NEW BRIARANE DITERPENES FROM A GORGONACEAN *BRIAREUM* SP.[1]

Tetsuo Iwagawa,*[a] Keita Takayama,[a] Hiroaki Okamura,[a] Munehiro Nakatani,*[a]
and Matsumi Doe*[b]

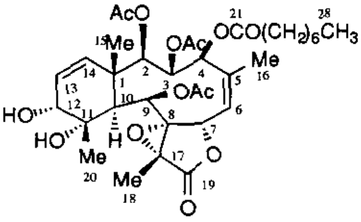
[a] Faculty of Science, Kagoshima University, Kagoshima 890-0065,
Japan
[b] Faculty of Science, Osaka City University, Osaka 558-0022, Japan

Abstract- Five new diterpenes violides C (1)-I (7), possessing a 2,3,4-, 2,3-, and 2,4-oxidized briarane skeleton have been isolated from a gorgonacean *Briareum* sp. Their structures were established by spectral methods.

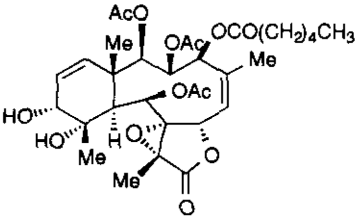
The gorgonian octocoral *Briareum* has produced a number of briarane type diterpenes, containing a γ-lactone in a bicyclic [8.4.0] ring system.[2] The majority of these diterpenes showed interesting biological activity such as cytotoxic, anti-flammatory, and antiviral activities.[3] In a previous paper,[1] we reported the isolation of two new diterpenes with a 2,3,4-oxidized briarane skeleton from a *Briareum* sp., collected in the area of Bonotsu, Kagoshima prefecture. We here propose to name the two compounds violides A (**8**) and B (**9**) for *Pachyclavularia violacea*, original name of the gorgonian coral. Further investigation of the dichloromethane soluble part of the methanol extract of the *Briareum* sp. has led to the isolation of five new briaranes, violides C (**1**)-I (**7**). In this note, we describe the isolation and characterization of these compounds.

Compound (**1**), $C_{34}H_{48}O_{13}$, showed IR absorptions of a hydroxyl group (3508 cm^{-1}), a γ-lactone (1788 cm^{-1}), and an ester carbonyl (1748 cm^{-1}). In the ^{13}C NMR spectrum (Table 1), resonances due to four tertiary methyl groups (δ 10.0, 15.5, 21,2, 25.4, each q], a *n*-octanoate group [δ 14.1 (q) and 22.6, 24.7, 28.9, 29.0, 31.6, 34.2 each t, 172.8 (s)], four acyl carbons (δ 168.8, 169.7, 170.0, 170.7 each s), three of which are acetyls (δ 20.6, 21.0, 21.3, each q), four olefinic carbons [δ 125.3, 125.4, 138.5, each d and 140.5 (s)], seven methine carbons (δ 43.1, 65.5, 70.2, 71.0, 73.4, 76.0, 76.9, each d), and four quaternary carbons (δ 46.9, 64.6, 71.5, 74.0) were observed. Comparison of the ^{1}H NMR spectral data (Table 2) with those of violide B (**9**) indicated that an acetate group in **9** was replaced by the *n*-octanoate group [δ 0.87 (3H, t, J=6.8 Hz), 1.27 (4H, m), 1.56 (2H, overlapped), and 2.25 (2H, m)]. The position of the *n*-octanoate group was determined to be located at C-4 by the observation of a correlation between C-21 (δ 172.8, s) and H-4 (δ 5.11, 1H, d, J=10.4 Hz) in the HMBC spectrum. Therefore, violide C (**1**) was the 3-acetyl analogue of violide A. The relative stereochemisty of chiral centers was deduced to be the same as that of **9** on the basis of NOE correlations (Figure 1) and coupling patterns. NOEs from H-

