Spectroscopic Data of Steroid Glycosides: Cardenolides and Pregnanes

Volume 4

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SPECTROSCOPIC DATA OF STEROID GLYCOSIDES: CHOLESTANES, ERGOSTANES, WITHANOLIDES, STIGMASTANE
Edited by Viqar Uddin Ahmad and Anwer Basha

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SPECTROSCOPIC DATA OF STEROID GLYCOSIDES: STIGMASTANES, FUROSTANES, SPIRTOSTANES
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Volume 6
SPECTROSCOPIC DATA OF STEROID GLYCOSIDES: MISCELLANEOUS STEROIDS AND INDEXES
Edited by Viqar Uddin Ahmad and Anwer Basha

Spectroscopic Data of Steroid Glycosides: Cardenolides and Pregnanes

Volume 4

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PREFACE

The present volumes reproduce the spectroscopic data of naturally occurring steroidal glycosides as far as they are available in the chemical literature published until the end of 2004. Steroids have the basic skeleton of cyclopentanoperhydrophenanthrene. Generally they do not have methyl groups attached to C-4 and thus differ from triterpenes. Many of the steroidal glycosides, or saponins, have interesting biological activities and constitute the active principles of the natural drugs. The cardiac glycosides (cardenolides) included in the present work act as life-saving medicines in certain ailments.

Not included in this work are the glycosides of steroidal alkaloids. However, the compounds which contain a nitrogen atom in the sugar or in the ester moiety (e.g. nicotinoyl moiety) are included.

The steroidal glycosides are arranged according to the class of their aglycones (steroidal parts). Within each class increasing molecular weight is taken as the basis for this arrangement. If the compounds of the same class have the same molecular weight, then the glycosides with lesser number of carbon atoms come earlier than those with more carbon atoms. Finally, if all these factors are the same, then the compounds are arranged in alphabetical order.

The chemical shifts in the proton nuclear magnetic resonance (PMR) spectral data are arranged according to the increasing δ (ppm) values. Each signal represents one proton unless indicated otherwise. The small alphabets used as superscript in PMR and ^{13}C-NMR (CMR)-spectral data mean that the assignments are ambiguous and may be reversed with signals having the same superscripts. The signals masked by solvent peaks or by other signals of the compound are marked by an asterisk.

Compounds can be easily located in this book with the help of the four indexes at the end of the last volume. The trivial names of the compounds given by the original authors are used as the heading of the compound. If no trivial name has been given, then the name of the plant from which the glycoside has been isolated followed by the word "saponin" or "glycoside" and then the numerical order are used as the main heading. For the subheading, the name of the aglycone (trivial names if available) followed by names of the sugars are used with clear indication of glycosidic linkages and branching of the sugar chain if present.

I am very grateful to Ms. Judy Watson of Chemical Abstract Service who has helped me greatly in finding the registry numbers of several compounds. This work would not have been possible without the help of literature surveyors Dr. Akbar Ali, Dr. Hidayat M. Khan, Dr. M. Athar Abbasi, Mr. Touseef Ali Khan, Mr. Umair Quyyum Khan, Miss. Humera Zaheer, Miss. Rukhsana Kausor, Miss Husna Qamar, Miss. Fouzia Shamim,

Ms. Zeenat Siddiqui, Muhammad Zubair, Afsar Khan, and Shazia Yasmeen to whom my sincere thanks are due. The whole book has been typed, composed, and structures drawn by Mr. Rafat Ali, Mr. Shabbir Ahmed, and Tariq Ilyas and I wish to express my sincere thanks to them.

ABBREVIATIONS

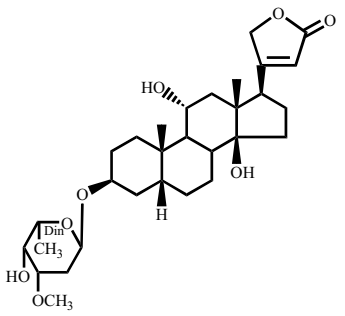
Aco	Acofrose
Afr	Acrofriose
Agl	Aglycone
All	Allose
Alt	Altrose
Ang	Angeloyl
Ant	Antirose
Ara	Arabinose
Boi	Boivinose
Ben	Benzoyl
Can	Canarose
Cin	Cinnamoyl
CMR	^{13}C-Nuclear Magnetic Resonance
Cym	Cymarose
DAC	4-Deoxy-4-aminocymarose
DMC	4-Deoxy-4-methylaminocymarose
Dal	6-Deoxyallose
Ddg	Dideoxygulopyranoside
Def	2-Deoxyfucose
Dex	6-Deoxy-D-glycero-L-threo-4-hexosulose
DHMP	2,3-Dihydroxy-3-methylpentanoyl
DMB	Dimethoxybenzoyl
DMC	4-Deoxy-4-methylaminocymarose
Dil	Digitalose
Din	Diginose
Dix	Digitoxose
Dma	Deoxymethylallose
DMP	3,4-Dimethyl-2(*E*)-pentenoyl
DMX	Dimethylxylose
EI	Electron ionization
ESI	Electro-spray ionization
F	Furanosyl
FAB	Fast Atom Bombardment
FD	Field desorption
Fuc	Fucose
Gal	Galactose

Glc	Glucose
Glum	6-Deoxy-α-L-glucopyranoside
Gum	Gulomethylose
HMB	Hydroxymethoxybenzoyl
HMG	Hydroxymethylglutaroyl
HR	High resolution
Ike	Ikemoyl (3,4-dimethyl-2-pentenoyl)
LD	Laser Desorption
Meb	2-Methylbutanoyl
MeXyl	Methylxylose
MGl	Methylglucose
Neg	Negative
Nic	Nicotinoyl
Ole	Oleandrose
Oli	Olivose
PMB	*Para* -methoxybenzoyl
Pos	Positive
PMR	Proton Magnetic Resonance
Qui	Quinovose
Rha	Rhamnose
Sar	Sarmentose
Tam	Talomethylose
Tar	Triacetylarabinose
The	Thevetose
TMB	Trimethoxybenzoyl
TOF	Time of flight
Xyl	Xylose

CONTENTS

DIVOSTROSIDE

Sarmentogenin 3-O-α-L-diginopyranoside



Source : *Strophanthus divaricatus* (Lour.) Hook. et Arn.[1,2] (Apocynaceae), *S. divaricatus* calli[3]
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 195-199°C[2]
$[\alpha]_D^{22}$: -54.5° (c=0.56, MeOH)[2]
Registry No. : [76704-78-4]

PMR ($CDCl_3$, 400 MHz)[2] **:** δ 0.88 (s, 3xH-18)[a], 1.05 (s, 3xH-19)[a], 1.24 (d, *J*=6.0 Hz, 3xH-6 of Din), 3.39 (s, OC*H*$_3$ of Din), 4.74 (dd, *J*=18.0, 1.0 Hz, H-21A), 4.97 (s, H-1 of Din), 5.00 (dd, *J*=18.0, 1.0 Hz, H-21B), 5.84 (t, *J*=1.0 Hz, H-22).

PMR (C_5D_5N, 300 MHz)[3] **:** δ 1.00 (s, 3xH-18), 1.10 (s, 3xH-19), 1.39 (d, *J*=6.0 Hz, 3xH-6 of Din), 2.29 (dd, *J*=12.0, 3.5 Hz, H-2A of Din), 2.85 (dd, *J*=9.0, 5.0 Hz, H-17α), 3.22 (s, OC*H*$_3$ of Din), 3.80 (ddd, *J*=12.0, 5.0, 3.0 Hz, H-3 of Din), 4.04 (br s, H-3), 4.92 (dd, *J*=18.0, 1.5 Hz, H-21A), 5.13 (br d, *J*=3.0 Hz, H-1 of Din), 5.19 (dd, *J*=18.0, 1.5 Hz, H-21B), 6.00 (br s, H-22).

