205)
$[\alpha]^{16}D$: +104° ($CHCl_3$) (205)
UV: 200, 259 (205)
IR: 1740, 1770, 1615, 1640, 3400 (205)
^{1}H-HMR: CCl_4 (205)
SOURCES: Valerianaceae: *Valeriana* (205)

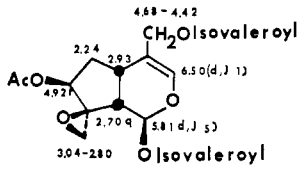


205 DEOXYDIDROVALTRATE
$C_{22}C_{32}O_7$: 408.2148
MP: 68–70° (195)
UV: (CH_3OH) 204 (195)
IR: KBr, 3095–3075, 1750–1780, 1752, 1672, 885–895 (195)
^{1}H-NMR: $CDCl_3$, 100 MHz (195)
SOURCES: Valerianaceae: *Valeriana* (195)



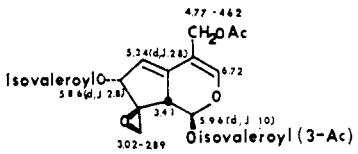
206 HOMODIDROVALTRATE

$C_{23}H_{34}O_8$: 438.2253
MP: 50–1° (195)
$[\alpha]^{21}D$: −72° (CH_3OH) (195)
UV: 206 (ca 3) (195)
IR: KBr, 1766, 1733, 1672 (195)
PMR: $CDCl_3$, 60 MHz (195)
SOURCES: Valerianaceae: *Valeriana* (195)



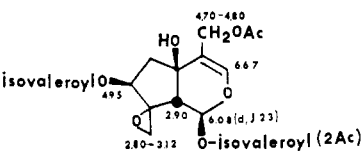
207 DIDROVALTRATE

$C_{22}H_{32}O_8$: 424.2097
MP: 64–5° (195)
$[\alpha]^{21}D$: −80.8 (CH_3OH) (195)
UV: (CH_3OH) 206 (3.0) (195)
IR: KBr, 1766, 1733, 1672 (195)
^{1}H-NMR: $CDCl_3$ (195)
^{13}C-NMR: C_6D_6, (1) 88.1, (3) 141.9, (4) 110.6, (5) 39.4, (6) 35.1, (7) 75.6, (8) 64.0, (9) 32.5, (10) 63.1, (11) 48.6, (CO-Ac) 169.3, (CO isoVal) 170.6, 172.5, (CH_3-Ac) 20.9, (CH_3-isoVal) 22.4, (CH-isoVal) 22.5, 25.7, (CH_2-isoVal) 43.1, 43.3 (204)
SOURCES: Valerianaceae: *Valeriana* (77), Stereochemistry (203)



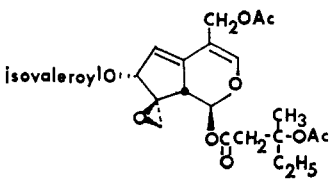
208 ACEVALTRATE

$C_{24}H_{32}O_{10}$: 480.1995
MP: 83–4° (195)
$[\alpha]^{24}D$: +163.7 (CH_3OH) (195)
UV: (CH_3OH) 204 (3.0), 256 (4.23) (195)
IR: KBr, 1766, 1740, 1640, 1610 (195)
^{1}H-NMR: $CDCl_3$, 100 MHz (195)
SOURCES: Valerianaceae: *Valeriana, Centranthus* (195)



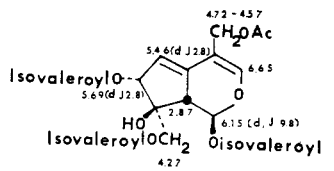
209 AHD-VALTRATE

$C_{24}H_{34}O_{11}$: 498.2101
MP: 107–8° (206)
IR: KBr, 3600–3300, 3020, 2960, 2880, 1760–1730, 1665, 1470, 1380, 1245 (206)
^{1}H-NMR: (206)
MS: M^+ 498, *m/e* 413, 397, 396, 339 (206)
SOURCES: Valerianaceae: *Centranthus* (206)



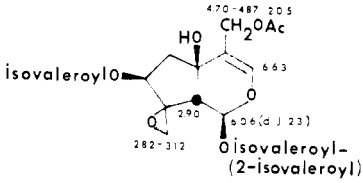
210 HOMOACEVALTRATUM

$C_{25}H_{34}O_{10}$: 494.2151
MP: 82–3° (202)
SOURCES: Valerianaceae: *Valeriana, Centranthus* (202)

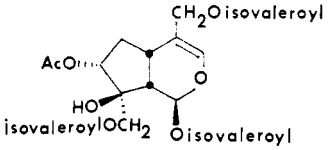


211 VALTRATE ISOVALEROXYHYDRIN

$C_{27}H_{40}O_{10}$: 524.2621
MP: 105–7° (195)
$[\alpha]^{22}D$: +204.6 (CH_3OH) (195)
UV: (CH_3OH) 256 (4.23) (195)
IR: 1762, 1735, 1702, 1640, 1610 (195)
^{1}H-NMR: CCl_4, 60 MHz (195)
SOURCES: Valerianaceae: *Valeriana* (195)



212 IVHD-VALTRATE
$C_{27}H_{40}O_{11}$: 540.2570
MP: 64–5° (207)
UV: 256 (207)
IR: 3490, 1250, 1750, 1640, 1612, 1671 (207)
^{1}H-NMR: $CDCl_3$, 100 MHz (207)
MS: *m/e*: 455, 439, 438, 85, 57 (207)
NOTE: Valtrate and acetate groups are exchangeable (207)
SOURCES: Valerianaceae: *Centranthus* (207)



213 ISOVALTRATUM ISOVALEROXYHYDRIN
$C_{27}H_{42}O_{10}$: 526.2778
MP: 92–3° (202)
SOURCES: Valerianaceae: *Valeriana*, *Centranthus* (202)

Compounds with no spectral or structural data:

214 AUCUBIN ACETATE (208)

215 CATALPOL MONOACETATE (208)

216 ISOCATALPOL (209)

217 ISOGENTISIN (168)

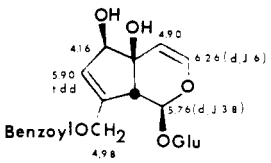
218 METHYL CATALPOL MONOACETATE (208)

219 ODONTOSIDE ACETATE (208)

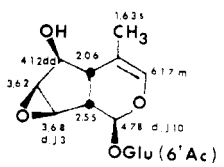
220 HARPAGOSIDE MONOACETATE (7)

221 VALERIDINE (205)

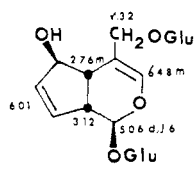
Addendum



222 GLOBULARIFOLIN
$C_{22}H_{26}O_{11}$: 466.1475
$[\alpha]^{20}D$: 122.8 (c=1.18, CH_3OH) (211)
UV: (CH_3OH) 229 (4.1), 274 (2.9) (211)
IR: KBr, 3340, 1720, 1655, 1602, 1585, 1454 (211)
^{1}H-NMR: CD_3OD, 100 MHz (211)
^{13}C-NMR: (1) 93.7, (3) 142.3, (4) 108.3, (5) 72.6, (6) 80.2, (7) 130.5, (8) 142.6, (9) 54.1, (10) 63.2, (1') 99.5, (2') 74.2, (3') 77.8*, (4') 71.3, (5') 77.2*, (6') 62.6, (1") 130.8, (2") 130.5[b], (3") 129.5[b], (4") 134.3, (5") 129.5[b], (6") 130.5[b] (CO) 167.2 (211)
DERIVATIVE: Pentaacetate:
$[\alpha]^{20}D$: −138.8 (c=0.67, $CHCl_3$) (211)
SOURCES: Globulariaceae: *Globularia* (211)