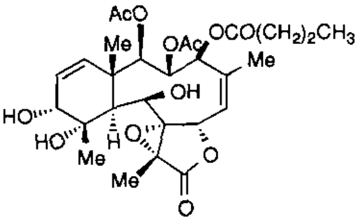
20 (δ 1.15, 3H, s) to H-12 (δ 3.70, 1H, br d, J=6.2 Hz) and H-15 (δ 1.14, 3H, s) showed these hydrogens occur on the same face on the ring system (β) and the ring junction is *trans*. H-2 (δ 4.69, 1H, br s) and H-10 (δ 2.69, 1H, d, J=4.0 Hz) were on the face (α) opposite H-20, since an NOE between H-2 and H-10 was observed. The broad singlet of H-2 and the large coupling constant ($J_{3,4}$=10.4 Hz) between H-3 (δ 6.10, 1H, br d) and H-4 (δ 5.11, 1H, d) suggested that H-2 and H-3 are orthogonal to each other and H-3 and H-4 are antiparallel. The Z configurations of the olefinic bonds at Δ^5 and Δ^{13} were determined from an NOE between H-6 (δ 5.57, 1H, br d, J=9.7 Hz) and H-16 (δ 2.16, 3H, br s) and the coupling constant ($J_{13,14}$=10.4 Hz) between H-13 (δ 5.85, 1H, dd, J=6.2 and 10.4 Hz) and H-14 (δ 5.48, 1H, d, J=10.4 Hz). The Z nature of the olefinic bond at Δ^5 was also consistent with the value of the chemical shift of C-16 methyl carbon (δ 25.4, q). NOEs from H-4 to H-2 and from H-4 to H-16 suggested that H-3 and H-4 were α-oriented, and H-6 and H-16 were folded downward as for violides A (**8**) and B (**9**).[1] An NOE between H-3 and H-7 (δ 5.91, 1H, d, J=9.7 Hz) and the large coupling constant (J=9.7 Hz) between H-6 and H-7 indicated H-7 to be in a β-orientation. NOEs from H-9 (δ 5.96, 1H, d, J=4.0 Hz) to H-18 (δ 1.68, 3H, s) and H-20 (δ 1.15, 3H, s) and the chemical shifts around the epoxide in the NMR spectra suggested the α-configuration of the epoxide. Thus, violide C (**1**) was assigned as 3-acetylviolide A.



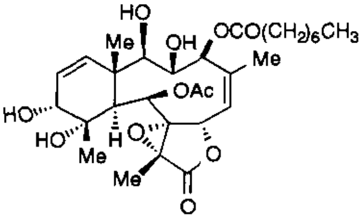
1



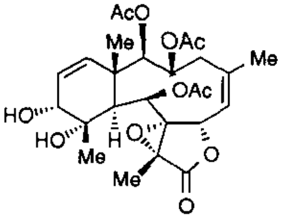
2



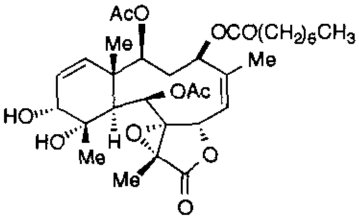
3



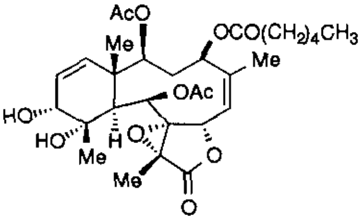
4



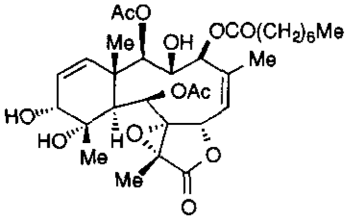
5



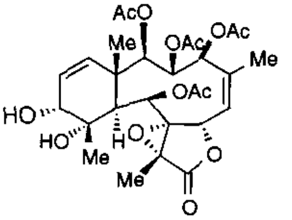
6



7



8



9

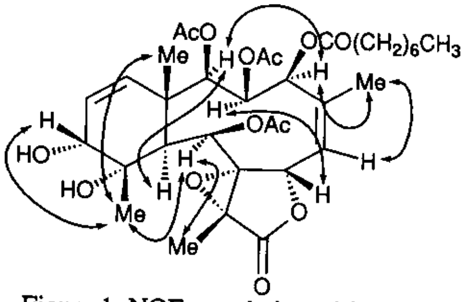


Figure 1. NOE correlation of 1.

