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Research Article

New Steroidal Erythrityl Triesters from the Heat Processed Roots of *Panax ginseng*

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Two new compounds stigmasta-3α-ol-3α-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**1**) and stigmasta-5-en-3β-ol-3β-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**2**) along with β-sitosterol-β-D-glucoside were isolated and identified from the heat processed roots of *Panax ginseng*. The structures of the new compounds were elucidated by 1D and 2D NMR (COSY, HSQC, and HMBC) spectroscopic techniques aided by FAB-MS, ESI FT/MS, and IR spectra.

1. Introduction

Ginseng (*Panax ginseng* C. A. Meyer, Araliaceae) is one of the most important oriental medicinal plants in Japan, Korea and China [1]. Of the two kinds of ginseng, white ginseng is air dried, and red ginseng is produced by steaming raw ginseng at 98–100°C for 2-3 h. It has been reported that red ginseng is more effective in pharmacological activities than white ginseng [2–5]. The differences in biological activities and chemical constituents of red and white ginsengs have been reported. Anticancer properties and other pharmacological activities of *Panax ginseng* [6–8] have been studied and ginsenosides are recognized as active anticancer compounds [6]. Compared with Asian white ginseng, red ginseng has stronger anticancer activities [9, 10]. Recently, there was a report using a steaming process to treat American ginseng root [5]. In the study, however, the treatment temperature was 100°C and, thus, chemical constituents did not change significantly.

Anticarcinogenic and antidiabetic effects of *P. ginseng* have been reported [9, 11]. Several other compounds and biological activities have been reported from the ginseng roots of *P. ginseng* [12–14]. The most well-known chemical constituent of ginseng is ginsenosides, which are dammarane glycosides. Dammarane glycosides were reported from many parts of ginseng and heat processed *P. ginseng* roots [15, 16]. The chemical and morphological variations of *Panax notoginseng* and their relationship were recently described [17].

In continuation of our previous work [18, 19] on *P. ginseng* roots, two more new compounds were isolated as natural products. This paper deals with the isolation and structure elucidation of two new compounds, stigmasta-3α-ol-3α-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**1**) and stigmasta-5-en-3β-ol-3β-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**2**), on the basis of ^{1}H and ^{13}C NMR, spectroscopic studies, including 2D-NMR (COSY, HMBC, and HSQC), FAB-MS, ESI FT/MS, IR spectroscopy, and chemical reactions from the heat processed roots of *P. ginseng*. This is the first report of the isolated compounds (**1** and **2**) from the heat processed roots of *P. ginseng*. Due to the significance of ginseng roots of *P. ginseng* of this plant as a medicinal, the work in this area

has already been done. The aim of the present investigation is to report some of the new findings in the form of natural products from heat processed roots of *P. ginseng* (Korean red ginseng).

2. Materials and Methods

Optical rotation was measured with an instrument on an AA-10 model polarimeter (Instruments Ltd,. Seoul, Republic of Korea). IR spectra were recorded on an Infinity Gold FT-IR (Thermo Mattson, Waltham, MA, USA) spectrophotometer, which was available at Korea Institute of Science and Technology, Seoul, Republic of Korea. Both ^{1}H and ^{13}C-NMR spectra were obtained on a Bruker Avance 600 high-resolution spectrometer operating at 600 and 150 MHz, respectively. This NMR machine was available at Seoul National University (SNU), Seoul, Republic of Korea, and all NMR spectra were recorded at SNU (Instrument, Bruker, Germany). NMR spectra were obtained in deuterated chloroform using tetramethylsilane (TMS) as an internal standard, with chemical shifts expressed in ppm (δ) and coupling constants (J) in Hz. FAB/MS data were recorded on a JMS-700 (Jeol, Mitaka, Japan) spectrometer instrument which was available at SNU, Seoul, Republic of Korea. All chemicals used were of analytical grade. Hexane, ethyl acetate, chloroform, methanol, ethanol, water, sulphuric acid and vanillin were purchased from Daejung Chemicals and Metals Co. Ltd., Republic of Korea. Precoated TLC plates (layer thickness 0.25 mm), silica gel for column chromatography (70–230 mesh American Society Testing Materials), and LiChroprep RP-18 (40–63 μm) were from Merck (Darmstadt, Germany). Authentic standards of chemicals were purchased from Sigma-Aldrich, USA. Previously isolated authentic standards of β-sitosterol-β-D-glucoside were available.