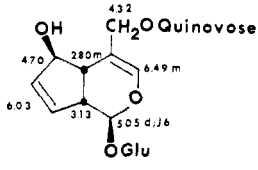


223 6'-O-ACETYL DEUTZIOSIDE
$C_{17}H_{24}O_{10}$: 388.1369
MP: 223–5° (221)
$[\alpha]^{22}D$: −82° (c=0.34, CH_3OH) (221)
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O/Acetone-d_6: (1) 96.8, (3) 135.8, (4) 113.3, (5) 41.0, (6) 78.5, (7) 59.3, (8) 56.2, (9) 42.5, (10) 16.1, (1') 100.1, (2') 73.5, (3') 76.4, (4') 70.2, (5') 74.5, (6') 63.8 (221)
SOURCES: Loasaceae: *Mentzelia* (221)



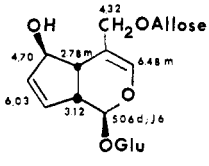
224 GLUCOSYL-DECALOSIDE

$C_{21}H_{32}O_{14}$: 508. 1792
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O: (1) 98.5, (3) 141.6, (4) 113.3, (5) 44.6, (6) 80.9, (7) 136.1, (8) 134.2, (9) 47.7, (10) 70.3, (1') 99.4, (2') 73.4, (3') 76.6, (4') 70.3, (5') 77.1, (6') 61.4, (1") 101.8, (2") 74.0, (3") 76.4, (4") 70.3, (5") 76.4, (6") 61.4 (221)
DERIVATIVE: Nonaacetate:
MP: 177–9° (221)
$[\alpha]^{22}D$: −126° (c=0.29, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



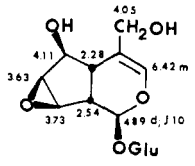
225 QUINOVOSYL-DECALOSIDE

$C_{21}H_{32}O_{13}$: 492.1843
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O, (1) 98.7, (3) 141.7, (4) 113.6, (5) 44.9, (6) 81.2, (7) 136.2, (8) 134.2, (9) 47.8, (10) 70.5, (1') 99.6, (2') 73.6, (3') 76.6, (4') 70.5, (5') 77.2, (6') 61.5, (1") 101.9, (2") 74.2, (3") 76.7, (4") 75.8, (5") 72.6, (6") 17.6 (221)
DERIVATIVE: Octaacetate:
MP: 156–7° (221)
$[\alpha]^{22}D$: −129° (c=0.7, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



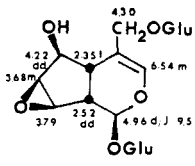
226 ALLOSYL-DECALOSIDE

$C_{21}H_{32}O_{14}$: 508.1792
MP: 239° dec (221)
$[\alpha]^{22}D$: −163° (c=0.54, H_2O) (221)
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O, (1) 98.5, (3) 141.6, (4) 113.5, (5) 44.7, (6) 81.0, (7) 136.1, (8) 134.2, (9) 47.7, (10) 70.1, (1') 99.7, (2') 73.5, (3') 76.5, (4') 70.4, (5') 77.1, (6') 61.5, (1") 99.4, (2") 71.2, (3") 72.0, (4") 67.7, (5") 74.4, (6") 62.1 (221)
DERIVATIVE: Nonaacetate:
MP: 145–6° (221)
$[\alpha]^{22}D$: −113° (221)
SOURCES: Loasaceae: *Mentzelia* (221).



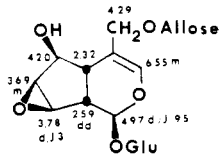
227 EPOXY-DECALOSIDE

$C_{15}H_{22}O_{10}$: 362.1213
MP: 187–8° dec. (221)
$[\alpha]^{22}D$: −86° (c=0.27, CH_3OH) (221)
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O, (1) 96.9, (4) 139.4, (4) 115.8, (5) 37.9, (6) 78.6, (7) 59.1, (8) 56.2, (9) 42.1, (10) 62.0, (1') 99.9, (2') 73.5, (3') 76.6, (4') 70.3, (5') 77.1, (6') 61.4 (221)
DERIVATIVE: Hexaacetate:
MP: 176° (221)
$[\alpha]^{22}D$: −115° (c=0.34, $CHCl_3$) (21)
SOURCES: Loasaceae: *Mentzelia* (221)



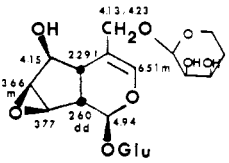
228 GLUCOSYL-EPOXYDECALOSIDE

$C_{21}H_{32}O_{15}$: 524.1741
MP: 216–7° (221)
$[\alpha]^{22}D$: −87° (c=0.5, H_2O) (221)
^{1}H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O, (1) 97.0, (3) 142.2, (4) 111.9, (5) 38.2, (6) 78.1, (7) 59.4, (8) 56.2, (9) 42.2, (10) 69.7, (1') 100.0, (2') 73.5, (3') 76.7, (4') 70.5, (5') 77.1, (6') 61.6, (1") 101.5, (2") 74.0, (3") 76.7, (4") 70.5, (5") 76.7, (6") 61.6 (221)
DERIVATIVE: Nonaacetate:
MP: 109–110° (221)
$[\alpha]^{22}D$: −81° (c=0.4, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



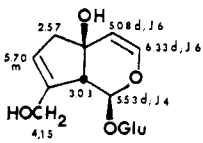
229 ALLOSYL-EPOXYDECALOSIDE

$C_{21}H_{32}O_{15}$: 524.1741
MP: 274–5° (221)
$[\alpha]^{22}D$: −98° (c=0.6, H_2O) (221)
^1H-NMR: D_2O, 90 MHz (221)
^{13}C-NMR: D_2O, (1) 97.0, (3) 142.2, (4) 111.8, (5) 38.3, (6) 78.0, (7) 59.3, (8) 56.1, (9) 42.2, (10) 69.6, (1′) 100.1, (2′) 73.5, (3′) 76.6, (4′) 70.3, (5′) 77.1, (6′) 61.4, (1″) 99.2, (2″) 71.2, (3″) 72.0, (4″) 67.7, (5″) 74.5, (6″) 62.1 (221)
DERIVATIVE: Nonaacetate:
MP: 191–2° (221)
$[\alpha]^{22}D$: −77° (c=0.5, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



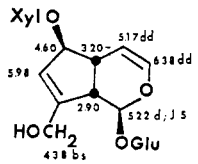
230 MENTZELOSYL-EPOXYDECALOSIDE

$C_{20}H_{30}O_{13}$: 478.1686
MP: 236–7° dec. (221)
$[\alpha]^{22}D$: −108° (c=0.4, H_2O) (221)
^1H-NMR: D_2O, 270 MHz (221)
^{13}C-NMR: D_2O, (1) 96.9, (3) 141.7, (4) 112.2, (5) 38.6, (6) 78.1, (7) 59.3, (8) 56.1, (9) 42.2, (10) 69.8, (1′) 100.0, (2′) 73.5, (3′) 76.5, (4′) 70.3, (5′) 77.1, (6′) 61.4, (1″) 99.8, (2″) 69.4, (3″) 68.5, (4″) 29.2, (5″) 60.2 (221)
DERIVATIVE: Octaacetate:
MP: 143–6° hygroscopic (221)
$[\alpha]^{22}D$: −116° (c=0.6, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



