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CHEMICAL CONSTITUENTS FROM THE RHIZOMES OF *SANSEVIERIA ROXBURGHIANA* SCHULT. & SCHULT. F.

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ABSTRACT

Sansevieria roxburghiana Schult. & Schult. f. (family Asparagaceae), distributed in the Eastern coastal region of India, Sri Lanka, Indonesia, Bangladesh, tropical Africa and Myanmar, is a stemless evergreen, up to 1 m tall, perennial herb. Its rhizomes are used to treat colds, cough, ear pain, diabetes, inflammation, fever, asthma, wound, hypertension, oxidative stress and rheumatism. Our study was planned to isolate chemical constituents from a methanolic extract of the rhizomes of *S. roxburghiana* and to characterize their structures on the basis spectral data analysis. Phytochemical investigation of the rhizome methanolic extract led to isolate four fatty acid esters identified as dodecyl tetradecanoate (dodecanyl myristate, **1**) and pentadecanyl dodecanoate (pentadecanyl laurate, **2**), eicosa-9′-on -1′-olyl decanoate (9′-oxoarachinyl caprate, **3**), and nonadecanyl dodecanoate (nonadecanyl laurate, **4**), a long chain higher aliphatic constituent characterized as *n*-tritriacontane (**5**), a new lactone substituted hydroxyl acyl fatty acid ester formulated as 17′ β- hydroxyl-17′-(γ-lactone)-heptadecanyl palmitate (**6**) and an unknown lanostenyl lactone and its structure was established as lanast-5 -en-3 β-ol-21(24 β)-olide (**7**).

KEYWORDS: *Sansevieria roxburghiana*, rhizomes, phytoconstituents, isolation, characterization.

INTRODUCTION

Sansevieria roxburghiana Schult. & Schult.f., syn. *Acyntha roxburghiana* (Schult. & Schult.f.) Kuntze, *Cordyline roxburghiana* (Schult. & Schult.f.) Merr., *Sansevieria zeylanica* Roxb., (family Asparagaceae), known as Bowstring hemp, Marul, Murahri, Murva and Indian bow string hemp, is distributed in the Eastern coastal region of India, Sri Lanka, Indonesia, Bangladesh, tropical Africa and Myanmar.[1] It is a stemless evergreen perennial herb, up to 1 m tall, leaves succulent, erect, rigid, flat or concave or terete, fleshy, fibrous, often variegated, in a rosette borne on a rhizomatous subterraneous rootstock, inflorescence a terminal, erect, branched raceme, with bisexual, often fragrant flowers, fruit a 1-3 seeded berry. The whole plant is used as a cardiotonic, expectorant, febrifuge, purgative, tonic, in glandular enlargement and rheumatism.[2-4] The mucilaginous rhizomes are used in long-lasting chronic persistent coughs, for quick relief of a common cough and cold, in ear pain, and consumptive complaints.[4,5] The roots and rhizomes are used as the remedies for diabetes, inflammation, pains, fever, asthma, wound, hypertension, oxidative stress and rheumatism.[6] The rhizomes are used to cure ear pain.[7] The juice of tender shoots is administered to children for clearing viscid phlegm from throats. The roots are used as a febrifuge in snake bite and haemorrhoids.[4,5] A leaf paste is applied to treat itches.[8] The leaves are regarded as abortifacient, leaf juice is installed into the ear to prevent ear infection. The roots are inserted into the vagina to induce abortion.[9]

The plant showed the presence of alkaloids, carbohydrates, flavonoids, phenols, glycosides, proteins, anthocyanin and betacyanin, steroids, and saponins.[10] The rhizomes contained palmitic acid, isorhamnetin-3-O-b-D-glucopyranoside, gallic acid, 6,4-dihydroxy-3-propen chalcones, bis (2-ethylhexyl) phthalate, bupanidrine, caftaric acid, diisobutyl phthalate, and 4-propenoxy-7-hydroxy anthocyanins.[11] The plant contained cambodianol, lupeol and gallic acid.[12,13] The leaves possessed protocatechuic acid.[14] The presence of herbal chemical constituents vary due to many factors such as geographic regions, soils, seasonal changes, plant species and application of fertilizers. Keeping in views the various therapeutic values and variation aspects of chemical constituents of the plants and development of ecofriendly, biodegradable and safer herbal preparations, it has been aimed to establish chemical structures of phytoconstituents isolated from the rhizomes of *Sansevieria roxburghiana*.

