A New Diterpene Glycoside from *Isodon forrestii*

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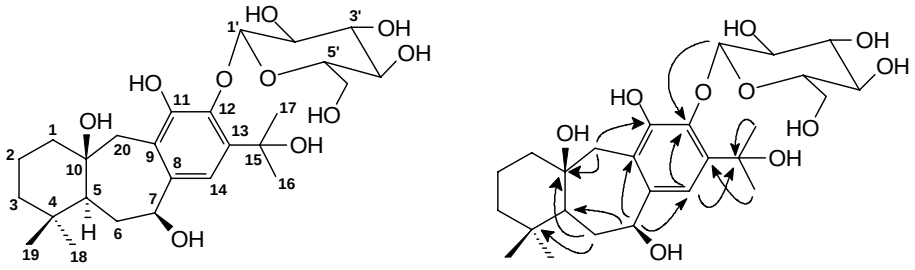
Abstract: A new diterpene glycoside named 9(10→20)-abeo-7β,10β,11,15-tetrahydroxy-8,11,13-abietatrien-12-O-β-D-glucopyranoside was isolated from aerial parts of *Isodon forrestii*. Its structure was determined by means of spectroscopic studies.

Keywords: *Isodon forrestii*, diterpene glycoside, abietanoid; 9(10→20)-abeo-7β,10β,11,15-tetrahydroxy-8,11,13-abietatrien-12-O-β-D-glucopyranoside.

The genus *Isodon* has been shown to be a rich source of diterpenes, especially the highly oxidized *ent*-kaurene diterpenoids with various biological activities[1-3]. The chemical constituents of *Isodon forrestii* was reported by Yun Long Xu *et al.*[4]. We have investigated the titled plant collected in another place, from the 70% acetone extract of the aerial parts of *I. forrestii*, seven compounds including a new diterpene glycoside **1** were isolated by a combination of silica gel, preparative TLC and recrystallization.

Figure 1 The key HMBC correlations of **1**



1

9(10→20)-Abeo-7β,10β,11,15-tetrahydroxy-8,11,13-abietatrien-12-O-β-D-glucopyranoside **1**, $C_{26}H_{40}O_{10}$, $[\alpha]_D^{24.7}$ –24.05 (c=0.291, C_5H_5N); UV spectrum: 282.5, 218.5 and 206 nm and IR spectrum: 1643, 1587 cm^{-1} exhibited the presence of aromatic ring; in ^1H and ^{13}C NMR spectra (**Table 1**) the signals associated with a β-D-glucopyranoside were readily recognized. The DEPT spectrum gave signals of aglycone moiety, four methyls (δ 31.9, 31.6, 31.4, 22.1), five methylenes (δ 42.7, 42.3, 40.7, 35.6, 19.1), two methines

(δ 73.0, 55.8)，three quaternary carbons (δ 72.3, 70.3, 34.5) and six aromatic carbons (δ 149.9, 144.5, 142.8, 139.3, 122.2, 112.0). The spectral data above suggested that the aglycone moiety of **1** was a 20(10→9)-abeo-abietanoid with aromatic C-ring[5]. Its HMBC spectra **(Figure 1**) determined the glucose moiety was located at C-12, and four hydroxyl groups were at C-7, C-10, C-11 and C-15, respectively. Furthermore, its Roesy spectrum showed that H-7 correlated to H-5α and H-20α, H-1β to H-20β and H-1α to H-20α, confirming β-oriented 7-OH and 10-OH. Thus, compound **1** was elucidated as 9(10→20)-abeo-7β,10β,11,15-tetrahydroxy-8,11,13-abietatrien-12-O-β-D-glucopyranoside.

Table 1 ^{1}H (400 MHz) and ^{13}C (100.6 MHz) NMR spectral data for **1** (in C_5D_5N)

No.	C	No.	C	No.	H (J Hz)	No.	H (J Hz)
1	42.3 (t)	14	112.0 (d)	1α	1.53 (m)	18	0.96 (s)
2	19.1 (t)	15	72.3 (s)	1β	1.96 (m)	19	1.14 (s)
3	42.7 (t)	16	31.6 (q)	2α	1.32 (m)	20α	2.62 (d, 14.1)
4	34.5 (s)	17	31.4 (q)	2β	2.11 (m)	20β	3.87 (d, 14.1)
5	55.8 (d)	18	31.9 (q)	3α	1.24 (m)	1′	5.33 (d, 8.1)
6	35.6 (t)	19	22.1 (q)	3β	1.40 (m)	2′	4.30 (overlap)
7	73.0 (d)	20	40.7 (t)	5α	1.60 (d, 10.1)	3′	4.19 (t, 9.0)
8	144.5 (s)	1′	106.5 (d)	6α	2.34 (m)	4′	4.30 (overlap)
9	122.2 (s)	2′	75.2 (d)	6β	2.44 (m)	5′	3.80 (m)
10	70.3 (s)	3′	78.1 (d)	7α	5.26 (d, 9.7)	6′a	4.44 (dd, 9.9, 1.7)
11	149.9 (s)	4′	70.9 (d)	14	8.03 (s)	6′b	4.30 (overlap)
12	142.8 (s)	5′	79.2 (d)	16	1.92 (s)		
13	139.3 (s)	6′	61.9 (t)	17	2.00 (s)		

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