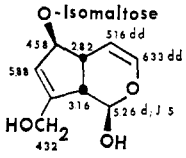
231 ISOAUCUBIN

$C_{15}H_{22}O_9$: 346.1263
$[\alpha]^{24}D$: −99.4° (c=1.63, CH_3OH) (222)
IR: KBr, 3350, 1650, 1230 (222)
^1H-NMR: D_2O, 60 MHz (222)
DERIVATIVE: Pentaacetate:
MP: 125° (222)
$[\alpha]^{28}D$: −46.3, (c=0.95, EtOH) (222)
^{13}C-NMR: $CDCl_3$, (1) 92.3, (3) 138.9, (4) 111.4, (5) 72.0, (6) 45.3, (7) 129.4, (8) 135.2, (9) 54.9, (10) 61.7, (1′) 96.0, (2′) 71.1, (3′) 72.9, (4′) 68.4, (5′) 72.1, (6′) 61.5 (222)
SOURCES: Orobanchaceae: *Aegenetia* (222).



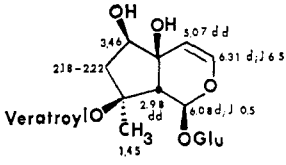
232. 6-*O*-β-D-XYLANOPYRANOSYLAUCUBIN

$C_{20}H_{30}O_{13}$: 478.1686
MP: 192–3° (223)
$[\alpha]^{25}D$: −85° (c=1.0, H_2O) (223)
UV: (CH_3OH) 204 (3.6) (223)
IR: KBr, 3400, 2900, 2860, 1655, 1385, 1245, 1165, 1050, 970 cm^{-1} (223)
^1H-NMR: D_2O (223)
^{13}C-NMR: D_2O, (1) 94.8, (3) 139.0, (4) 103.9, (5) 40.0, (6) 88.7, (7) 125.3, (8) 147.7, (9) 45.7, (10) 59.8, (1′) 97.5, (2′) 73.6, (3′) 77.1, (4′) 70.5, (5′) 76.6, (6′) 64.7, (1″) 101.6, (2″) 74.0, (3″) 76.7, (4″) 70.1, (5″) 64.0 (223)
DERIVATIVE: Octaacetate:
MP: 145–6° (223)
SOURCES: Scrophulariaceae: *Verbascum* (223)



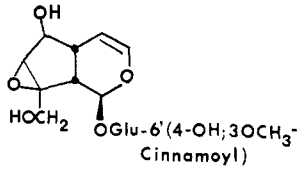
233 ULMOSIDE (AUCUBIGENIN-1-β-ISOMALTOSIDE)

$C_{21}H_{32}O_{14}$: 508.1792
$[\alpha]^{20}D$: -16.6 (c=2.5, CH_3OH) (224)
UV: (EtOH) 204 (3.6) (224)
IR: KBr, 1650 (224)
^{1}H-NMR: D_2O, 90 MHz (224)
^{13}C-NMR: D_2O, (1) 96.3, (3) 140.3, (4) 106.1, (5) 43.3, (6) 81.4, (7) 129.7, (8) 147.4, (9) 47.2, (10) 60.3 (224)
DERIVATIVE: Nonaacetate:
$[\alpha]^{20}D$: -27.9 (c=1.3, $CHCl_3$) (224)
SOURCES: Eucommiaceae: *Eucommia* (224)



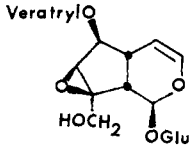
234 TECOSIDE

$C_{21}H_{32}O_{13}$: 492.1843
MP: 139–142° (225)
$[\alpha]^{27}D$: -159.3 (c=0.4, CH_3OH) (225)
UV: (CH_3OH) 225 (4.6), 262 (4.4), 293 (4.1), 330 (3.3) (225)
IR: KBr, 3509–3226, 1712, 1653, 1603, 1220, 770 (225)
^{1}H-NMR: D_2O, Acetone-d_6, 100 MHz (225)
MS: (225)
DERIVATIVE: Hexaacetate:
MP: 167–8° (225)
$[\alpha]^{26}D$: -271.4 (c=0.14, $CHCl_3$) (225)
SOURCES: Bignoniaceae: *Tecomella* (225)



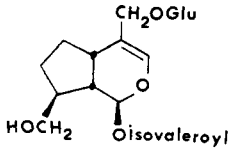
235 PICROSIDE III

$C_{22}H_{28}O_{12}$: 484.1580
DERIVATIVE: Hexaacetate:
MP: 154–5° (226)
$[\alpha]^{20}D$: -78.1 (c=2.0, $CHCl_3$) (226)
^{1}H-NMR: $CDCl_3$, 60 MHz (226)
^{13}C-NMR: (1) 94.1, (3) 141.0, (4) 101.9, (5) 34.8, (6) 79.6, (7) 58.5, (8) 62.5, (9) 41.4, (10) 61.2, (1') 96.5, (2') 70.6, (3') 72.6, (4') 68.2, (5') 72.6, (6') 62.3, (1") 133.1, (2") 111.5, (3") 151.4, (4") 141.5, (5") 123.1, (6") 121.5 (α) 144.8, (β) 117.4, (CO) 166.1 (226)
SOURCES: Scrophulariaceae: *Picrorhiza* (226)



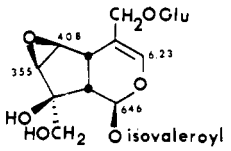
236 6-O-VERATRYL CATALPOSIDE

$C_{24}H_{30}O_{13}$: 526.1686
MP: 218–9° (227)
$[\alpha]^{35}D$: -179 (Pyridine) (227)
UV: (EtOH) 225, 262, 293 (227)
IR: KBr, 1712, 1653, 1603, 1226 (227)
MS: *m/e* 364 (227)
DERIVATIVE: Pentaacetate:
MP: 123–4° (227)
^{1}H-NMR: $CDCl_3$ (227)
SOURCES: Bignoniaceae: *Tecomella* (227)

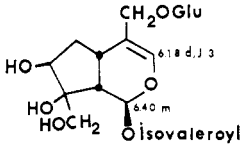


237 DIHYDROPENSTEMIDE

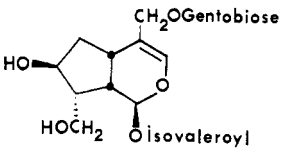
$C_{21}H_{34}O_{10}$: 446.2151
^{13}C-NMR: D_2O, (1) 93.2, (3) 140.2, (4) 115.0, (5) 35.8, (6) 30.1, (7) 27.7, (8) 42.6, (9) 43.6, (10) 65.9, (11) 69.8, (1') 102.2, (1") 176.0, (2") 43.8, (3") 26.2, (4") 22.3 (212)
SOURCES: Caprifoliaceae: *Viburnum* (212)



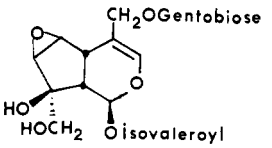
238 KANOKOSIDE A
$C_{21}H_{32}O_{12}$: 476.1893
^{1}H-NMR: D_2O (228)
DERIVATIVE: Pentaacetate:
MP: 58–62° (228)
$[\alpha]_D$: −87.5 (CH_3OH) (228)
SOURCES: Valerianaceae: *Valeriana* (228)



