Chinese Chemical Letters Vol. 15, No. 8, pp 925-926, 2004
http://www.imm.ac.cn/journal/ccl.html

A New Dihydroflavone Glycoside from *Glycyrrhiza uralensis*

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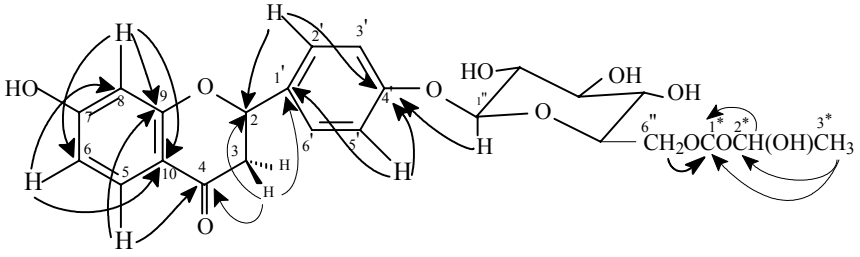
Abstract: A new dihydroflavone glycoside was isolated from the underground parts of *Glycyrrhiza uralensis*. Its structure was elucidated as 7–hydroxyl–4'–*O*–β–D–(6"–*O*–α–hydroxylpropionyl) glucopyranosyl dihydroflavone by spectral methods.

Keywords: *Glycyrrhiza uralensis*, dihydroflavone glycoside.

Licorice root is one of oldest traditional Chinese medicines. In recent years, there have been many reports on the antimicrobial activities of flavonoids from the root and rhizome of *Glycyrrhiza* species[1]. The chemical research of *Glycyrrhiza uralensis* led to the isolation of a new dihydroflavone glycoside **1**. In this paper we report the structure elucidation of it.

Compound **1** was isolated as white amorphous powder, mp 230°C. $[\alpha]_D^{25}$ –6.6 (*c* 0.03, DMSO). Its molecular formula was determined as $C_{24}H_{26}O_{11}$ by HRFAB-MS *m/z* 491.1538 $[M+H]^+$ (calcd. 491.1553), FAB-MS *m/z* $[M+H]^+$ 491 and ESI-MS, *m/z* $[M–H]^-$ 489. The IR spectrum (KBr, cm^{-1}) exhibited absorption bands at 3400, 1720, 1650, 1610, 1470. The UV spectrum (MeOH, λ_{max}) exhibited absorption bands at 202 (sh),

Figure 1 The long correlations observed from HMBC spectrum of compound **1**



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210 (sh), 220, 270, 302 (sh) nm. The ^{1}HNMR spectrum of compound 1 showed signals of three aromatic protons forming an ABX system [δ 7.66 (d, J=8.6 Hz, H-5), 6.52 (dd, J=8.6, 2.0 Hz, H-6) and 6.36 (d, J=2.0 Hz, H-8)], four aromatic protons forming AA'BB' system [δ 7.44 (d, J=8.6 Hz, H-2', H-6') and 7.06 (d, J=8.6 Hz, H-3', H-5')] and aliphatic protons attributed to a CH-CH_2 system [δ 5.54 (dd, J=13.0, 2.5 Hz, H-2) and 3.12 (dd, J=17.0, 13.0 Hz, H-3_{trans}), 2.67 (dd, J=17.0, 2.5 Hz, H-3_{cis}), including the presence of a dihydroflavone structure in the molecule. Comparing the NMR data of compound 1 with literature values for liquiritin[2] showed the presence of an anomeric proton for β-glucose [δ 4.94 (d, J=7.5 Hz, H-1")] substituted at C-4'. Furthermore, in the ^{13}CNMR spectrum of compound 1, the downfield shifted signal for C-6" (+3.74 ppm) and the upfield shifted signal for C-5" (–2.33 ppm) indicated that compound 1 was liquiritin with a substitute at the C-6"[3]. The ^{13}CNMR spectrum of compound 1 showed the presence of a methyl (δ 21.23), a methine having a hydroxyl group (δ 66.77) and an ester carbonyl (δ 175.28). Additionally, the ^{1}HNMR spectrum for 1 showed a doublet at δ 1.27 for a methyl group and a quartet at δ 4.14 for a methine group. These data identified the substitute as α-hydroxylpropionyl group. The ^{1}HNMR–^{13}CNMR long–range correlations in HMBC experiment further confirmed the above structural elucidation of **1**. Consequently, compound 1 was identified as 7–hydroxyl–4'–*O*–β–D–(6"–*O*–α–hydroxylpropionyl) glucopyranosyl dihydroflavone, a glycoside which has not previously been reported in nature.

Table 1 ^{1}HNMR(500MHz) and ^{13}CNMR(125MHz) data of compound **1** in DMSO-d_6, δ_{ppm}

NO.	δ_C	δ_H	NO.	δ_C	δ_H
2	79.50	5.54,dd,(13.0,2.5)	3´,5´	117.04	7.06,d,(8.6)
3	44.08	3.12,dd,(17.0,13.0)	4´	158.13	
		2.67,dd,(17.0,2.5)	1"	100.93	4.94,d,(7.5)
4	190.75		2"	73.96	
5	129.29	7.66,d,(8.6)	3"	77.17	
6	111.44	6.52,dd,(8.6,2.0)	4"	70.73	3.14-4.45(6H,m)
7	165.51		5"	74.69	
8	103.44	6.36,d,(2.0)	6"	64.50	
9	163.91		1*	175.28	
10	114.42		2*	66.77	4.14,q,(7.0)
1´	133.40		3*	21.23	1.27,d,(7.0)
2´,6´	128.84	7.44,d,(8.6)			

Acknowledgment

This work was supported by the Natural Science Foundation of Beijing (NO.7011002)

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Received 8 October, 2003