2.1. Plant Material. Fresh ginseng (*P. ginseng*) was cultivated of ground dried roots ginseng (6 years old) in Ganghwado, Republic of Korea. A voucher specimen (No. PG-R-11) has been deposited at the Department of Applied Life Science, Konkuk University. Korean red ginseng was prepared by using nonpeeled fresh ginseng, which was steamed at 98°C for 2 h using an autoclave. The steamed ginseng after drying and powdered 297.8 g was prepared for extraction.

2.2. Extraction of Korean Red Ginseng Powder. The Korean red ginseng powder (297.8 g) was immersed in methanol (3 × 1 litre) for three days at room temperature and then the supernatant was concentrated under vacuum to yield 30.1 g of the extract, which was suspended in water and extracted with hexane, ethyl acetate, and n-butanol successively to produce 5 g, 8.9 g, and 14.2 g extract, respectively.

2.3. Isolation of the Compounds from Ethyl Acetate Extract. The entire ethyl acetate extract was subjected to normal phase column chromatography over silica gel (500 g) to yield 30 fractions (each of 500 mL) with the following eluants: fractions 1-2 with hexane, fractions 2–4 with hexane-chloroform (9 : 1), fractions 5-6 with hexane-chloroform (8 : 2), fractions 7-8 with hexane-chloroform (7 : 3), fractions 9-10 with hexane : chloroform (6 : 4), fractions 11-12 with hexane : chloroform (1 : 1), fractions 13-14 with hexane : chloroform (4 : 6), fractions 15-16 with hexane : chloroform (3 : 7), fractions 17-18 with hexane : chloroform (2 : 8), fractions 19-20 with hexane : chloroform (1 : 9), fractions 12–22 with chloroform, fractions 23-24 with chloroform : Methanol (9.8 : 0.2), fractions 25-26 with chloroform : Methanol (9.5 : 0.5), fractions 27-28 with chloroform : Methanol (9 : 1), and fractions 29-30 with $CHCl_3$: MeOH (8.5 : 1.5). All fractions were examined by TLC. Fractions 1–4 were not further separated due to the low amount of the substance. Fractions 25-26 (0.9 g) were crystallized after the purification by column chromatography, yielding β-sitosterol-β-D-glucoside (20 mg) whose identity was confirmed through the comparison of TLC and spectroscopic data with those of an authentic sample. Fractions 23-24 (1.4 g) were rechromatographed over LiChroprep RP-18 (ODS silica gel; 40–63 μm: 100 g; each fraction 100 mL). The elution was sequentially performed with methanol and water to yield 10 fractions fractions 1-2 with H_2O : MeOH (1 : 1), fractions 3-4 with H_2O : MeOH (2 : 8), fractions 5-6 with H_2O : MeOH (1 : 9), and fractions 7–10 with MeOH. Fraction 9 (1.1 g) after rechromatography over silica gel with chloroform and methanol in the ratio of (9.5 : 0.5 and 9 : 1) to yield two new compounds **1** (29 mg) and **2** (23 mg).

