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Chemical constituents of *Alocasia portei* Schott

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ABSTRACT

*Chemical investigation of the dichloromethane extract of Alocasia portei afforded phytyl fatty acid esters (**1**), polyprenols (**2**), lutein (**3**), a mixture of stigmasterol (**4**) and β-sitosterol (**5**), chlorophyll a (**6**), chlorophyllide a (**7**), a mixture of linolenic acid (**8**) and saturated fatty acids (**9**), and hydrocarbons (**10**). The structures of **1**-**10** were identified by comparison of their NMR data with those reported in the literature.*

Keywords: *Alocasia portei*, Araceae, phytyl fatty acid esters, polyprenol, lutein, stigmasterol, β-sitosterol, chlorophyll a, chlorophyllide a, linolenic acid, saturated fatty acids, hydrocarbons

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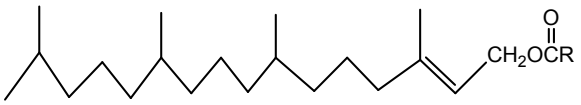
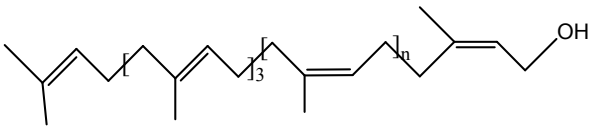
INTRODUCTION

Alocasia portei is a plant native to the Philippines that grow in old clearings and at edges of forests [1]. It is widely cultivated in the country [2] because of its horticultural value. There is no reported study on the chemical constituents and biological activities of the plant. However, a number of studies reported on the biological activities and chemical constituents of plants belonging to the genus *Alocasia*. The crude ethanolic extract of dried rhizome of *A. indica* (Roxb.) Schott was reported to exhibit analgesic and anti-inflammatory activities [3]. *A. macrorrhiza* (L.) G. Don was used for prevention and treatment of inflammation, disease of abdomen and spleen, antimicrobial, anticancer, analgesic, hepatoprotective, hepatorenal, antioxidant, antifungal, laxative, diuretic and astringent [4]. It was reported to contain flavonoids, oxalic acid, cyanogenic glycosides, alocasin, cholesterol, amino acids, gallic acid, mallic acid, ascorbic acid, succinic acid, glucose, fructose, sucrose and betalectins [4]. The diethyl ether extracts of *A. macrorhiza* (Linn.) G. Don and *Alocasia fornicate* (Roxb.) Schott were shown to exhibit antioxidant activities [5]. Another study reported that the n-butanol extract of *A. cucullata* showed cytotoxicity against gastric cancer cells with IC_{50} value of 18.8 μg/mL *in vitro* [6].

We report herein the isolation of phytyl fatty acid esters (**1**), polyprenols (**2**), lutein (**3**), a mixture of stigmasterol (**4**) and β-sitosterol (**5**), chlorophyll a (**6**), chlorophyllide a (**7**), a mixture of linolenic acid (**8**) and saturated fatty acids (**9**), and hydrocarbons (**10**) from *Alocasia portei*. The structures of these compounds are presented in Fig. 1. To the best of our knowledge this is the first report on the isolation of **1**-**10** from the plant.



1 R = long chain fatty acid



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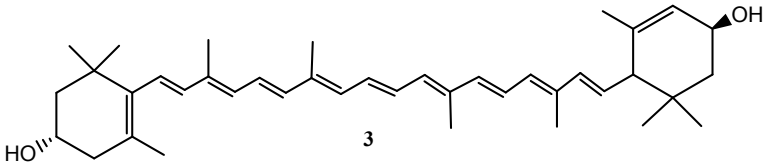

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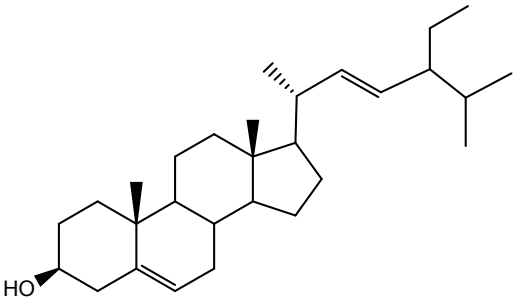

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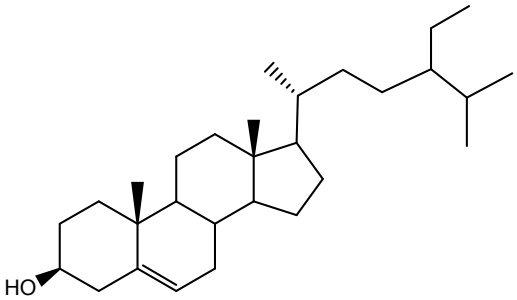

