

**FAVELOXIDE, A NEW ISOPRENOID DERIVATIVE FROM
THE BRAZILIAN PLANT, *CNIDOSCOLUS PHYLLACANTHUS***

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Abstract --- A new isoprenoid derivative, faveloxide, was isolated from the bark of *Cnidoscopus phyllacanthus*. The relative stereostructure (**1**) was determined on the basis of a spectroscopic analysis and a chemical transformation.

In the course of our investigation on antitumor constituents from natural sources, we have isolated five components having new types of skeleton from the Brazilian plant, *Cnidoscopus phyllacanthus* (MART.) PAX et K. HOFFM.¹⁻³ Further survey of this plant belonging to Euphorbiaceae, resulted in the isolation of a new compound, faveloxide.

Faveloxide (**1**, 5.5 mg, 2.75x10⁻³%), mp 165-169 °C, [α]_D²⁶ -117.3° (c 0.486, CHCl₃), C₁₉H₂₄O₃ determined by HREI-MS (*m/z* 300.1707, Δ -1.8 mmu), was isolated from the MeOH extract of the dried bark of *C. phyllacanthus*, after repeated chromatography on silica gel (elution with hexane and EtOAc mixture) or reversed phase silica gel (ODS, elution with 80-90% MeOH). Faveloxide (**1**) showed characteristic IR absorptions at 1735, 1650, 1600 and 1500 cm⁻¹, and UV maxima (ϵ) at 269.6 (4200), 232.1 (sh, 5800), 226.8 (8000) and 221.5 (7900) nm due to a conjugated carbonyl and a benzene ring. ¹H, ¹³C NMR and HMQC spectra showed the signals for three tertiary methyls (δ _H/ δ _C: 0.81/28.13; 1.12/26.68; 2.22/15.88), a methoxyl (δ _H/ δ _C: 3.91/55.56), four methylenes (δ _H/ δ _C: 2.82-2.84/41.13; 1.53,2.02/31.60; 1.66,1.82/19.76; 1.34-1.44/36.92), two methines (δ _H/ δ _C: 1.75/45.97; 3.65/60.95), and two quaternary carbons (δ _C 33.99; 64.53). Signals due to a conjugated system consist of seven sp² carbons (δ _H/ δ _C: 6.96/112.15; 7.52/131.65, δ _C: 127.71; 129.12; 134.18; 160.96; 203.11). A large CH-coupling constant, 176 Hz, between an oxygenated methine hydrogen and a carbon signals (δ _H/ δ _C: 3.65/60.95) implied an epoxide ring in the structure of faveloxide (**1**). 2D NMR analysis with

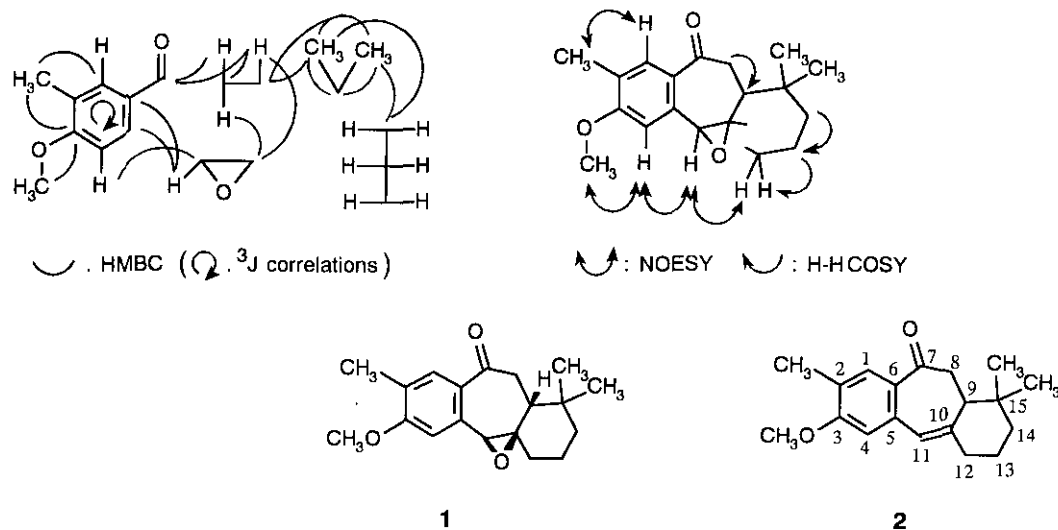


Figure 1

H-H COSY, NOESY and HMBC spectra indicated the connectivities as illustrated in Figure 1. Judging from the above data including NOE data as shown in Figure 1 and seven degrees of unsaturation derived from the molecular formula, faveloxide was suggested to have the structure (1) or its antipode. Since the structure (1) implied that faveloxide was an oxidative metabolite of faveline methyl ether (2),¹ we treated 2 with an excess of *meta*-chloroperbenzoic acid in CH_2Cl_2 at room temperature. The epoxidized product, $[\alpha]_{\text{D}}^{23} -97.1^\circ$ (c 0.239, CHCl_3), was identical to 1 in all respect. The fact that the sole stereoisomer (1) was obtained indicated the above epoxidation took place at the C-11 *si*-face that is stereochemically vacant. Consequently the relative stereostructure (1) was established for faveloxide.

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