The ^{1}H and ^{13}C NMR spectral data of violides D (2)-E (3) were nearly identical to those of 1, except for resonances corresponding to aliphatic ester portion. Resonances due to a methyl carbon (δ13.8, q), four methylene carbons (δ 22.3, 24.4, 31.2, 34.1 each t), and an ester carbon (δ 172.8, s) in the ^{13}C NMR spectrum of 2, $C_{32}H_{44}O_{13}$, suggested that a *n*-octanoate group in 1 was replaced by a *n*-hexanoate group.

Table 1. ^{13}C NMR Spectral Data for 1-7.[a]

carbon no.	1	2	3	4	5	6	7
1	46.9	46.9	46.9	48.5	46.8	46.7	46.8
2	76.9	76.9	76.9	76.0	77.4	77.6	77.6
3	71.0	71.0	71.0	71.1	71.7	38.3	38.3
4	76.0	76.0	76.0	77.8	34.6	72.1	72.1
5	140.5	140.5	140.5	140.9	139.6	144.0	144.1
6	125.3	125.3	125.3	123.7	121.4	123.0	123.0
7	73.4	73.4	73.4	73.6	74.6	73.7	73.7
8	71.5	71.5	71.5	71.4	71.6	71.1	71.1
9	65.5	65.6	65.5	65.5	65.8	65.8	65.8
10	43.1	43.1	43.1	43.9	43.6	43.4	43.4
11	74.0	74.0	74.0	73.9	73.7	73.7	73.7
12	70.2	70.2	70.2	70.6	70.7	70.3	70.3
13	125.4	125.4	125.4	123.2	125.0	124.9	124.8
14	138.5	138.5	138.5	140.5	138.1	138.7	138.7
15	15.5	15.5	15.5	14.2	15.4	15.2	15.2
16	25.4	25.4	25.4	26.1	27.1	25.8	25.8
17	64.6	64.6	64.6	64.7	64.8	64.5	64.5
18	10.0	10.0	10.0	9.7	10.0	9.8	9.8
19	170.7	170.7	170.8	170.4	170.7	170.7	170.7
20	21.2	21.2	21.2	21.6	21.3	21.4	21.4
$\underline{\text{Me}}$CO	20.6,21.0	20.6, 21.0	20.6, 21.0	21.5	20.8, 21.2	21.1, 21.6	21.1, 21.6
	21.3	21.3	21.3		21.2		
Me$\underline{\text{C}}$O	168.8, 169.7	168.8, 169.7	168.9, 169.7	168.3	168.9, 170.3	168.2, 170.3	168.2, 170.3
	170.0	170.0	170.0		170.4		
$C_nH_{2n+1}COO$	14.1, 22.6	13.8, 22.3	13.6, 18.2	14.1, 22.6		14.1, 22.6	13.9, 22.3
	24.7, 28.8	24.4, 31.2	36.1, 172.6	24.8, 28.9		24.9, 28.9	24.5, 31.2
	29.0, 31.6	34.1, 172.8		29.0, 31.6		29.0, 31.6	34.2
	34.2, 172.8			34.2, 173.8		34.3, 172.9	172.9
	34.2, 172.8			34.2, 173.8		34.3, 172.9	172.9

[a] TMS was used as the internal standard; chemical shifts are shown in δ scale.

In compound (3), $C_{30}H_{40}O_{13}$,[4] the presence of a propionate group was suggested by analysis of the ^{13}C NMR spectrum of 3 (δ 13.6, q, δ 18.2, t, δ 36.1, t, δ 172.6, s). The acyl groups were determined to be located at C-4 on the basis of a correlation between C-21 and H-4 in the HMBC experiments of 2 and 3. The relative stereochemistries of 2 and 3 were deduced from the similar signal patterns in the NMR spectra and NOE correlations to those of 1 (Tables 1-3).

Inspection of the ^{1}H NMR data of 4, mp 149-152 °C, $C_{30}H_{44}O_{11}$, indicated that 4 was similar to 8, except that an acetyl group at C-2 was missing. This was supported by the upfield shift of H-2 (δ 3.27, 1H, br s) by 1.43 ppm as well as the downshift of H-14 (δ 5.97, 1H, d, *J*=10.4 Hz) by 0.62 ppm compared to those of **8**. The downfield shift of H-14 would be in a position to be deshielded by the hydroxyl oxygen. Therefore, **4** was the deacetyl derivative of **8**. Location of a *n*-octanoate group at C-4 was evident from an HMBC correlation of C-21 (δ 173.8, s) to H-4 (δ 4.89, 1H, d, *J*=10.6 Hz) . The relative stereochemistry of **4** was assumed on the basis of the signal patterns and NOE data (Tables 1-3), as for **8**. Therefore, violide F (**4**) was concluded to assign as 2-deacetylviolide A.