2.4. Stigmasta-3α-ol-3α-(2′R, 3′S)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**1**). Yellow viscous liquid; R_f 0.34 $CHCl_3$: MeOH; 9.5 : 0.5; $[\alpha]_D^{22}$: 23.7 (MeOH, c 0.2); IR (KBr): ν (cm^{-1}): 2924, 2854, 1740, 1733, 1721, 1645, 1458, 1376, 1165, 1073, 721; ^{1}H NMR (600 MHz, $CDCl_3$): δ_{ppm} 5.38 (1H, m, H-9″), 5.36 (1H, m, H-10″), 5.34 (1H, m, H-9‴), 5.32 (1H, m, H-10‴), 5.31 (1H, m, H-9⁗, H-10⁗), 5.30 (1H, m, H-12⁗), 5.28 (1H, m, H-13⁗), 5.07 (1H, m, H-2′), 4.98 (1H, d, J = 4.8 Hz, H_2-4′a), 4.30 (1H, d, J = 5.4 Hz, H_2-4′b), 4.13 (1H, m, H-3′), 4.05 (1H, br m, $W_{1/2}$ = 12.5 Hz, H-3β), 3.72 (1H, d, J = 5.2 Hz, H_2-1′a), 3.70 (1H, d, J = 6.6 Hz, H_2-1′b), 1.15 (3H, br s, Me-19), 0.93 (3H, d, J = 6.6 Hz, Me-21), 0.89 (3H, d, J = 6.5 Hz, Me-26), 0.87 (3H, d, J = 6.3 Hz, Me-27), 0.85 (3H, t, J = 7.8 Hz, Me-29), 0.84 (3H, t, J = 6.6 Hz, Me-18″), 0.82 (3H, t, J = 6.6 Hz, Me-18‴), 0.80 (3H, t, J = 6.3 Hz, Me-18⁗), 0.70 (3H, br s, Me-18); ^{13}C-NMR (150 MHz $CDCl_3$) see Table 1; FAB-MS (positive ion mode) (m/z, %): 1312 $[M+H]^+$ (1.1), ($C_{87}H_{155}O_7$), 415 (16.2), 398 (21.2), 282 (11.6), 280 (18.1), 263 (54.5); ESIFT/MS: m/z 1312.1776 $[M+H]^+$ (calcd. for $C_{87}H_{155}O_7$, 1312.1779).

2.5. Stigmasta-5-en-3β-ol-3β-(2′R,3′S)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**2**). Yellow semisolid; R_f 0.29 $CHCl_3$: MeOH; 9.5 : 0.5; $[\alpha]_D^{22}$: 33.1 (MeOH, c 0.2); IR (KBr) ν (cm^{-1}): 2958, 2830, 1745, 1732, 1650, 1460, 1378, 1239, 1053, 754; ^{1}H NMR (600 MHz, $CDCl_3$): δ 5.72 (1H, m, H-13⁗), 5.40 (1H, m, H-12⁗), 5.38 (1H, m, H-10⁗), 5.35 (1H, m, H-9⁗), 5.33 (1H, m, H-6), 5.30 (1H, m, H-9‴), 5.26 (1H, m, H-9″),

Table 1: ^{13}C NMR (150 MHz) spectral data of compounds **1** and **2**.

Position	δ_C (**1**)	δ_C (**2**)
1	39.0	37.2
2	31.4	31.5
3	70.8	71.7
4	42.3	40.4
5	50.9	140.7
6	17.4	121.6
7	31.9	31.8
8	34.0	36.1
9	51.1	50.1
10	35.9	36.4
11	22.5	22.6
12	39.7	39.7
13	45.7	45.8
14	56.4	56.7
15	24.8	24.2
16	27.1	28.2
17	55.8	56.0
18	11.9	11.9
19	20.8	21.0
20	41.4	42.2
21	19.7	19.7
22	33.5	33.9
23	25.5	27.1
24	46.7	45.3
25	29.3	29.1
26	18.6	18.9
27	18.6	18.7
28	23.0	23.0
29	11.8	11.8
1′	61.4	61.4
2′	72.0	71.1
3′	64.9	65.0
4′	62.0	62.0
1″	173.8	173.8
1‴	173.6	173.2
1⁗	173.3	171.8
9″	131.8	130.1
10″	128.0	129.9
9‴	130.1	129.6
10‴	127.8	129.2
9⁗	129.7	128.0
10⁗	127.0	127.0
12⁗	125.3	138.2
13⁗	123.6	123.6
18″	14.2	14.0
18‴	14.0	14.0
18⁗	14.0	13.6
CH_2 (ester units)	34.2, 34.1, 33.8, 33.7, 29.6–29.0, 27.9, 25.9, 22.6, 21.1, 21.0, 20.4.	35.6, 34.2, 34.1, 34.0, 31.4, 29.6–29.2, 28.8, 26.0–24.3, 22.5