MATERIALS AND METHODS

The protocols of all methodologies (procedures, experimental designs and spectral data analysis) were adopted from the earlier published work.[15-17]

General Procedures

Melting points were measured using one end open capillary tubes on a thermoelectrically heated melting point apparatus (Perfit, India) without correction. UV spectra were determined with Lambda Bio 20 spectrophotometer (Perkin Elmer, Schwerzenbach, Switzerland) in methanol. The IR spectra were obtained by using KBr pellets with Jasco FT/IR-5000 Spectrometer (FTS 135, Hong Kong). The ^{1}H (400 MHz) NMR spectra were recorded on Bruker DRX Spectrometer (Rheinstetten, 2 Germany) using $CDCl_3$ and DMSO-d_6 as solvents. TMS (Fluka analytical, Sigma-Aldrich, Netherland) was taken as an internal standard and the coupling constants (*J* values) are expressed in Hertz (Hz). Mass spectra were recorded by affecting electron impact ionization at 70 eV on a Jeol SX-102 mass spectrometer (Waters Corp., UK) instrument equipped with direct inlet prob system. The *m/*z values of the more intense peaks are mentioned and the figures in bracket attached to each *m/*z values indicated relative intensities with respect to the base peak. Column chromatography was performed on silica gel (Qualigens, Mumbai, India) with 60-120 mesh particle size. The purity of the isolated compounds was checked on precoated TLC plates with silica gel 60 F_{254} (0.25 mm, Merck, Mumbai, India). The spots were visualized by exposure to iodine vapours and under UV radiations at 254 and 366 nm and spraying with ceric sulphate solution.

Collection and Authentication of Plant Material

The rhizomes of *Sansevieria roxburghiana* were collected from Chennai, Tamil Nadu. The plant material was identified and authenticated by Prof. M. P. Sharma, Taxonomist, Department of Botany, Jamia Hamdard, New Delhi. A Voucher specimen of the plant material was preserved in the herbarium of the Department of Pharmacognosy and Phytochemistry, Jamia Hamdard, New Delhi.

Extraction and Isolation

The rhizomes of *Sansevieria roxburghiana* (1 kg each) were dried in air, coarsely powdered and extracted exhaustively with methanol in a Soxhlet apparatus. The extracts were concentrated under reduced pressure to get a dark brown mass, 121 g. The dried residue (100 g) was dissolved in minimum amount of methanol and adsorbed on silica gel column grade (60-120 mesh) to obtain a slurry. It was air-dried and chromatographed over a silica gel column loaded in petroleum ether (b. p. 60 – 80 °C). The column was eluted with petroleum ether, petroleum ether - chloroform (9:1, 3:1, 1:1, 1:3, *v/v*), chloroform and chloroform - methanol (99:1, 49:1 *v/v*). Various fractions were collected separately and matched by TLC to check homogeneity. Similar fractions having the same R_f values were combined and crystallized with solvents. The isolated compounds were recrystallized to get pure compounds.

