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ANTITUMOR AGENTS, 104.[1] ISOLATION OF YADANZIOSIDES M AND P FROM *BRUCEA ANTIDYSENTERICA* AND IDENTIFICATION OF BRUCEANTINOSIDE B AS A MIXTURE OF YADANZIOSIDE P AND BRUCEANTINOSIDE C

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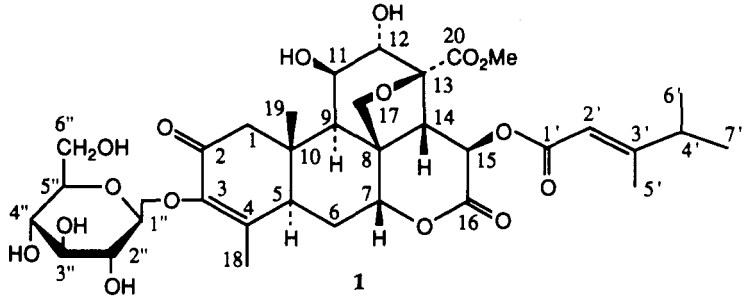
ABSTRACT.—Yadanziosides M [**3**] and P [**1**] were isolated from *Brucea antidysenterica*. Their structures were elucidated by spectral data. Bruceantinoside B reported previously was reinvestigated and revealed to be a mixture of yadanzioside P and bruceantinoside C [**2**]. The structure of yadanzioside P was found to be identical to that of bruceantinoside B.

Recently we reported the isolation and structural elucidation of bruceantinosides A (1), B (1), and C [**2**] (2), and yadanziosides G (2) and N (2) from the stem of *Brucea antidysenterica* Mill. (Simaroubaceae). We assigned **1** to bruceantioside B, a structure that was subsequently pointed out by Sakaki *et al.* (3) to be another structure from a spectral point of view. The previously reported bruceantinoside B was reexamined in detail by hplc and spectral comparison. The result of this reexamination indicates that it is a mixture of yadanzioside P [**1**] and bruceantinoside



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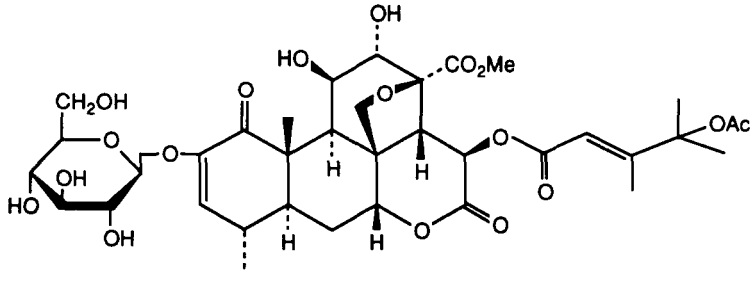

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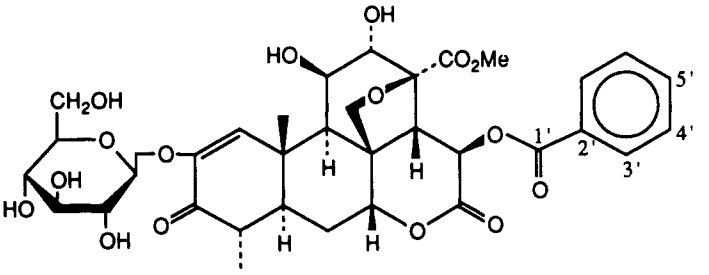
[1]For part 103, see Y.C. Wu, Y.F. Liou, S.T. Lu, C.H. Chen, J.J. Chang and K.H. Lee, *Planta Med.*, in press.

C [**2**], both of them showing nearly identical retention times and R_f values. The structure of yadanzioside P was found to be identical to that of bruceantinoside B. The isolation of yadanziosides M [**3**] (4) and P [**1**] (3) from *B. antidysenterica* is also described. Although **3** has been obtained from *Brucea javanica* recently by Sakaki *et al.* (3), this compound was isolated from *B. antidysenterica* for the first time.



