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Alkaloids from the Roots of *Saccopetalum prolificum*

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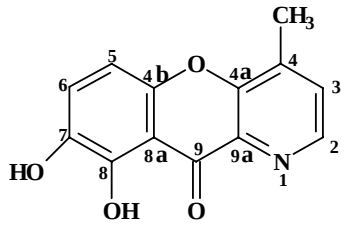
Abstract: A new alkaloid, named prolifine (**1**), was isolated along with four known alkaloids, liriodenine (**2**), 6-hydroxyonychine (**3**), isooncodine (**4**) and discretamine (**5**) from the roots of *Saccopetalum prolificum*. The structure of **1** was elucidated on the basis of spectroscopic and chemical methods.

Keywords: *Saccopetalum prolificum*, alkaloid, prolifine.

In recent years, an increased interest in the phytochemistry of the Annonaceae has been sparked by the isolation of the antileukemic Annonaceous acetogenin[1]. *Saccopetalum prolificum* (Chun *et* How) Tsiang (Annonaceae) is an evergreen tree distributed in Hainan Province, P. R. China. The ethanolic extract of the plant exhibited cell growth inhibitory activity (20 μg/ml) against L1210 lymphocytic leukemia. A new alkaloid, prolifine (**1**), was isolated from the roots of *S. prolificum*, in addition to four known alkaloids, liriodenine (**2**), 6-hydroxyonychine (**3**), isooncodine (**4**) and discretamine (**5**). Among them, liriodenine (**2**) was reported to have potent cytotoxicity against KB, A-549, HCT-8, P-388 and L-1210 cell lines[2]. In this paper, we focus on the structure elucidation of compound **1**.



1

Prolifine (**1**) was isolated as yellow needles, mp 243-245°C, UV λ_{max}^{MeOH} (log ε) 205 (4.43), 222 (4.27), 253 (4.02), 269 (4.06), 286 (4.04), 352 (3.97) nm. The HREIMS of **1** exhibited the $[M]^+$ peak at *m/z* 243.0529 corresponding to the molecular formula $C_{13}H_9NO_4$ (calcd 243.0531). Its IR spectrum indicated the presence of hydroxy (3419

cm^{-1}), carbonyl (1712 cm^{-1}) and aromatic ring (1587, 1500, 1452 cm^{-1}). The ^{13}C NMR spectrum and DEPT experiments of **1** revealed 13 signals, composed of one methyl, four methines and eight quaternary carbons (**Table 1**). The ^{1}H NMR spectrum showed the existence of a methyl group at δ 2.79 (3H, s) bonded to an aromatic ring. In the low-field region of the ^{1}H NMR spectrum, two characteristic α- and β- pyridine protons appeared at δ 8.83 (1H, d, J = 5.2 Hz) and δ 7.59 (1H, d, J = 5.2 Hz) respectively. The ^{1}H NMR signal of a hydroxy group resonated at δ 13.72 due to a hydrogen bond formed between the hydroxy and the carbonyl. The presence of two vicinal hydroxy groups was demonstrated by the positive reaction of **1** to $SrCl_2$ test[3]. Then an AB pair of aromatic protons at δ 6.71 (1H, d, J = 8.8 Hz) and δ 7.04 (1H, d, J = 8.8 Hz) must be located at C-5 and C-6 positions. The ^{1}H and ^{13}C NMR data of **1** were further assigned on the basis of the HMBC spectrum. In the HMBC spectrum of **1**, the correlations of H-2 with C-3, C-4 and C-9a; H-3 with C-2, C-4, C-4a and 4-CH_3; H-5 with C-4b, C-6, C-7 and C-8a; H-6 with C-4b, C-5, C-7 and C-8; 7-OH with C-6, C-7 and C-8; 8-OH with C-7, C-8 and C-8a; the hydrogen of 4-CH_3 with C-3 and C-4 were observed. All of these correlations were in agreement with the structure.

Table 1. ^{13}C and ^{1}H NMR Spectral Data of **1** in $CDCl_3$ (125 MHz for ^{13}C and 500 MHz for ^{1}H)

NO.	δ_C	δ_H	J_{HZ}
2	151.0	8.83 (d)	5.2
3	126.2	7.59 (d)	5.2
4	115.4		
5	105.0	6.71 (d)	8.8
6	118.9	7.04 (d)	8.8
7	141.5		
8	146.1		
9	180.1		
4a	159.1		
4b	144.6		
8a	103.8		
9a	154.4		
7-OH		9.10 (s)	
8-OH		13.72 (s)	
CH_3	22.60	2.79 (s)	

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