CMR (C_5D_5N, 100 MHz)[2] **:** δ C-1) 33.9[a] (2) 28.2 (3) 72.5 (4) 31.1 (5) 38.9 (6) 27.3[b] (7) 22.3 (8) 42.3 (9) 41.4 (10) 37.1 (11) 67.7[c] (12) 50.6 (13) 50.3 (14) 84.3 (15) 33.7[a] (16) 27.8[b] (17) 51.3 (18) 17.7 (19) 24.5 (20) 175.4 (21) 73.8 (22) 117.7 (23) 174.5 **Din** (1) 96.4 (2) 31.4 (3) 76.0 (4) 67.1 (5) 67.8[c] (6) 17.7 (O*C*H$_3$) 55.0.

Mass (FAB, Positive ion)[3] **:** *m/z* 557 $[M+Na]^+$.

Mass (F.D.)[2] **:** *m/z* 535 $[M+H]^+$, 490, 389, 145.

References

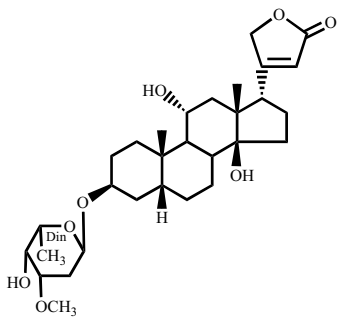
1. O. Renkonen, O. Schindler and T. Reichstein, *Helv. Chim. Acta*, **42**, 160, 182 (1959).

2. R.F. Chen, F. Abe, T. Yamauchi and M. Taki, *Phytochemistry*, **26**, 2351 (1987).

3. K. Kawaguchi, I. Asaka, M. Hirotani, T. Furuya and S. Katsuki, *Phytochemistry*, **34**, 1317 (1993).

17βH-DIVOSTROSIDE

17βH-Sarmentogenin-3-O-α-L-diginopyranoside



Source : Tissue cultures plants from *Strophanthus divaricatus* calli (Lour.) Hook. et Arn. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
$[\alpha]_D^{23}$: -50.9° (c=0.53, MeOH)
Registry No. : [152323-38-1]

PMR (C_5D_5N, 300 MHz) : δ 1.15 (s, 3xH-18 and 3xH-19), 1.40 (d, *J*=6.0 Hz, 3xH-6 of Din), 2.30 (dd, *J*=12.0, 3.5 Hz, H-2A of Din), 3.22 (OC*H*$_3$ of Din), 3.27 (dd, *J*=9.5, 9.5 Hz, H-17β), 3.80 (ddd, *J*=12.0, 5.0, 3.0 Hz, H-3 of Din), 3.98 (m, H-11β), 4.07 (br s, H-3α), 4.66 (dd, *J*=17.5, 1.5 Hz, H-21A), 4.81 (dd, *J*=17.5, 1.5 Hz, H-21B), 5.15 (br d, *J*=3.0 Hz, H-1 of Dig), 5.96 (br d, *J*=1.5 Hz, H-22).

CMR (C_5D_5N, 75 MHz) : δ 34.3 (2) 28.4 (3) 72.7 (4) 31.3 (5) 39.2 (6) 27.8 (7) 22.0 (8) 42.8 (9) 41.3 (10) 37.2 (11) 67.8 (12) 42.6 (13) 50.0 (14) 84.9 (15) 32.0 (16) 25.1 (17) 49.3 (18) 19.8 (19) 24.6 (20) 172.7 (21) 74.2 (22) 116.8 (23) 174.7 **Din** (1) 96.7 (2) 31.5 (3) 76.2 (4) 67.3 (5) 67.9 (6) 17.8 (O*C*H$_3$) 55.0.

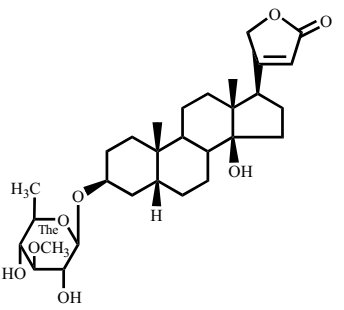
Mass (FAB-MS) : *m/z* 557 $[M+Na]^+$.

Reference

1. K. Kawaguchi, I. Asaka, M. Hirotani, T. Furuya and S. Katsuki, *Phytochemistry*, **34**, 1317 (1993).

HONGKELIN, HONGHELIN

Digitoxoigenin 3-O-β-D-thevetopyranoside



Source : *Adenium honghel* A. DC.[1] (Apocynaceae), *Adenium obesum* Fosk.[2] (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 130-135°C[1]
$[\alpha]_D^{26}$: -10.3° (MeOH)[1]
Registry No. : [560-67-8]

UV[2] : 220 (log ε, 4.25) nm.

IR[2] : 1780, 1740, 1620 cm^{-1}.

PMR ($CDCl_3$, 60 MHz)[2] : δ 0.87 (s, C*H*$_3$), 0.93 (s, C*H*$_3$), 3.60 (s, OC*H*$_3$), 4.00 (1H), 4.90 (2H), 5.83 (1H).

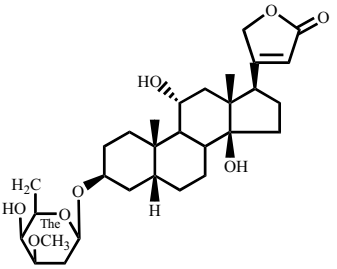
Mass (E.I.)[2] : *m/z* 534 $[M]^+$, 357, 339, 203.

References

1. K. Reyle and T. Reichstein, *Helv. Chim. Acta*, **35,** 195 (1952).
2. J.J. Hoffmann, J.R. Cole, *J. Pharm. Sci*., **66**, 1336 (1977).

KWANGOSIDE

Sarmentogenin 3-O-β-D-diginopyranoside



Source : *Strophanthus amboensis* (Schinz) Engl. et Pax.[1], *S. vanderijstii* Staner.[2] (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 212-217°C[2]
$[\alpha]_D^{19}$: -9.4° ± 1,5° (c=0.163, $CHCl_3$)[2]

UV $(EtOH)^2$: λ_{max} 217 (log ε, 4.23) nm..

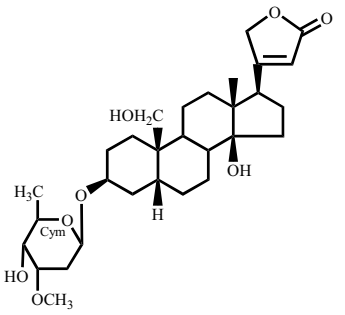
Biological Activity : Lethal dose 0.3276 ± 0.0249 mg/kg in cats.[1]

References

1. O. Schindler, *Helv. Chim. Acta*, **39**, 64 (1956).
2. H. Lichti, C. Tamm and T. Reichstein, *Helv. Chim. Acta*, **39**, 1933 (1956).

MAQUIROSIDE A

Cannogenol 3-O-β-D-cymaroside



Source : *Maquira calophylla* (P&E) C.C. Berg. (Moraceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 123-125°C
$[\alpha]_D^{25}$: +17.9° (c=0.07, $CHCl_3$)
Registry No. : [110187-24-1]

UV (EtOH) : λ_{max} 218 (ε, 5628), 290 (ε, 239) nm.