5.14 (1H, m, H-10″), 5.08 (1H, m, H-10‴), 5.02 (1H, dd, J = 8.4, 9.0 Hz, H-2′), 4.30 (2H, m, H_2-1′), 4.96 (1H, m, H-3′), 4.06 (1H, d, J = 6.0 Hz, H_2-4′a), 3.72 (1H, d, J = 5.4 Hz, H_2-4′b), 3.51 (1H, br m, $W_{1/2}$ = 15.6 Hz, H-3α), 1.01 (3H, br s, Me-19), 0.92 (3H, d, J = 6.0 Hz, Me-21), 0.90 (3H, d, J = 6.3 Hz, Me-26), 0.88 (3H, d, J = 6.1 Hz, Me-27), 0.86 (3H, t, J = 6.5 Hz, Me-18″), 0.84 (3H, t, J = 6.2 Hz, Me-18‴), 0.82 (3H, t, J = 6.0 Hz, Me-18⁗), 0.80 (3H, d, J = 6.3 Hz, Me-29), 0.67 (3H, br s, Me-18); ^{13}C NMR (150 MHz $CDCl_3$) see Table 1; FAB-MS (positive ion mode) (m/z, %): 1310 $[M+H]^+$ (1.1), ($C_{87}H_{153}O_7$), (2.7), 413 (100), 398 (99.8), 395 (98.5), 381 (66.1), 282 (83.0), 280 (21.7), 271 (69.3), 255 (90.2), 213 (92.1); ESIFT/MS: m/z 1310.1619 $[M+H]^+$ (calcd. for $C_{87}H_{153}O_7$, 1310.1622).

2.6. Alkaline Hydrolysis. A solution of compounds **1** and **2** (10 mg each) in 5% dry KOH MeOH (2 mL) was heated under stirring separately at temperature (40–50°C) for 4 h. The reaction mixture was acidified to pH 7.0 and partitioned between MeOH and n-hexane. The n-hexane layer containing the fatty acids was confirmed on the basis of TLC. Each solution after separation of the fatty acids was evaporated to dryness and the residue was dissolved in chloroform to isolate steroids (β-sitosterol was compared by TLC). Each solid residue was identified as erythritol by HPLC, R_t 13 min [23].

3. Results and Discussion

Compound **1** showed IR absorption bands for ester functions (1740, 1733, 1721 cm^{-1}), unsaturation (1645 cm^{-1}), and long aliphatic chain (721 cm^{-1}). On the basis of FAB mass and ^{13}C NMR spectra, the molecular ion peak of **1** was determined at m/z 1311 $[M+H]^+$ consistent with the molecular formula of a steroidal erythrityl triester $C_{87}H_{155}O_7$. The ion peaks arising at m/z 415 [M – erythrityl unit]$^+$ and 398 [415 – OH]$^+$ suggested stigmastane unit in the molecule. The ion fragments generated at m/z 282 $[CH_3(C_{16}H_{30})COOH]^+$, 280 $[CH_3(C_{16}H_{28})COOH]^+$, and 263 [280 – OH]$^+$ indicated that oleic and linoleic acids were esterified with the erythritol unit.

