

## CHEMICAL CONSTITUENTS FROM THE FRUITS OF *Cinnamomum kotoense*

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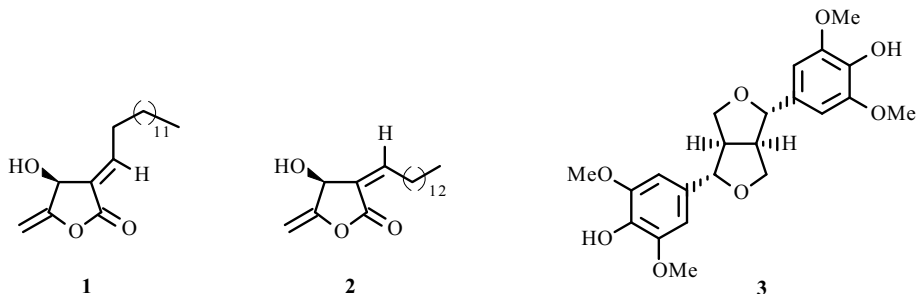
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*Cinnamomum kotoense* Kanehira & Sasaki (Lauraceae) is a small evergreen tree, endemic to Lanyu Island of Taiwan. It has been cultivated for ornamental purposes in Taiwan Island. In previous studies, we have investigated the chemical constituents of the Formosan Lauraceous plants [1–13]. Three new butanolides, a new secobutanolide, along with 26 known compounds were identified from the stems and leaves of *C. kotoense* [9, 11]. The MeOH extract of its fruits was subjected to solvent partitioning and chromatographic separation to afford five pure substances. The chemical constituents in the fruits of *C. kotoense* were separated with column chromatography. Five compounds, including two butanolides, isoobtusilactone A (**1**) [11] and obtusilactone A (**2**) [11], one lignan, (+)-syringaresinol (**3**) [14], and two steroids,  $\beta$ -sitosterol (**4**) [15], and stigmasterol (**5**) [15], were isolated from the fruits of *C. kotoense*. All of these compounds were found for the first time from this plant part.

The fruits of *C. kotoense* were collected from Fooyin University, Kaohsiung County, Taiwan, May 2004. Plant material was identified by Dr. Pei-Fang Lee (Graduate Institute of Biotechnology, Fooyin University). A voucher specimen was deposited in the School of Medical and Health Sciences, Fooyin University, Kaohsiung County, Taiwan. The air-dried fruits of *C. kotoense* (128 g) were extracted with MeOH at room temperature, and a MeOH extract was dried and evaporated to leave a viscous residue (27.3 g). The residue was placed on a silica gel column and eluted with  $\text{CHCl}_3$  gradually enriched with MeOH to afford five fractions. Fraction 2 (3.14 g) eluted with *n*-hexane–EtOAc (4:1) was further purified by silica gel column chromatography using the same solvent system to obtain  $\beta$ -sitosterol (**4**) (4 mg) and stigmasterol (**5**) (3 mg). Fraction 3 (5.22 g) eluted with  $\text{CH}_2\text{Cl}_2$ –MeOH (30:1) was further separated using silica gel column chromatography and purified by preparative TLC (thin layer chromatography) to yield isoobtusilactone A (**1**) (2 mg) and obtusilactone A (**2**) (2 mg). Fraction 4 (4.83 g) was purified by silica gel chromatography ( $\text{CH}_2\text{Cl}_2$ –MeOH, 10:1) to give (+)-syringaresinol (**3**) (6 mg).

**Isoobtusilactone A (1)** as in [11], colorless oil ( $\text{CH}_2\text{Cl}_2$ ). UV ( $\lambda_{\text{max}}$ , nm): 220. IR ( $\nu_{\text{max}}$ ,  $\text{cm}^{-1}$ ): 3421, 1743.  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ,  $\delta$ , J/Hz): 0.87 (3H, t,  $J = 7.0$ , H-19), 1.25 (20H, br.s, H-9~18), 1.53 (2H, m, H-8), 2.10 (1H, br.d,  $J = 7.6$ , 3-OH,  $\text{D}_2\text{O}$  exchangeable), 2.46 (2H, m, H-7), 4.72 (1H, dd,  $J = 2.8, 1.4$ , H-5a), 4.95 (1H, dd,  $J = 2.8, 1.6$ , H-5b), 5.26 (1H, br.s, H-3), 7.09 (1H, td,  $J = 7.9, 2.1$ , H-6). EI-MS  $m/z$  309  $[\text{M}]^+$ .

**Obtusilactone A (2)** as in [11], colorless oil ( $\text{CH}_2\text{Cl}_2$ ). UV ( $\lambda_{\text{max}}$ , nm): 220. IR ( $\nu_{\text{max}}$ ,  $\text{cm}^{-1}$ ): 3421, 1743.  $^1\text{H}$  NMR (400 MHz,  $\text{CDCl}_3$ ,  $\delta$ , J/Hz): 0.88 (3H, t,  $J = 7.0$ , H-19), 1.26 (20H, br.s, H-9~18), 1.53 (2H, m, H-8), 2.11 (1H, br.d,  $J = 7.6$ , 3-OH,  $\text{D}_2\text{O}$  exchangeable), 2.45 (2H, m, H-7), 4.73 (1H, dd,  $J = 2.8, 1.4$ , H-5a), 4.98 (1H, dd,  $J = 2.8, 1.6$ , H-5b), 5.24 (1H, br.s, H-3), 6.49 (1H, td,  $J = 7.9, 2.1$ , H-6). EI-MS  $m/z$  309  $[\text{M}]^+$ .



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**(+)-Syringaresinol (3)** as in [14], white powder (CH<sub>2</sub>Cl<sub>2</sub>). UV ( $\lambda_{\max}$ , nm): 220, 238, 280. IR ( $\nu_{\max}$ , cm<sup>-1</sup>): 3400, 1610, 1505. <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>,  $\delta$ , J/Hz): 3.08 (2H, m, H-1 and H-5), 3.92 (2H, dd, J = 3.6, 5.4, H-4<sub>ax</sub> and H-8<sub>ax</sub>), 3.88 (12H, s, OMe), 4.25 (2H, dd, J = 9.2, 6.8, H-4<sub>eq</sub> and H-8<sub>eq</sub>), 4.72 (2H, d, J = 4.4, H-2 and H-6), 5.52 (2H, s, OH), 6.55 (4H, s, H-2', H-2'', H-6' and H-6''), EI-MS *m/z* 418 [M]<sup>+</sup>.

**$\beta$ -Sitosterol (4)** as in [15], colorless needles (CH<sub>2</sub>Cl<sub>2</sub>). UV ( $\lambda_{\max}$ , nm): 220, 235, 273. IR ( $\nu_{\max}$ , cm<sup>-1</sup>): 3400, 2910, 1625. EI-MS *m/z* 414 [M]<sup>+</sup>.

**Stigmasterol (5)** as in [15], colorless needles (CH<sub>2</sub>Cl<sub>2</sub>). UV ( $\lambda_{\max}$ , nm): 220, 235, 273. IR ( $\nu_{\max}$ , cm<sup>-1</sup>): 3400, 2910, 1625. EI-MS *m/z* 412 [M]<sup>+</sup>.

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