IR ($CHCl_3$) : 3568, 3322, 2933, 2870, 1740, 1615, 1448, 1085 cm^{-1}.

PMR ($CDCl_3$, 360 MHz) : δ 0.87 (s, 3xH-18), 1.23 (d, *J*=6.0 Hz, 3xH-6 of Cym), 1.30-2.00 (m, ~25H), 2.07 (m, H-2 of Cym), 2.76 (m, H-17), 3.22 (dd, *J*=3.4, 9.0 Hz, H-4 of Cym), 3.43 (s, OCH_3), 3.50 (m, H-5 of Cym), 3.64 (m, H-3 of Cym), 3.54 and 3.80 (ABq, *J*=11.0 Hz, 2xH-19), 4.02 (br s, H-3), 4.72 (dd, *J*=1.5, 9.0 Hz, H-1 of Cym), 4.89 (ABq, J_{AB}=6.0 Hz, $J_{21,22}$=1.5 Hz, 2xH-21), 5.88 (s, H-22).

CMR (C_5D_5N, 22.5 MHz) : δ C-1) 30.8 (2) 27.2 (3) 71.0 (4) 30.8 (5) 35.9 (6) 27.2 (7) 24.8 (8) 42.0 (9) 30.0 (10) 39.9 (11) 21.9 (12) 40.5 (13) 50.2 (14) 84.9 (15) 33.0 (16) 27.4 (17) 51.6 (18) 16.3 (19) 65.5 (20) 175.9 (21) 73.7 (22) 117.7 (23) 174.5 **Cym** (1) 96.6 (2) 36.2 (3) 79.0 (4) 74.3 (5) 73.2 (6) 19.1 (OCH_3) 58.0.

Mass (C.I., Isobutane, H.R.) : *m/z* 535.3353 [(M+Na), calcd. for 535.3271].

Mass (C.I.) : *m/z* (rel.intens.) 535 [M^+ + H, 2.3%], 391 (21.6), 389 (2.6), 373 (24.2), 355 (44.95), 219 (12.3), 179 (3.9), 165 (1.7), 162 (1.1), 147 (14.7), 145 (100), 144 (6.0), 117 (10), 111 (20.2), 100 (2.9), 87 (87.2), 86 (3.2), 74 (37.9).

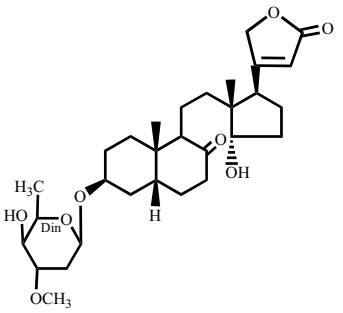
Biological Activity : Maquiroside exhibited activity against the KB cell culture system with an ED_{50}=0.013 μg/ml.

Reference

1. J.M. Rovinski, G.L. Tewalt and A.T. Sneden, *J. Nat. Prod.*, **50**, 211 (1987).

NERIASIDE

Neriagenin 3-O-β-D-diginopyranoside



Source : *Nerium odorum* Soland.(Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
$[\alpha]_D^{25}$: -17.6°
Registry No. : [68165-55-9]

UV (MeOH) : λ_{max} 217 nm.

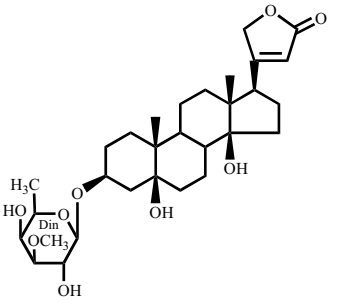
PMR : δ 0.76 (s, 3xH-18), 0.80 (s, 3xH-19), 1.34 (d, *J*=6.0 Hz, 3xH-6 of Din), 2.91 (dd, *J*=9.0, 9.0 Hz, H-17), 3.44 (s, OC*H*$_3$ of Din), 3.76 (d, *J*=3.0 Hz, H-4 of Din), 4.15-4.35 (2H), 4.58 (dd, *J*=4.0, 9.0 Hz, H-1 of Din), 4.82 (s, 2xH-21), 5.98 (s, H-22).

Reference

1. T. Yamauchi and F. Abe, *Tetrahedron Lett*., 1825 (1978).

NERIDIGINOSIDE

3β,5β,14β-Trihydroxy-card-20(22)-enolide 3-O-β-D-diginopyranoside



Source : *Nerium oleander* Linn. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 195.8-196.5°C
$[\alpha]_D^{26}$: +38.31° (c=0.522, $CHCl_3$)
Registry No. : [221380-14-9]

UV (MeOH) **:** λ_{max} 219 nm.

IR ($CHCl_3$) **:** 3450, 1780 and 1740 cm^{-1}.

PMR ($CDCl_3$, 500 MHz) **:** δ 1.00 (s, 3xH-18), 1.05 (s, 3xH-19), 1.10 (dddd, *J*=14.0, 3.0, 3.0, 3.0 Hz, H-11A), 1.32 (d, *J*=6.5 Hz, 3xH-6 of Din), 1.38 (m, H-7A), 1.38 (ddd, *J*=11.5, 11.0, 4.5 Hz, H-12A), 1.42 (m, H-1A), 1.48 (m, H-15A), 1.51 (m, H-2A), 1.51 (m, H-7B), 1.57 (ddd, *J*=11.5, 4.5, 3.0 H,z H-12B), 1.60 (dd, *J*=10.0, 5.0 Hz, H-4A), 1.61 (m, H-2B), 1.62 (ddd, *J*=14.5, 6.5, 3.0 Hz, H-15B), 1.68 (ddd, *J*=12.5, 12.0, 9.5 Hz, H-2A of Din), 1.70 (m, H-6A), 1.74 (m, H-16A), 1.76 (m, H-9), 1.79 (m, H-8), 1.82 (m, H-1B), 1.94 (ddd, *J*=12.5, 5.0, 2.0 Hz, H-2B of Din), 1.95 (m, H-6B), 2.10 (m, H-11B), 2.15 (dd, *J*=10.0, 4.5 Hz, H-4B), 2.15 (m, H-16B), 2.74 (dd, *J*=9.5, 6.0 Hz, H-17), 3.33 (ddd, *J*=12.0, 5.0, 3.5 Hz, H-3 of Din), 3.38 (s, OC*H*$_3$ of Din), 3.40 (dq, *J*=6.5, 3.5 Hz, H-5 of Din), 3.67 (br t, *J*=3.5 Hz, H-4 of Din), 4.05 (br s, *W*½=7.0 Hz, H-3), 4.44 (dd, *J*=9.5, 2.0 Hz, H-1 of Din), 4.80 (dd, *J*=18.0, 1.5 Hz, H-21A), 4.98 (dd, *J*=18.0, 1.5 Hz, H-21B), 5.85 (t, *J*=1.5 Hz, H-22).

CMR ($CDCl_3$, 125 MHz) **:** δ C-1) 26.89 (2) 27.01 (3) 72.20 (4) 35.03 (5) 74.50 (6) 32.04 (7) 17.60 (8) 36.94 (9) 35.54 (10) 35.19 (11) 22.47 (12) 40.38 (13) 50.42 (14) 85.90 (15) 29.86 (16) 27.38 (17) 51.84 (18) 18.42 (19) 25.36 (20) 174.30 (21) 73.37 (22) 117.90 (23) 174.20 **Din** (1) 97.80 (2) 31.71 (3) 78.03 (4) 67.19 (5) 70.40 (6) 16.80 (O*C*H$_3$) 55.73.