Dodecanyl myristate(1)

Elution of the column with petroleum ether gave a colourless amorphous powder of **1**, yield 118 mg, recrystallized from chloroform-methanol (1:1), m. p. 22 - 23 °C; UV λmax (MeOH): 219 nm (log ε 4.8); IR υ_{max} (KBr): 2918, 2849, 1733, 1465, 1374, 1173, 1012, 724 cm^{-1}; ^{1}H NMR ($CDCl_3$): δ 4.11 (2H, m, H_2 -1′), 2.26 (2H, t, J = 7.2 Hz, H_2 -2), 1.58 (2H, m, H_2-3), 1.25 (40H, brs, 20 x CH_2), 0.94 (3H, t, J = 6.1 Hz, Me-14), 0.91 (3H, t, J = 6.2 Hz, Me-12′); EIMS *m/z* (rel.int.): 396 $[M]^+$ ($C_{26}H_{52}O_2$) (6.3), 211 (21.4), 185 (100).

Pentadecanyl laurate (2)

Further elution of the column with petroleum ether yielded a colourless amorphous powder of **2**, yield 149 mg, recrystallized from chloroform-methanol (1:1), m. p. 24-25 °C; UV λmax (MeOH): 214 nm (log ε 4.2); IR υ_{max} (KBr): 2919, 2851, 1736, 1463, 1375, 1174, 1015, 721 cm^{-1}; ^{1}H NMR ($CDCl_3$): δ 4.09 (2H, m, H_2 -1′), 2.27 (2H, t, J = 7.1 Hz, H_2 -2), 1.98 (2H, m, H_2-3), 1.36 (2H, m, H_2-2′), 1.25 (40H, brs, 20 x CH_2), 0.85 (3H, t, J = 6.1 Hz, Me-12), 0.82 (3H, t, J = 6.2 Hz, Me-15′); EIMS *m/z* (rel.int.): 410 $[M]^+$ ($C_{27}H_{54}O_2$) (7.4), 227 (6.1), 183 (14.2).

9′-Oxoarachinyl caprate (3)

Further elution of the column with petroleum ether produced a colourless amorphous powder of **3**, yield 103 mg, recrystallized from chloroform-methanol (1:1), m. p. 34-35 °C; UV λmax (MeOH): 219 nm (log ε 4.6); IR υ_{max} (KBr): 2921, 2850, 1725, 1710, 1465, 1172, 1012, 724 cm^{-1}; ^{1}H NMR ($CDCl_3$): δ 4.11 (2H, m, H_2 -1′), 2.25 (2H, m, H_2-8′), 2.21 (2H, m, H_2-10′), 2.12 (2H, t, J = 7.1 Hz, H_2 -2), 1.62 (4H, m, H_2-3, H_2-4), 1.36 (2H, m, H_2-2′), 1.25 (38H, brs, 19 x CH_2), 0.83 (3H, t, J = 6.1 Hz, Me-10), 0.80 (3H, t, J = 6.2 Hz, Me-20′); EIMS *m/z* (rel. int.): 466 $[M]^+$ ($C_{30}H_{58}O_3$) (6.7), 311 (78.9), 283 (31.3), 183 (100), 155 (82.5).

Nonadecanyl laurate (4)

Elution of the column with petroleum ether - chloroform (9 : 1) furnished a colourless amorphous powder of **4**, yield 210 mg, recrystallized from chloroform-methanol (1:1), m. p. 57 – 59 °C; UV λmax (MeOH): 218 nm (log ε 4.1); IR υ_{max} (KBr): 2918, 2849, 1738, 1466, 1169, 726 cm^{-1}; ^{1}H NMR ($CDCl_3$): δ 4.14 (2H, m, H_2 -1′), 2.27 (2H, t, J = 7.7 Hz, H_2 -2), 1.61 (2H, m, H_2-3), 1.54 (2H, m, H-2′), 1.32 (2H, m, H_2-4), 1.25 (46H, brs, 23 x CH_2), 0.85 (3H, t, J = 6.3 Hz, Me-12), 0.82 (3H, t, J = 6.2 Hz, Me-19′); EIMS *m/z* (rel. int.): 466 $[M]^+$ ($C_{31}H_{62}O_2$) (5.3), 283 (11.7), 199 (8.3), 183 (100), 155 (10.5), 141 (66.9).

n-Tritriacontane (5)

