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Short Communication

A novel homosesquiterpene from *Cinnamomum macrostemon* Hayata

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Abstract

***Cinnamomum macrostemon* Hayata is a medium-sized evergreen tree, and it's endemic in Taiwan, distributed at medium altitudes throughout the island. The MeOH extract of its twigs was subjected to solvent partitioning and chromatographic separation to afford reticuol (1). The compound was found for the first time from this plant. In addition, the homosesquiterpene also found *Cinnamomum* species, there is potential for the development of its biological activity in natural medicine.**

Keywords: *Cinnamomum macrostemon* Hayata, homosesquiterpene, biological activity, natural medicine.

INTRODUCTION

Cinnamomum macrostemon Hayata is branchlets appear to be erect, slender and glabrous; and it buds with 9 imbricate seales, scales with brown hairs in winter. Leaves appear to be chartaceous, somewhat polished above, dull beneath, ovate-lanceolate to oblong-lanceolate, 10-15 cm long, 3-4 cm wide, acuminate to obtuse apex, acute or suddenly acute at base, with 3 main veins, nerves finely prominent on both sides, not fragrant when crushed; petioles appear to be 1 cm long and are widely furrowed above (Liao, 1996). The MeOH extract of its twigs was subjected to solvent partitioning and chromatographic separation to afford reticuol (1) (Cheng et al., 2010). The compound was found for the first time from this plant.

After analyzed several *Cinnamomum* plants (Chen et al., 2006; Chen, 2006; Chen et al., 2008; Chen et al., 2007; Chen et al., 2007; Chen et al., 2008; Chen et al., 2007; Chen et al., 2010; Chen et al., 2011; Cheng et al., 2010; Cheng et al., 2010; Cheng et al., 2009; Hsieh et al., 2006; Hsieh et al., 2010; Lin et al., 2010; Lin et al., 2009; Lin et al., 2008; Liu et al., 2008; Kuo et al., 2007; Kuo et al., 2008; Kuo et al., 2008), we found reticuol (1) (Cheng et al., 2010) in *C. macrostemon* Hayata and *C. reticulatum* Hayata, separated tenuifolin (2) (Lin et al., 2009) from *C. reticulatum* Hayata and *C. tenuifolium* Sugimoto, isolated subamol (3) (Chen et al., 2010) from *C. subavenium* Miq and also separated burmanol (4) (Chen et al., 2011) from *C. burmanii*. Japanese researcher also isolated the same reticuol (1) (Subehan et al., 2008) compound from the stems of *C. burmanii* Blume (Figure 1). We discovered a new compound of homosesquiterpenoid, which might exist in *Cinnamomum* plant specially. Such compounds are novel, only very few studies reported at present.

MATERIALS AND METHODS

General

UV spectra were obtained in MeCN, IR spectra were measured on a Hitachi 260-30 spectrophotometer. H-NMR (400 MHz), C-NMR (125 MHz), HSQC, HMBC, COSY and NOESY spectra were obtained on a Varian (Unity Plus) NMR spectrometer. Low-resolution ESI-MS spectra were obtained on an API 3000 70 (Applied Biosystems) and high-resolution ESI-MS spectra on a Bruker Daltonics APEX II 30e spectrometer. Silica gel 60 (Merck, 70–230 mesh, 230–400 mesh) was used for column chromatography. Precoated Silica gel plates (Merck, Kieselgel 60 F-254), 0.20 and 0.50 mm, were used for analytical TLC and preparative TLC, respectively, visualised with 50% H_2SO_4.

Plant material

The twigs of *C. macrostemon* Hayata were collected from Pinglin Hsiang, Taipei County, Taiwan, November, 2009. Plant material was identified by Dr. Fu-Yuan Lu (Department of Forestry and Natural Resources College of Agriculture, National Chiayi University). A voucher specimen (Cinnamo. 9) was deposited in the Department

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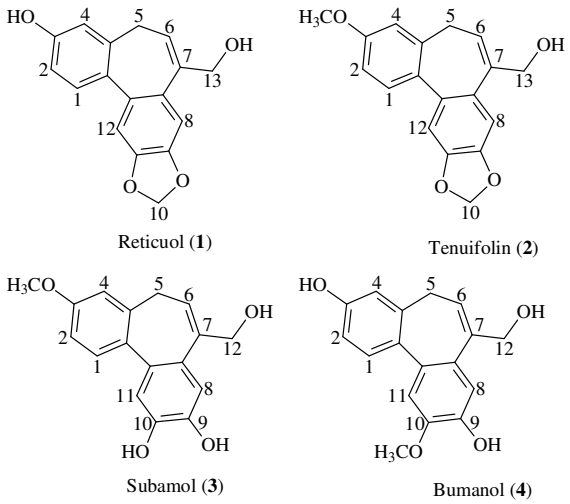

Figure 1. Chemical Structure of *Cinnamomum* homosesquiterpenoids 1-4.