Mass (H.R.) **:** *m/z* 390.2410 [$C_{23}H_{34}O_5$], 373.2318 [$C_{23}H_{33}O_4$], [$C_{23}H_{31}O_3$], 337.2108 [$C_{23}H_{29}O_2$], 208.1161 [$C_{12}H_{16}O_3$], 181.0882 [$C_{10}H_{13}O_3$], 161.0850 [$C_7H_{13}O_4$], 145.0901 [$C_7H_{13}O_3$].

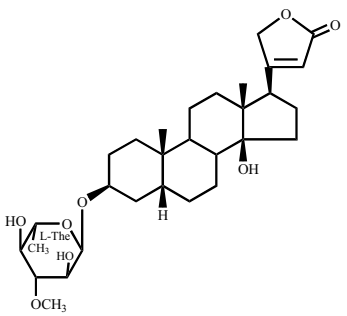
Biological Activity : The compound showed sedation in mice at 25 mg/kg dose.

Reference

1. S. Begum, B.S. Siddiqui, R. Sultana, A. Zia and A. Suria, *Phytochemistry*, **50**, 435 (1999).

NERIIFOLIN

Digitoxoigenin 3-O-α-L-thevetopyranoside



Source : *Thevetia neriifolia* Juss. ex Steud.[1], *T. peruviana* Pers. Schum.[2] (Apocynaceae), *T. thevetiodes*[3], *T. ahouai* (L.) A. DC.[4], *Cerbera odollam* Gaertn.[5] (Apocynaceae), *C. manghas* L.[6]
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 218-225°C[1]
$[\alpha]_D$: -50.2° (MeOH)[1]
Registry No. : [466-07-9]

PMR ($CDCl_3$, 60/250 MHz)[7] : δ 0.88 (s, 3xH-18), 0.97 (s, 3xH-19), 1.26 (d, *J*=6.3 Hz, 3xH-6 of The), 2.0-2.25 (m, 2xH-16), 2.78 (dd, *J*=8.8, 5.0 Hz, H-17), 3.15 (t, *J*=9.0 Hz, H-4 of The), 3.25 (t, *J*=8.9 Hz, H-3 of The), 3.58 (dd, *J*=8.9, 4.4 Hz, H-2 of The), 3.69 (s, O*CH*$_3$), 3.74 (dq, *J*=9.0, 6.3 Hz, H-5 of The), 3.97 (m, H-3), 4.82 (dd, *J*=18.0, 1.5 Hz, H-21A), 4.86 (d, *J*=4.4 Hz, H-1 of The), 4.98 (dd, *J*=18.0, 1.5 Hz, H-21B), 5.88 (t, *J*=1.5 Hz, H-22).

CMR ($CDCl_3$, 22.63 MHz)[7] : δ C-1) 30.6[a] (2) 26.5[a] (3) 73.3 (4) 30.0[a] (5) 36.9 (6) 26.5[a] (7) 21.2[b] (8) 41.8 (9) 35.9 (10) 35.3 (11) 21.4[b] (12) 40.0 (13) 50.3 (14) 85.5 (15) 33.2 (16) 26.9 (17) 50.9 (18) 15.8 (19) 23.9 (20) 174.6 (21) 73.4 (22) 117.8 (23) 174.6 **The** (1) 97.2 (2) 73.0 (3) 84.7 (4) 74.7 (5) 67.5 (6) 17.5 (O*C*H$_3$) 60.6.

Mass (E.I.)[9] : *m/z* 534 $[M]^+$, 516 $[M\text{-}H_2O]^+$, 502, 484, 459, 440, 430, 417, 403, 385, 375 [Agl+H], 353, 339, 323, 257, 246, 231, 229, 217, 213, 203, 165, 177, 163, 147, 145, 128, 121, 105, 87, 85, 74.

Mass (F.I.) : *m/z* 534 $[M]^+$, 516 $[M\text{-}H_2O]^+$, 375 [Agl+H], 373 $[Agl\text{-}H]^+$, 357, 339, 317, 299, 179, 169, 161, (sugar), 143.

2'-O-Acetate :

PMR (C_5D_5N, 400 MHz)[8] : δ 0.83 (s, 3xH-18)[a], 1.02 (s, H-19)[a], 1.61 (d, *J*=6.0 Hz, H-6 of The), 2.80 (dd, *J*=9.0, 6.0 Hz, H-17), 3.66 (t, *J*=9.0 Hz, H-4 of The), 3.84 (OC*H*$_3$ of The), 4.00 (t, *J*=9.0 Hz, H-3 of The), 4.08 (dd, *J*=4.0, 9.0 Hz, H-2 of The), 4.18 (br s, H-3α), 4.31 (m, H-5 of The), 5.03 (H-21A), 5.24 (d, *J*=4.0 Hz, H-5 of The), 5.31 (dd, *J*=18.0, 1.0 Hz, H-21B), 6.13 (br s, H-22).

CMR (C_5D_5N, 100 MHz)[8] : δ C-1) 30.3 (2) 26.9[a] (3) 73.7 (4) 31.0 (5) 36.8 (6) 27.1[a] (7) 21.5[b] (8) 41.9 (9) 35.8 (10) 35.5 (11 21.9[b] (12) 39.8 (13) 50.1 (14) 84.6 (15) 33.2 (16) 27.1[a] (17) 51.5 (18) 16.2 (19) 23.8 (20) 175.9 (21) 73.6 (22) 117.6 (23) 174.4 **The** (1) 98.9 (2) 73.4 (3) 85.4 (4) 76.6 (5) 68.9 (6) 18.5 (O*C*H$_3$) 60.5.

Biological Activity : Increase muscle tone and abolishes peristaltic motion of guinea pig ileum,[10] cardiotonic,[11] insecticidal,[3] cytotoxic,[3] strong inotropic activity.[12]

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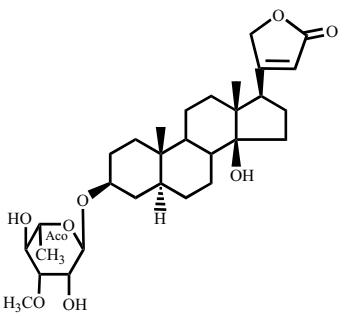
NERIIFOSIDE

3β,14β-Dihydroxy-5α-carda-20:22-enolide 3-O-α-L-acofrioside



Source : *Thevetia neriifolia* Juss. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 210-212°C
Registry No. : [145921-45-5]

UV (MeOH) : λ_{max} 217 nm.

IR ($CHCl_3$) : 3400, 2900-2850, 1780, 1740, 1600, 1120, 1020 cm^{-1}.

PMR ($CDCl_3$, 400 MHz) : δ 0.80 (s, 3xH-19), 0.87 (s, 3xH-18), 1.16 (m, H-5), 1.29 (d, *J*=6.21 Hz, H-6 of Aco), 1.36 (m, 3xH-12), 1.38 (m, H-2A), 1.39 (m, H-12B), 1.51 (m, H-11A), 1.52 (m, H-8), 1.55 (m, H-11B), 1.64 (m, 2xH-4), 1.70 (m, H-1A), 1.75 (m, H-1B), 1.77 (m, H-2B), 1.82 (m, 2xH-6), 2.05 (m, H-15A), 2.07 (m, H-15B), 2.12 (m, H-16A), 2.16 (m, H-16B), 2.16 (m, 2xH-7), 2.75 (dd, *J*=9.26, 5.58 Hz, H-17), 3.38 (dd, *J*=9.20, 3.19 Hz, H-3 of Aco), 3.46 (s, OC*H*$_3$), 3.46 (t, *J*=9.20 Hz, H-4 of Aco), 3.76 (dq, *J*=9.20, 6.21 Hz, H-5 of Aco), 3.96 (m, H-3), 3.98 (dd, *J*=3.19, 1.69 Hz, H-2 of Aco), 4.76 (dd, *J*=17.99, 1.17 Hz, H-21A), 4.96 (d, *J*=1.69 Hz, H-1 of Aco), 4.97 (dd, *J*=17.99, 1.82 Hz, H-21B), 5.85 (dd, *J*=1.82, 1.17 Hz, H-22).

