



## Short communication

Cytotoxic prenylated xanthone and coumarin derivatives from Malaysian *Mesua beccariana*Thiruvenkaran Karunakaran<sup>a</sup>, Gwendoline C.L. Ee<sup>a,\*</sup>, Keng H. Tee<sup>a</sup>, Intan S. Ismail<sup>a,b</sup>, Nor H. Zamakshshari<sup>a</sup>, Waziri M. Peter<sup>c</sup><sup>a</sup> Department of Chemistry, Faculty of Science, Universiti Putra Malaysia, Serdang, Selangor 43400, Malaysia<sup>b</sup> Laboratory of Natural Products, Institute of Bioscience, Universiti Putra Malaysia, Serdang, Selangor 43400, Malaysia<sup>c</sup> Makna Cancer Research Laboratory, Institute of Bioscience, Universiti Putra Malaysia, Serdang, Selangor 43400, Malaysia

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## ABSTRACT

Our recent research on the phytochemical constituents of the stem bark of *Mesua beccariana* gave one new xanthone, beccarixanthone T (**1**) and one new coumarin, beccamarin T (**2**) together with three known xanthones mesuarianone (**3**), mesuasione (**4**), 1,5-dihydroxyxanthone (**5**) and four known terpenoids, friedelin (**6**), stigmasterol (**7**), beta-sitosterol (**8**) and gamma-sitosterol (**9**). The structures of these compounds were elucidated and determined using spectroscopic techniques such as NMR and MS. The cytotoxic activities of compounds **1–4** as well as the crude extracts were tested against two cancer cell lines, Hep G2 (liver cancer cell line) and HT-29 (colon cancer cell line) using MTT assays. Mesuarianone (**3**) gave a significant activity on the HT-29 cell line while mesuasione (**4**) gave moderate activity against HT-29 cell line.

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## 1. Introduction

*Mesua beccariana* locally known as “mergasing paya” with a commercial name ironwood (Teh et al., 2010) belongs to the Clusiaceae family. This species of *Mesua* is distributed along in East Malaysia especially in the state of Sarawak. This *Mesua* genus has previously been reported to have ethnomedicinal values and is locally used to treat some diseases like fever, renal diseases, poultice and dyspepsia (Verotta et al., 2004; Teh et al., 2013). Phytochemicals discovered from these plants have been reported to have very good therapeutic values (Teh et al., 2010, 2013;). Moreover, the plant from this genus are known to be a prolific source of coumarins, xanthones and benzophenones which exhibit strong anti-inflammatory, antibiotic, antibacterial and cytotoxicity activities (Awang et al., 2010; Ee et al., 2005a,b, 2012; Mazumder et al., 2004; Teh et al., 2011; Feng et al., 2014; Karunakaran et al. (2016); Dang et al., 2015; Roy et al., 2013). There are not many phytochemical reports on this species but the phytochemical studies conducted by previous researchers have shown these species to possess some good ethnomedicinal values.

This paper reports our structural elucidations of compounds **1** and **2** (Fig. 1) as well as the cytotoxic activities of the crude extracts and compounds **1–4**.

## 2. Result and discussion

Compound **1** with molecular formula C<sub>29</sub>H<sub>32</sub>O<sub>6</sub> was obtained as yellowish oil from the hexane extract of *M. beccariana*. The HRESIMS spectrum revealed a pseudomolecular ion peak at *m/z* 477.1921 [M+H]<sup>+</sup> (calcd 477.2277) while the EIMS spectrum gave molecular ion (M<sup>+</sup>) peak at *m/z* 476 which corresponded to the molecular formula. The UV spectrum suggested a xanthone type compound with absorptions at λ<sub>max</sub> 342 (6.23), 260 (6.11) and 208 (6.01) supporting the xanthone structure. The FTIR spectrum showed an absorption at ν<sub>max</sub> 1375 cm<sup>-1</sup>, due to a geminal dimethyl moiety, while absorptions of a conjugated carbonyl group (C=O) at 1730 cm<sup>-1</sup>, an aromatic group (C=C) at 1580 cm<sup>-1</sup> and 1460 cm<sup>-1</sup> and an ether group at 1113 cm<sup>-1</sup>. A broad absorption peak at 3384 cm<sup>-1</sup> can also be seen due to the OH stretching.

The <sup>1</sup>H NMR spectrum supported the presence of a chelated hydroxyl by revealing a deshielded proton singlet at δ 13.08 (s, OH-1), two aromatic singlets at δ 6.36 (s, 1H, H-2) and δ 7.43 (s, 1H, H-8) as well as one methoxyl group at δ 3.90 (s, 3-OCH<sub>3</sub>, 3H). Signals due to the pyrano group were observed at δ 5.65 (d, 1H, J=9.15 Hz, H-10) and δ 6.46 (d, 1H, J=9.15 Hz, H-11). The presence of prenyl

\* Corresponding author.

E-mail addresses: [gwen@upm.edu.my](mailto:gwen@upm.edu.my), [gwendolinechenglian@gmail.com](mailto:gwendolinechenglian@gmail.com) (G.C.L. Ee).