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A new cytotoxic xanthone from *Garcinia rigida*

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Abstract

A new xanthone, yahyaxanthone (**1**), was isolated from *Garcinia rigida* leaves. Cytotoxicity evaluation showed that **1** was inhibitory to L1210 cell, with an IC_{50} value 4.08 μg/ml.

Keywords: *Garcinia rigida*; Yahyaxanthone; Cytotoxicity

1. Introduction

Garcinia species have been reported as sources of xanthones with useful biological activities, such as anti-inflammatory, antibacterial, antifungal, antioxidant, cytotoxic and anti-HIV [1]. *Garcinia rigida*, a lofty tree, is known in Indonesia as "manggis hutan" [2]. Some xanthones have already been isolated from this plant [3,4]. A new xanthone (**1**, Fig. 1), isolated from the same source , is described in this paper.

2. Experimental

2.1. General

FTIR: Bio-Rad Merlin. MS: Autospec 3000. NMR: Bruker AM-400 and DRX-500.

2.2. Plant

G. rigida Miq. (Guttiferae), leaves collected in Bogor, Indonesia, in October 2002 identified by Mrs. Dr. Irawati. A voucher specimen (No GR-1002) has been deposited in the Pharmacy Department of the University of Indonesia.

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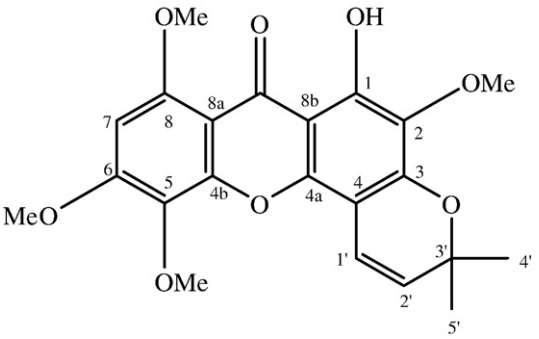

Fig. 1. Structure of compound **1**.

2.3. Extraction and isolation

The air dried leaves (900 g) were extracted with hexane for a week. The extract was concentrated to give a residue (10.0 g) that was Si-gel CC with petroleum ether-EtOAc to give **1** (172 mg).

Yahyaxanthone (**1**), yellow crystals, mp 194–196 °C, IR bands (KBr) 2968, 1657, 1568, 1156 cm^{-1}. EIMS *m/z*: 414 $[M]^+$(69), 399 (100), 384 (38), 354 (6), 192 (54). HRIEMS *m/z*: 414.1392 calc. for $C_{22}H_{22}O_8$ 414.1358. ^1H and ^{13}C NMR :see Table 1.

2.4. Cytotoxicity evaluation

Cytotoxicity test was done against L1210 murine leukemia cell line [5]. The bioassay was performed in the multi-well plate tissue culture (1 ml cell/well). Three various doses of the sample were diluted in MeOH and 1 ml MeOH as control. The samples and control were added to cells and were incubated during 48 h in the CO_2 incubator at 37 °C. The

Table 1
^1H and ^{13}C NMR data for **1** (500 and 125 MHz, $CDCl_3$, *J* in Hertz and δ in ppm)

C	δ_H	δ_C
1	13.33 (1H,s)	157.8
2	–	127.9
3	–	148.5
4	–	105.2
4a	–	152.9
4b	–	151.3
5	–	130.5
6	–	153.3
7	6.35 (1H, s)	91.5
8	–	157.2
8a	–	104.9
9	–	180.7
8b	–	103.0
1′	6.72 (1H, d, *J* 10)	115.7
2′	5.58 (1H, d, *J* 10)	127.3
3′	–	78.1
4′	1.75 (3H, s)	28.2
5′	1.75 (3H, s)	28.2
2-OMe	3.98 (3H, s)	61.5
5-OMe	3.93 (3H, s)	61.4
6-OMe	3.90 (3H, s)	56.3
8-OMe	3.96 (3H, s)	56.4

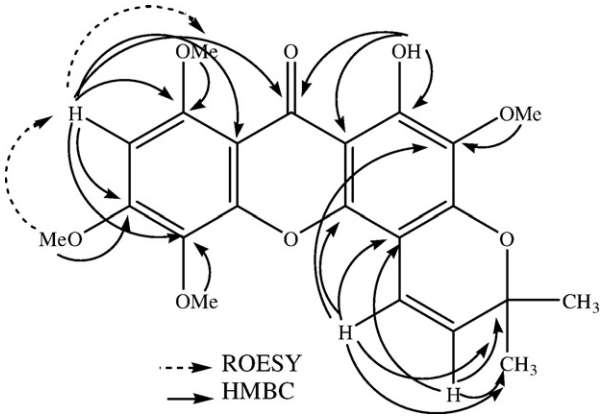

Fig. 2. Selected HMBC and ROESY correlations.

L1210 cells were obtained and derived from the Institute of Physical and Chemical Research (RIKEN), Japan. Brine shrimp lethality test (BLST) was done according to the method described by Meyer et al. [6].

3. Result and discussion

Compound **1**, $C_{22}H_{22}O_8$ in the ^1H NMR spectrum revealed the presence of one chelated hydroxyl group (δ 13.33), four methoxyls group, one aromatic proton singlet (δ 6.35), two *cis*-olefinic protons as doublets at δ 6.72 and 5.58 and two methyl groups on carbon carrying oxygen at δ 175 This suggested the presence of a dimethyl chromene fused with the xanthone nucleus. HMBC , ^1H–^{13}C COSY and ROESY NMR spectra suggested structure **1** for the isolated compound (Fig. 2). Compound **1** showed *in vitro* cytotoxic activity to L1210 murine leukemia cell line, with IC_{50} 4.08 μg/ml. Xanthone **1** also showed toxicity to *Artemia salina* in brine shrimp lethality test (BLST) with LC_{50} 3.09 μg/ml.

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