Elution of the column with petroleum ether – chloroform (3:1) afforded colourless crystals of **5**, recrystallized from benzene to obtain orthorhombic crystals, yield 211

mg, m. p. 70 – 72 ° C; UV λmax (MeOH): 210 nm (log ε 4.3); IR υmax (KBr): 2918, 2849, 1467, 1378, 724 cm^{-1}; ^1H NMR ($CDCl_3$): δ 1.55 (2H, m, H_2-16), 1.25 (60H, brs, 30 × CH_2), 0.88 (3H, t, J = 6.1 Hz, Me-1), 0.85 (3H, t, J = 6.2 Hz, Me-33); EIMS *m/z* (rel. int.): 464 $[M]^+$ ($C_{33}H_{68}$) (3.7).

17′ β- Hydroxyl-17′-(γ-lactone)-heptadecanyl palmitate (6)

Elution of the column with petroleum ether – chloroform (1:1, v/v) yielded a colourless mass of **6**, recrystallized from acetone-methanol (1:1, v/v), yield 131 mg, m. p. 74 - 76 ° C; UV λmax (MeOH): 211 nm (log ε 5.2); IR υ_{max} (KBr): 3430, 2921, 2852, 1765, 1726, 1461, 1375, 1246, 1042, 921, 732 cm^{-1}; ^1H NMR ($CDCl_3$): δ 4.11 (2H, m, H_2-20′), 4.03 (2H, m, H_2 -1′), 3.51 (1H, m, $w_{1/2}$ = 15.5 Hz, H -17′α), 2.35 (1H, m, $w_{1/2}$ = 6.5 Hz, H-18), 2.26 (2H, t, J = 7.1 Hz, H_2-2), 1.57 (2H, m, H_2 -19′), 1.37 (4H, m, H_2-3, H_2 -2′), 1.25 (44H, brs, 22 x CH_2), 1.07 (4H, m, H_2-12, H_2-13), 0.87 (3H, t, J = 6.3 Hz, Me-14); EIMS *m/z* (rel. int.): 566 $[M]^+$ ($C_{35}H_{66}O_5$) (12.6), 481 (13.6), 451 (6.7), 429 (18.6), 347 (73.5), 270 (31.7), 227 (53.8), 211 (69.5), 187 (22.1), 169 (43.2), 115 (7.8), 113 (58.3).

Lanast-5 -en-3 β-ol-21(24 β)-olide (7)

Elution of the column with chloroform gave colourless crystals of **7**, recrystallized from chloroform – methanol (1:1), yield 172 mg, m. p. 129 - 131 °C; UV λmax (MeOH): 217 nm (log ε 5.3); IR υ_{max} (KBr): 3431, 2924, 2852, 1723, 1641, 1461, 1378, 1273, 1054 cm^{-1}; ^1H NMR (DMSO-d_6): δ 5.23 (1H, dd, J = 5.6, 5.2 Hz, H-6), 4.12 (1H, m, $w_{1/2}$ = 12.5 Hz, H-24 β), 3.86 (J = 5.5, 8.5 Hz, H-3α), 2.63 (1H, dd, J = 5.5, 10.6 Hz, H_2-7a), 2.59 (1H, dd, J = 5.3, 11.5 Hz, H_2-7b), 2.33 (1H, m, H-20), 2.24 – 1.36 (20H, m, 8 x CH_2, 4H), 1.27 (3H, brs, Me-28), 1.08 (3H, brs, Me-19), 1.01 (3H, brs, Me-30), 0.93 (3H, d, J = 6.2 Hz, Me-26), 0.87 (3H, d, J = 6.1 Hz, Me-27), 0.83 (3H, brs, Me-29), 0.65 (3H, brs, Me-18); EI-MS *m/z* (rel. int.): 456 $[M]^+$ ($C_{30}H_{48}O_3$) (9.6), 356 (13.7), 315 (19.6), 313 (22.1), 304 (16.8), 297 (20.3), 220 (21.9), 202 (21.6), 195 (37.8), 192 (5.3), 174 (17.6), 157 (53.2), 148 (36.5), 134 (100), 99 (68.9).