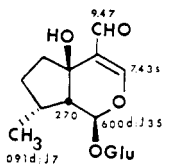
239 KANOKOSIDE B
$C_{21}H_{34}O_{12}$: 478.2050
^{1}H-NMR: D_2O (228)
DERIVATIVE: Pentaacetate:
MP: 110–1° (228)
$[\alpha]_D$: −27.7° (EtOH) (228)
SOURCES: Valerianaceae: *Valeriana* (228)



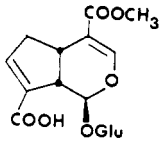
240 KANOKOSIDE D
$C_{27}H_{43}O_{16}$: 623.2550
DERIVATIVE: Nonaacetate:
MP: 179–181° (228)
$[\alpha]_D$: −30° (CH_3OH) (228)
^{1}H-NMR: $CDCl_3$, 1.96–2.13 (9 Ac), 5.96 (d, J 5 Hz, H at C-1), 6.45 (d, J 1.5 Hz, H at C-3) (228)
SOURCES: Valerianaceae: *Valeriana* (228)



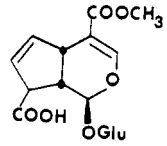
241 KANOKOSIDE C
$C_{27}H_{42}O_{17}$: 638.2422
DERIVATIVE: Octaacetate:
MP: 102–5° (228)
$[\alpha]_D$: −51.5° (CH_3OH) (228)
^{1}H-NMR: $CDCl_3$, 2.00–2.19 (8 Ac), 6.45 (d, J 1 Hz, H at C-3), 6.54 (br. s., H at C-1) (228)
SOURCES: Valerianaceae: *Valeriana* (228)



242 YUHEINOSIDE
$C_{16}H_{24}O_9$: 360.1420
$[\alpha]^{22}_D$: −157° (c=1.2, CH_3OH) (229)
UV: (CH_3OH) 243 (4.09) (229)
IR: KBr, 3250, 2860, 1655, 1620 (229)
^{1}H-NMR: Pyridine-d_5, 90 MHz (229)
^{13}C-NMR: Pyridine-d_5, (1) 99.9, (3) 161.9 (4) 125.5, (5) 73.2, (6) 38.5, (7) 32.0, (8) 33.9, (9) 51.6, (10) 16.2, (11) 190.6, (1') 96.7, (2'), (3'), (4'), (5') 78.6, 77.8, 74.2, 71.2, (6') 62.4 (229)
DERIVATIVE: Tetraacetate:
MP: 188–9° (229)
$[\alpha]^{22}_D$: −138° (c=0.75, CH_3OH) (229)
SOURCES: Scrophulariaceae: *Leucocarpus* (229)

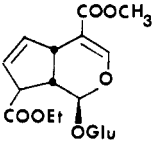


243 11-METHYL IXOSIDE
$C_{16}H_{22}O_{11}$: 390.1161
DERIVATIVE: Tetraacetate:
MP: 225° (230)
$[\alpha]^{22}_D$: +2.83 (c=0.6, $CHCl_3$) (230)
UV: (CH_3OH) 220 (4.2), 230 sh (230)
IR: KBr, 1755, 1715, 1645 (230)
MS: (230)
^{1}H-NMR: $CDCl_3$, 2.00–2.10 (4 Ac), 2.70 (m, H at C-9), 3.00 (m, H at C-5) 3.50 (m, H's at C-6), 3.75 (OCH_3) 6.15 (d, J 3.1, H at C-1), 7.15 (t, H at C-7), 7.50 (s, H at C-3) (230)
^{13}C-NMR: $CDCl_3$, (1) 92.7, (3) 151.1, (4) 111.9, (5) 31.9, (6) 38.5, (7) 149.9, (8) 132.4, (9) 46.8, (10) 176.8, (11) 166.9, (OCH_3) 51.2, (1') 96.1, (2') 70.7, (3') 72.1, (4') 68.4, (5') 72.6, (6') 61.9 (230)
SOURCES: Rubiaceae: *Fenetia* (230)



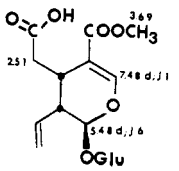
244 APODANTHOSIDE

$C_{17}H_{21}O_{11}$: 401.1083
^{13}C-NMR: $CDCl_3$, (1) 95.0, (3) 150.4, (4) 108.6, (5) 38.0, (6) 128.4, (7) 132.3, (8) 52.7, (9) 42.3, (10) 176. 8, (11) 166.6, (OCH_3) 49.1, (1') 97.7, (2') 71.7, (3') 74.9, (4') 68.5, (5') 75.3, (6') 59.7 (230)
DERIVATIVE: Tetraacetate:
$[\alpha]^{22}D$: −9.98 (c=1.04, $CHCl_3$) (230)
UV: 232 (3.96) (230)
MS: (230)
^{1}H-NMR: $CDCl_3$, 1.95–2.05 (4 Ac), 2.80 (m, H at C-9), 3.60 (m, H's at C-5 and C-8), 3.75 (OCH_3), 5.75 (n, H at C-7), 6.15 (m, H at C-6) 7.35 (s, H at C-3) (230)
SOURCES: Rubiaceae: *Feretia* (230)



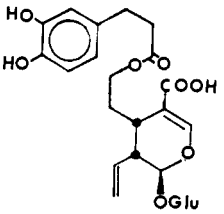
245 10-ETHYL APODANTHOSIDE

$C_{19}H_{26}O_{11}$: 430.1475
DERIVATIVE: Tetraacetate
MP: 69° (230)
$[\alpha]^{22}D$: −9.90 (c=0.5, $CHCl_3$) (230)
UV: 232 (3.92) (230)
IR: 1765, 1715, 1645 (230)
MS: (230)
^{1}H-NMR: $CDCl_3$, 1.25 (CH_3 at ethyl side chain), 1.90–2.10 (4 Ac), 2.85 (m, H at C-9), 3.50 (m, H's at C-5 and C-8), 3.70 (OCH_3), 4.10 (q, (q, O-CH_2-). 5.25 (d, J 3.8 Hz, H at C-1), 5.75 (m, H at C-7), 6.00 (m, H at C-6), 7.20 (s, H at C-3) (230)
^{13}C-NMR: $CDCl_3$, (1) 95.0, (3) 150.1, (4) 111.0, (5) 38.5, (6) 127.9, (7) 135.1, (8) 51.2, (9) 43.6, (10) 172.5, (11) 166.7, (OCH_3) 51.2, (OCH_2-) 61.0, (OCH_2-CH_3) 14.0, (1') 93.3, (2') 70.5, (3') 72.0, (4') 68.1, (5') 72.4, (6') 61.6 (230)
SOURCES: Rubiaceae: *Feretia* (230)



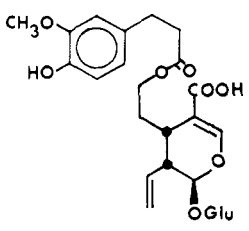
246 SECOXYLOGANIN

$C_{17}H_{24}O_{11}$: 404.1318
^{1}H-NMR: 90 MHz (221)
DERIVATIVE: Tetraacetate methyl ester:
MP: 144–5° (221)
$[\alpha]^{18}D$: −96° (c=0.2, $CHCl_3$) (221)
SOURCES: Loasaceae: *Mentzelia* (221)



