

# Chemical Constituents Of *Mitrella Kentii* (Annonaceae)

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**Abstract:** *Mitrella kentii* which belongs to the Annonaceae family is a tree-climbing liana found in the Malaysian Peninsula, Islands of Sumatra, Borneo, and New Guinea. This species was studied in 1972 for their alkaloids, 1997 and 2012 for their non-alkaloid constituents. In this study, chalcones, Desmosdumotin C (**1**) and their tautomer, 2-cinnamoyl-3-hydroxy-5-methoxy-4,6,6-trimethylcyclohexa-2,4-dienone (**2**), flavanone, 7-hydroxy-5,6-dimethoxy-2-phenylchroman-4-one (**3**), oxoaporphine alkaloids, Liriodenine (**4**) and Atherospermidine (**5**) and also terpenoid,  $\beta$ -Sitostenone (**6**) have been isolated from this species. All these compounds were isolated for the first time from *Mitrella kentii* except Liriodenine (**4**). The isolated compounds were elucidated using spectroscopic techniques such as UV, IR, 1D and 2D NMR and mass spectroscopy and by comparison their spectral data with those previously reported in the literatures. Desmosdumotin C (**1**) showed the anti-ulcer activity.

**Keywords:** Annonaceae, Alkaloid, Anti-ulcer activity, Desmosdumotin C, *Mitrella kentii*.

## 1. INTRODUCTION

*Mitrella kentii* from the family Annonaceae is a tree-climbing liana belonging to the custard apple family found in the Malaysian Peninsula and in the islands of Sumatra, Borneo, and New Guinea [1, 2]. Its synonyms are *Melodorum pisocarpum* and *M. elegans*, while the common (Indonesian) name is 'kiawi'. The plant is found in the tropics, especially in the Asia-Pacific regions. It is consumed in the form of a root decoction to treat fever in Malaysia. From the previous chemical studies on the stem bark of this species, in 1972, they are found oxoaporphine and isoquinoline types of alkaloid [1] and in 1997 for non-alkaloid constituents [2]. In our continuous research for biologically active compounds from the Malaysian flora, we started on the hexane and dichloromethane extracts of the stem bark of this plant for phytochemical investigations. This study led to the isolation of six known compounds; Desmosdumotin C (**1**) and its tautomer (**2**), 7-hydroxy-5,6-dimethoxy-2-phenylchroman-4-one (**3**), Liriodenine (**4**), Atherospermidine (**5**) and  $\beta$ -Sitostenone (**6**).

## 2. RESULTS AND DISCUSSION

Desmosdumotin C (**1**) was previously isolated from the roots of *Desmos dumosus* [3] and *Campomanesia lineatifoli*<sup>4</sup> and it was isolated for the first time from *Mitrella kentii*. Desmosdumotin C (**1**) was a novel chalcone and its structure has been established by X-ray crystallography together with 1D and 2D NMR spectroscopy.

Desmosdumotin C (**1**), yellow needle crystals, has the molecular formula  $C_{19}H_{20}O_4$  was established by high-resolution mass measurement (HREIMS) of the molecular ion peak  $[M+H]^+$  at  $m/z$  313.1435 and elemental analysis

data. Its IR spectrum showed the absorption peaks at  $1657\text{ cm}^{-1}$  indicating the presence of conjugated carbonyl group, the alkene group absorbed at  $1624\text{ cm}^{-1}$  and aromatic rings at  $1576$  and  $1514\text{ cm}^{-1}$ . The  $^1\text{H}$  NMR spectrum showed signals for a methoxyl group at  $\delta$  3.93 as a singlet, olefinic methyl group resonated at  $\delta$  2.02 as a singlet and two geminal methyl groups appeared at  $\delta$  1.36 as a singlet with six protons. The aromatic protons were resonated at  $\delta$  7.66-7.37 as multiplet and two *trans*-oriented olefinic protons were resonated at  $\delta$  8.32 as a doublet with  $J$  value 16.0 Hz and  $\delta$  7.92 as a doublet with  $J$  value 16.0 Hz which were assigned for C2'-H and C3'-H respectively. The  $^{13}\text{C}$ -NMR spectrum showed the presence of nineteen signals which belong to eight quaternary carbons, seven methine group, three methyls and one methoxyl group. From the foregoing results, the compound was identified as Desmosdumotin C. In addition, the chemical structure was confirmed by the X-ray crystallographic structure analysis as seen in Fig. (2) and Fig. (3) showed the HMBC, which is the correlations between hydrogen and carbon.