The ^{1}H-NMR spectrum of **1** showed multiple signals from δ 5.38 to 5.28 assigned to eight vinylic protons, oxygenated methine protons of the steroid unit at δ 4.05 with half width of 12.5 Hz ascribed to H-3β, four one-proton doublets at δ 4.33 (J = 4.8 Hz), 4.30 (J = 5.4 Hz), δ 3.72 (J = 5.2 Hz), and 3.70 (J = 6.6 Hz), attributed to oxygenated methylene H_2-1′ and H_2-4′ protons, and two one-proton multiplets at δ 5.07 and 4.98 accounted to oxygenated methine H-2′ and H-3′ protons, respectively. Nine three-proton signals as broad signals at δ 1.15 and 0.70, as doublets at δ 0.93 (J = 6.6 Hz),

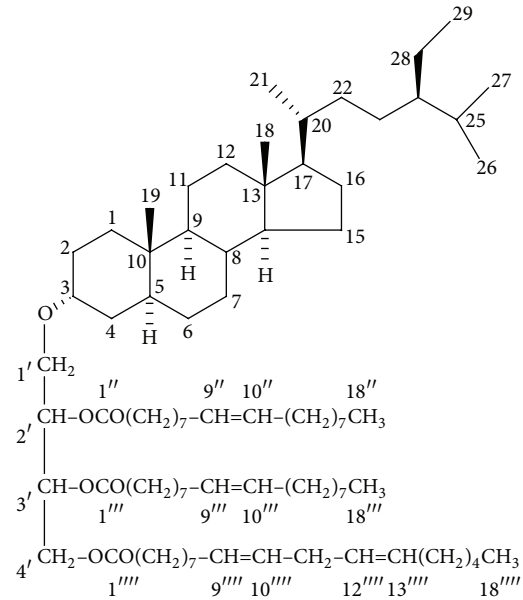
0.89 (J = 6.5 Hz), and δ 0.87 (J = 6.3 Hz), and as triplets between δ 0.85 and, 0.75 were associated with the tertiary C-19, and C-18, secondary C-21, C-26 and C-27, and primary C-29, C-18$''$, C-18$'''$, and C-18$''''$ methyl protons, respectively, all attached to saturated carbons.

The ^{13}C-NMR spectrum of **1** exhibited signals for ester carbons at δ 173.8 (C-1$''$), 173.6 (C-1$'''$), and 173.3 (C-1$''''$), vinylic carbons between δ 131.8 and 123.6, steroidal oxygenated methine carbon at δ 68.2 (C-3), erythritol carbons at δ 61.4 (C-1$'$), 72.0 (C-2$'$), 64.9 (C-3$'$), and 62.0 (C-4$'$), and methyl carbons from δ 20.8 to 11.8. The stereochemistry of the steroids at C-3 oxygenated methine proton was established by coupling interaction of the ^{1}H NMR spectral data and by comparison of the ^{1}H and ^{13}C NMR values of the steroidal carbon frameworks with the reported steroidal data [20–22]. The poliol was detected as erythritol by comparing retention time by HPLC [23].

The ^{1}H-^{1}H COSY spectrum of **1** showed correlations of H-3 with H$_2$-2 and H$_2$-4; H-2$'$ with H-1$'$ and H-3$'$; H-9$''$/H-9$'''$ with H-10$''$/H-10$'''$ and H$_2$-11$''''$ with H-9$''''$, H-10$''''$, H-12$''''$, and H-13$''''$. The HMBC spectrum of **1** that exhibited interactions of proton carbon relations is shown in Figure 3. The HSQC spectrum of **1** showed correlation of H-3 (δ 4.05), H$_2$-1$'$ (δ 3.70, 3.72), H-2$'$ (δ 5.07), H-3$'$ (δ 4.13), and H-4$'$ (δ 4.33, 4.30) with the respective oxygenated carbons C-3 (δ 68.2), C-1$'$ (δ 61.4), C-2$'$ (δ 72.0), C-3$'$ (δ 64.9), and C-4$'$ (δ 62.0) and vinyl and methyl protons with their corresponding carbon signals. The absence of a carbon signal between δ 110 and 90 supported the linkage of erythritol moiety to the steroid. Alkaline hydrolysis of **1** yielded 3-epistigmastanol oleic and linoleic acids (TLC comparable) and erythritol (HPLC comparable). On the basis of foregoing description, the structure of **1** was elucidated as stigmasta-3α-ol-3α-(2$'R$,3$'S$)-butane-1$'$,2$'$,3$'$,4$'$-tetraolyl-2$'$,3$'$-dioctadec-9$''$/9$'''$-enoyl-4$'$-octadec-9$''''$,12$''''$-dienoate (**1**, Figure 1). This is a new steroidal erythrityl trimester.