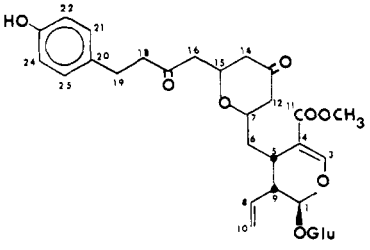
247 GRANDIFLOROSIDE

$C_{25}H_{30}O_{13}$: 538.1686
UV: (CH_3OH) 219 (4.2), 230 sh (4.1), 300 sh (4.0), 330 (4.1) (231)
DERIVATIVE: Hexaacetate:
MP: 118–9° (231)
^{1}H-NMR: $CDCl_3$, 100 MHz, 1.99–2.08 (4 Ac), 2.30 (2 Ac phenolics), 4.90–5.42 (m, H at C-8, 2H at C-10), 6.34 (d, J 16 Hz, H at C-1) (231)
MS: (231)
SOURCES: Loganiaceae: *Anthocleista* (231)



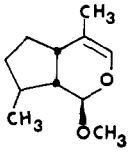
248 METHYL GRANDIFLOROSIDE

$C_{26}H_{32}O_{13}$: 552.1842
UV: (CH_3OH) 219 (4.2), 234 (4.1), 300 sh (3.9), 327 (4.1) (231)
IR: KBr, 3400, 2910, 1700, 1645, 1625, 1590, 1505, 1375, 1265, 1060, 1020 (231)
DERIVATIVE: Pentaacetate:
MP: 89–90° (231)
^{1}H-NMR: $CDCl_3$, 100 MHz, 1.96–2.10 (4 Ac), 2.30 (Ac, phenolic), 3.82 (OCH_3), 4.85–5.40 (m, H at C-8 and 2H at C-10), 6.34 (d, J 16 Hz), 7.00–7.20 (m, 3 Ar-H), 7.38 (H at C-3), 7.60 (d, J 16 Hz) (231)
MS: (231)
SOURCES: Loganiaceae: *Anthocleista* (231)



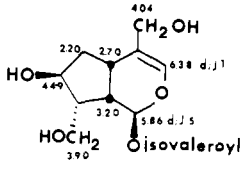
249 HYDRANGENOSIDE A

$C_{31}H_{40}O_{13}$: 620.2468
$[\alpha]_D$: −85.2° (CH_3OH) (233)
IR: 3400, 1600, 1520 (233)
^{1}H-NMR: CD_3OD (233)
DERIVATIVE: Pentaacetate:
^{13}C-NMR: (1) 95.6, (3) 150.4, (4) 111.2, (5) 27.8, (6) 34.1, (7) (15) 68.6, 71.9, (8) 132.9, (9) 43.7, (10) 120.1, (11) 166.5, (OCH_3) 51.1, (12) (14) (16) (18) 44.8, 46.0, 46.6, 46.8, (13) (17) 206.0, 206.3, (19) 28.7, (20) 138.3, (21) 129.0, (23) 148.7, (24) 121.1 (233)
SOURCES: Saxifragaceae (Hydrangeaceae): *Hydrangea* (233)



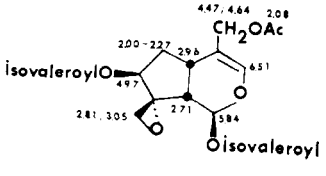
250 MYODESERTIN

$C_{11}H_{18}O_2$: 182.1306 (217)



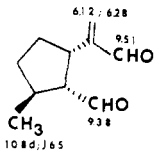
251 PATRINOSIDE AGLYCONE

$C_{15}H_{24}O_6$: 300.1573
MP: 111–3° (81)
$[\alpha]_D$: −85.7° (CH_3OH) (81)
MS: (81)
IR: KBr, 1740, 1658 (81)
^{1}H-NMR: $CDCl_3$, 60 MHz (81)
DERIVATIVE: Triacetate:
$[\alpha]_D$: −45.6° (EtOH) (81)
SOURCES: Valerianaceae: *Patrinia* (81)



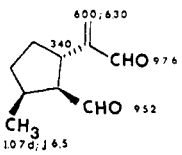
252 ISODIDROVALTRATE

$C_{22}H_{32}O_8$: 424.2097
$[\alpha]^{23}_D$: −72° (c=1.0, CH_3OH) (232)
^{1}H-NMR: $CDCl_3$, 90 MHz (232)
SOURCES: Valerianaceae: *Valeriana* (232)



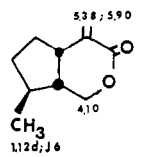
253 TEUCRIUM LACTONE A

$C_{10}H_{14}O_2$: 166.0994
$[\alpha]^{20}D$: −72° (c=4.2, Benzene) (234)
IR: CCl_4, 2710, 1724, 1695, 1630, 950 (234)
UV: H_2O, 223 (3.) (234)
^{1}H-NMR: $CDCl_3$ (234)
SOURCES: Labiatae: *Teucrium* (234) also *Dolichoderus* ants.



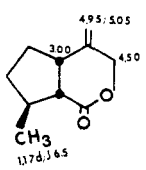
254 TEUCRIUM LACTONE B (ANISOMORPHAL)

$C_{10}H_{14}O_2$: 166.0994
$[\alpha]^{20}D$: +3.5 (c=4.3, benzene) (234)
IR: CCl_4, 2710, 1722, 1696, 1630, 950 (234)
UV: (H_2O) 2.23 (3.) (234)
SOURCES: Labiatae: *Teucrium* (234)



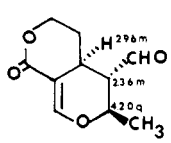
255 TEUCRIUM LACTONE C

$C_{10}H_{14}O_2$: 166.0994
^{1}H-NMR: CCl_4 (234)
SOURCES: Labiatae: *Teucrium* (234)



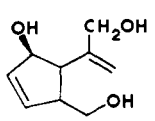
256 TEUCRIUM LACTONE D

$C_{10}H_{14}O_2$: 166.0994
$[\alpha]^{20}D$: +31.7 (c=4.5, Benzene) (234)
IR: CCl_4, 1730 (234)
^{1}H-NMR: (234)
SOURCES: Labiatae: *Teucrium* (234)



257 NAUCLEDAL

$C_{10}H_{12}O_4$: 196.0735
UV: 246 (3.), 285 (3.) sh (235)
IR: (235)
^{1}H-NMR: 220 MHz (236)
MS: (235)
SOURCES: Rubiaceae: *Nauclea* (235)



258 MENTZETRIOL

$C_9H_{14}O_3$: 170.0943
$[\alpha]^{22}D$: −345° (221)
MS: (221)
^{13}C-NMR: D_2O, (1) 65.8, (3) 111.1, (4) 154.4, (5) 48.7, (6) 78.5, (7) 135.6, (8) 135.0, (9) 53.1, (10) 63.0 (221)
SOURCES: Loasaceae: *Mentzelia* (221)

TABLE 2. Names and synonyms of iriodids cited in this review.