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Yadanzioside M [**3**], $C_{34}H_{40}O_{16}$, was obtained as a colorless amorphous powder. A comparison of its ir, ^{1}H- and ^{13}C-nmr, and mass spectral data with those of **3** obtained from *B. javanica* (4) indicates that they are identical with each other.

Yadanzioside P [**1**], $C_{34}H_{46}O_{16}$, was isolated as a colorless amorphous powder. Its spectral data are identical with those reported for yadanzioside P [**1**], which was isolated from *B. javanica* by Sakaki *et al.* (4).

EXPERIMENTAL

GENERAL EXPERIMENTAL PROCEDURES.—Melting points were determined on an MRK air-bath type melting point apparatus and were uncorrected. Specific rotations were obtained on a Yanako OR-50D polarimeter (L = 1 dm). Ir and uv spectra were recorded on a Jasco IR-810 spectrometer and a Hitachi 320S spectrometer, respectively. ^{1}H-nmr and ^{13}C-nmr spectra were determined on a Varian XL-200 (200.06 MHz for ^{1}H-nmr and 50.31 MHz for ^{13}C-nmr) using TMS as an internal standard, and the results are shown in Tables 1 and 2, respectively. All the samples for nmr analyses were dissolved in pyridine-d_5. The assignments of the carbon signals were made by off-resonance decoupling and distortionless enhancement by polarization transfer (DEPT) methods. Fd mass spectra were recorded on a Hitachi M80 instrument. Si gel (Merck, type 60, 70–230 mesh) was used for cc, and precoated Si gel plates (Merck, 60F-254, 0.25 mm) were used for analytical tlc. Detection of components was made by use of an uv lamp and heating after the spray of 10% H_2SO_4. Precoated Si gel (Merck, 60F-254, 2 mm) was used for preparative tlc. Analytical hplc was performed on a Waters Associates Model ALC/GPC 244 liquid chromato-

TABLE 1. ^{1}H-nmr Spectra of Quassinoid Glycosides **1** and **2**.

Proton	Compound	
	1	**2**
H-1	[a]	—
H-3	—	6.16 d (2)
H-4	—	[a]
H-5	[a]	[a]
H-7	5.1 br	5.18 brs
H-9	[a]	2.97 d (4)
H-11	4.80 brd (3.5)	6.32 d (4)
H-12	5.1 br	4.95 brs
H-14	3.09 brd (13)	[a]
H-15	6.92 br	6.98 br
H-20	5.1 br	5.16 d (8)
4-Me	2.07 s	0.88 d (7)
10-Me	1.74 s	1.90 s
OMe	3.81 s	3.92 s
H-2′	5.90 s	[a]
H-3′	—	—
H-4′	[a]	—
H-5′	—	—
3′-Me	2.18 s	2.30 s
4′-Me	0.85 d (7)	1.40 s
	—	1.46 s
4′-OAc	—	1.95 s
H-1″	5.47 d (7)	5.49 d (7)
H-6″	4.35 dd (12 and 5)	4.58 d (11)
	4.48 dd (12 and 3)	

[a]Not measured.

TABLE 2. ^{13}C-nmr Spectra of Quassinoid Glycosides **1** and **2**.

Carbon	Compound	
	1	**2**
C-1	51.1 t	199.7 s
C-2	193.7 s	146.4 s
C-3	148.0 s	124.9 d
C-4	146.6 s	31.5 d
C-5	43.4 d	36.8 d
C-6	29.4 t	28.7 t
C-7	83.4 d	82.9 d
C-8	46.0 s	46.7 s
C-9	42.0 d	44.1 d
C-10	40.9 s	48.9 s
C-11	73.1 d	75.1 d
C-12	76.1 d	76.2 d
C-13	82.7 s	82.9 s
C-14	50.5 d	50.8 d
C-15	68.4 d	69.2 d
C-16	168.3 s	168.1 s
C-17	73.6 t	73.6 t
C-18	15.3 q	14.5 q
C-19	15.9 q	18.9 q
C-20	171.2 s	171.1 s
OMe	52.4 q	52.6 q
C-1′	165.8 s	165.9 s
C-2′	113.4 d	113.5 d
C-3′	167.3 s	169.5 s
C-4′	38.1 d	82.3 s
C-5′	16.7 q	14.5 q
C-6′	20.7 q	26.4 q
C-7′	20.7 q	25.7 q
C-8′	—	163.7 s
C-9′	—	21.4 q
C-1″	104.9 d	100.7 d
C-2″	75.8 d	74.6 d
C-3″	78.7 d	79.0 d
C-4″	71.5 d	71.4 d
C-5″	78.5 d	78.6 d
C-6″	62.8 t	62.3 t