Compound **2** showed distinctive IR absorption bands for ester groups (1745, 1732 cm^{-1}), unsaturation (1650 cm^{-1}), and aliphatic chain (754 cm^{-1}). It had a molecular ion peak at m/z 1309 [M+H]$^+$ determined on the basis of FAB mass and ^{13}C NMR spectra consistent with the molecular formula steroidal erythritol triester, $C_{87}H_{153}O_7$. The ion peaks arising at m/z 413 [M − erythtrityl triester]$^+$, 398 [413 − Me]$^+$, 395 [413 − OH]$^+$, and 381 [398 − Me]$^+$ suggested that β-sitosterol was present as an aglyconic unit. It was also supported by the ion peaks generated at m/z 271 [413 − side chain]$^+$, 255 [271 − OH]$^+$, and 213 [255 − ring D]$^+$. The ion fragments produced at m/z 282 [CH$_3$(CH$_2$)$_7$ CH=CH(CH$_2$)$_7$COOH]$^+$ and 280 [CH$_3$(C$_{16}$H$_{28}$)COOH]$^+$ indicated that oleic and linoleic acids were esterified with erythritol unit.

The ^{1}H-NMR spectrum of **2** showed nine one-proton multiplets between δ 5.72 and 5.08 assigned to vinylic protons of the steroid and fatty acid units. A one-proton double doublet at δ 5.02 (J = 8.4, 9.0 Hz), a two-proton multiplet at δ 4.30, a one-proton multiplet at δ 4.96, and two one-proton doublets at δ 4.06 (J = 6.0 Hz) and 3.72 (J = 5.4 Hz) were ascribed to the erythritol protons H-2$'$, H$_2$-1$'$, H-3$'$, and H$_2$-4$'$, respectively. A one-proton broad multiplet at δ 3.51 with half width of 15.6 Hz was due to oxygenated H-3α methine proton. Nine three-proton signals as broad singlets at δ 1.01 and 0.67, as doublets at δ 0.92 (J = 6.0 Hz), 0.90 (J = 6.3 Hz), and 0.88 (J = 6.1 Hz), and as triplets at δ 0.86 (J = 6.5 Hz), 0.84 (J = 6.2 Hz), 0.82 (J = 6.0 Hz), and 0.80 (J = 6.3 Hz) were associated with the tertiary C-18 and C-19, secondary C-21, C-26, and C-27, and primary C-18$''$, C-18$'''$, C-18$''''$, and C-29 methyl protons, respectively, all attached to saturated carbons. The ^{13}C-NMR spectrum of **2** exhibited important signals for ester carbons at δ 173.8 (C-1$''$), 173.2 (C-1$'''$), and 171.8 (C-1$''''$), vinylic carbons between δ 140.7 and 123.6, oxygenated steroidal methine carbon at δ 71.7



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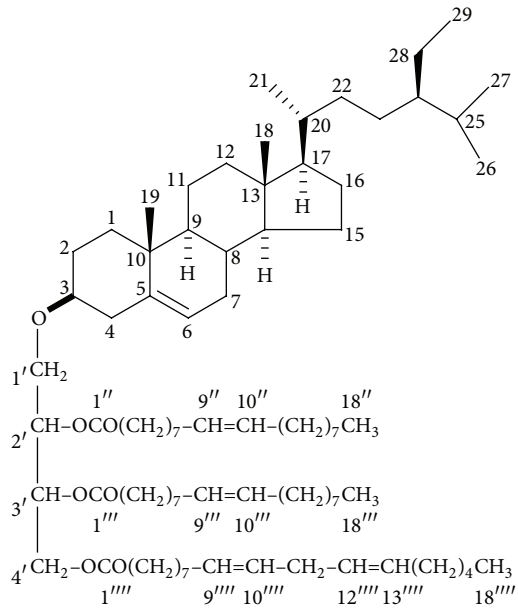