CMR ($CDCl_3$, 75 MHz) : δ C-1) 37.3 (2) 29.1 (3) 71.9 (4) 33.9 (5) 44.3 (6) 28.6 (7) 26.9 (8) 41.8 (9) 49.9 (10) 36.0 (11) 21.2 (12) 40.0 (13) 49.5 (14) 85.5 (15) 33.2 (16) 27.4 (17) 51.0 (18) 15.8 (19) 12.2 (20) 174.2 (21) 73.4 (22) 117.8 (23) 174.2 **Aco** (1) 97.5 (2) 67.6 (3) 81.4 (4) 72.0 (5) 67.7 (6) 17.6 (O*C*H$_3$) 57.0.

Mass (HRMS) : *m/z* 374.2429 ($C_{23}H_{34}O_4$, Agl), 356.2366 ($C_{23}H_{32}O_3$), 338.2291 ($C_{23}H_{30}O_2$), 257.1950 ($C_{18}H_{25}O$), 181.0917 ($C_{10}H_{13}O_3$), 109.0943 (C_8H_{13}), 84.9795 ($C_4H_4O_2$), 57.0507 (C_3H_5O), 55.0396 (C_3H_3O).

Reference

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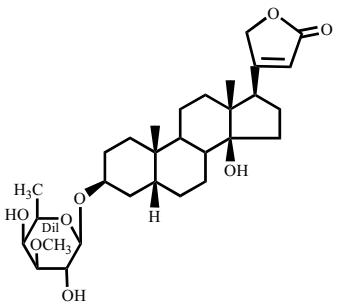
ODOROSIDE H

3-O-β-D-digitalopyranoside



Source : *Strophanthus gracilis* K. Sch. et Pax.[1], *S. vanderijstii* Staner.[2] (Apocynaceae), *Nerium odorum* Soland.[3] (Apocynaceae), *Nerium oleander* L.[4] (Apocynaceae), *Carissa ovata* R.Br. var. *stolonifera* F.M. Bailey[5], *C. lanceolata* R.Br.[5] (Apocynaceae), *Digitalis purpurea* L.[6] (Scrophulariaceae) *Mandevilla pentlandiana* (A.DC.)[7] (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 236-239°C[4]
$[\alpha]_D^{17}$: $+8 \pm 2^o$ (c=0.9972, MeOH)[5]
Registry No. : [18810-25-8]

UV (MeOH)[4] : λ_{max} 217 nm.

IR (KBr)[4] : 3400 (OH), 2885 (C–H, aliphatic), 1778, 1735 (α,β-unsaturated γ-lactone) and 1670 cm^{-1}.

CMR ($CDCl_3$, 25 MHz)[7] **:** δ C-1) 30.5 (2) 26.8[a] (3) 75.0 (4) 30.5 (5) 36.8 (6) 27.1[a] (7) 21.7[b] (8) 42.0 (9) 36.2 (10) 35.6 (11) 21.9[b] (12) 40.4 (13) 50.4 (14) 85.8 (15) 32.7 (16) 27.4 (17) 51.5 (18) 15.8 (19) 23.5 (20) 176.4[c] (21) 74.6 (22) 117.0 (23) 177.6[c] **Dil** (1) 102.5 (2) 70.8 (3) 84.0 (4) 68.1 (5) 70.6 (6) 16.3 (CH_3O) 56.6.

CMR (C_5D_5N, 22.63 MHz)[8] **:** δ **Dil** C-1) 103.6 (2) 70.9 (3) 85.1 (4) 68.7 (5) 71.0 (6) 17.4 (OCH_3) 57.2.

Mass (FD)[9] : *m/z* (rel.intens.) 535 [$(M+H)^+$, 100], 517 [$(M+H-H_2O)^+$, 41.7], 375 (Agl, 46.7), 357 (53.0), 161 (Dil, 50.0).

Mass (FAB, Positive ion)[9] : *m/z* (rel.intens.) 535 [$(M+H)^+$, 20], 517 [$(M+H-H_2O)^+$, 9.7], 375 (Agl, 34.0), 357 (39.6), 161 (Dil, 62.3), 129 (100).

Mass (FAB, Negative ion)[9] : *m/z* (rel.intens.) 533 [$(M-H)^-$, 77.6], 373 [$(Agl)^-$, 21.5], 355 [$(Agl-H_2O)^-$, 13.1].

Biological Activity : Causes sedation in mice at a dose of 25 mg/kg.[4]

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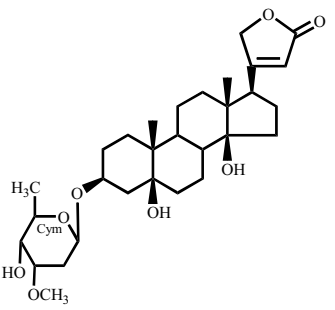
PERIPLOCYMARIN

Periplogenin 3-O-[β-D-cymaropyranoside]



Source : *Periploca graeca* L.[1] (Asclepiadaceae), *Strophanthus nicholsonii* Holm [2] (Apocynaceae), *S. hypoleucus* Stapf.[3], *S. eminii* Asch. et Pax.[4], *S. mirabilis* Gilg.[5], *S. preussi* Engl. et Pax.[6], *S. ledienii* Stein.[7], *S. hispidus* P. DC.[8], *S. kombe* Oliv.[9], *Pentopetia androsaemifolia* Decne[10] (Periplocaceae), *Castilla elastica* Cerv.[11] (Moraceae), *Periploca sepium* Bge.[12] (Asclepiadaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 138-145°C (methanol-ether)[2]; 210-212°C (acetone)
$[\alpha]_D^{16}$: 28.8 ± 2° (MeOH)[3]
Registry No. : [32476-67-8]

CMR (C_5D_5N, 100.6 MHz)[12] : δ C-1) 25.44 (2) 26.22 (3) 75.34 (4) 34.23 (5) 73.53 (6) 33.91 (7) 23.67 (8) 40.96 (9) 40.16 (10) 40.78 (11) 21.62 (12) 39.25 (13) 49.48 (14) 85.60 (15) 33.10 (16) 26.88 (17) 50.74 (18) 15.72 (19) 16.78 (20) 174.25 (21) 73.41 (22) 117.85 (23) 174.20 **Cym** (1) 96.49 (2) 34.69 (3) 77.30 (4) 72.36 (5) 71.00 (6) 18.23 (OCH_3) 57.38.
Mass (S.I.)[12] : *m/z* 535 $[M+H]^+$.

Biological Activity : Highly toxic, LD_{50} 0.154 mg/kg in cats.