## 3. EXPERIMENTAL SECTION

### 3.1 General Experimental Procedure

The  $^1\text{H}$ -NMR and  $^{13}\text{C}$ -NMR experiments were performed on a JOEL 400 MHz spectrometer, a Bruker 400 MHz and 600MHz, respectively. The 2-D NMR experiments were performed on the JOEL and Bruker spectrometer using appropriate pulse sequence programs. The IR spectra were obtained on a Perkin Elmer 1600 Double-Beam recording spectrometer. HREIMS were determined on Agilent Technologies 6530 Accurate-Mass Q-TOF LC/MS. The UV spectra were recorded on a Shimadzu UV-160A ultraviolet-visible spectrometer.

### 3.2. Plant Material

The bark of *Mitrella kentii* (B1.) Miq. was collected in Mersing, Johor with a voucher specimen (KL 4139) and was

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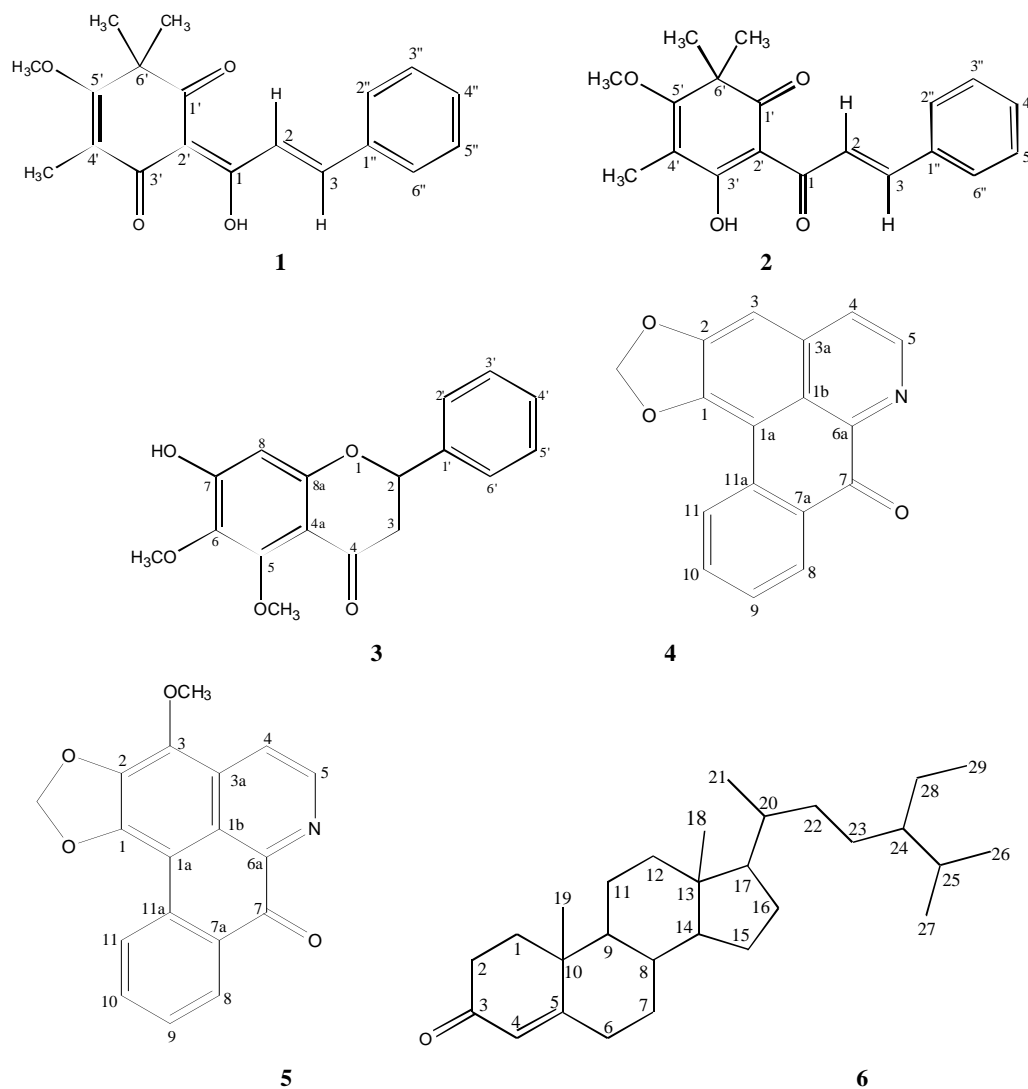


Fig. (1). Chemical constituents of *M. kentii*.

