CYTOTOXIC FLAVONES FROM *CENTAUREA URVILLEI*

AYHAN ULUBELEN and SEVIL ÖKSÜZ

Faculty of Pharmacy, University of Istanbul, Istanbul, Turkey

As a part of our continuing investigations for anticancer agents from Turkish plants,[1] we report here the cytotoxic flavonoids of *Centaurea urvillei*. A survey of the literature reveals that some methoxyflavones have shown *in vitro* antitumor activity (1–3).

EXPERIMENTAL[2]

PLANT MATERIAL.—The leaves of *Centaurea urvillei* Stepposa Wagenitz were collected from central Turkey (Eskisehir) in June 1980 and identified by Prof. Dr. A. Baytop. A voucher is deposited in the herbarium of the Faculty of Pharmacy (Istanbul) (ISTE 54514).

EXTRACTION AND ISOLATION OF THE FLAVONOIDS.[3]—Coarsely ground leaves (500 g) were extracted with ethanol in a Soxhlet and concentrated *in vacuo* to 200 ml. The concentrate was successively extracted with benzene, chloroform and ethyl acetate.

Both chloroform and ethyl acetate concentrates showed cytotoxic activity against L-Strain fibroblast in tissue culture. Benzene and remaining aqueous concentrates had no activity. Standard fractionation procedures (4) were used to obtain the following compounds from the combined active concentrates: 6-methoxyapigenin (hispidulin) (380 mg), apigenin (240 mg), 6-methoxyluteolin 7-methyl ether (cirsiliol) (10.5 mg), 6-methoxyluteolin (nepetin) (5 mg), 6-methoxyapigenin 7-methyl ether (cirsimaritin) (7.5 mg), 6-methoxyapigenin 7,4'-dimethyl ether (salvigenin) (7.8 mg), apigenin 7-methyl ether (genkwanin) (4.8 mg), apigenin 7-β-D-glucoside (3 mg), luteolin (4 mg) and esculetin (2 mg).

All of the flavonoids and the coumarin were identified by spectral methods, authentic sample comparison, color reactions and, in one case (apigenin 7-β-D-glucoside), acidic (0.1N HCl) and enzymatic (β-glucosidase) hydrolysis.

Since the crude concentrates showed cytotoxic activity, the major compound (hispidulin) was tested against the same system and was found to be active in 0.05 mg/ml doses. Other methoxyflavones will be tested in the future.

ACKNOWLEDGMENTS

The authors would like to thank Prof. Dr. T. J. Mabry (Austin, Texas) for ms and pmr spectra and Dr. D. Anil (Medical Faculty of Istanbul) for the tissue culture tests.

Received 15 April 1981

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[1]The previous paper of this series: A. Ulubelen and M. Tanker, *Planta medica*, **34**, 216 (1978).
[2]Spectra were recorded with the following instruments: uv Varian Techtron model 635; pmr Varian 90 MHz; ms DuPont 21-491. Adsorbants were from E. Merck and Macharey-Nagel.
[3]Full details of the isolation and identification are available on request to the authors.