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Two New Xanthone Glycosides from *Swertia Tetraptera*

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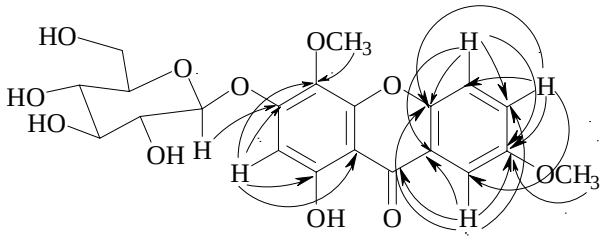
Abstract: Two new xanthone glycosides, tetraswerosides A and B, were isolated from the whole plant of *Swertia tetraptera*. Their structures were determined as 3-O-β-D-glucopyranosyl-1-hydroxy-4,7-dimethoxyxanthone and 3-O-[β-D-xylopyranosyl-(1→6)-β-D-glucopyranosyl]-1-hydroxy-4,7-dimethoxyxanthone by spectroscopic methods.

Keywords: *Swertia tetrapetra*, xanthone glycoside, tetraswerosides A and B.

Swertia tetraptera Maxim. is a high altitude perennial plant growing on grassy and moist meadows in the Qinhai-Xizang Plateau. It is used in Tibetan folk medicine for the treatment of hepatic, choleric and inflammatory disease[1]. In this paper, we report the structure elucidation of two new xanthone glycosides named tetraswerosides A (**1**) and B (**2**) isolated from the whole plant of *Swertia tetraptera*.

Figure 1 The key HMBC correlations for **1**



Compound **1** was obtained as yellow amorphous solid (62 mg), mp 252-254 °C. Its HRMS showed a molecular ion peak M^+ at *m/z* 450.1126, calculated 450.1162 for $C_{21}H_{22}O_{11}$. It was suggested the presence of a xanthone skeleton from UV absorption at: 223, 263, 303, 380 nm and IR (KBr) absorption bands at 3420, 1647, 1609 and 1489 cm^{-1}. The signal at δ 12.6 ppm in ^1H NMR spectrum of **1** (DMSO-d_6) indicated that a hydroxyl was chelated to a carbonyl group[2]. The ^1H NMR spectrum also exhibited one aromatic proton at δ 6.66 ppm (s), and three coupled aromatic protons at δ 7.46 (dd, J = 2.8, 8.7 Hz), 7.64 (d, J = 8.7 Hz) and 7.50 (d, J = 2.8 Hz), indicating that one aromatic ring was mono substituted and the other was trisubstituted. Hydrolysis with usual method gave glucose and aglycone. The signals of the anomeric proton of the glucose appeared at δ

5.10 (d, J = 6.8 Hz), indicating that the sugar moiety should be β-orientated. The HMBC correlations of **1** are shown in **Figure 1**. Therefore, **1** was identified as 3-O-β-D-glucopyranosyl-1-hydroxy-4, 7-dimethoxyxanthone.

Compound **2** was obtained as yellow amorphous solid (8.7 mg), mp 277-278°C. Its UV, IR and NMR spectra are very similar to **1**. The HRMS showed M^+ at 582.1580, calculated 582.1585 for $C_{26}H_{30}O_{15}$. EIMS showed *m/z* 582 M^+, 450 $[M-132]^+$, 388 $[M-132-162]^+$, indicating that **2** has one more sugar fragment than **1**. TLC hydrolysis with hydrochloric acid gave glucose and xylose. Comparing the chemical shifts of glucose with those of **1**, the C-6' in **2** shifted to lower field by about 7.4 ppm. So C-1" of xylose connected with the C-6' of glucose in **2**. The xylose should be β-orientated because the signal of the anomeric proton of the sugar moiety appeared at δ4.14 with coupling constant 7.2 Hz. From the ^{1}H NMR and ^{13}C NMR data, the structure of **2** was determined as 3-O-[β-D-xylopyranosyl-(1→6)-β-D-glucopyranosyl]-1-hydroxy-4,7-dimethoxyxanthone.

Table 1 ^{1}HNMR and ^{13}CNMR data of **1** and **2** (in DMSO-d_6, δ ppm)

	^{1}H		^{13}C			^{1}H		^{13}C	
No.	**1**	**2**	**1**	**2**	No.	**1**	**2**	**1**	**2**
1			157.5	157.5	glc-1'	5.10, d (6.8)	5.08, d (7.0)	99.9	100.1
2	6.66, s	6.72, s	97.9	97.9	2'			73.1	73.3
3			157.4	157.4	3'			77.1	76.5
4			128.7	128.8	4'			69.5	69.6
4a			148.9	149.0	5'			76.5	75.6
4b			150.2	150.3	6'			61.1	68.5
5	7.64, d (8.7)	7.67, d (9.0)	119.6	119.6	xyl-1"		4.14, d (7.2)		104.1
6	7.46, dd (8.7, 2.8)	7.49, dd (9.1, 3.0)	124.9	125.0	2"				73.1
7			155.8	155.8	3"				76.5
8	7.50, d (2.8)	7.53, d (3.0)	105.2	105.3	4"				69.4
8a			119.9	120.0	5"				65.6
8b			103.1	103.3	4-OMe	3.85, s	3.87, s	60.5	61.2
C=O			180.2	180.3	7-OMe	3.88, s	3.93, s	55.7	55.8

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