10-Acetoxy-ligustroside **154**
10-Acetoxy-oleuropein **157**
6-O-Acetyldeutzioside **223**
Acetyl Barlerin **96**
8-Acetyl Harpaguide **24**
10-Acetyl Scandoside **117**
Acevaltrate **208**
Adoxoside **106**
Agnuside **35**
AHD-Valtrate **209**
Ajugol **18**
Ajugoside **19**
Allamandicin **198**
Allamandin **197**
Allamdin **196**
Allosyldecaloside **226**
Allosylepoxydecaloside **229**
Amarogentin **159**
Amaropanin **158**
Amaroswerin **161**
Amphicoside **50**
Anisomorphal **254**
Antirride **11**
Antirrinoside **28**
Apodanthoside **244**
Aralidioside **134**
Asperuloside **123**
Asperulosidic Acid **115**
Aucubin **32**
Aucubin Acetate **214**
Aucuboside **32**
Aucubigenin-1-β-isomaltoside **233**
Baldrinal **189**
Barlerin **95**
Bartsioside **31**
6,10 Bisdeoxyaucubin **10**
Bisdesoxydihydromonotropein **77**
Bisdeoxydihydromonotropein Methyl Ester **78**
Boschnaloside **72**
Boschnialactone **172**
Brasoside **79**
Cantleyoside **165**
Caryoptoside **93**
Catalpol **37**
Catalpol Monoacetate **215**
Catalposide **49**
Centapicrin **155**
7-Chlorodeutziol **7**
Cornin **86**
Daphylloside **121**
Deacetyl-Asperuloside **122**
Decaloside **9**
Decapetaloside **60**
5-9 Dehydro-nepetalactone **175**
Deoxyamarogentin **158**
10-Deoxy Aucubin **12**
Deoxydidrovaltrate **205**
Deoxyloganin **78**
Deacetyl-Asperulosidic Acid **113**
Desisovaleroxydidrovaltratum **200**
6-Desoxy-harpagide **14**
Desoxyloganic Acid **77**
Deutzioside **6**
5-Desoxy Lamiide **93**
Deutziol **5**
Didrovaltrate **207**
Dihydrocornin **80**
Dihydrofoliamenthin **150**
Dihydropenstemide **237**
Dihydroplumericin **195**
β-Dihydro Plumericinic Acid **193**
Durantoside-I **103**
Durantoside-II **102**
Durantoside-III **101**
Elenolide **185**
6-Epi-paederosidic Acid **116**
Epoxydecaloside **227**
Erythrocentaurine **176**
10-Ethylapodanthoside **245**
Eucommiol **173**
Eustomoruside **140**
Eustomoside **139**
Eustoside **138**
Feretoside **120**
Foliamenthin **148**
Forsythide **130**
Forsythide Methyl Ester **131**
Fulvoplumierin **191**
Galiridoside **20**
Gardenoside **129**
Gardoside **76**
Genipic-acid **170**
Genipin **187**
Genipin-1-O-β-gentiobicside **109**
Geniposide **108**
Geniposidic Acid **107**
Gentioflavoside **147**
Gentiolactone **177**
Genitopicroside **142**
Gentioside **94**
GI-3 **169**
GI-5 **168**
Globularidin **38**
Globularimin **56**
Globularifolin **222**
Globularin **39**
Globularinin **57**
Glucoside-VII **17**
5-O-β-Glucosyl-antirrinoside **29**
10-O-β-Glucosyl-aucubin **33**
Glucosyldecaloside **224**
Gluroside **13**
Glucosylepoxydecaloside **228**
Grandifloroside **247**
Griselinoside **133**
Harpagide **23**
Harpagoside **25**
Harpagoside Monoacetate **220**
Hastatoside **87**
Homoacevaltratum **210**
Homodidrovaltrate **206**
10-Hydroxy-ligstroside **153**
Hydrangenoside A **249**
Ipolamiide **89**
Ipolamiidoside **90**
Isodidrovaltrate **252**
Iridoid A **22**
Iridodial **180**
Iridolactone **182**
Iridomyrmecin **181**
Isoaucubin **231**
Isocatalpol **216**
Isogenticin **217**
Isoiridomyrmecin **182**
Isoneomatatabiol **183**
Isoplumericin **194**
Isovaltral **202**
Isovaltrate **203**
Isovaltratum Isovaleroxhydrin **213**
IVHD-valtrate **212**
Ixoroside **73**
Ixoside **132**
Jasminin **151**
Kanokoside A **238**
Kanokoside B **239**
Kanokoside C **241**
Kanokoside D **240**
Ketologanin **85**
Kingiside **145**
Kutkoside **40**
Ladroside **84**
Lamalbid **104**
Lamiide **99**
Lamiidoside **100**
Lamiol **59**
Lamioside **58**
Lateriosido **21**
Leonuride **19**
Ligstroside **152**
Linaride **12**
Linarioside **30**
Loganic Acid **81**
Loganin **82**
Loganoside **82**
Loniceroside **135**
Loasaside **4**
Macfadienoside **55**
Matatabieter **178**
Melampyroside **36**
Melittoside **54**
Menthiafolin **149**
Mentzeloside **6**
Mentzelosylepoxydecaloside **230**
Mentzetriol **258**
Methyl Catalpol Monoacetate **218**
Methyl Grandifloroside **248**
11-Methyl Ixoside **243**
Minecoside **48**
Mioporoside **15**
Monomelittoside **52**
Monotropein **125**
Monotropein Methyl Ester **127**
Montinioside **62**
Morroniside **144**
Mussaenoside **83**
Myodesertin **250**
Naucledal **257**
Neomatatabiol **184**
Nepetalactone **179**
Nuzhenide **162**
Nyctanthoside **128**
Odontoside **53**
Odontoside Acetate **219**
Oleuropein **156**
O-Methyl Catalpol **42**
8-O-Methyl-p-coumaroyl Harpagide **26**
Opulus Iridoid-I **67**
Opulus Iridoid-II **69**
Opulus Iridoid-III **68**
Opulus Iridoid-IV **70**
Oruwacin **199**
7-Oxologanin **85**
Paederoside **124**
Paederosidic Acid **118**
Patrinoside **66**
Patrinoside Aglycone **256**
Penstemide **71**
Phlomiol **105**
Picroside-I **41**
Picroside-II **50**
Picroside-III **235**
Plumericin **192**
Plumieride **110**
Procumbide **27**
Pulchelloside-I **97**
Pulchelloside-II **98**
Quinovosyldecaloside **225**
Reptoside **16**
6-α-Rhamnopyranosyl Catalpol **51**
Sarracenin **188**
Scabroside **8**
Scandoside **114**
Scandoside Methyl Ester **119**
Scrophularioside **34**
Scutellariosid-I **39**
Scutellariosid-II **43**
Secogalioside **146**
Secologanic Acid **141**
Secologanin **135**
Secoxyloganin **246**
Shanzhiside **91**
Shanzhiside Methyl Ester **92**
Specioside **46**
Stilbericoside **2**
Strictoside **3**
Sweroside **137**
Swertiamarin **136**
Swertiamaroside **136**
Sylvestroside-I **166**
Sylvestroside-II **167**
Sylvestroside-III **163**
Sylvestroside-IV **164**
Syringenone **64**
Syringopicroside **88**
Syringoxide **65**
Tarennoside **74**
Tecomoside **75**
Tecoside **234**
Teucrium Lactone A **253**
Teucrium Lactone B **254**
Teucrium Lactone C **255**
Teucrium Lactone D **256**
Theveside **111**
Theviridoside **112**
Trifloroside **160**
Ulmoside **233**
Unedoside **1**
Vaccinioside **126**
Valechlorine **204**
Valeridine **221**
Valerosidate **63**
Valtrate **201**

TABLE 2. *Continued.*

Valtrate Isovaleroxhydrin **211**
6-O-Veratryl Catalposide **236**
Verbenalin **86**
Verbenalol **186**
Verbenaloside **86**
Verminoside **45**
Veronicoside **47**
Verproside **44**
Viburtinal **174**
Villoside **61**
Vogeloside **143**
Xyllomollin **190**
6-Ō-β-D-Xylanopyranosyl aucubin **232**
Yuheinoside **242**

TABLE 3. Calculated molecular weight of iridoids.

