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NOTE

A New Alkaloids from *Corydalis impatiens*

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A new alkaloids, named impatien A **1**, were isolated from the roots of *Corydalis impatiens* (Pall.) Fisch. The structures of the new compounds were established on the basis of spectroscopic data analysis, especially of their 2D NMR spectra.

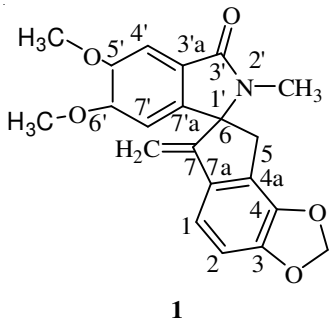
Key Words: *Corydalis impatiens*, Isoindole alkaloids.

Corydalis impatiens (Pall.) Fisch grows in south China and is an important component in various prescriptions in traditional Chinese medicine[1]. The Corydalis plant has been demonstrated to possess many pharmacological activities, including antibacterial, antiviral and anticancer activities[2]. To the best of our knowledge, no study on the chemical constituents of the *C. impatiens* has *hitherto* been reported. As part of our studies of medicinal plants growing on the Yunnan Plateau, we did a careful phytochemical investigation on the roots of this plant was performed. As a result, a new alkaloids were isolated and identified as impatien A **1**.

Plant material: The roots of *C. impatiens* were collected from Diqing area, Yunnan Province, China, in October 2005 and identified by prof. Gan-peng li in Yunnan University of Nationalities. A voucher specimen was deposited in our laboratory of school of chemistry and biotechnology.

Extraction and isolation: The air-dried plant materials (14 kg) were ground and extracted with 70 % EtOH under reflux. The filtered extract was combined and concentrated in vacuum at 40 ºC to yield EtOH extract (750 g). The extract was dissolved in 2 % hydrochloric acid. The filtrated HCl aqueous solution was defatted with ether and basified to pH = 10 with 10 % aqueous ammonia and was extracted with chloroform to give total alkaloids (300 g). The chloroform extract (40 g) was chromatographed over silica gel column eluted with $CHCl_3$-MeOH (100:1 to 20:1) to give alkaloids **1** (12 mg).

Compound **1** gave a molecular formula of $C_{21}H_{19}NO_5$, on the basis of HRESIMS (m/z 388.1159 $[M + Na]^+$, calcd. (%)



1

Fig. 1. Structures of compound **1**

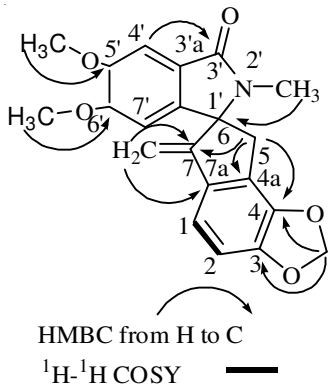


Fig. 2. Key HMBC and ^{1}H-^{1}H COSY correlations of compound **1**

388.1160), colourless needles, m.p. 152-153 ºC. The UV spectrum of **1** showed absorption maxima at 224 (4.2) nm and the

TABLE-1
NMR (300 Hz) DATA OF **1** (CD_3OD, δ ppm, *J* IN Hz)

No.	δ_H	δ_C	No.	δ_H	δ_C
1	7.21(1H, d, *J* = 8.1)	116.0(d)	1'		75.1 (s)
2	6.86(1H, d, *J* = 8.1)	109.5(d)	2'(N-CH_3)	2.82 (3H, s)	25.2 (q)
3	–	150.3(s)	3'	–	170.5 (s)
4	–	145.0(s)	3'a	–	123.3 (s)
4a	–	123.3(s)	4'	7.28 (1H, s)	105.8 (d)
5	3.31 (2H, m)	36.7(t)	5'	–	151.5 (s)
6	–	75.1(s)	6'	–	155.1 (s)
7	–	149.8(s)	7'	6.65 (1H, s)	104.5 (d)
7a	–	135.8 (s)	7'a	–	146.2 (s)
$=CH_2$	5.54 or 4.42 (each 1H, s)	104.9(t)	$-OCH_3$	3.89 (3H, s)	56.6 (q)
$-OCH_2O-$	6.03 (2H, d)	103.1(t)	$-OCH_3$	3.73 (3H, s)	56.6 (q)

inspection of the NMR data revealed an isoindole-type alkaloids[3,4]. The ^{13}C NMR and DEPT (Table-1) spectra of **1** showed 21 carbon signals including 3 methyl, 3 methylene, 4 methine and 11 quaternary carbons. The ^{13}C NMR signal at δ_C 104.9 (t) revealed an exocyclic methylene group. The ^{13}C NMR spectrum showed carbonyl and N-CH_3 at δ_C 170.5 and δ_C 25.2, respectively. The ^1H NMR spectrum displayed a high-field resonance of three protons at δ_C 2.82(s) for the N-CH_3 group and three protons at δ_H 3.89(s) for the $-OCH_3$ group and three protons at δ_H 3.73(s) for another $-OCH_3$ group.The HMBC correlations were observed from the proton signals of 5.54, 4.42 ($=CH_2$) to C-6, C-7 and C-7a, suggesting the olefinic methylene located at C-7. The HMBC correlations from δ_H 7.28 (H-4') to δ_C 170.5 (C-3') and from δ_H 2.82 (2'-NCH_3) to δ_C 170.5 (C-3') and δ_C 75.1 (C-6) indicated that an carbonyl located at C-3' and an methyl located at N-2' (Fig. 2), which was also supported by the IR data (1686 cm^{-1}). There is one spin-spin system of **1** established by COSY correlations, the spin-spin system by two aromatic protons at δ_H 7.21(1H, d, *J* = 8.1Hz, H-1) and δ_H 6.86 (1H, d, *J* = 8.1 Hz, H-2). Based on the above analyses, the structure of **1** (Fig. 1) was identified as impatien A.

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