Table 2. ^{1}H NMR Spectral Data for **1-7**.[a]

proton no.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2	4.69 br s	4.69 br s	4.69 br s	3.27 br s	4.76 br s	4.61 d *J*=7.0	4.62 br d *J*=7.3
3	6.10 br d *J*=10.4	6.10 br d *J*=9.9	6.10 br d *J*=10.3	4.83, br d *J*=10.6	5.59 br dd *J*=5.5, 12.5	*ca.* 2.09[b] 2.92 br dd *J*=12.6, 14.8	*ca.* 2.08[b] 2.93 br dd *J*=12.6, 15.0
4	5.11 d *J*=10.4	5.10 d *J*=9.9	5.11 d *J*=10.3	4.89 d *J*=10.6	1.96[b] 2.93 br dd *J*=5.5, 13.4	5.03 dd *J*=5.3, 12.6	5.04 dd *J*=5.3, 12.6
6	5.57 br d *J*=9.7	5.57 br d *J*=9.9	5.57 br d *J*=10.1	5.44 br d *J*= 9.5	5.43 br d *J*=9.5	5.45 br d *J*=9.3	5.45 br d *J*=9.5
7	5.91 d *J*=9.7	5.91 d *J*=9.9	5.91 d *J*=10.1	5.68 d *J*=9.5	5.69 d *J*=9.5	5.74 d *J*=9.3	5.74 d *J*=9.5
9	5.96 d *J*=4.0	5.96 d *J*=3.7	5.96 d *J*=3.7	5.91 d *J*=3.7	5.93 d *J*=3.7	5.93 d *J*=3.7	5.94 d *J*=3.5
10	2.69 d *J*=4.0	2.69 d *J*=3.7	2.69 d *J*=3.7	2.41[b]	2.59 d *J*=3.7	2.55 d *J*=3.7	2.55 d *J*=3.5
12	3.7 br d *J*=6.2	3.70 br d *J*=6.2	3.70 br d *J*=6.4	3.71 d *J*=6.1	3.69 dd *J*=5.1, 6.4	3.68 br d *J*=6.1	3.68 br d *J*=5.9
13	5.85 br dd *J*=6.2, 10.4	5.85 dd *J*=6.2, 10.3	5.85 dd *J*=6.4, 10.3	5.83 dd *J*=6.1, 10.4	5.82 dd *J*=6.4, 10.3	5.82 dd *J*=6.1, 10.4	5.82 br dd *J*=5.9, 10.6
14	5.48 d *J*=10.4	5.48 d *J*=10.3	5.48 d *J*=10.3	5.97 d *J*=10.4	5.42 d *J*=10.3	5.38 d *J*=10.4	5.39 br d *J*=10.6
15	1.14 s	1.14 s	1.14 s	1.18 s	1.13 s	1.17 s	1.18 s
16	2.16 br s	2.16 br s	2.16 br s	2.03 br s	1.95 br s	2.09 br s	2.10 br s
18	1.68 s	1.68 s	1.68 s	1.70 s	1.69 s	1.69 s	1.69 s
20	1.15 s	1.15 s	1.15 s	1.17 s	1.13 s	1.14 s	1.15 s
MeCOO	2.07, 2.17 2.30 s	2.07, 2.17 2.30	2.08, 2.17 2.30	2.25 s	2.12 x 2 s 2.19 s	2.12 s 2.23 s	2.12 s 2.23 s
$C_nH_{2n+1}COO$	0.87 3H, t *J*=6.8 1.27 8H m 1.56 2H m 2.25 2H m	0.89 3H t *J*=7.0 1.32 4H m 1.26-1.32 4H m 1.57[b] 2H 2.25 2H m	0.92 3H t *J*=7.3 *ca.* 1.60[b] 2H 2.24 2H, m	0.88 3H t *J*=6.6 *ca.* 1.28 8H m 1.65 2H m 2.39[b] 2H		0.87 3H t *J*=6.8 1.28 8H m 1.60 2H m 2.30 2H t *J*=7.7	0.89 3H t *J*=6.7 1.24-1.39 4H m *ca.* 1.60[b] 2H 2.30 3H t *J*=7.5

[a] TMS was used as the internal standard; chemical shifts are shown in δ scale with *J* values (Hz).