Acetate : Constituent of *Strophanthus kombe* Oliv.[13] (Apocynaceae)

Mol. Formula : $C_{32}H_{48}O_9$; **Mol. Wt. :** 576; **M.P. :** 129-137°C[13]; **$[\alpha]_D^{13}$:** 46.1 ± 5° (c=0.477, $CHCl_3$)[13]

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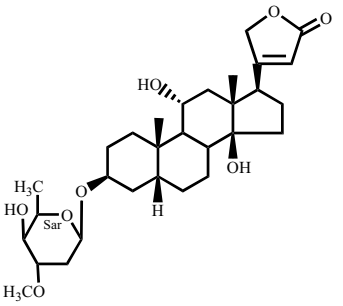
SARMENTOCYMARIN

Sarmentogenin 3-O-β-D-sarmentopyranoside



Source : Seeds of *Strophanthus sarmentosus* P.DC.[1], *S. hispidus* P.DC.[2], *S. gerrardi* Stapf.[3], *S. courmontii* Sacl.[4], *S. petersianus* Klotzsch, *S. grandifolorus* N.E.Br. Gilg., *Strophanthus* sp. var. *sarmentogenifera*[6], *S. vanderijstii* Staner.[7] (Apocynaceae), *Cryptolepis buchanani* Roem. et Schult.[8] (Asclepiadaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 129-132°C (dehydrate)[5], 206-208°C[5]
$[\alpha]_D^{25}$: -13.2° ± 1° (c=2.0387, MeOH)[5]
Registry No. : [98633-61-5]

UV (EtOH)[7] : λ_{max} 218 (log ε, 4.22) nm.

CMR (C_5D_5N, 22.63 MHz)[9] : δ **Sar** C-1) 97.3 (2) 33.6 (3) 80.3 (4) 67.9 (5) 69.9 (6) 17.5 (OCH_3) 56.7.

Biological Activity : Toxic, LD_{50} 0.202 mg/kg in cats.[9]

References

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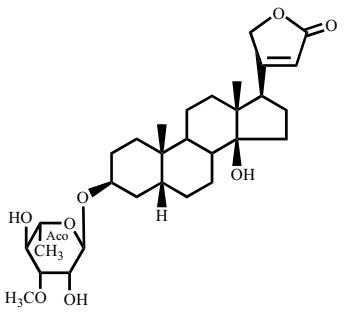
SOLANOSIDE, 3'-O-METHYLEVOMONOSIDE

Digitoxigenin 3-O-α-L-acofrioside



Source : *Vallaris solanacea* (Roth) O.K. (Apocynaceae)[1,2], *Cerbera odollam* Gaertn.[3], *C. manghas* L.[3], *Thevetia ahouai* (L.) A. DC. (Apocynaceae)[4], *Thevetia neriifolia* Juss (Apocynaceae)[5]
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 203-204°C[4]
$[\alpha]_D^{25}$: -20.6° (MeOH)[4]
Registry No. : [4356-33-6]

IR (KBr)[4] : 3600, 3460, 3005, 1788, 1742, 1620, 1442, 1376, 1096, 1040, 975, 915, 890, and 780 cm^{-1}.

PMR ($CDCl_3$, 60/250 MHz)[4] : δ 0.88 (s, 3xH-18), 0.94 (s, 3xH-19), 1.29 (d, *J*=6.3 Hz, 3xH-6 of Aco), 2.0-2.25 (m, 2xH-16), 2.28 (dd, *J*=9.0, 5.3 Hz, H-17), 3.42 (dd, *J*=9.2, 3.1 Hz, H-3 of Aco), 3.50 (s, OC*H*$_3$), 3.50 (t, *J*=9.1 Hz, H-4), 3.73 (dq, *J*=9.0, 6.3 Hz, H-5 of Aco), 3.97 (m, H-3), 4.02 (dd, *J*=3.1, 1.7 Hz, H-2 of Aco), 4.82 (dd, *J*=18.0, 1.5 Hz, H-21A), 4.92 (d, *J*=1.7 Hz, H-1 of Aco), 4.99 (dd, *J*=18.0, 1.5 Hz, H-21B), 5.88 (t, *J*=1.5 Hz, H-22).

CMR ($CDCl_3$, 22.63 MHz)[4] : δ C-1) 30.4[a] (2) 26.5[a] (3) 71.7 (4) 29.4[a] (5) 36.5 (6) 26.6 (7) 21.2[b] (8) 41.8 (9) 35.7 (10) 35.2 (11) 21.4[b] (12) 40.0 (13) 50.3 (14) 85.5 (15) 33.1 (16) 26.9 (17) 50.9 (18) 15.8 (19) 23.8 (20) 174.6 (21) 73.5 (22) 117.7 (23) 174.6 **Aco** (1) 97.3 (2) 67.4 (3) 81.4 (4) 71.7 (5) 67.7 (6) 17.6 (OC*H*$_3$) 57.0

Mass (E.I.)[4] : *m/z* (rel. intens.) 534 (M^+, 0.2), 403 (9.8) 385 (2), 375 (10.5), 357 [(m-sugar-H)$^+$, 89.4], 356 (48.4), 339 [(357-H)$^+$, 96.4], 246 [(357-$C_6H_7O_2$)$^+$, 56.8], 231 (11.3), 203 [(246-CH_3-CO)$^+$, 96], 181 (22.9), 177 (22.8), 161 [(M-H-

Aglycone) (30.5)], 149 (16.3), 147 (22.8), 135 (18), 129 (24), 121 (25.8) 111 (25.3), 109 (30.4), 107 (32.5), 105 (25.4), 95 (48) , 85 (52.9), 74 [(100) $CH_3OCH{=}CHOH$].

Biological Activity : Toxic, lethal dose cats 0.175 ± 0.009 mg/kg.[1] Cytotoxic against human epidermoid carcinoma of nasopharynx (KB) test system.[4]

Mono-O-Acetate : Position of acetyl group not certain.

Source : *Vallaris solanaceae* Roth. O.K. (Apocynaceae)[1]; **Mol. Formula :** $C_{32}H_{48}O_9$; **Mol. Wt. :** 576; **M.P. :** 135-141°C; **$[\alpha]_D^{24}$:** -15.1±2° (c=1.03, MeOH)

IR (KBr) : 3460 (br), 2932, 2881, 1779, 1754, 1736, 1623, 1443, 1373, 1237 cm^{-1}.

Biological Activity : Toxic, lethal dose for cats 0.317 ± 0.012 mg/kg.[1]

References

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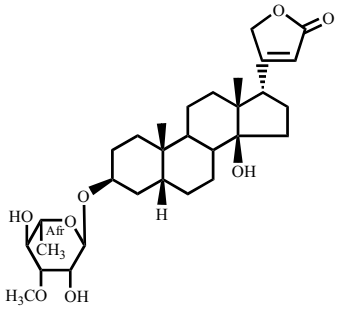
17α-SOLANOSIDE

17α-Digitoxigenin 3-O-α-L-acofrioside



Source : *Cerbera odollam* Gaertn., *C. manghas* L. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 247-248°C
$[\alpha]_D^{27}$: -30.4° (c=0.14, MeOH)
Registry No. : [111613-31-1]

PMR (C_5D_5N, 400 MHz) : δ 0.93 (s, 3xH-18)[a], 1.20 (s, 3xH-19)[a], 1.66 (d, *J*=6.0 Hz, 3xH-6 of Afr), 3.43 (t, *J*=9.0 Hz, H-17), 3.55 (OC*H*$_3$ of Afr), 3.95 (dd, *J*=3.0, 9.0 Hz, H-3 of Afr), 4.21 (br s, H-3α), 4.29 (m, H-5 of Afr), 4.30 (t, *J*=9.0

Hz, H-4 of Afr), 4.57 (dd, *J*=2.0, 3.0 Hz, H-2 of Afr), 4.82 (H-21A), 4.95 (dd, *J*=18.0, 2.0 Hz, H-21B), 5.42 (d, *J*=2.0 Hz, H-1 of Afr), 6.13 (br s, H-22).