Table 1. ^{1}H NMR Spectral Data of *Cinnamomum* homosesquiterpenoids 1-4.

^{1}H NMR	Reticuol (1)	Tenuifolin (2)	Burmanol (3)	Subamol (4)
1	7.26 d, J = 8.4	7.38 d, J = 8.4	7.50 d, J = 8.8	7.36 d, J = 8.4
2	6.69 dd, J = 8.4, 2.8	6.84 dd, J = 8.4, 2.8	7.31 dd, J = 8.8, 1.5	6.76 dd, J = 8.4, 2.8
4	6.64 d, J = 2.8	6.76 d, J = 2.8	7.23 d, J = 1.5	6.70 d, J = 2.8
5a	2.66 dd, J = 12.8, 6.2	2.77 dd, J = 12.8, 6.2	2.80 dd, J = 12.5, 6.5	2.78 dd, J = 12.8, 6.2
5b	3.03 dd, J = 12.8, 8.0	3.08 dd, J = 12.8, 8.0	3.14 dd, J = 12.5, 8.0	3.06 dd, J = 12.8, 8.0
6	6.14 tq, J = 8.0, 1.2	6.16 tq, J = 8.0, 1.4	6.19 tq, J = 8.0, 1.4	6.16 tq, J = 8.0, 1.4
8	7.12 s	7.14 s	7.13 s	7.17 s
10	6.00 d, J = 1.2	6.02 d, J = 1.6	---	---
11	---	---	7.22 s	7.16 s
12	7.04 s	7.08 s	---	---
12a	---	---	4.36 d, J = 13.0	4.36 d, J = 13.0
12b	---	---	4.53 dt, J = 13.0, 1.4	4.53 dt, J = 13.0, 1.4
13a	4.27 d, J = 13.2	4.32 d, J = 13.0	---	---
13b	4.38 dt, J = 13.2, 1.4	4.49 dt, J = 13.0, 1.4	---	---
OCH_3	---	3.84 s	3.99 s	3.97 s

Data are presented (in order) as: chemical shift (δ); multiplicity of peaks; coupling constant (in Hz). Spectra were recorded in $CDCl_3$ at 400 MHz.

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Extraction and isolation

The air-dried twigs of *C. macrostemon* (1.7 kg) were extracted with MeOH (50 L×5) at room temperature and a MeOH extract (125.8 g) was obtained upon concentration under reduced pressure. The residue was placed on a silica gel column and eluted with $CHCl_3$ gradually enriched with MeOH to afford 4 fractions. Fraction 4 (4.85 g) was purified by silica gel chromatography (*n*-hexane–Acetone, 4:1) to give reticuol (1) (4 mg).

RESULTS

To sum up, we have isolated these novel homosesquiterpenoid compounds from *Cinnamomum* plants such as *C. macrostemon* Hayata, *C. reticulatum* Hayata, *C. tenuifolium* Sugimoto, *C. subavenium* Miq, *C. burmanii* Blume etc., so it could prove our speculation. This research would keep on studing bio-activity of these compounds, and provide more complete reports. We at

present discovered four compound (1-4) ^{1}H NMR spectra reorganize in Table 1.

DISCUSSION

We have isolated these homosesquiterpenoid compounds from *Cinnamomum* plants such as *C. macrostemon* Hayata, *C. reticulatum* Hayata, *C. tenuifolium* Sugimoto, *C. subavenium* Miq, *C. burmanii* Blume etc., so it could prove our speculation. These compounds from *Cinnamomum* plants and their biological activity have not been studied. And to our knowledge sesquiterpene compounds bioactivity including insecticidal activity (Tianzeng et al., 1999), prevention of oxidative damage (Repetto and Boveris, 2010), inflammation-mediate (Repetto and Boveris, 2010), cytotoxicity activity (Aspollah Sukari et al., 2010), antimicrobial (Aspollah Sukari et al., 2010) etc., visible homosesqiterpene compounds are worth development natural product. We are collecting the amount of these compounds, all looking forward to a detailed bioassay and structure activity relationship analysis.

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