

Dissectol A, A Novel Monoterpene Glycoside from *Incarvillea dissectifoliola*

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Abstract: Dissectol A, a novel monoterpene glycoside was isolated from the methanol part of the 95% EtOH extract of *Incarvillea dissectifoliola* and its structure was determined by 1D and 2D NMR data.

Keywords: *Incarvillea dissectifoliola*, dissectol A, monoterpene glycoside.

The genus *Incarvillea* (Bignoniaceae) is widely distributed in Yunnan Province and has various bioactivities. *Incarvillea arguta* is a Yi herbal medicine traditionally used to treat hepatitis, diarrhea and infectious diseases in Sichuan and Yunnan Provinces¹. *I. sinensis* is one of the traditional herbal medicines used to treat rheumatism and relieve pain². Literature reported that the crude extract of *I. arguta* display antibacterial activity against *Staphylococcus aureus*, *Shigella sonnei*, *Pseudomonas aeruginosa* and can inhibit influenza virus¹, and that argutone isolated from *I. arguta* had bacteriostatic and sedative activities³. Previous reports showed the isolation of monoterpene alkaloids including incarvillateine⁴, incarvilline⁵, incarvines A⁶, B, C⁷ and incarvine D, methoxycarvillateine⁸, incarvillateines C and D⁹; N-oxides including incarvillateine N-oxide and incarvine A N-oxide⁸, and macrocyclic spermine alkaloids including incasines A, A', B, B' and C¹⁰ from *I. sinensis*, and 8-epideoxyloganic acid and alkaloids delavayines A, B and C from *I. delavayi*^{11,12}. Moreover, some monoterpene alkaloids such as incarvillateine and delavayine A had antinociceptive activity^{11,13}. Investigation on the phytochemistry of *I. dissectifoliola*¹⁴ was not reported before this work. Aerial parts of *I. dissectifoliola* collected in Yanyuan County, Sichuan Province were extracted with 95% EtOH. The alcoholic extract was separated into the petroleum ether, ethyl acetate and methanol parts. The methanol part was chromatographically isolated over silica gel and reversed-phase silica gel to afford a novel monoterpene glycoside, named dissectol A (**1**).

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carbon at δ 51.6 connecting with the one at δ 87.4 because the proton at δ 5.36 showed ^1H - ^{13}C long-range correlation with the carbon at δ 87.4, and the carbon at δ 87.4 showed ^{13}C - ^1H long-range correlation with proton at δ 3.84. Moreover, the carbon at δ 87.4 showed ^1H - ^{13}C correlations with the protons at δ 4.99 and 5.09, and carbon at δ 142.8 showed ^1H - ^{13}C correlations with protons at δ 4.54 and 4.57, indicating that the carbon at δ 142.8 linked with carbon at δ 51.6 to form the fragment **1f**. The carbon at δ 142.8 showed ^1H - ^{13}C correlations with the protons at δ 1.97 and 1.34, indicating the linkage of fragments **1c** and **1f** via the carbons at δ 142.8 and 37.3 to give the fragment **1g**. The carbon at δ 87.4 showed ^1H - ^{13}C long-range correlations with the proton at δ 5.52 (s), and the carbon at δ 110.4d showed ^1H - ^{13}C long-range correlations with the protons at δ 4.54 and 4.57, indicating that the carbon at δ 87.4 linked with the one at δ 110.4, and the carbon at δ 72.0 linked with the one at δ 110.4 through X, respectively. All oxygen substitutions were assigned based on ^{13}C NMR and HRFABMS data. The stereochemistry of C-2, C-4' and C-5' was determined to be shown in Figure 1 based on the correlations obtained from ROSEY experiment.

Table 1 The ^1H , ^{13}C NMR data, ^1H - ^{13}C long-range and ^1H - ^1H correlations^{1a}.

| position | ^{13}C | $^1\text{H}^b$ | HMBC | ^1H - ^1H COSY |
|----------|-----------------|--|--|----------------------------------|
| 1 | 72.0 | 4.54 (dd, H β) 4.57 (dd, H α) | C-2, C-3, C-1', C-2' C-2, C-3, C-1' | H-2 H-2 |
| 2 | 51.6 | 3.84 (t, 9.5) | C-1, C-3, C-3a, C-4, C-2', C-3' | Ha-1, Hb-1 |
| 3 | 142.8 | / | / | / |
| 3a | 113.7 | 4.99 (s, Ha) 5.09 (s, Hb) | C-2, C-3, C-4, C-2' C-2, C-3, C-4, C-2' | Hb-3a Hb-3a |
| 4 | 37.3 | 1.97 (m, 2H) | C-2, C-3, C-3a, C-5, C-6 | H-5 |
| 5 | 25.6 | 1.34 (m, 2H) | C-3, C-4, C-6 | H-4, H-6 |
| 6 | 33.5 | 0.96 (m, Ha) 1.36 (m, Hb) | C-5, C-8 C-3, C-5, C-7a, C-8 | H-5 Ha-6, H-8 |
| 7 | 36.5 | 1.65 (m) | C-5, C-6 | Ha-6, Ha-7a |
| 7a | 67.6 | 3.54 (dd, 5.7, 10.4, Ha) 3.62 (dd, 5.7, 10.4, Hb) | C-6, C-8 C-6, C-8 | H-7 H-7 |
| 8 | 17.4 | 0.88 (d, 7.4, 3H) | C-6, C-7, C-7a | H-7 |
| 1' | 110.4 | 5.52 (s) | C-1, C-2, C-2' | / |
| 2' | 87.4 | / | / | / |
| 3' | 209.8 | / | / | / |
| 4' | 72.6 | 5.36 (d, 10.0) | C-2c, C-2', C-3', C-5', C-6' | H-5' |
| 5' | 78.7 | 3.90 (br d, 10.0) | C-1', C-3' | H-4', H-6' |
| 6' | 62.1 | 4.43 (m, 2H) | C-4', C-5' | H-5' |

^a ^1H , ^{13}C -NMR and HMBC, ^1H - ^1H COSY and ROESY spectra were obtained at 500 MHz, 125 MHz and 500MHz, and recorded in $\text{C}_5\text{D}_5\text{N}$ at room temperature, respectively.

^b Coupling constants are presented in Hz. Unless otherwise indicated, all proton signals integrate to ^1H .

^c Signals of ^1H - ^{13}C long-range correlations are weak.

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