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Phytochemical communication

Phenolic constituents from the leaves of the carnivorous plant *Nepenthes gracilis*

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Abstract

Plumbagin, isoshinanolone, epishinanolone, shinanolone, quercetin and kaempferol were isolated from the leaves of *Nepenthes gracilis*. Spectral data of shinanolone are presented.

Keywords: Nepenthes gracilis; Shinanolone, NMR

Plant. *Nepenthes gracilis* (Nepenthaceae) leaves collected in Singapore in August 2000. A voucher specimen (Chia Lian Sai # 1) is deposited at the Plant Resource Center of the University of Texas at Austin.

Use in traditional medicine. No reports. Some other *Nepenthes* species have been used as folk remedies in Malaysia. The crushed leaves of some species have been applied in traditional medicine as an astringent [1].

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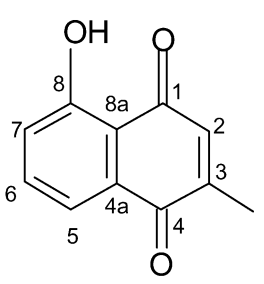
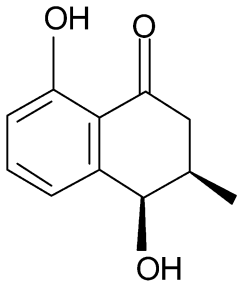
Previously isolated constituents. No reports. Some species of the genus *Nepenthes* are reported to accumulate triterpenes [2] and quinones [3,4].

Newly isolated constituents. Plumbagin **(1)** [5,6], isoshinanolone **(2)** [6,7], epi-isoshinanolone **(3)** [6,7], shinanolone **(4)** [6,7] and a small amount of quercetin and kaempferol.



1



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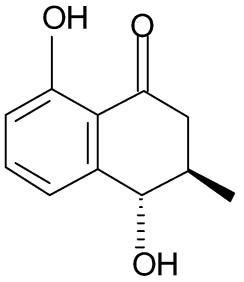

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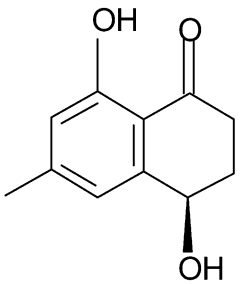

4

Shinanolone **(4).**^{1}H-NMR (500 MHz, $CDCl_3$): δ 2.16 (1H, *m*, H-3a), 2.30 (1H, *m*, H-3b), 2.36 (3H, *br s*,), 2.62 (1H, *m*, H-2a), 2.95 (1H, *m*, H-2b), 4.85 (1H, *dd*, *J* 8.0, 3.5 Hz, H-4), 6.75 (1H, *br s* H-7), 6.86 (1H, *br s*, H-5), 8.10 (1H, *s*, 4-OH), 12.40 (1H, *s*, 8-OH); ^{13}C-NMR (500 MHz, $CDCl_3$): δ 22.2 (CH_3), 31.30 (C-3), 34.4 (C-2), 67.7 (C-4), 113.1 (C-8a), 117.6 (C-7), 118.5 (C-5), 145.5 (C-6), 148.7 (C-4a), 162.8 (C-8), 203.5 (C-1); The ^{13}C assignments were achieved by HMQC and HMBC experiments; MS(CI) *m/z*: 193 $(M + H)^+$, 176 (base), 175; CI-HRMS: found 193.0856 $(M + H)^+$ calculated for $C_{11}H_{12}O_3$ 193.0864.

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