graph equipped with a Radial-Pak Liquid Chromatography Cartridge (8NVC18) and a Waters Model 440 uv detector. Preparative hplc was done on a Gilson preparative liquid chromatograph equipped with an M&S PACK C18-A column (20 mm × 250 mm) and a Gilson Model 111B uv detector.

CHROMATOGRAPHY OF THE $CHCl_3$ FRACTIONS.—The crude $CHCl_3$ fraction (705 g), which was part of the $CHCl_3$ extract of the ground wood of *B. antidysenterica* (4,228 lb) reported previously (2), was subjected to cc on Si gel (3 kg, 10 cm × 90 cm) and eluted first with EtOAc-Et_2O (1:1) and then with $CHCl_3$-MeOH-H_2O (50:14:3) to yield 9 and 16 fractions, respectively. Fractions 9–10 and fractions 11–16 of the latter elution were combined (113 g and 72.6 g, respectively) and subjected twice to cc on Sephadex LH-20 (60 mm × 90 cm) eluting with MeOH to remove resinous substance and to afford pale yellow gums (39.6 g and 26.2 g, respectively).

ISOLATION OF YADANZIOSIDE M [3].—The foregoing pale yellow gum (39.6 g) was further subjected to low pressure cc using an ODS column and MeOH-H_2O (1:1) as eluent to give 25 fractions. Fractions 7–11 were shown to contain a new peak (Rt 9.0 min) by analytical hplc using MeOH-H_2O (1:1, 1 ml/min) as an eluent, although the peak was very small. Further preparative hplc of these fractions with elution by MeOH-H_2O (1:1, 2 ml/min) and preparative tlc led to the isolation of **3** (27 mg, 0.0000014%).

Yadanzioside M [3].—Compound **3** was obtained as a colorless amorphous powder: mp 208–213° (dec); $[\alpha]^{23}D$ +39° (c = 0.41, EtOH).

ISOLATION OF YADANZIOSIDE P [1].—The foregoing pale yellow gum (26.2 g) was subjected to low pressure cc using an ODS column and MeOH-H_2O (1:1) as eluent to give ten fractions. Fractions 3–5 were found to contain a new peak (Rt 11.0 min) by analytical hplc using MeOH-H_2O (1:1, 1 ml/min) as an eluent, although the peak was nearly overlapped with that of **2** reported previously (2). Repeated preparative hplc of these fractions with elution by MeOH-H_2O (1:1, 2 ml/min) led to the isolation of **1** (787 mg, 0.000041%).

Yadanzioside P [1].—Compound **1** was isolated as a colorless amorphous powder: mp 193–198°; $[\alpha]^{23}D$ +7.0° (c = 0.57, EtOH).

REEXAMINATION OF BRUCEANTINOSIDE B.—The previously reported bruceantinoside B (1) was reinvestigated. The analytical hplc [MeOH-H_2O (1:1), 1 ml/min] showed a broad peak (Rt 11.6 min). However, as it was assumed to contain two compounds with overlapped retention times, it was subjected to further preparative hplc to isolate the first half and the latter half. After repetition of the preparative hplc, two compounds (Rt 11.2 and 11.7 min, respectively) were isolated. Their spectral data (ir, ^{1}H-nmr, and ^{13}C-nmr) coincided with those of yadanzioside P [1] (4) and bruceantinoside C [2] (2), respectively.

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