

Phytochemistry, 1973, Vol. 12, p. 1825. Pergamon Press. Printed in England.

FLAVONOIDS FROM *EUPATORIUM SUBHASTATUM*

G. E. FERRARO and J. D. COUSSIO

Departamento de Bioquímica Vegetal, Cátedra de Farmacognosia, Facultad de Farmacia
y Bioquímica, Universidad de Buenos Aires, Junjn 956, Buenos Aires, Argentina

(Received 15 January 1973. Accepted 8 February 1973)

Key Word Index—*Eupatorium subhastatum*; Compositae; eriodictyol; eupafolin; quercetin glycosides.

Plant. *Eupatorium subhastatum* Hooker et Arnott.¹ **Source.** Collected on February 1972 at Chaco Province, Argentina (local name 'Yerba del Charrúa' or 'Pilarcito'). A voucher specimen is deposited in the University herbarium (Museo de Botánica, Universidad de Buenos Aires, Buenos Aires, Argentina). **Uses.** Medicinal.^{2,3} **Previous work.** Phytochemical screening.⁴ On sister species: tumor inhibitory sesquiterpene lactones,⁵⁻⁷ cytotoxic flavones,⁸ flavonols⁹ and flavonol glycosides.^{10,11}

Isolation. Dried aerial parts of *E. subhastatum* were extracted with hot EtOH. Removal of the solvent left a green residue that was dissolved in warm H₂O and then extracted successively with C₆H₆, CHCl₃, Et₂O and EtOAc.

Ether extract. Eriodictyol (5,7,3',4'-tetrahydroxyflavanone)¹² and eupafolin (6-methoxy-5,7,3',4'-tetrahydroxyflavone),⁸ identified by chromatography (PC and TLC, 3 solvents), UV, IR and NMR analysis and its acetates. Quercetin and kaempferol were also identified.

Ethyl acetate extract. Quercetin 3-galactoside (hyperoside), quercetin 3-glucoside (isoquercitrin), quercetin 3-rhamnoside (quercitrin) and quercetin 3-rutinoside (rutin) were isolated by column chromatography on polyamide and identified by direct comparison with authentic samples, cochromatography (TLC, 3 solvents), UV analysis¹² and hydrolysis.

Acknowledgements—The authors are indebted to Dr. A. Schulz (Instituto Nacional de Tecnología Agropecuaria, Chaco Province, Argentina) for the supply of plant material and botanical identification. This work was supported in part by Grant 3520 a/71 from the Consejo Nacional de Investigaciones Científicas y Técnicas.

* Part VIII in the series "Flavonoids from Argentine Medicinal Plants". For Part VII see FERRARI, F., DELLE MONACHE, F., JUÁREZ, B. E. and COUSSIO, J. D. (1972) *Phytochemistry*, **11**, 2647.

¹ CABRERA, A. L. (1963) *Flora de la Provincia de Buenos Aires*, Vol. IV, Part VI, p. 42, Colección Científica del I.N.T.A., Buenos Aires.

² PACCARD, E. (1905) *Lista de Algunas Plantas Medicinales de las Repúblicas Oriental y Argentina*, p. 64, Talleres A. Eire y Ramos, Montevideo, Uruguay.

³ ROJAS ACOSTA, N. (1905) *Plantas Medicinales de Corrientes*, p. 8, Imprenta P. Gadola, Buenos Aires, Argentina.

⁴ BANDONI, A. L., RONDINA, R. V. and COUSSIO, J. D. (1972) *Rev. Invest. Agropec. Ser. 2* (I.N.T.A., Buenos Aires) in press.

⁵ KUPCHAN, S. M., KELSEY, J. E., MARUYAMA, M., CASSADY, J. M., HEMINGWAY, J. C. and KNOX, J. R. (1969) *J. Org. Chem.* **34**, 3876.

⁶ KUPCHAN, S. M., MARUYAMA, M., HEMINGWAY, R. J., HEMINGWAY, J. C., SHIBUYA, S., FUJITA, T., CRADWICK, P. O., HARDY, A. D. U. and SIM, G. A. (1971) *J. Am. Chem. Soc.* **93**, 4914.

⁷ LEE, K.-H., HUANG, H.-C., HUANG, E.-S. and FURUKAWA, H. (1972) *J. Pharm. Sci.* **61**, 629.

⁸ KUPCHAN, S. M., SIGEL, C. W., HEMINGWAY, R. J., KNOX, J. R. and UDAYAMURTHY, M. S. (1969) *Tetrahedron* **25**, 1603.

⁹ KUPCHAN, S. M., SIGEL, C. W., KNOX, J. R. and UDAYAMURTHY, M. S. (1969) *J. Org. Chem.* **34**, 1460.

¹⁰ WAGNER, H., IYENGAR, M. A., HORHAMMER, L. and HERZ, W. (1972) *Phytochemistry* **10**, 1504.

¹¹ HERZ, W., GIBAJA, S., BHART, S. V. and SRINIVASAN, A. (1972) *Phytochemistry* **11**, 2859.

¹² MABRY, T. J., MARKHAM, K. R. and THOMAS, M. B. (1970) *The Systematic Identification of Flavonoids*, Springer, Berlin.