



NOTE

Third New Alkaloids from *Corydalis impatiens*

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A new alkaloids, named impatien C 1, was 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.

Keywords: *Corydalis impatiens*, Isoindole alkaloids.

Corydalis impatiens (Pall.) Fisch grows in south China and is an important component in various prescriptions in traditional Chinese medicine¹. The *Corydalis* plant has been demonstrated to possess many pharmacological activities, including antibacterial, antiviral and anticancer activities². 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. As a result, a new alkaloids were isolated and identified as impatien C 1.

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 °C 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 soluble extract (30 g) was repeated CC and Sephadex LH-20 to provide impatien C 1 (19 mg).

The HRESIMS determined the formula of compound **1** to be C₂₂H₂₁NO₆ (at *m/z* 396.1442 [M + 1]⁺, Calcd.: 396.1447), white crystals, m.p. 160-161°C. The ¹³C NMR and DEPT

(Table-1) spectra of compound **1** showed 22 carbon signals including one methyl, 6 methylene, 6 methine and 9 quaternary carbons. The ¹³C NMR signal at δ_c 172.4 (s) revealed a carboxyl. The HMBC correlations from δ_H 2.68 (H-15) to δ_c 172.4 (C-16), δ_c 57.0 (C-8) and from δ_H 4.55 (H-8) to δ_c 119.1 (C-8a), δ_c 46.1 (C-6), δ_c 38.4 (C-15), δ_c 172.4 (C-16) indicated an carboxyl at C-8, which also was supported by its IR data (1719 cm⁻¹). There are four spin-spin systems (Fig. 2) of compound **1** established by COSY correlations, the first spin-spin system by two protons at δ_H 2.75 (2H, d, *J* = 9.4 Hz, H-5) and δ_H 2.90 (2H, d, *J* = 9.4 Hz, H-6), the second spin-spin system by other two protons at δ_H 4.55 (1H, d, *J* = 14 Hz, H-8) and δ_H 2.68 (2H, d, *J* = 14 Hz, H-15), the third spin-spin system by other two protons at δ_H 3.10 (2H, d, *J* = 10.4 Hz, H-13) and δ_H 4.11 (1H, d, *J* = 10.4 Hz, H-14) and the fourth spin-spin system by two aromatic protons at δ_H 6.69 (1H, d, *J* = 7.9 Hz, H-11) and δ_H 6.59 (1H, d, *J* = 7.9 Hz, H-12). Its ¹H and ¹³C NMR spectra (Table-1) were similar to those of the compound impatien B³, suggesting compound **1** was also an protoberberine-type alkaloids⁴⁻⁶. Analysis of ¹H and ¹³C NMR data of compound **1** in comparison with impatien B clearly indicated that the difference between the two compounds should be confined to a functional group at C-16, which was found to be the -OCH₃ in compound **1** instead of the -OH in impatien B. The ¹³C NMR signal at δ_c 51.7(q) revealed an oxygenated methyl group and the HNMR spectrum displayed a high-field resonance of three protons at δ_H 3.67 for the -OCH₃ group. Thus compound **1** (Fig. 1) was characterized to be impatien C.

TABLE-1
NMR (300 Hz) DATA OF COMPOUND 1 (CDCl₃, δppm, J IN Hz)

No.	δ _H	δ _C	No.	δ _H	δ _C
1	6.60 (1H, s)	106.6(d)	10		145.1(s)
1a		131.8(s)	11	6.69 (1H, d, <i>J</i> = 7.9)	108.6(d)
2		145.6(s)	12	6.59 (1H, d, <i>J</i> = 7.9)	121.3(d)
3		146.0(s)	12a		128.0(s)
4	6,57 (1H, s)	107.2(d)	13	3.10 (2H, d, <i>J</i> = 10.4)	31.7(t)
4a		127.4(s)	14	4.11 (1H, d, <i>J</i> = 10.4)	51.0(d)
5	2.75 (2H, d, <i>J</i> = 9.4)	29.7(t)	15	2.68 (2H, d, <i>J</i> = 14.0)	38.4(t)
6	2.90 (2H, d, <i>J</i> = 9.4)	46.1(t)	16		172.4(s)
8	4.55 (1H, d, <i>J</i> = 14.0)	57.0(d)	-OCH ₂ O-	5.97 or 5.93 (1H, 1H, d, d)	100.7(t)
8a		119.1(d)	-OCH ₂ O-	5.94 or 5.90 (1H, 1H, s, s)	101.1(t)
9		143.6(s)	-OCH ₃	3.67 (3H, s)	51.7(q)

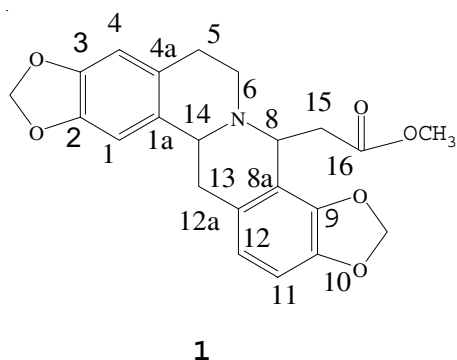


Fig. 1. Structures of compound 1

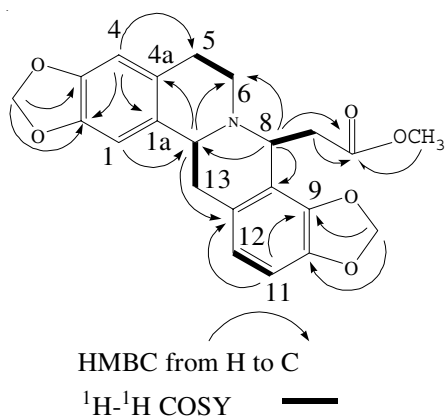


Fig. 2. Key HMBC and ¹H-¹H COSY correlations of compound 1

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