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NYMPHAEACEAE

3,4-DIMETHOXY-TRANS-CINNAMIC ACID FROM *NUPHAR VARIEGATUM*

T. P. FORREST and S. RAY

Dalhousie University, Halifax, Canada

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Plant. *Nuphar variegatum*¹. *Source.* Nova Scotia, Canada. *Previous work.* Alkaloids from this and sister species *N. japonicum* and *N. luteum*.²⁻⁷ *Trans*-cinnamic, arachidic, behenic acid and palmitic acid from rhizomes⁸ and ellagic, caffeic, *p*-coumaric, sinapic and ferulic acids from leaves of *N. luteum*.⁹

Examined part. Rhizomes were extracted with CHCl_3 at room temp. The residue was further extracted with EtOAc-HOAc (49:1) yielding a dark brown residue; column chromatography of this residue on silicic acid yielded 3,4-dimethoxy-*trans*-cinnamic acid, caffeic acid and ferulic acid.

3,4-Dimethoxy-trans-cinnamic acid. Eluted from silicic acid with benzene-MeOH (49:1), crystallized from benzene, m.p. 181–182°. Mol. formula $\text{C}_{11}\text{H}_{12}\text{O}_4$ (mass spectrometry), NMR (CDCl_3), τ 6.05 (s, 6H, OCH_3), 2.85 (m, 3H, aromatic H), 3.62 (d, $J = 16.0$ Hz, 1 olefinic H), 2.20 (d, $J = 16.0$ Hz, 1 olefinic H), -0.83 (br, 1H, COOH). Confirmed by comparison of IR and NMR spectra of an authentic sample.

The occurrence of 3,4-dimethoxycinnamic acid appears to be rare in that only one previous report of its isolation could be found. It was reported¹⁰ to be present in the bark of *Veronica* (= *Leptrandra*) *virginia* (Scrophulariaceae).

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¹ A. E. ROLAND and E. C. BATE-SMITH, *Proc. N.S. Inst. of Sci.* 26, 277 (1969).

² R. BARCHET and T. P. FORREST, *Tetrahedron Letters* 4229 (1965).

³ T. P. FORREST and S. RAY, *Can. J. Chem.* 49, 1774 (1971).

⁴ C. F. WONG and R. T. LALONDE, *Phytochem.* 9, 2417 (1970).

⁵ C. F. WONG and R. T. LALONDE, *Phytochem.* 9, 1851 (1970).

⁶ C. F. WONG and R. T. LALONDE, *Phytochem.* 9, 659 (1970).

⁷ J. T. WROBEL, in *The Alkaloids* (edited by R. H. F. MANSKE), Vol. IX, Chap. 10, Academic Press, New York (1967).

⁸ F. ZAMOJSKA, *Bull. de l'Académie Polonaise des Sciences* (Série des Sciences Chimiques) 27, 281 (1969).

⁹ E. C. BATE-SMITH, *Phytochem.* 7, 459 (1968).

¹⁰ F. B. POWER and H. ROGERSON, *J. Chem. Soc.* 97, 1944 (1910).

Key Word Index—*Nuphar variegatum*; Nymphaeaceae; 3,4-dimethoxycinnamic acid.