152.1201 $C_{10}H_{16}O_1$
Matatabieter **178**
154.0994 $C_9H_{14}O_2$
Boschnialactone **172**
160.0524 $C_{10}H_8O_2$
Viburtinal **174**
164.0837 $C_{10}H_{12}O_2$
5-9 Dehydronepetalactone **175**
166.0994 $C_{10}H_{14}O_2$
Nepetalactone **179**
Teucrium Lactone A **253**
Teucrium Lactone B **254**
Teucrium Lactone C **255**
Teucrium Lactone D **256**
168.1150 $C_{10}H_{16}O_2$
Iridoidial **180**
Iridomyrmecin **181**
Isoiridomyrmecin **182**
170.0943 $C_9H_{14}O_3$
Mentzetriol 258
170.1306 $C_{10}H_{18}O_2$
Isoneomatatabiol **183**
Neomatatabiol **184**
176.0473 $C_{10}H_8O_3$
Erythrocentaurine **176**
182.1306 $C_{11}H_{18}O_2$
Myodesertin **250**
188.1048 $C_9H_{16}O_4$
Eucommiol **173**
196.0735 $C_{10}H_{12}O_4$
Naucledal **257**
212.0684 $C_{10}H_{12}O_5$
Gentiolactone **177**
218.0579 $C_{12}H_{10}O_4$
Baldrinal **189**
224.0684 $C_{11}H_{12}O_5$
Elenolide **185**
226.0841 $C_{11}H_{14}O_5$
Genipin **187**
Sarracenin **188**
Verbenalol **186**
243.0868 $C_{11}H_{15}O_6$
Genipic Acid **170**
244.0735 $C_{14}H_{12}O_4$
Fulvoplumierin **191**
274.1052 $C_{12}H_{18}O_7$
Xylomollin **190**
278.0790 $C_{14}H_{14}O_6$
β-Dihydroplumericinic Acid **193**
290.0790 $C_{15}H_{14}O_6$
Isoplumericin **194**
Plumericin **192**
292.0947 $C_{15}H_{16}O_6$
Allamdin **196**
Dihydroplumericin **195**
300.1573 $C_{13}H_{24}O_6$
Patrinoside Aglycone **251**
308.0896 $C_{15}H_{16}O_7$
Allamandicin **198**
Allamandin **197**
314.1365 $C_{15}H_{22}O_7$
6,10 Bisdeoxyaucubin **10**
324.1573 $C_{17}H_{24}O_6$
Desisovaleroxydidrovaltratum **200**
330.1314 $C_{15}H_{22}O_8$
Antirride **11**
Bartsioside **31**
Linaride **12**
Loasaside **4**
332.1107 $C_{14}H_{20}O_9$
Unedoside **1**
332.1471 $C_{15}H_{24}O_8$
Gluroside **13**
Strictoside **3**
344.1471 $C_{16}H_{24}O_8$
Boschnaloside **72**
346.1263 $C_{15}H_{22}O_9$
Aucubin **32**
Decaloside **9**
Galiridoside **20**
Isoaucubin **231**
Mentzeloside **6**
346.1627 $C_{16}H_{26}O_8$
Decapetaloside **60**
Villoside **61**
348.1056 $C_{14}H_{20}O_{10}$
Stilbericoside **2**
348.1420 $C_{15}H_{24}O_9$
Ajugol **18**
6-Desoxy-harpagide **14**
Deutziol **5**
Mioporoside **15**
356.1107 $C_{16}H_{20}O_9$
Gentiopicroside **142**
358.1263 $C_{16}H_{22}O_9$
Brasoside **79**
Sweroside **137**
Tarennoside **74**
360.1420 $C_{18}H_{24}O_9$
Bisdesoxydihydromonotropein **77**
Ixoroside **73**
Yuheinoside 242
362.1213 $C_{15}H_{22}O_{10}$
Antirrinoside **28**
Catalpol **37**
Epoxydecaloside **227**
Monomelittoside **52**
Procumbide **27**
Scabroside **8**
364.1369 $C_{15}H_{24}O_{10}$
Harpagide **23**
Iridoid A **22**
372.1056 $C_{16}H_{20}O_{10}$
Deacetyl-asperuloside **122**
372.1420 $C_{17}H_{24}O_9$
Syringenone **64**
374.1213 $C_{16}H_{22}O_{10}$
Gardoside **76**
Geniposidic Acid **107**
Gentioflavoside **147**
Secologanic Acid **141**
374.1577 $C_{17}H_{26}O_9$
Deoxyloganin **78**
376.1369 $C_{16}H_{24}O_{10}$
Loganic Acid **81**
O-Methyl Catalpol **42**
Tecomoside **75**
378.1161 $C_{15}H_{22}O_{11}$
Macfadienoside **55**
378.1526 $C_{16}H_{26}O_{10}$
Lamiol 59
382.1030 $C_{15}H_{23}O_9Cl$
7-Chlorodeutziol **7**
388.1005 $C_{16}H_{20}O_{11}$
Ixoside **132**
388.1369 $C_{17}H_{24}O_{10}$
6-O-Acetyldeutzioside **223**
Geniposide **108**
Ketologanin **85**
Loniceroside **135**
Syringoxide **65**
Theviriodside **112**
Verbenalin **86**
390.1161 $C_{15}H_{22}O_{11}$
Desacetylasperulosidic Acid **112**
Eustomoside **139**
Forsythide **130**
11-Methyl Ixoside **243**
Monotropein **125**
Scandoside **114**
Swertiamarin **136**
Theveside **111**
390.1526 $C_{17}H_{26}O_{10}$
Adoxoside **106**
Ajugoside **19**
Dihydrocornin **80**
Glucoside-VII **17**
Loganin **82**
Mussaenoside **83**
Reptoside **16**
Vogeloside **143**
392.1318 $C_{16}H_{24}O_{11}$
Shanzhiside **91**
398.0980 $C_{15}H_{23}O_{10}Cl$
Linarioside **30**
398.1002 $C_{21}H_{18}O_5$
Oruwacin 199
401.1083 $C_{17}H_{21}O_{11}$
Apodanthoside **244**
404.1318 $C_{17}H_{24}O_{11}$
Feretoside **120**
Forsithyde Methyl Ester **131**
Gardenoside **129**
Gentioside **94**
Hastatoside **87**
Kingiside **145**
Monotropein Methyl Ester **127**
Scandoside Methyl Ester **119**
Secoxyloganin **246**
406.1475 $C_{17}H_{26}O_{11}$
8-Acetyl Harpagide **24**
Caryoptside **93**
Ipolamiide **89**
Morroniside **144**
Shanzhiside Methyl Ester **92**
408.1267 $C_{16}H_{24}O_{12}$
Eustomorruside **140**
408.2148 $C_{22}H_{32}O_7$
Deoxydidrovaltrate **205**
414.1161 $C_{18}H_{22}O_{11}$
Asperuloside **123**
420.1267 $C_{17}H_{24}O_{12}$
Secogalioside **146**
420.1631 $C_{15}H_{28}O_{11}$
Lamioside **58**
422.1424 $C_{17}H_{26}O_{12}$
Lamalbid **104**
Lamiide **99**
Nyctanthoside **128**
Pulchelloside-I **97**
Pulchelloside-II **98**
422.1940 $C_{22}H_{30}O_8$
Isovaltral **202**
Isovaltrate **203**
Valtrate **201**
424.2097 $C_{22}H_{32}O_8$
Didrovaltrate **207**
Isodidrovaltrate **252**
426.0928 $C_{16}H_{23}O_{11}Cl$
Eustoside **138**
430.0933 $C_{15}H_{22}O_{10}S$
Paederoside **124**
430.1475 $C_{19}H_{26}O_{11}$
10-Ethyl Apodanthoside **245**
432.1267 $C_{18}H_{24}O_{12}$
10-Acetyl Scandoside **117**
Asperulosidic Acid **115**
Griselinoside **133**
438.1373 $C_{17}H_{26}O_{13}$
Phlomiol **105**
438.1525 $C_{21}H_{26}O_{10}$
Agnuside **35**