[b] This is an overlapped signal.

Violide G (**5**) was isolated as prisms, mp 131-133 °C, with a molecular formula $C_{26}H_{34}O_{11}$. The ^{1}H NMR spectrum was similar to that of **9**, except that resonances due to an acyl group were missing and instead resonances due to H-4 methylene protons were observed at δ 1.96 (1H, overlapped) and 2.93 (1H, br dd, J=5.5 and 13.4 Hz), suggesting that **5** was the 4-deacetoxyl derivative of **9**. The stereochemistry was determined by the signal patterns and the observation of NOE correlations (Tables 1-3). Therefore, violide G (**5**) was determined to be 4-deacetoxyviolide B.

Table 3. NOE Spectral Data for **1**-**7**.

proton no.	**1**[a]	**2**[a]	**3**[a]	**4**	**5**[a]	**6**	**7**
2	H-4, H-10, H-16	H-4, H-10, H-16	H-4, H-10, H-16	H-10, H-16	H-10, H-16	H-10, H-16	H-10, H-16
3	H-7, H-15	H-7, H-15	H-7, H-15	H-7, H-15	H-7, H-15	H-7, H-15	H-7, H-15
4	H-2, H-16	H-2, H-16	H-2, H-16	H-16	H-16	H-16	H-16
6	H-16	H-16	H-16	H-16	H-16	H-16	H-16
7	H-3	H-3	H-3	H-3	H-3	H-3	H-3
9	H-18, H-20	H-18, H-20	H-18, H-20	H-18, H-20	H-18, H-20	H-18, H-20	H-18, H-20
10	H-2, H-18	H-2, H-18	H-2, H-18	H-2, H-18	H-2, H-18	H-2, H-18	H-2
12	H-20	H-20	H-20	H-20	H-20	H-20	H-20
14	H-15	H-15	H-15	H-15	H-15	H-15	H-15
15	H-3, H-14	H-3, H-14	H-3, H-14	H-3, H-14, H-20	H-3, H-14	H-14, H-20	H-14, H-20
16	H-4, H-6	H-4, H-6	H-4, H-6	H-4, H-6	H-4, H-6	H-4, H-6	H-4, H-6
18	H-9, H-10	H-9, H-10	H-9, H-10	H-9, H-10	H-9, H-10	H-9, H-10	H-9
20	H-9, H-12	H-9, H-12	H-9, H-12	H-9, H-12, H-15	H-9, H-12	H-9, H-12, H-15	H-9, H-12, H-1

[a] The signals of H-15 and H-20 were overlapped to each other.

The ^{1}H NMR data of **6**, $C_{32}H_{46}O_{11}$, were closely related to those of **1**, except that resonances due to an acetate group at C-3 in **1** were missing and resonances due to H-3 methylene protons (δ 2.09, 1H, overlapped) and δ 2.92 (1H, br dd, J=12.6 and 14.8 Hz) appeared. The position of an n-octanoate group was concluded to be C-4 from a correlation of H-4 (δ 5.03, 1H, dd, J=5.3 and 12.6 Hz) to C-21 (δ 172.9, s) in the HMBC experiment. Compound (**6**) was therefore the 3-deacetoxyl analogue of **1**. The relative stereochemistry was established on the basis of the signal patterns and NOE interactions (Tables 1-3). Violide H (**6**) was, therefore, assigned as 3-dehydroxyviolide A.[4]

The NMR data of **7**, $C_{30}H_{42}O_{11}$, were similar to those of **6**, except for resonances due to aliphatic ester portion. As in case of **2**, an acyl group was established to be a n-hexanoate group by comparing resonances due to the n-hexanoate carbons in the ^{13}C NMR spectrum of **7** with those of violide D (**2**). The n-hexanoate group at C-4 was deduced to be located at C-4 from an HMBC correlation between H-4 (δ 5.04, 1H, br dd, J=5.3 and 12.6 Hz) and C-21 (δ 172.9). A close comparison of the signal patterns and NOE results of **7** with those of **6** suggested the relative stereochemistry of 7 was the same as that of **6** (Tables 1-3). Violide I (**7**) was, thus, determined to be 3-deacetoxyviolide D.