RESULTS AND DECUSSION

Compounds **1** and **2** were known fatty acid esters identified as dodecyl tetradecanoate (dodecanyl myristate) and pentadecanyl dodecanoate (pentadecanyl laurate), respectively (Fig.1).

Compound **3** exhibited IR absorption bands for an ester group (1725 cm^{-1}), carbonyl function (1710 cm^{-1}) and long aliphatic chain (724 cm^{-1}). Its mass spectrum showed a molecular ion peak at *m/z* 466 $[M]^+$ consistent with a molecular formula of a fatty acid ester with carbonyl group, $C_{30}H_{58}O_3$. Two prominent ion peaks formed at *m/z* 183 [$C_{8'}$ - $C_{9'}$ fission, CO-$(CH_2)_{10}$-$CH_3]^+$ and 283 [M – 183, CH_3-$(CH_2)_8$-COO-$(CH_2)_8]^+$ suggested the presence of carbonyl group at C-9′ position. The ion peaks generating 155, 311 [C_1 - O fission, CH_3-$(CH_2)_8$-$CO]^+$ and 311 [M - 155, O-$(CH_2)_8$-CO-$(CH_2)_{10}$-$CH_3]^+$ indicated that capric acid was esterified with 9′-oxoarachinyl alcohol. The ^1H NMR spectrum of **3** exhibited three two-proton multiplets at δ 4.11, 2.25 and 2.21 assigned to oxymethylene H_2 -1′ and methylene H_2-8′ and H_2-10′ adjacent to the carbonyl carbon, respectively. A two-proton triplet at δ 2.12 (J = 7.1 Hz) was attributed to methylene H_2 -2 protons adjacent to the ester function. The remaining methylene protons appeared as multiplets at δ 1.62 (4H) and 1.36 (2H) and as a broad singlet at δ 1.25 (38H). Two three-proton triplets at δ 0.83 (J = 6.1 Hz) and 0.80 (J = 6.2 Hz) were ascribed to primary C-10 and C-20′ methyl protons, respectively. On the basis of this discussion the structure of **3** has been characterized as eicosa-9′-on -1′-olyl decanoate (9′-oxoarachinyl caprate), a new fatty acid ester (Fig. 1).

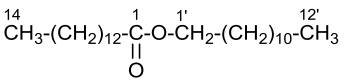
Compound **4** displayed IR absorption bands for an ester group (1738 cm^{-1}) and long aliphatic chain (726 cm^{-1}). Its mass spectrum exhibited a molecular ion peak at *m/z* 466 corresponding to a molecular formula of a fatty acid ester, $C_{31}H_{62}O_2$. The ion peaks generated at *m/z* 183 [C_1 - O fission, $CH_3(CH_2)_{10}$-$CO]^+$, 283 [M – 183, O-CH_2-$(CH_2)_{17}$-$CH_3]^+$ and 199 [$C_{1'}$ - O fission, $CH_3(CH_2)_{10}$-$COO]^+$ suggested that lauric acid was esterified with nonadecan-1-ol. The ^1H NMR spectrum of **4** showed a two-proton multiplet δ 4.14 and a two-proton triplet at δ 2.27 (J = 7.7 Hz) assigned correspondingly to oxymethylene H_2-1′ and methylene H_2 -2 protons adjacent to the ester function. The remaining methylene protons resonated as two-proton multiplets at δ 1.61, 1.54 and 1.32 and as a broad singlet at δ 1.25 (46H). Two three-proton triplets at δ 0.85 (J = 6.3 Hz) and 0.82 (J = 6.2 Hz) were ascribed to primary C-12 and C-19′ methyl protons, respectively. On the basis of the foregoing discussion the structure of **4** has been characterized as nonadecanyl dodecanoate (nonadecanyl laurate), a new fatty acid ester (Fig. 1).

