NOTE

Two Phenolic Compounds from *Sarcopyramis bodinieri* var. *Delicate*

WEI LIU¹ and CHUN-PENG WAN^{2,*}

¹Key Laboratory at Universities of Education Department of Xinjiang Uygur Autonomous Region, Yili Normal University, Yining 835000, P.R. China

²College of Agronomy, Jiangxi Agricultural University, Nanchang 330045, P.R. China

*Corresponding author: E-mail: lemonwan@126.com

(Received: 17 October 2012;

Accepted: 5 July 2013)

AJC-13774

In continuation of the investigation of the chemical constituents of the herb of *Sarcopyramis bodinieri* var. *delicate* led to the isolation and identification of two phenolic compounds, namely, flavogallonic acid (**1**) and isorhamnetin-3-O-(6''-O-caffeoyl)- β -D-galactoside (**2**). Their structures were determined by the extensive spectroscopic analyses including UV, 1D NMR, 2D NMR and ESI-MS. The two phenolic compounds were isolated for the first time from the genus of *Sarcopyramis*.

Key Words: Chemical constituents, Phenolic compounds, *Sarcopyramis bodinieri* var. *delicate*.

Sarcopyramis bodinieri var. *delicate* belongs to the family of Melastomataceae and is widely cultured in Fujian province, China. In the folk medicine, *Sarcopyramis bodinieri* var. *delicate* is used to treat the liver and other inflammatory diseases (*i.e.*, acute and chronic hepatitis). Previously study has showed that the ethyl acetate extract of the plant was reported to demonstrate promising antioxidant and free radical scavenging activities *in vitro*¹. In addition, we previously have made a fully investigation on the chemical constituents of this plant and more than twenty flavonoid and phenolic compounds were isolated, including two new flavonol glycosides²⁻⁵. In our ongoing search on this species, herein we have further isolated two phenolic compounds (**1** and **2**, Fig. 1) that were not reported in the genus of *Sarcopyramis* previously.

ESI-MS were recorded on 3200 Q-trap ESI-MS spectrometer (ABI, American). The ¹H, ¹³C NMR and 2D-NMR spectra were

recorded on a Bruker Avance-600 FT-NMR spectrometer, with TMS internal standard. A Shimadzu LC-20AT HPLC system was used to analyze the purity of the compounds. Column chromatography was performed on D101 macroporous resin (Cangzhou Bonchem Co., Ltd., China), silica gel (200-300 mesh, Qingdao Marine Chemical Inc., China), RP-ODS (50 μ m) and Sephadex LH-20 (Pharmacia Co.). All of the organic solvents used were analytical grade and purchased from Sinopharm Chemical Reagent Co., Ltd. (Shanghai, China). The specimen of *S. bodinieri* var. *delicate* was collected from Fujian Province, P.R. China, in April 2007. A voucher specimen (RSC07) is deposited in our laboratory.

Extraction and isolation: The detailed extraction and isolation procedure was followed as reported earlier³. In brief, the air-dried plant material (10 kg) was grounded and extracted exhaustively by maceration at room temperature with EtOH-H₂O

Fig. 1. Structures of two phenolic compounds **1** and **2**

(70:30, 20 L $\times$ 3 L). The concentrated total extract (1.8 kg) was extracted with petroleum ether (PE), CHCl_3 , EtOAc and *n*-BuOH, respectively. The EtOAc extract (SBC, 95 g) was suspended in H_2O (2 L) and the filter layer was then subjected to D-101 macroporous adsorption resin column, eluted with an equivalent H_2O -EtOH stepwise gradient to obtain 5 fractions. Fraction 2 (eluted with 30 % EtOH and labeled SBC-B, 44.4 g) was dissolved in the 20 % MeOH and the supernatant was subjected to RP-ODS column gradient eluted with MeOH- H_2O to afford 5 subfractions. Fr. SBC-B1 was subjected to Sephadex LH-20 column eluted with MeOH to give compound (**1**) (11.3 mg); fraction 3 (eluted with 50 % EtOH and labeled SBC-C, 13.76 g) was subjected to a Sephadex LH-20 column eluted with MeOH to give 6 subfractions. Fr. SBC-C3 was repeatedly chromatographed on RP-ODS column gradient eluted with MeOH- H_2O and then the repeated silica gel (200-300 mesh) column to give compound (**2**) (4.8 mg).

Spectral data: Flavogallonic acid (**1**) white amorphous powder; UV-visible (MeOH) λ_{max} = 364 and 256 nm; ESI-MS m/z : 469 $[\text{M}-\text{H}]^-$, 301 $[\text{M}-\text{H}-\text{Galloyl}]^-$; ^1H NMR (600 MHz, $\text{DMSO}-d_6$) δ : 7.49 (1H, s, H-5'), 6.96 (1H, s, H-6''); ^{13}C NMR (150 MHz, $\text{DMSO}-d_6$) δ : 166.56 (C-7'), 159.67 (C-7'), 159.64 (C-7), 150.06 (C-3), 148.98 (C-3'), 143.25 (C-3''), 140.07 (C-4, 2', 4'), 139.44 (C-5''), 137.11 (C-2), 136.79 (C-4'), 128.45 (C-5), 125.62 (C-1'), 122.65 (C-2'), 120.06 (C-6), 115.31 (C-6'), 114.49 (C-1), 112.47 (C-1'), 110.76 (C-5'), 108.52 (C-6''). The NMR data were consistent with the literature^{6,7}.

