Journal of Natural Products
Vol. 51, No. 5, pp. 971-972, Sep-Oct 1988

SWERTISIN 2″-ARABINOSIDE, A NEW *C*-GLYCOSYLFLAVONE FROM *ACHILLEA FRAGRANTISSIMA*

AHMED A. AHMED,*

Department of Chemistry, Faculty of Science, El-Minia University, El-Minia, Egypt

A.M. SHALABY, F.R. MELEK,

National Research Center, Dokki, Cairo, Egypt

and TOM J. MABRY

Department of Botany, University of Texas at Austin, Austin, Texas 78713

Achillea (Compositae, Tribe Anthemideae) is a genus of about 85 species from southeastern Europe and southeastern and central Asia (1). Recent chemical studies of the genus have shown that 6-*C*-glycosylflavones and their 7-methylated derivatives represent the main flavonoid constituents in members of this genus, whereas the corresponding 8-*C*-glycosylflavones are of restricted distribution (2–4). Considerable variability in both morphology and flavonoids has been observed in *Achillea* (4).

We report here from *Achillea fragrantissima* (Forssk.) Sch. Bip., a new *C*-glycosylflavone. When the compound was viewed on paper chromatography in uv light, it exhibited a purple color changing to greenish-yellow with both NH_3 and naturstoffreagenz-A (NA), indicating a 5,4′-dihydroxyl system. The bathochromic shift, with increased intensity of Band I in NaOMe, confirmed a free 4′-hydroxyl group; moreover, the absence of a bathochromic shift of Band II in NaOAc relative to Band II in MeOH supported a 7-*O*-substituent.

Acid hydrolysis yielded arabinose and swertisin, which were identified by cochromatography with authentic samples. Ms of the permethylated derivatives gave a molecular ion $[M]^+$ at *m/z* 690 (rel. int. 45%) confirming swertisin with an *O*-arabinosyl moiety. The compound was identified as swertisin 2″-arabinoside (6-*C*-glucosylapigenin 7-methyl ether 2″-arabinoside), a new *C*-glycoside, by the absence of peaks at *m/z* $[M-15]^+$ and $[M-31]^+$ (5), which were replaced by ions $[SO]^+$ at *m/z* 515 (58%) and $[S]^+$ at *m/z* 499 (100%) derived from the elimination of a permethylated 2″-*O*-arabinosyl residue with and without the oxygen atom of the glycosidic bond, respectively (6). The detection of swertisin 2″-arabinoside in *A. fragrantissima* is not surprising because isoorientin 2″-arabinoside has been reported from *Achillea sibirica* ssp. *mongolica* (4).

EXPERIMENTAL

PLANT MATERIAL.—*A. fragrantissima* was collected from Wadi Houf, near Cairo, in April 1985. A voucher specimen (# A110) is deposited in the Department of Botany, El-Minia University, Egypt.

EXTRACTION AND ISOLATION OF FLAVONOIDS.—Dried leaves of *A. fragrantissima* (1 kg) were extracted with 85% and 50% aqueous MeOH. The combined extracts were concentrated to an aqueous layer under reduced pressure, and the concentrate was chromatographed over Polyclar AT (GAF Corp.); the column was eluted with H_2O with increasing amounts of MeOH. Fractions, which were collected by monitoring the column with uv light, were further separated by paper chromatography using 15% HOAc and TBA (*t*-BuOH-HOAc-H_2O, 3:1:1) on Whatman 3MM paper. The compound was purified over Sephadex LH-20 eluted with 40% aqueous MeOH, prior to spectral analysis by uv and cims as a permethylated derivative.

SWERTISIN 2″-ARABINOSIDE.—R_f (Whatman no. 1, TBA) 0.25, (15% HOAc) 0.75. Color on paper under uv, purple; uv/NH_3, yellow-green, uv/NA, yellow; uv λ max (MeOH), 271, 332, (NaOMe) 276, 305 sh, 400, ($AlCl_3$) 267, 280, 350, 385, ($AlCl_3$/HCl) 267, 280, 350,

385, (NaOAc) 273, 375 (NaOAc/H_3BO_3) 270, 342; ms (permethylated) *m/z* (%) $[M]^+$ 690 (45), $[M-131]^+$ 559 (17), $[M-145]^+$ 545 (63), $[M-161]^+$ 529 (5), $[M-175]^+$ 515 (58), $[M-191]^+$ 499 (100).

ACKNOWLEDGMENTS

The work in Egypt was supported by the Faculty of Science, El-Minia University and the National Research Center, Cairo; financial support at the University of Texas was provided by the Robert A. Welch Foundation (Grant F-130).

LITERATURE CITED

1. V.H. Heywood, J.B. Harborne, and B.L. Turner, "The Biology and Chemistry of the Compositae," Academic Press, New York, 1977, p. 874.
2. A.A. Ahmed, N.H. El-Sayed, and T.J. Mabry, *Rev. Latinoamer. Quim.*, (in press).
3. K. Valant, *Biochem. Syst. Ecol.*, **13**, 119 (1985).
4. K. Valant, *Biochem. Syst. Ecol.*, **13**, 15 (1985).
5. M.L. Bouillant, J.F. Bonvin, and J. Chopin, *Phytochemistry*, **14**, 2267 (1975).
6. T.J. Mabry, K.R. Markham, and M.B. Thomas, "The Systematic Identification of Flavonoids," Springer-Verlag, New York, 1970, p. 80.

Received 2 November 1987