Compound **5** was a long chain higher aliphatic constituent characterized as *n*-tritriacontane.[18,19]

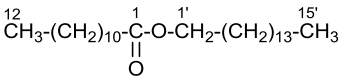
Compound **6** showed IR absorption bands for a hydroxyl function (3430 cm^{-1}), γ-lactone group (1765 cm^{-1}), ester group (1726 cm^{-1}) and long aliphatic chain (732 cm^{-1}). Its mass spectrum exhibited a molecular ion peak at *m/z* 566 related to the molecular formula of a lactone substituted hydroxyl acyl fatty acid ester, $C_{35}H_{66}O_5$. The important ion peaks generated at *m/z* 115 [$C_{16'}$ - $C_{17'}$ fission, $C_5H_7O_3]^+$, 481 [$C_{17'}$ - $C_{18'}$ fission, $C_{31}H_{61}O_3]^+$ and 451 [M – 115, $C_{30}H_{59}O_2]^+$ indicated that hydroxy group and γ-lactone ring were located at C-17′ terminal carbon position of the carbon chain. The ion peaks arising at *m/z* 227 [$C_{1'}$ - O fission, $C_{14}H_{27}O_2]^+$, and 211 [C_1 - O fission, $C_{14}H_{27}O]^+$, suggested that palmitic acid was esterified with lactone substituted heptadecane diol. The ^1H NMR spectrum of **6** displayed two two-proton multiplets at δ 4.11 and 4.03 assigned to oxymethylene H_2-20′ and H_2 -1′ protons, respectively. A one-proton multiplet at δ 3.51 with half-width of 15.5 Hz was ascribed to alpha-

oriented carbinol H -17′ proton. A one-proton multiplet at δ 2.35 with half-width of 6.5 Hz and a two-proton triplet at δ 2.26 (J = 7.1 Hz) were attributed correspondingly to beta-oriented methine proton nearby the lactonic carbonyl carbon and to methylene H_2 -2 protons adjacent to the ester function. The remaining methylene protons appeared as multiplets at δ 1.57 (2H), 1.37 (4H), and 1.07 (4H) and as a broad singlet at δ 1.25 (44H). A three-proton triplet at δ 0.87 (J = 6.3 Hz) was accounted to C-14 primary methyl protons. On the basis of these spectral data analysis, the structure of **6** has been elucidated as 17′ β- hydroxyl-17′-(γ-lactone)-heptadecanyl palmitate, a new lactone substituted hydroxyl acyl fatty acid ester (Fig. 1).