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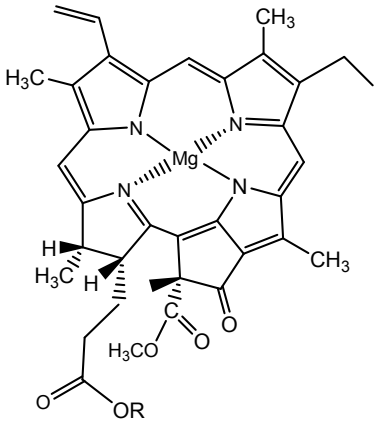
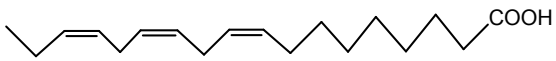


6 R = phytyl
7 R = H



8

9 $CH_3(CH_2)nCOOH$

10 $CH_3(CH_2)nCH_{10}$

Fig. 1. Chemical structures of phytyl fatty acid esters (1), polyprenols (2), lutein (3), stigmasterol (4), β-sitosterol (5), chlorophyll a (6), chlorophyllide a (7), linolenic acid (8), saturated fatty acids (9), and hydrocarbons (10) from *Alocasia portei*

MATERIALS AND METHODS

General Experimental Procedure
NMR spectra were recorded on a Varian VNMRS spectrometer in $CDCl_3$ at 600 MHz for ^1H NMR and 150 MHz for ^{13}C NMR spectra. Column chromatography was performed with silica gel 60 (70-230 mesh). Thin layer chromatography was performed with plastic backed plates coated with silica gel F_{254} and the plates were visualized by spraying with vanillin/H_2SO_4 solution followed by warming.

General Isolation Procedure
A glass column 18 inches in height and 1.0 inch internal diameter was used for the chromatography of the crude extracts. Twenty milliliter fractions were collected. All fractions were monitored by thin layer chromatography. Fractions with spots of the same R_f values were combined and rechromatographed in appropriate solvent systems until TLC pure isolates were obtained. A glass column 12 inches in height and 0.5 inch internal diameter was used for the rechromatography. Five milliliter fractions were collected. Final purifications were conducted using Pasteur pipettes as columns. One milliliter fractions were collected.

Plant material
Alocasia portei Schott was collected from De La Salle University-Dasmariñas, Cavite, Philippines in 2015 and authenticated by one of the authors (MPM).

Isolation
The air-dried leaves (400 g) of *A. portei*were ground in an osterizer, soaked in CH_2Cl_2 for three days, and then filtered. The filtrate was concentrated under vacuum to afford a crude extract (25 g) which was chromatographed using increasing proportions of acetone in CH_2Cl_2 (10% increment) as eluents. The CH_2Cl_2 fraction was rechromatographed (2 ×) using petroleum ether to afford **10** (4 mg). The 10% acetone in CH_2Cl_2 fraction was rechromatographed (2 ×) using 5% EtOAc in petroleum ether to yield **1** (3 mg). The 20% acetone in CH_2Cl_2 fraction was rechromatographed (3 ×) using 10% EtOAc in petroleum ether to yield **2** (3 mg). The 30% acetone in CH_2Cl_2 fraction was rechromatographed using 15% EtOAc in petroleum ether. The less polar fractions were combined and rechromatographed (2 ×) using 15% EtOAc in petroleum ether to yield a mixture of **4** and **5** (3 mg) after washing with petroleum ether. The more polar fractions were combined and rechromatographed (2 ×) using 15% EtOAc in petroleum ether to yield **6** (3 mg) after washing with petroleum ether, followed by Et_2O. The 40% acetone in CH_2Cl_2 fraction was rechromatographed (3 ×) using 20% EtOAc in petroleum ether to yield a mixture of **8** and **9** (3 mg). The 50% acetone in CH_2Cl_2 fraction was rechromatographed (3 ×) using CH_3CN:Et_2O:CH_2Cl_2 (1:1:8, v/v) to afford **3** (7 mg) after washing with petroleum ether, followed by Et_2O. The 70% acetone in CH_2Cl_2 fraction was rechromatographed (4 ×) using CH_3CN:Et_2O:CH_2Cl_2 (2:2:8, v/v) to afford **7** (7 mg) after washing with petroleum ether, followed by Et_2O.

RESULTS AND DISCUSSION

Silica gel chromatography of the dichloromethane extract of *Alocasia portei* afforded phytyl fatty acid esters (**1**) [7], polyprenols (**2**) [8], lutein (**3**) [9], a mixture of stigmasterol (**4**) [10] and β-sitosterol (**5**) [10], chlorophyll a (**6**) [11], chlorophyllide a (**7**) [11], a mixture of linolenic acid (**8**) [12] and saturated fatty acids (**9**)[13], and hydrocarbons (**10**) [14]. The structures of **1**-**10** were identified by comparison of their NMR data with those reported in the literature.

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