TABLE 3. *Continued.*

438.2253 $C_{23}H_{34}O_5$
Homodidrovaltrate **206**
442.1838 $C_{21}H_{30}O_{10}$
Penstemide **71**
446.1424 $C_{19}H_{26}O_{12}$
Barlerin **95**
Daphylloside **121**
446.2151 $C_{21}H_{34}O_{10}$
Dihydropenstemide **237**
448.1039 $C_{15}H_{24}O_{11}S$
6-Epi-paederosidic Acid **116**
Paederosidic Acid **118**
448.1216 $C_{15}H_{24}O_{13}$
Aralidioside 134
448.1580 $C_{19}H_{28}O_{12}$
Ipolamiidoside **90**
450.1525 $C_{22}H_{26}O_{10}$
Melampyroside **36**
458.1707 $C_{22}H_{31}O_8Cl$
Valechlorine **204**
462.2101 $C_{21}H_{34}O_{11}$
Patrinoside **66**
Valerosidate **63**
466.1475 $C_{22}H_{26}O_{11}$
Veronicoside **47**
Globularifolin **222**
470.1423 $C_{21}H_{26}O_{12}$
Plumieride **110**
476.1682 $C_{24}H_{28}O_{10}$
Scrophulariosido **34**
476.1893 $C_{21}H_{32}O_{12}$
Kanokoside A **238**
Montinioside **62**
478.1686 $C_{20}H_{30}O_{13}$
Mentzelosyl Epoxydecaloside **230**
6-O-β-D-Xylanopyranosylaucubin **232**
478.1838 $C_{24}H_{30}O_{10}$
Laterioside **21**
478.2050 $C_{21}H_{34}O_{12}$
Kanokoside B **239**
480.1995 $C_{24}H_{32}O_{10}$
Acevaltrate **208**
482.1423 $C_{22}H_{26}O_{12}$
Catalposide **49**
483.1580 $C_{22}H_{25}O_{12}$
Picroside-III **235**
488.1530 $C_{21}H_{28}O_{13}$
Acetyl Barlerin **96**
492.1631 $C_{24}H_{28}O_{11}$
Globularin **39**
Picroside-I **41**
492.1843 $C_{21}H_{32}O_{13}$
Quinovosyldecaloside **225**
Tecoside **234**
494.1788 $C_{24}H_{30}O_{11}$
Globularidin **38**
Harpagoside **25**
Syringopicroside **88**
494.2151 $C_{25}H_{34}O_{10}$
Homoacevaltratum **210**
498.1373 $C_{22}H_{26}O_{13}$
Verproside **44**
498.2101 $C_{24}H_{34}O_{11}$
AHD-valtrate **209**
508.1580 $C_{24}H_{28}O_{12}$
Odontoside **53**
Scutellariosid-II **43**
Specioside **46**
508.1792 $C_{21}H_{32}O_{14}$
Allosyldecaloside **226**
10-O-β-Glucosyl Aucubin **33**
Glucosyldecaloside **224**
6-α-L-Rhamnopyranosyl Catalpol **51**
Ulmoside **233**
510.1736 $C_{24}H_{30}O_{12}$
Globularimin **56**
Globularinin **57**
512.1530 $C_{23}H_{28}O_{13}$
Amphicoside **50**
Kutkoside **40**
520.1581 $C_{25}H_{28}O_{12}$
Centapicrin **155**
524.1530 $C_{24}H_{28}O_{13}$
Verminoside **45**
524.1741 $C_{21}H_{32}O_{15}$
Allosylepoxydecaloside **229**
5-O-β-Glucosyl Antirrinoside **29**
Glucosyl epoxydecaloside **228**
Melittoside **54**
524.1893 $C_{25}H_{32}O_{12}$
Ligstroside **152**
524.2621 $C_{27}H_{40}O_{10}$
Valtrate Isovaleroxhydrin **211**
526.1686 $C_{24}H_{30}O_{13}$
6-O-Veratrylcatalposide **236**
526.2778 $C_{27}H_{42}O_{10}$
Isovaltratum isovaleroxhydrin **213**
536.1530 $C_{25}H_{28}O_{13}$
Vaccinioside **126**
538.1686 $C_{25}H_{30}O_{13}$
Grandifloroside **247**
Minecoside **48**
540.1842 $C_{25}H_{32}O_{13}$
10-Hydroxy-ligstroside **153**
Oleuropein **156**
O-Methyl-p-Coumaroyl Harpagide **26**
540.2206 $C_{26}H_{36}O_{12}$
Foliamenthin **148**
Menthiafolin **149**
540.2570 $C_{27}H_{40}O_{11}$
IVHD-valtrate **212**
542.2363 $C_{26}H_{38}O_{12}$
Dihydrofoliamenthin **150**
Jasminin **151**
550.1897 $C_{28}H_{34}O_{13}$
Genipin-1-O-β-gentiobioside 109
552.1842 $C_{26}H_{32}O_{13}$
Durantoside-I **103**
Ladroside **84**
Methyl Grandifloroside **248**
568.1792 $C_{26}H_{32}O_{14}$
Lamiidoside **100**
570.1737 $C_{29}H_{30}O_{12}$
Amaropanin **158**
582.1948 $C_{27}H_{34}O_{14}$
10-Acetoxy-ligustroside **154**
Durantoside-II **102**
584.2104 $C_{27}H_{36}O_{14}$
Sylvestroside-III **163**
Sylvestroside-IV **164**
586.1686 $C_{29}H_{30}O_{13}$
Amarogentin **159**
598.1897 $C_{27}H_{34}O_{15}$
10-Acetoxy-oleuropein **157**
602.1634 $C_{29}H_{30}O_{14}$
Amaroswerin **161**
612.2053 $C_{25}H_{36}O_{15}$
Durantoside-III 101
620.2468 $C_{31}H_{40}O_{13}$
Hydrangenoside A **249**
623.2550 $C_{27}H_{43}O_{16}$
Kanokoside D **240**
638.2422 $C_{27}H_{42}O_{17}$
Kanokoside C **241**
688.2578 $C_{31}H_{44}O_{17}$
Nuzhenide **162**
746.2632 $C_{33}H_{46}O_{19}$
Cantleyoside **165**
748.2789 $C_{33}H_{48}O_{19}$
Sylvestroside-I **166**
782.2269 $C_{35}H_{42}O_{20}$
Trifloroside **160**
790.2894 $C_{38}H_{50}O_{20}$
Sylvestroside-II **167**
910.3107 $C_{42}H_{54}O_{22}$
GI-5 **168**
1072.3635 $C_{48}H_{64}O_{27}$
GI-3 **169**

ACKNOWLEDGMENTS

We wish to thank the U. S. Public Health Service for the grant (GM-20968) from the National Institutes of Health and Josephine S. Failer for partial support of this work. We also wish to thank Virginia Hall, Nicholas Felt and Mary Amorose of the library of The Ohio State University College of Pharmacy for their cooperation and help in locating reference materials.

Received 7 February 1980.

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