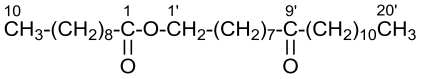
Compound **7** showed characteristics IR absorption bands for a hydroxyl group (3431 cm^{-1}), lactone group (1723 cm^{-1}) and unsaturation (1641 cm^{-1}). On the basis of mass spectrum, the molecular ion peak of **7** was determined at *m/z* 456 corresponding to the molecular formula of a tetracyclic triterpenic lactone, $C_{30}H_{48}O_3$. The ion fragments arising at *m/z* 99, 356 [$C_{4,5}$ – $C_{1,10}$ fission, $C_6H_{12}O$ and $C_{24}H_{36}O_2]^+$, 304 [$C_{6,7}$ – $C_{9,10}$ fission, $C_{20}H_{32}O_2]^+$, 134 [M – 304 - H_2O, $C_{10}H_{14}]^+$ and 148 [$C_{7,8}$ – $C_{9,10}$ fission, -H_2O, $C_{11}H_{16}]^+$ indicated the presence of the hydroxyl group in ring A placed on C-3 on biogenetic consideration, saturated nature of the ring A and existence of the vinylic linkage in ring B at C-5 position. The ion peaks formed at *m/z* 192 [$C_{8,14}$ -$C_{9,\ 11}$ fission, $C_{13}H_{20}O]^+$, 174 [192 – $H_2O]^+$, 220 [$C_{8,14}$ -$C_{12,\ 13}$ fission, $C_{15}H_{24}O]^+$, 202 [220 – $H_2O]^+$, 315 [C_{17} -C_{20} fission, $C_{22}H_{35}O]^+$, and 297 [315 – $H_2O]^+$, supported saturated nature of the rings C and D and the location of the lactone ring in the side chain. The ^{1}H NMR spectrum of **7** showed three one-proton signals as double doublets at δ 5.23 (J = 5.6, 5.2 Hz) and 3.86 (J = 5.5, 8.5 Hz) and as a multiplet at δ 4.12 with half-width of 12.5 Hz assigned to vinylic H-6, alpha-oriented carbinol H-3 and beta-oriented oxymethine H-24 protons, respectively. Five three-proton singlets at δ 1.27, 1.08, 1.01, 0.83 and 0.65 were attributed correspondingly to C-28, C-19, C-30, C-29 and C-18 tertiary methyl protons. Two three-proton doublets at δ 0.93 (J = 6.2 Hz, Me-26) and 0.87 (J = 6.1 Hz, Me-27) were ascribed to secondary C-26 and C-27 methyl protons, respectively. The remaining methine and methylene protons appeared between δ 2.63 – 1.40. The ^{1}H NMR spectral data of the triterpenic nucleus were compared with other lanostene –type molecules [17, 20]. On the basis of spectral data analysis, the structure of **7** has been characterized as lanast-5 -en-3 β-ol-21(24 β)-olide, a new lanostanyl lactone (Fig. 1).



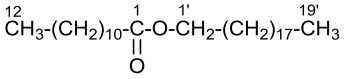
Dodecanyl myristate (1)



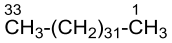
Pentadecanyl laurate (2)



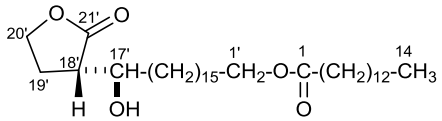
9-Oxo arachinyl caprate (3)



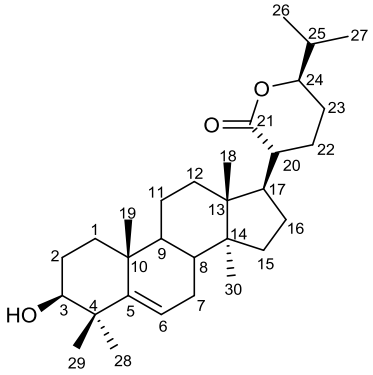
Nonadecanyl laurate (4)



Tritriacontane (5)



17′β-Hydroxy-17′-(γ-lactone)-heptadecanyl palmitate (6)



Lanost-5-en-3β-ol-21, 24β-olide (7)

Fig. 1: Chemical constituents 1 to 8 isolated from the rhizomes of *Sansevieria roxburghiana*.

CONCLUSION

Phytochemical investigation of the rhizome methanolic extract of *Sansevieria roxburghiana* led to isolate four fatty acid esters identified as dodecyl tetradecanoate (dodecanyl myristate, **1**) and pentadecanyl dodecanoate (pentadecanyl laurate, **2**), eicosa-9′-on -1′-olyl decanoate (9′-oxoarachinyl caprate, **3**), nonadecanyl dodecanoate (nonadecanyl laurate, **4**), a long chain higher aliphatic constituent characterized as *n*-tritriacontane (**5**), a new lactone substituted hydroxyl acyl fatty acid ester formulated as 17′ β- hydroxyl-17′-(γ-lactone)-heptadecanyl palmitate (**6**) and an unknown lanostenyl lactone and its structure was established as characterized as lanast-5 -en-3 β-ol-21(24 β)-olide (**7**). This work has enhanced understanding about the chemical constituents of the undertaken plants. Further research is recommended to screen bioactivities of the isolated phytoconstituents with a view for supplementing conventional drug development especially in developing countries.

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