Violides A-F were the first example of diterpenes possessing a 2,3,4-oxidized briarane skeleton except for several briaranes with an acyl group at C-1 and an epoxide between C-3 and C-4.[5]

Briarane diterpenes, which have been isolated so far only from gorgonian corals,[2] a soft coral,[6] a sea pansy,[7] and sea pens,[8-13] contained several kinds of acyl groups: CH_3COO-, C_2H_5COO-, n-C_3H_7COO-, n-$C_5H_{11}COO$-, n-$C_7H_{15}COO$-. Diterpenes such as violides D (**2**) and I (**7**), containing a n-hexanoate group, were rarely found in briaranes.[14]

EXPERIMENTAL

General Experimental Procedures. Melting points were uncorrected. Optical rotations were obtained at 22° C on a JASCO DIP-370S spectropolarimeter. UV and IR spectra were recorded on a UV-210 and a MASCO FT/IR 5300 spectrometers. NMR spectra were recorded with a 400 MHz JEOL NMR instruments using TMS as internal standard and $CDCl_3$ as solvents. MS were obtained with a JEOL XD-303 instrument.

Extraction and Isolation. The organisms (wet weight: 7.6 kg) was chopped into small pieces and extracted with MeOH (30 L) at rt for a few days immediately after collection. The MeOH extract (22 g) was suspended in H_2O and extracted with CH_2Cl_2. The CH_2Cl_2 layer was dried over Na_2SO_4, filtered , and evaporated to dryness (9.6 g) . Portion (5 g) of the CH_2Cl_2 extract was absorbed on silica gel and subjected to chromatography on silica gel packed in hexane, fractions (100 mL) being collected as follows: 1-2 (CH_2Cl_2-hexane, 4:1), 3-34 (CH_2Cl_2), 5-6 (MeOH-CH_2Cl_2, 1:49), 7-8 (MeOH-CH_2Cl_2, 1:19), 9-10 (MeOH-CH_2Cl_2, 1:9), 11-12 (MeOH-CH_2Cl_2, 1:4), and 13-14 (MeOH). Fractions 8-10 (2.1 g) were chromatographed on silica gel using MeOH and CH_2Cl_2, increasing the proportion of MeOH to elute the fractions from the column. The fractions eluted with MeOH-CH_2Cl_2 (1:49) gave a residue (620 mg), which was applied to HPLC (ODS) with MeOH-H_2O (1:1), yielding **1** (8.6 mg), **2** (3.0 mg), **3** (5.9 mg), **5** (15.9 mg), **6** (13.4 mg), and **7** (2.8 mg) . Further elution with MeOH-CH_2Cl_2 (1:24) afforded crystals **4** (8.5 mg).

Violide C (1). Amorphous, $[\alpha]_D$ +72.6° (*c* 0.43, MeOH); UV (MeOH) λmax 205 nm (ε 7800); IR (film) νmax 3508, 1788, 1747, 1221 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 665.3181 $[M + H]^+$ (Calcd for $C_{34}H_{49}O_{13}$ 665.3173).

Violide D (2). Amorphous, $[\alpha]_D$ +74.3° (*c* 0.15, MeOH); UV (MeOH) λmax 205 nm (ε 7100); IR (film) νmax 3499, 1786, 1747, 1221 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 637.2855 $[M + H]^+$ (Calcd for $C_{32}H_{45}O_{13}$ 637.2861).

Violide E (3). Amorphous, $[\alpha]_D$ +76.2° (*c* 0.30, MeOH); UV (MeOH) λmax 205 nm (ε 7600); IR (film) νmax 3503, 1786, 1748, 1676, 1221 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 609.2534 $[M + H]^+$ (Calcd for $C_{30}H_{41}O_{13}$ 609.2547).