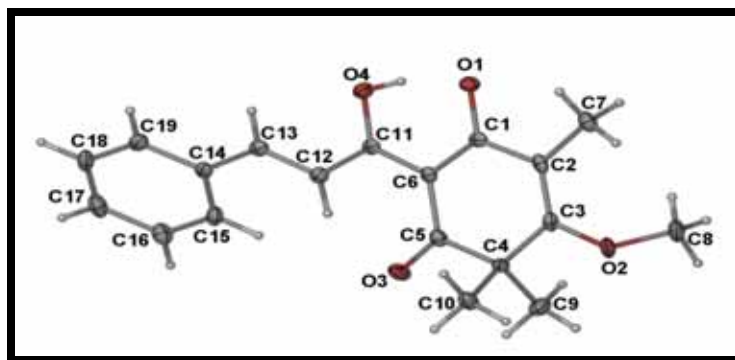


Fig. (2). X-ray crystallographic.

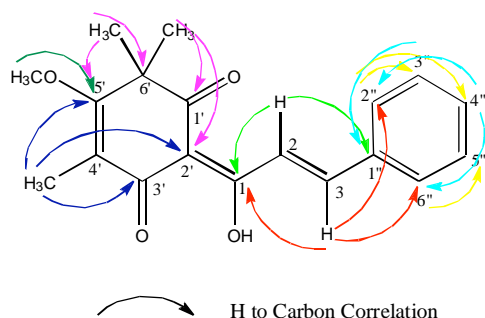
deposited at the Herbarium of Department of Chemistry, University of Malaya, Kuala Lumpur, Malaysia.

### 3.3. Extraction and Isolation

The dried and ground bark of *M. kentii* (1.0 kg) was first extracted with hexane followed by CH<sub>2</sub>Cl<sub>2</sub> and methanol. The hexane, CH<sub>2</sub>Cl<sub>2</sub> and methanol extracts were evaporated to dryness to give crude hexane, CH<sub>2</sub>Cl<sub>2</sub> and methanol extract, respectively. These extracts were subjected to

column chromatography using silica gel 60 and preparative TLC on Si gels. Two compounds were isolated from the hexane extract: Desmosdumotin C (1), its tautomer (2) and β-Sitostenone (6). 7-hydroxy-5,6-dimethoxy-2-phenylchroman-4-one (3), Liriodenine (4) and Atherospermidine (5) were isolated from the CH<sub>2</sub>Cl<sub>2</sub> extract.

**Desmosdumotin C (1):** C<sub>19</sub>H<sub>20</sub>O<sub>4</sub>, isolated as a yellow needle crystals from a n-hexane – CH<sub>2</sub>Cl<sub>2</sub> mixture, m.p.: 93-



**Fig. (3).** Selected 2D NMR correlations of Desmosdumotin C (1).

94 °C; UV  $\lambda_{\text{methanol}}$  : 380, 242, 225 nm; IR<sub>max</sub> (cm<sup>-1</sup>, NaCl disc): 3401, 1657, 1624, 1577, 1513, 1426, 1371, 1243, 1153, 1122, 977, 944; EIC-MS m/z [M+H]<sup>+</sup> (%): 312.140729 (calc. 312.3646 for C<sub>19</sub>H<sub>20</sub>O<sub>4</sub>); <sup>1</sup>H NMR (CDCl<sub>3</sub>, TMS)  $\delta$  (ppm): 8.3(1H, d, *J*= 16Hz), 7.9(1H, d, *J*=16Hz), 7.7(2H, m, Ar-2'',6''-H), 7.4(3H, s, Ar-3'', 4'', 5''-H), 3.9(3H, s, OCH<sub>3</sub>), 2.0(3H, s, Ar-CH<sub>3</sub>) 1.7(6H, s, CH<sub>3</sub>x2). <sup>13</sup>C NMR (CDCl<sub>3</sub>, TMS)  $\delta$  (ppm) : 198.1(C-1'), 192.5(C-3'), 187.3(C-1), 176.7(C-5'), 123.3(C-2), 144.9(C-3), 135.3 (C-1''), 130.7(C-3'',C-4'',C-5''), 128.9(C-2'',C-6''), 113.7(C-2''), 106.7(C-4'), 62.2(C-5'-OCH<sub>3</sub>), 50.5(C-6'), 24.4(C6'-CH<sub>3</sub>x2),

9.9(C4'-CH<sub>3</sub>). The compound was identified by comparison of their spectroscopic data with literature values.

### CONFLICT OF INTEREST

The authors confirm that this article content has no conflicts of interest.

### ACKNOWLEDGEMENTS

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