Isorhamnetin-3-O-(6''-O-caffeoyl)- β -D-galactoside (2**):** Yellowish amorphous powder; UV-VIS (MeOH) λ_{max} = 336, 252 nm; ESI-MS m/z : 639.3 $[\text{M}-\text{H}]^-$; ^1H NMR (600 MHz, $\text{DMSO}-d_6$) δ : 7.89 (1H, d, J = 2.0 Hz, H-2'), 7.58 (1H, dd, J = 8.5, 2.0 Hz, H-6'), 7.34 (1H, d, J = 15.9 Hz, H-7''), 6.97 (1H, d, J = 1.7 Hz, H-2''), 6.87 (1H, d, J = 8.5 Hz, H-5'), 6.80 (2H, m, H-5'', 6''), 6.33 (1H, d, J = 2.0 Hz, H-8), 6.17 (1H, d, J = 2.0 Hz, H-6), 6.04 (1H, d, J = 15.9 Hz, H-8''), 5.35 (1H, d, J = 7.4 Hz, H-1'), 4.30 (2H, d, J = 4.5 Hz, H2-6''), 3.94 (3H, s, OCH_3), 3.51-3.45 (3H, m, H-2'', 3'', 5''), 3.37 (1H, m, H-4'). ^{13}C NMR (150 MHz, $\text{DMSO}-d_6$) δ : 121.9 (C-6'), 114.1 (C-5'), 112.2 (C-2'), 98.0 (C-6), 92.3 (C-8), 144.9 (C-7''), 121.3 (C-6''), 114.6 (C-5''), 113.2 (C-2''), 112.3 (C-8''), 102.1 (C-1'), 75.9 (C-5''), 74.0 (C-2'', 3''), 69.7 (C-4''), 62.2 (C-6''), 54.7 (OCH_3). The NMR data were consistent with the literature⁸.

Compound **1** was isolated as a white amorphous powder. The UV spectrum showed two maximums absorption peak at 256 and 364 nm (Fig. 2). ^1H and ^{13}C NMR and MS spectra showed that compound **1** consisted of ellagic acid and gallic acid. Compound **1** was identified as flavogallonic acid on the basis of spectral analysis^{6,7}.

Compound **2** was isolated as a yellow powder. The UV spectrum showed two maximums absorption peak at 252 and 336 nm (Fig. 2). The ^1H NMR spectrum revealed a set of

Fig. 2. UV spectra of two phenolic compounds **1** and **2**

isorhamnetin signals: two doublets at δ_{H} 6.17 (d, J = 2.0 Hz, H-6) and 6.33 (d, J = 2.0 Hz, H-8); an ABX spin system due to the aromatic ring at δ_{H} 6.87 (d, J = 8.5 Hz, H-5'), 7.58 (dd, J = 8.5, 2.0 Hz, H-6') and 7.89 (d, J = 2.0 Hz, H-2'); a methoxyl at δ_{H} 3.94 (s, 3'-OMe); a caffeoyl signals: 6.80 (2H, m, H-5'', 6'') and 6.97 (d, J = 1.7 Hz, H-2''), together with two olefinic protons with a trans coupling constant (J = 15.9 Hz) at δ_{H} 6.04 (d, H-8'') and 7.34 (d, H-7''); in addition, a glycopyranose moiety for an anomeric proton of a sugar at δ : 5.35 (1H, d, J = 7.4 Hz, H-1'). The coupling constant of J = 7.4 Hz indicated a β -configuration for the glyucose moiety. The carbon signals at δ_{C} 102.1 (C-1'), 75.9 (C-5''), 74.0 (C-2'', 3''), 69.7 (C-4'') and 62.2 (C-6'') revealed a galactopyranoside moiety⁸. The downfield shift of H2-6'' to 4.30 were in accordance with the caffeoyl acylated at C-6'' of the galactose moiety. The NMR data were good consistent with the literature⁸. The structure of compound **2** was therefore assigned as isorhamnetin-3-O-(6''-O-caffeoyl)- β -D-galactopyranoside.

In short, two phenolic compounds named flavogallonic acid (**1**) and isorhamnetin-3-O-(6''-O-caffeoyl)- β -D-galactoside (**2**) were isolated from the genus of *Sarcopyramis* for the first time.

ACKNOWLEDGEMENTS

This project was supported by the Project of Key Laboratory at Universities of Education Department of Xinjiang Uygur Autonomous Region (No. 2013ylsyt003).

REFERENCES

1. X.G. Huang and C.P. Wan, *Asian J. Chem.*, **23**, 3581 (2011).
2. J.Y. Yang, C.P. Wan and Y. Qiu, *J. Chin. Med. Mater.*, **33**, 542 (2010).
3. C.P. Wan, X. Zheng, H.F. Chen, X. Zou, Z.R. Song, S.R. Zhou and Y. Qiu, *China J. Chin. Mater. Med.*, **34**, 172 (2009).
4. X.M. Wang, C.P. Wan, S.R. Zhou and Y. Qiu, *Molecules*, **13**, 1399 (2008).
5. C.P. Wan, Y. Qiu and S.W. Cao, *Chem. Nat. Comp.*, **48**, 126 (2012).
6. B. Pfundstein, S.K. El Desouky, W.E. Hull, R. Haubner, G. Erben and R.W. Owen, *Phytochemistry*, **71**, 1132 (2010).
7. T. Tanaka, G.I. Nonaka and I. Nishioka, *Chem. Pharm. Bull.*, **34**, 1039 (1986).
8. F. Calzada, R. Cedillo-Rivera and R. Mata, *J. Nat. Prod.*, **64**, 671 (2001).