CMR (C_5D_5N, 100 MHz)) : δ C-1) 30.2 (2) 27.2[a] (3) 72.4 (4) 31.0 (5) 37.2 (6) 26.9[a] (7) 21.6 (8) 41.7 (9) 36.0 (10) 35.5 (11) 20.7 (12) 31.7 (13) 49.4 (14) 85.2 (15) 31.0 (16) 24.9 (17) 48.9 (18) 18.6 (19) 24.0 (20) 172.8 (21) 74.1 (22) 116.6 (23) 174.1 **Afr** (1) 99.7 (2) 70.0 (3) 82.8 (4) 72.3 (5) 68.8 (6) 18.6 (OCH_3) 57.0.

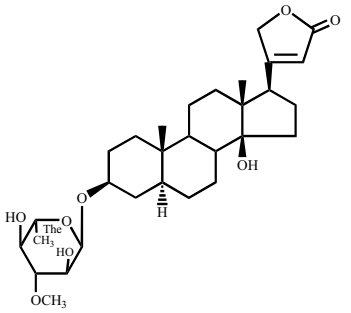
Mass (FAB) : *m/z* 557.310 [$(M+Na)^+$, calcd. 557.309].

Reference

1. T. Yamauchi, F. Abe and A.S.C. Wan, *Chem. Pharm. Bull*., **35**, 2744 (1987).

THEVOFOLINE

Uzarigenin3-O-α-L-thevatoside

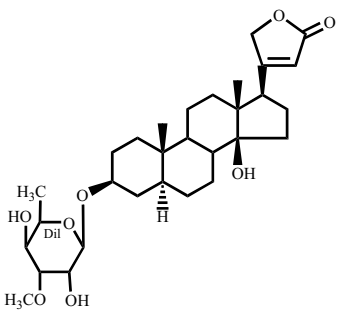


Source : *Thevtia peruviana* (Pers.) K. Schum. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 260°C
$[\alpha]_D^{22}$: -66.0° (MeOH)
Registry No. : [34302-25-5]

Reference

1. M. Frerejacque and M. Durgeat, *Compte rend. Acad. Sci., Ser. D*, **272,** 2620 (1971).

UZARIGENIN 3-O-β-D-DIGITALOPYRANOSIDE



Source : *Nerium odorum* Sol. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 239-240°C[1]
$[\alpha]_D$: +4.2° (MeOH)[1]
Registry No. : [61217-80-9]

UV (MeOH)[1] : λ_{max} 218 (ε 15900) nm.

Mass (F.D.)[2] : *m/z* (rel.intens.) 535 [$(M+H)^+$, 100], 517 [$(M+H-H_2O)^+$, 17.5], 375 [$(Agl+H)^+$, 40.4], 357 (57.9), 161 (63.2).

Mass (FAB, Positive ion)[2] : *m/z* (rel.intens.) 535 [$(M+H)^+$, 59.5], 517 [$(M+H-H_2O)^+$, 4.8], 375 (31.0), 357 (42.9), 161 (88.1), 129 (100).

Mass (FAB, Negative ion)[2] : *m/z* 355 [$(M-H)^-$, 13.1].

Diacetate :

M.P. : 262-264°C[1]; **$[\alpha]_D$:** +66.7° (c=0.12)[1].

PMR ($CDCl_3$)[1] : δ 4.48 (d, *J*=8.0 Hz, H-1 of Dil), 5.01 (dd, *J*=8.0, 10.0 Hz, H-2 of Dil), 5.32 (dd, *J*=1.4 Hz, H-4 of Dil), 5.89 (H-22).

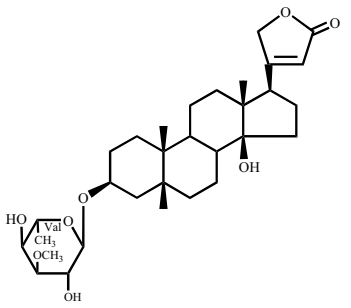
References

1. T. Yamauchi, M. Takahashi and F. Abe, *Phytochemistry*, **15**, 1275 (1976).

2. R. Isobe, T. Komori, F. Abe and T. Yamauchi, *Biomed. Envirom. Mass Spectrom*., **13**, 585 (1986).

VALLAROSIDE

Digitoxoigenin 3-O-α-L-vallaropyranoside



Source : *Vallaris solanacea* (Roth.) O.K.[1,2] (Aspocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 122-124°C[1]
$[\alpha]_D^{24}$: -46.5±2° (c=0.91, MeOH)[1]
Registry No. : [4477-75-2]

IR (KBr)[1] : 3448 (br), 2932, 1779, 1742, 1628, 1628, 1449, 1377, 1344, 1287, 1256, 1190, 1158, 1051 cm^{-1}.

Biological Activity : Lethal dose for cats 0.1707±0.0068 mg/kg.[1]

Acetate : Monoacetylvallaroside

Source : *Vallaris solanacea* (Roth.) O.K (Apocynaceae), **Mol. Formula :** $C_{32}H_{48}O_9$, **Mol. Wt. :** 576, **M.P. :** 196-199°C[1]; **$[\alpha]_D^{27}$:** -38.2° (c=1.0, MeOH)[1]

Position of acetyl group not certain.

IR (KBr)[1] : 3460 (br), 2924, 2881, 1776, 1739, 1618, 1445, 1368, 1230 cm^{-1}.

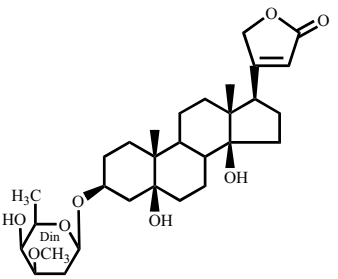
Biological Activity : Lethal dose for cats 0.3138±0.0230 mg/kg.[1]

References

1. H. Kaufmann, W. Wehrli and T. Reichstein, *Helv. Chim. Acta*, **48**, 65 (1965).
2. H. Kaufmann, *Helv. Chim. Acta*, **48**, 83 (1965).
3. K.K. Chen, *J. Med. Chem.*, **13**, 1029 (1970).

VANDEROSIDE

Periplogenin 3-O-β-D-diginopyranoside



Source : *Strophanthus vanderijstii* Staner. (Apocynaceae)
Mol. Formula : $C_{30}H_{46}O_8$
Mol. Wt. : 534
M.P. : 217-222°C
$[\alpha]_D^{27}$: +7.8 ± 2.0° (c=1.32, $CHCl_3$)

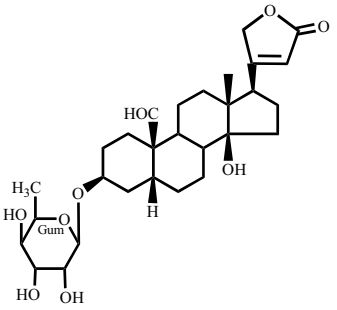
UV (EtOH) : λ_{max} 218 (log ε, 4.25) nm.

Reference

1. H. Lichti, C. Tamm and T. Reichstein, *Helv. Chim. Acta*, **39**, 1933 (1956).

CHEIRANT(H)OSIDE

Cannogenin 3-O-[6-deoxy-β-D-gulopyranoside]



Source : *Cheiranthus allioni* Hort. (Syn. *Erysimum asperum*, Brassicaceae)
Mol. Formula : $C_{29}H_{42}O_9$
Mol. Wt. : 534
M.P. : 154-156°C
$[\alpha]_D^{22}$: -41.3±3° (c=1.12, MeOH)
Registry No. : [29781-78-0]

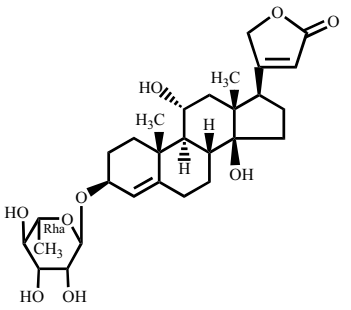
UV (EtOH) : λ_{max} 217 (log ε, 4.19), 296 (log ε, 1.73) nm.