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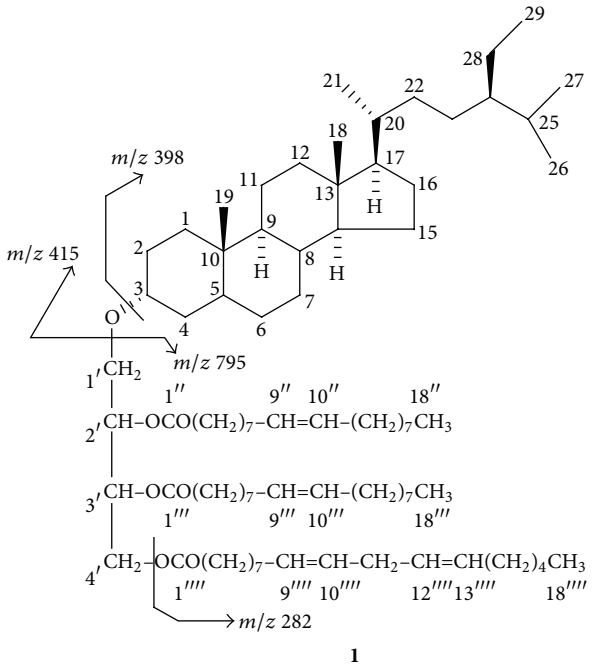
Figure 1: Chemical structures of compounds **1** and **2**.



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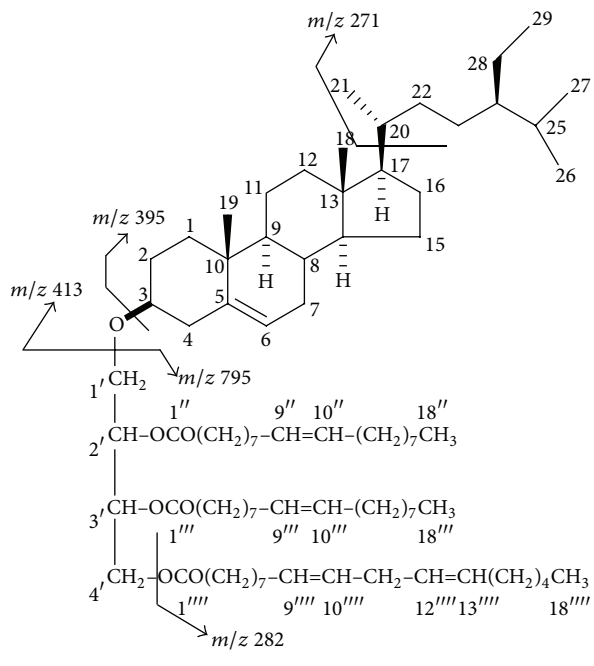
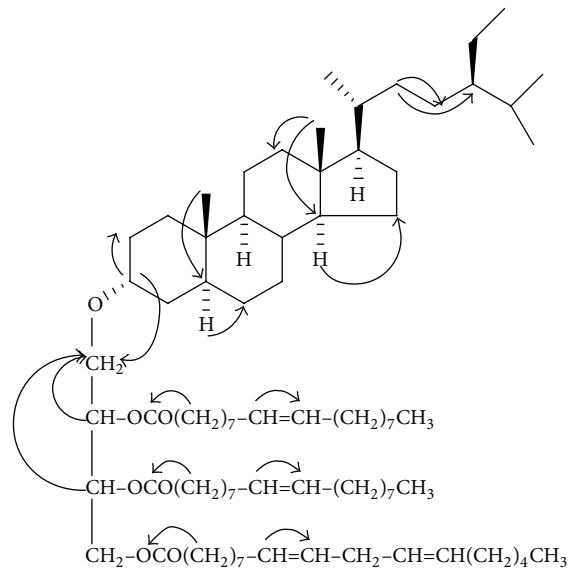


2

Figure 2: Mass fragmentation pattern of compounds **1** and **2**.