Violide F (4). Prisms from CH_2Cl_2-*n*-C_6H_{14}, mp 149-152C°, $[\alpha]_D$ -2.6° (*c* 0.39, MeOH); UV (MeOH) λmax 205 nm (ε 8300); IR (film) νmax 3434, 1784, 1745, 1668, 1215 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 581.2952 $[M + H]^+$ (Calcd for $C_{30}H_{45}O_{11}$ 581.2962).

Violide G (5). Prisms from C_6H_6-*n*-C_6H_{14}, mp 131-133C°, $[\alpha]_D$ -10.0° (*c* 0.58, MeOH); UV (MeOH) λmax 205 nm (ε 6800); IR (film) νmax 3497, 1784, 1736, 1670, 1229 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 523.2198 $[M + H]^+$ (Calcd for $C_{26}H_{35}O_{11}$ 523.2179)

Violide H (6). Amorphous, $[\alpha]_D$ -0.8° (*c* 0.66, MeOH); UV (MeOH) λmax 206 nm (ε 7600); IR (film) νmax 3501, 1782, 1740, 1213 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 607.3113 $[M + H]^+$ (Calcd for $C_{32}H_{47}O_{11}$ 607.3119).

Violide I (7). Amorphous, $[\alpha]_D$ -3.1° (*c* 0.13, MeOH); UV (MeOH) λmax 205 nm (ε 7100); IR (film) νmax 3499, 1780, 1740, 1213 cm^{-1}; ^1H NMR (see Table 2); ^{13}C NMR (see Table 1); (+)-FABMS *m/z* 579.2825 $[M + H]^+$ (Calcd for $C_{30}H_{43}O_{11}$ 579.2844).

ACKNOWLEDGMENT

We are grateful to Messrs. M. Hatanaka and K. Takemura (Sankei Kagaku Co. Ltd.) for collecting and identifying the sample.

REFERENCES AND NOTES

1. New briarane diterpenes from *Briareum* sp., collected at Bonotsu, Kagoshima prefecture. For part 1. see: T. Iwagawa, N. Takenoshita, H. Okamura, M. Nakatani, M. Doe, K. Shibata, and M. Shiro, *Heterocyles*, **1998**, *48*, 123.
2. D. J. Faulkner, *Nat. Prod. Rep.*, 1996, **13**, 75 and the references cited therein.
3. J.-H. Sheu, P.-J. Sung, L.-H. Huang, S.-F. Lee, and T. B.-Y., Chang, C.-Y. Duh, L.-S.Fang, K. Soong, and T.-J. Lee, *J. Nat. Pro.*, 1996, **59**, 935 and the references cited therein.
4. Recently, briarains corresponding to violides F (**4**) and G (**5**) have been independently isolated. Y. Uchio T. Haino, S. Usui, and Y. Fukazawa, 39th Symposium on the Chemistry of Natural Products, Symposium Papers, Sappporo, Japan, p. 625.
5. A. D. Rodríguez, C. Ramírez, and O. M. Cóbar, *J. Nat. Prod.*, 1996, **59**, 15.
6. M. B. Ksebati and F. Schmitz, *J. Bull. Soc. Chim. Belg.*, 1986, **95**, 835.
7. P. A. Ksebati, K. L. Rinehart, and I. R. Hopper, *J. Org. Chem.*, 1986, **51**, 4450.
8. R. L. Hendrickson and J. H. Cardellina, *Tetrahedron* , 1986, **42**, 6565.
9. S. J. Wratten and D. J. Jaulkner, *Tetrahedron*, 1979, **35**, 1907 and the references therein.
10. B. N. Ravi, J. F. Marwood, and R. J. Wells, *Aust, J. Chem.*, 1980, **33**, 2307.
11. A. Clastres, A. Ahond, C, Poupat, P. Potier, and S. K. Kan, *J. Nat, Prod.*, 1984, **47**, 155.
12. A. Clastres, P. Laboute, A. Ahond, C, Poupat, and P. Potier, *J. Nat, Prod.*, 1984, **47**, 162.
13. R. L. Hendrickson and J. H. Cardellina, *Tetrahedron*, 1986, **42**, 6565.
14. F. J. Schmitz, M. M. Schulz, J. Siripitayananon, M. B. Hossain, D. van der Helm, *J. Nat. Prod.*, 1993, **56**, 1339.

Received, 25th February, 1999