Reference

1. I.F. Makarevich, *Khim. Prir. Soedin.*, **6**, 331 (1970); *Chem. Nat. Comp*., **6**, 331 (1970).

CHEIRANTHUS ALLIONI SAPONIN Ch-30

3β,11α,14-Trihydroxy-4,20(22)-dienolide 3-O-[α-L-rhamnopyranoside]



Source : *Cheiranthus allioni* Hort. (Brassicaceae)
Mol. Formula : $C_{29}H_{42}O_9$
Mol. Wt. : 534
M.P. : 268-275°C
$[\alpha]_D^{20}$: -38.2±3° ($CHCl_3$, MeOH)
Registry No. : [109138-53-6]

IR : 1630, 1620, 810 cm^{-1}.

Mass (FAB) : *m/z* 388, 370 $[M-H_2O]^+$, 352 $[M-2H_2O]^+$, 334 $[M-3H_2O]^+$, 319 $[M-3H_2O-CH_2]^+$, 217, 201, 199, 179, 173, 145, 91, 67, 55.

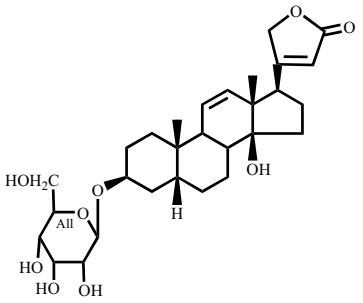
Biological Activity : Toxic, lethal dose 0.25 mg/kg in cats.

Reference

1. I.F. Makarevich, A.I. Pavlii and S.I. Makarevich, *Khim. Prir. Soedin.*, 119 (1987); *Chem. Nat. Comp*., **23**, 101 (1987).

CHRYSOLINA POLITA SAPONIN 3

Δ^{11}-Digitoxigenin 3-O-β-allopyranoside



Source : *Chrysolina polita* (Chrysomelidae)
Mol. Formula : $C_{29}H_{42}O_9$
Mol. Wt. : 534
Registry No. : [115569-99-8]

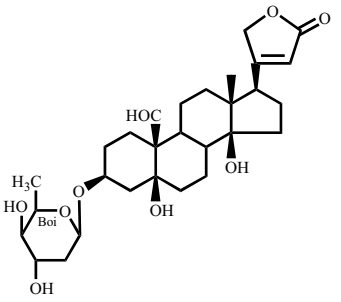
PMR (CD_3OD, 250 MHz) : δ 0.90 (s, 3xH-18), 0.90 (s, 3xH-19), 2.34 (br d, *J*=11.0 Hz, H-9), 2.91 (dd, *J*=6.0, 6.0 Hz, H-17), 3.49 (dd, *J*=9.5, 3.0 Hz, H-4 of All), 3.6-3.8 (H-5 and 2xH-6 of All), 4.05 (dd, *J*=3.0, 3.0 Hz, H-3 of All), 4.07 (br s, H-3), 4.70 (d, *J*=8.0 Hz, H-1 of All), 4.98 (*J*=18.0, 2.0, 2.0 Hz, 2xH-21), 5.48 (br s, H-11, H-12), 5.96 (br s, H-22).

Reference

1. S.V. Oycke, T. Randoux, J.C. Braekman, D. Daloze and J.M. Pasteels, *Bull. Soc. Chim. Belg.*, **97**, 297 (1988).

CORCHOROSIDE A

Strophanthidin 3-O-[β-D-boivinopyranoside]



Source : *Corchorus capsularis* L.[1] (Tiliaceae), *C. olitorius* L.[2] (Tiliaceae), *Erysimum perofskianum* Fisch. et. Mey.[3] (Cruciferae), *Castilla elastica* Cerv.[4] (Moraceae) etc.
Mol. Formula : $C_{29}H_{42}O_9$
Mol. Wt. : 534
M.P. : 163-168°C[5]
$[\alpha]_D$: 9.9°±2° (c=1.2, MeOH)[1]
Registry No. : [508-76-9]

UV (EtOH)[3] : λ_{max} 216 (log ε, 4.18), 300 (log ε, 1.34) nm.

CD (MeOH, rel.intens.)[2] : 245.5 nm (+13.0), 306 (-1.4).

PMR (CD_3OD, 600 MHz)[2] : δ 0.84 (s, 3xH-18), 1.22 (d, *J*=6.5 Hz, 3xH-6 of Boi), 2.82 (m, H-17), 3.21 (m, H-4 of Boi), 3.94 (m, H-5 of Boi), 3.96 (m, H-3 of Boi), 4.17 (m, H-3), 4.87 (dd, *J*=2.0, 10.0 Hz, H-1 of Boi), 4.90, 5.02 (each 1H, dd, *J*=2.0, 18.5 Hz, 2xH-21), 5.89 (s, H-22), 10.04 (H-19).

CMR (CD_3OD, 150 MHz)[2] : δ C-1) 25.1 (2) 25.9 (3) 76.0 (4) 36.8 (5) 75.30[a] (6) 37.1 (7) 23.2 (8) 42.5 (9) 40.4 (10) 56.1 (11) 18.9 (12) 40.5 (13) 50.7 (14) 85.9 (15) 32.4 (16) 27.9 (17) 51.7 (18) 16.1 (19) 210.1 (20) 178.1 (21) 75.27[a] (22) 117.8 (23) 177.2 **Boi** (1) 99.0 (2) 34.7 (3) 70.29[b] (4) 70.9 (5) 70.35[b] (6) 16.9.

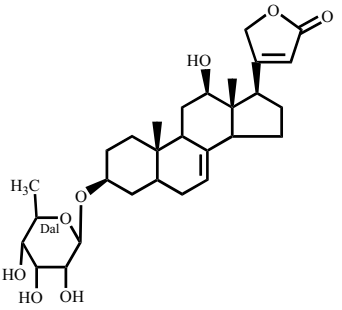
Mass (FAB, Negative ion)[2] : *m/z* 533 $[M-H]^-$, 403 $[Agl-H]^-$.

Biological Activity : Mean lethal dose in cats : 0.0768±0.053 mg/kg.[3]

References

1. M. Frerejacque and M. Durgeat, *Compt. Rend.*, **238**, 507 (1954).
2. T. Nakamura, Y. Goda, S. Sakai, K. Kondo, H. Akiyama and M. Toyoda, *Phytochemistry*, **49**, 2097 (1998).
3. Z. Kowalewski, H. Jäger, O. Schindler and T. Reichstein, *Helv. Chim. Acta*, **43**, 957 (1960).
4. P. Brauchli, O. Schindler and T. Reichstein, *Helv. Chim. Acta*, **44**, 904 (1961).
5. W. Kreis, C. Tamm and T. Reichstein, *Helv. Chim. Acta*, **40**, 593 (1957).

7,8-DIDEHYDROSYRIOGENIN 3-O-[6-DEOXY-β-D-ALLOPYRANOSIDE]



Source : *Asclepias syriaca* L. (Asclepiadaceae)
Mol. Formula : $C_{29}H_{42}O_9$
Mol. Wt. : 534
$[\alpha]_D^{22}$: -54.6° (c=1.16, MeOH)
Registry No. : [676353-37-0]