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Chemical constituents of Aglaia loheri

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ABSTRACT

The dichloromethane extract of the leaves of Aglaia loheri afforded spinasterol (1), trilinolein (2) and phytyl fatty acid ester (3). The structures of 1-2 were identified by comparison of their 13C NMR data with those reported in the literature. Compounds 1, 2 and 3 were evaluated for cytotoxicity against the colon carcinoma (HCT 116) using the MTT assay. They exhibited moderate cytotoxicity against HCT 116 with IC50 values of 40.52, 46.73 and 40.06, respectively.

Keywords: Aglaia loheri, Meliaceae, spinasterol, trilinolein, phytyl fatty acid ester, cytotoxic.

INTRODUCTION

Aglaia loheri is an endemic Philippine tree. An earlier study reported that the crude ethanolic extracts of the leaves of A. loheri exhibited high cytotoxicity against two human cancer cell lines: lung non-small cell adenocarcinoma (A549) and colon carcinoma (HCT 116) with IC50 values below 20 µg/ml. The extract was portioned into ethyl acetate and hexane fractions and tested for cytotoxicity. Lower IC50 values were obtained on the ethyl acetate fraction.[1] Another study showed that the methanol extracts of Aglaia loheri have teratogenic activity against maternal mice. Mice orally administered with 5 mg/ml and 10 mg/mL concentrations of Aglaia loheri extracts resulted in 75% and 100% resorption, respectively.[2] A previous study showed that the extracts of Aglaia loheri have angiosuppressive activity on duck embryo. Extracts of Aglaia loheri reduced CAM vascular density of treated embryos suggesting antiangiogenic activity.[3]

We report here the isolation, identification and cytotoxicity test results of 1–3 (Figure 1) against the colon carcinoma (HCT 116) using the MTT assay. To the best of our knowledge this is the first report on the isolation of these compounds from Aglaia loheri.

MATERIALS AND METHODS

General Experimental Procedures

NMR spectra were recorded on a Varian VNMRS spectrometer in CDCl3 at 600 MHz for 1H-NMR and 150 MHz for 13C-NMR spectra. Column chromatography was performed with silica gel 60 (70–230 mesh), while the TLC was performed with plastic backed plates coated with silica gel F254. The plates were visualized with vanillin-H2SO4 and warming.

Figure 1. Chemical constituents of A. loheri: spinasterol (1), trilinolein (2) and phytyl fatty acid ester (3).
Plant Material

Aglaia loheri leaves were collected from Kanawan, Morong, Bataan Province, Philippines in March 2012. Specimens of the plants were authenticated at the Institute of Biology, University of the Philippines, Diliman.

Extraction and Isolation

The air-dried leaves (550 g) of A. loheri were ground in an osterizer, soaked in CH₂Cl₂ for three days, and then filtered. The filtrate was concentrated by evaporation under vacuum to afford a crude extract (5.8 g) which was chromatographed in increasing proportions of acetone in CH₂Cl₂ at 10% increment by volume. The CH₂Cl₂ fraction was rechromatographed (3x) in petroleum ether to afford 3 (5 mg). The 10% acetone in CH₂Cl₂ fraction was rechromatographed (5x) in 5% EtOAc in petroleum ether to afford 1 (12 mg) after washing with petroleum ether. The 20% acetone in CH₂Cl₂ fraction was rechromatographed (4x) in 10% EtOAc in petroleum ether to afford 3 (25 mg).

Spinasterol (1): ¹³C NMR (150 MHz, CDCl₃): δ 37.12 (C-1), 31.45 (C-2), 71.05 (C-3), 37.97 (C-4), 40.24 (C-5), 29.62 (C-6), 117.45 (C-7), 139.56 (C-8), 49.43 (C-9), 34.20 (C-10), 21.53 (C-11), 39.44 (C-12), 43.27 (C-13), 55.11 (C-14), 23.01 (C-15), 28.50 (C-16), 55.88 (C-17), 12.04 (C-18), 13.04 (C-19), 40.82 (C-20), 21.36 (C-21), 138.2 (C-22), 129.4 (C-23), 51.2 (C-24), 31.9 (C-25), 21.1 (C-26), 19.0 (C-27), 25.4 (C-28), 12.2 (C-29).

Trilinolein (2): ¹³C NMR (150 MHz, CDCl₃): δ 62.08 (glyceryl CH₂), 68.86 (glyceryl CH), 173.29 (C=O 3), 172.84 (C=O 2), 34.04 (C-2α), 34.18 (C-2β), 24.83 (C-3α), 24.87 (C-3β), 29.08 (C-4α), 29.04 (C-4β), 29.19 (C-5α), 29.27 (C-5β), 29.11 (C-6α), 29.17 (C-6β), 29.62 (C-7α), 29.65 (C-7β), 29.19 (both C-8), 130.00 (C-9α), 129.98 (C-9β), 128.05 (C-10α), 128.07 (C-10β), 25.62 (both C-11), 127.88 (C-12α), 127.87 (C-12β), 130.22 (both C-13), 27.19 (both C-14), 29.36 (both C-15), 31.52 (both C-16), 22.57 (both C-18).

RESULTS AND DISCUSSION

The structures of 1 and 2 were elucidated and confirmed by comparison of their ¹³C NMR data with those of spinasterol⁹ and trilinolein⁷ reported in the literature. The structure of 3 was identified by comparison of its ¹H NMR data with those reported in the literature for phytol fatty acid ester.⁸

Cytotoxicity tests on 1, 2 and 3 were conducted against the human colon cancer cell line, HCT116. Results of the study (Figure 2) indicated that 1, 2 and 3 exhibited moderate cytotoxicity against HCT 116 with IC₅₀ values of 40.52, 46.73 and 40.06, respectively.

REFERENCES


