

E2-11: Lignans from *Myristica dactyloides*

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The family Myristicaceae which consists of 18 genera and nearly 300 species is exclusively tropical and found in lowland rain forests in the Asian tropics. One hundred and twenty of these species belong to the genus *Myristica*. Only 3 species of *Myristica* are found in Sri Lanka. *M. fragrans*, *M. zeylanica* and *M. dactyloides*. Although all these species are widely used in the indigeneous system of medicine only the chemical constituents of *M. fragrans* (nutmeg) have been studied extensively due to their pharmacological properties. In this project priority was given for the chemical investigation of other indigenous Myristicaceae species.

Identification and collection of plant material, with the help of a qualified Botanist and the collected species *M. dactyloides* was authenticated at the National Herbarium, Royal Botanic Gardens, Peradeniya.

Sequential solvent extractions of dried and powdered stem bark of *M. dactyloides* were carried out with hexane, dichloromethane, ethyl acetate and methanol. The extracts were subject to fractionation by various separation techniques such as column chromatography, rotation locular counter current chromatography, chromatotrone and HPLC etc.

Structural elucidations of purified compounds were carried out using physical methods such as UV, IR, NMR, GCMS and chemical methods if necessary. ¹H and ¹³C NMR spectra were recorded respectively on a Varian Gemini 200 MHz and 50 MHz spectrometer. IR spectra were recorded on a Shimadzu IR-460 instrument in KBr discs unless otherwise stated and the MS spectra were recorded on a Shimadzu QP-1000 A spectrometer. Prep. TLC was carried out on Merck Kieselgel 60 F₂₅₄. Flash and medium pressure column chromatography were carried out on Merck Kieselgel 60.

Continuation of the chemical investigation of the hot hexane extract of *M.dactyloides* yielded 2 new lignans (**I**) and (**II**) other than the previously reported 7 aryl alkanones, 1-(1,6-dihydroxyphenyl) tetradecan-1-one, 1-(6-hydroxy-2-methoxyphenyl)tetradecan-1-one, 1-(2,6-dihydroxyphenyl)-9-(3,4-methylenedioxyphenyl)nonan-1-one, 1-(2,6-dihydroxyphenyl)-9-phenylnonan-1-one, 1-(6-hydroxy-2-methoxyphenyl)-9-(4-hydroxyphenyl)nonan-1-one, 1-(2,6-dihydroxyphenyl)-9-(4-hydroxyphenyl)nonan-1-one and 1-(2,6-dihydroxyphenyl)-9-(4-hydroxy-3-methoxyphenyl)nonan-1-one and lignan, 8,8'-dimethyl-7,7'-bis(3,4-methylenedioxyphenyl)tetrahydrofuran.

Spectral data of 2 new lignans:

Compound (**I**) colourless oil. IR_{max} (film) 2900, 1600, 1480, 1430, 1375, 1240, 1185, 1095, 1030, 925, 865, 805, and 770 cm, (CDCl₃): 6.73 (2H, d, J=2.0 Hz), 6.62 (2H, dd, J=11.0 & 2.0 Hz), 6.55 (2H, d, J=11Hz), 5.90 (4H, S), 2.54 (2H, dd, J= 14.0 & 6.0 Hz), 2.33 (2H, dd, J=14.0 & 8.0 Hz), 1.72 (2H, m). and 0.79 (6H, d, J=8.0 Hz); δ (CDCl₃) : 147.3 (s), 145.3 (s), 135.3 (s), 121.6 (d), 109.2 (d), 107.8 (d) 100.6 (t), 41.1 (d) 38.1 (t) and 13.7 (q), EIMS m/z : 326 [M]⁺.

Compound (**II**) yellow oil, IR_{max} (film) 2860, 1600, 1510, 1450, 1370, 1270, 1240, 1040, 980, 720cm⁻¹; ¹H NMR (CDCl₃) 6.90 (6H,m), 5.11 (1H, d, J=9 Hz) 4.40 (1H, d, J=9 Hz), 3.90 (6H,S), 2.25 (2H,m), 1.05 (3H, d, J=7Hz), 0.65 (3H, d, J=7Hz); ¹³C NMR, 146.3 (S), 144.8 (S) 134.5 (S), 119.5 (d) 109.0 (d), 108.4 (d), 87.8 (d), 55.8 (q) 50.9 (d), 13.80 (q), EIMS M/z (rel.int. 344 (40) [M]⁺, 192 (58), 177 (100), 164 (40), 161 (59), 145 (85), 124 (42).

From the above spectral data structures of the 2 new lignans were confirmed as rel-(8R,8'S)-bis(3,4-methylenedioxy)-8,8'-neolignan (**I**) and 8,8'-dimethyl-7,7'-bis(4-hydroxy-3-methoxyphenyl)tetrahydrofuran (**II**).

The structures of the other compounds isolated from the same extract were confirmed by comparison of the spectral data, mp, and TLC with the previously reported compounds.