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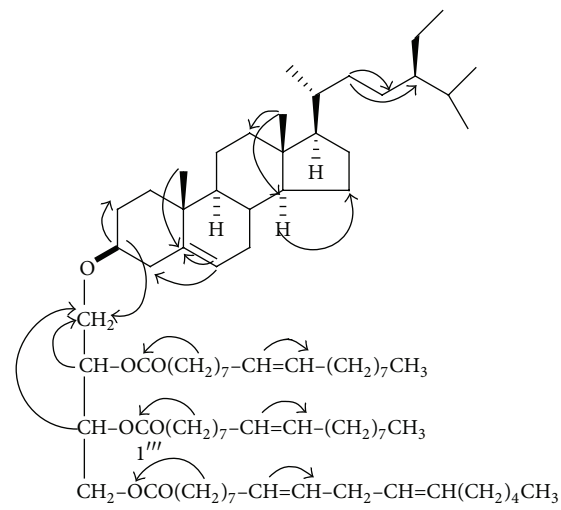

2

Figure 3: Key HMBC correlations of new compounds **1** and **2**.

(C-3), and erythritol carbons at δ 61.4 (C-1′), 68.1 (C-2′), 65.0 (C-3′), and 62.0 (C-4′), methyl carbons from δ 21.0 to 11.8. The absence of an anomeric carbon signals from δ 110 to 90 supported erythritol unit attached to the steroid. The stereochemistry of the steroids at C-3 oxygenated methine proton was established by coupling interaction of the ^{1}H NMR spectral data and by comparison of the ^{1}H and ^{13}C NMR values of the steroidal carbon frameworks with the reported steroidal data [20–22]. The poliol was detected as erythritol by comparing retention time by HPLC [23].

The ^{1}H-^{1}H COSY spectrum of **2** showed correlations of H-3 with H_2-2 and H_2-4; H-6 with H_2-4, H_2-7, and H-8; H-2′ with H_2-1′, H-3′, and H_2-4′; and H_2-11′′′′ with H-9′′′′, H-10′′′′, H-12′′′′, and H-13′′′′. The key HMBC correlations of **2** that exhibited interactions of proton carbon relations are shown in Figure 3. The HSQC spectrum of **2** showed correlations of H-3 at δ 3.51 with C-3 at δ 71.22; H_2-1′ at δ 5.02 with C-2′ at δ 68.19; H_2-1′ at δ 4.30 with C-1′ at δ 61.36; H-3′ at δ 4.13 with C-3′ at δ 65.01, and H_2-4′ at δ 3.72 and 3.51 with C-4′ at δ 62.07. Alkaline hydrolysis of **2** yielded β-sitosterol, oleic and linoleic acids, TLC comparable. These lines of evidence led to the formulation of the structure of **2** as stigmasta-5-en-3β-ol-3β-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9′′/9′′′-enoyl-4′-octadec-9′′′′,12′′′′-dienoate (**2**, Figure 2). This is a new steroidal erythrityl triestrer.

4. Conclusion

Two new compounds stigmasta-3α-ol-3α-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**1**) and stigmasta-5-en-3β-ol-3β-(2′*R*,3′*S*)-butane-1′,2′,3′,4′-tetraolyl-2′,3′-dioctadec-9″/9‴-enoyl-4′-octadec-9⁗,12⁗-dienoate (**2**) were isolated from the methanolic extraction of heat processed roots of *P. ginseng*. A lot of work already studied *P. ginseng* compounds and biological activity. Further studies on the *P. ginseng* compounds and bioactivity are also needed.

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