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HYMENOXIN A FLAVONE FROM *HELIANTHUS ANGUSTIFOLIUS**

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A chloroform extract of *Helianthus angustifolius* L (Tribe Heliantheae), collected in East Tennessee, yielded after chromatography a polar flavone whose m.p and UV properties were nearly identical to those of hymenoxin (5,7-dihydroxy-6,8-3′,4′-tetramethoxyflavone, I) [1] This compound, a member of the uncommon group of fully oxygenated A-ring flavones,[2] was first isolated from *Hymenoxys scaposa* (Compositae, Heleniеae).[3]

The NMR and MS of the *Helianthus* flavone in conjunction with its UV spectra were indicative of structure I,[1,4] and a direct comparison with authentic hymenoxin (m m p , TLC, UV) established its identity The co-occurrence of hymenoxin in the tribes Heleniеae and Heliantheae is consistent with the close relationship of these groups pointed out by Strother [5]

EXPERIMENTAL

Isolation of hymenoxin from Helianthus angustifolius L The dried and ground plant material (2 85 kg) of *Helianthus angustifolius* L (Voucher No HA-TC971-TW)[6] collected in September 1971 near Tracy City, Tennessee was exhaustively extracted with $CHCl_3$ at room temp The $CHCl_3$ extract was evaporated to dryness *in vacuo* and the crude syrup taken up in 800 ml of hot H_2O–EtOH (3 1) The mixture was stirred and heated for 15 min and cooled to room temp The aqueous extract was filtered through Celite and extracted repeatedly with 150 ml portions of $CHCl_3$ The combined organic phase was dried ($MgSO_4$), filtered and evaporated to dryness Repetitions of this procedure yielded 16 g of a combined final extract The thick oil was chromatographed on silica gel, eluting with C_6H_6 followed by increasing proportions of $CHCl_3$ Fractions were grouped according to TLC and rechromatography of combined later fractions yielded 15 mg of a greenish powder Recrystallizations from MeOH gave pure hymenoxin (I) (9 mg, m p 213–215°), identified by direct comparison with an authentic sample (m m p , TLC, UV) [7] The MS of I displayed fragment ions at *m/e* 374, 359, 341, 331, 197 and 169 NMR ($CDCl_3$) 4 00 ppm (4 × 3H, *s*), 6 57 (1H, *s*), 6 99 (1H, *d*, *J* 9 Hz), 7 58 (1H, dd, *J* 9 2 Hz), 7 40 (1H, d, *J* 2 Hz), 6 38 (1H, *bs*), 12 65 (1H, *s*)

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[1] MABRY, T J , MARKHAM, K R and THOMAS, M B (1970) *The Systematic Identification of Flavonoids*, Springer, New York

[2] HARBORNE, J B (1967) *Comparative Biochemistry of the Flavonoids*, pp 42–46, Academic Press, New York

[3] THOMAS, M B and MABRY, T J (1967) *J Org Chem* **32**, 3254

[4] KINGSTON, D G I (1971) *Tetrahedron* **27**, 2691

[5] STROTHER, J L , private communication

[6] Identified by Dr GENE S VAN HORN, Department of Biology, University of Tennessee at Chattanooga a voucher specimen has been deposited in the U T C Herbarium

[7] An authentic sample was kindly supplied by Dr T J MABRY, University of Texas