

The four compounds occurring in the oils that remain unidentified are: 1. RRT=0.339, MW152, *m/z* (%) 108(100), 93(67), 41(46), 67(28), 95(26), a monoterpene alcohol; 2. RRT=0.368, MW150, *m/z*(%) 91(100), 41(78), 94(45), 109(43), 79(42), a monoterpene alcohol; 3. RRT=0.387, MW152, *m/z*(%) 59(100), 94(66), 79(57), 43(33), 91(33), a monoterpene alcohol; and 4. RRT=0.715, MW222, *m/z*(%) 43(100), 81(97), 41(76), 79(51), 93(47), possibly an alcohol of β -elemene.

ACKNOWLEDGMENTS

We would like to thank NSF for continued support of chemosystematic studies in *Juniperus* (grants GB24320, GB37315X, DEB77-22331 to RPA) and to the staff of the National Research Council of Canada, Plant Biotechnology Institute, Saskatoon, Saskatchewan, Canada.

LITERATURE CITED

1. T.A. Zanoni and R.P. Adams, *Bol. Soc. Bot. Mex.*, **35**, 69 (1975).
2. T.A. Zanoni, *Phytologia*, **38**, 433 (1978).
3. T.A. Zanoni and R.P. Adams, *Biochem. Syst. Ecol.*, **4**, 147 (1976).
4. R.P. Adams, *Phytochemistry*, **9**, 397 (1970).
5. R.P. Adams, M. Granat, L.R. Hogge, and E. von Rudloff, *J. Chromatogr. Sci.*, **17**, 75 (1979).
6. R.P. Adams, E. von Rudloff, T.A. Zanoni, and L.R. Hogge, *Biochem. Syst. Ecol.*, **8**, 35 (1980).
7. R.P. Adams, E. von Rudloff, L. Hogge, and T.A. Zanoni, *J. Nat. Prod.*, **43**, 417 (1980).
8. R.P. Adams, E. von Rudloff, T.A. Zanoni, and L.R. Hogge, *Biochem. Syst. Ecol.*, **9**, 93 (1981).
9. R.P. Adams, E. von Rudloff, and L. Hogge, *Biochem. Syst. Ecol.*, **11**, 189 (1983).
10. R.P. Adams, T.A. Zanoni, and L.R. Hogge, *Biochem. Syst. Ecol.*, **12**, 23 (1984).
11. R.P. Adams, T.A. Zanoni, and L. Hogge, *J. Nat. Prod.*, **47**, 1064 (1984).
12. R.P. Adams, E. von Rudloff, L. Hogge, and T.A. Zanoni, *J. Nat. Prod.*, **44**, 21 (1981).
13. R.P. Adams, *Moscova*, **2**, 77 (1983).
14. R.P. Adams and L.R. Hogge, *Biochem. Syst. Ecol.*, **11**, 85 (1983).

Received 4 February 1985

C-GLYCOSYLFLAVONES FROM *MONNIERIA TRIFOLIA*

A. KEITA,

Office malien de Pharmacie, Bamako, Mali

J. GLEYE, E. STANISLAS,*

Faculté des Sciences Pharmaceutiques, Université Toulouse III, France

et I. FOURASTE

Faculté de Pharmacie, Université Montpellier I, France

We have previously reported alkaloids from the leaves of *Monnieria trifolia* L. (Rutaceae, Cuspariae) (1, 2). Recently, other alkaloids have been isolated from the leaves (3) and whole plant (4). In the present work the leaves of *M. trifolia* yielded four di-C-glycosylflavones: neoschaftoside, vicenin-3, schaftoside, and isoschaftoside.

EXPERIMENTAL

PLANT MATERIAL.—The leaf material was collected from plants grown in French Guyana. A voucher specimen has been deposited at the Herbarium of the Faculté des Sciences Pharmaceutiques, Toulouse, France.

EXTRACTION AND ISOLATION OF FLAVONES.—Air-dried leaves of *M. trifolia* were exhaustively extracted with MeOH. The concentrated MeOH extract was chromatographed on an Amberlite XAD₂ column with the following eluants: H₂O and NH₄OH (5%). The basic fraction, after neutralization, was extracted successively with Et₂O, EtOAc, and *n*-BuOH. The *n*-BuOH fraction contained most of the flavonoids.

The *n*-BuOH concentrate was chromatographed on cellulose (preparative tlc) with *n*-BuOH-HOAc-H₂O (4:1:5, upper phase). The above four flavonoids were isolated. Schaftoside and isoschaftoside were purified by preparative tlc on cellulose with 15% HOAc. All flavonoids were identified by comparison of uv and ms of their permethylated ethers with published values (5-7). They have been isolated from any sources (8).

The number of Rutaceae species that have been investigated for *C*-glycosylflavones is too few to determine whether the compounds identified from *M. trifolia* may have taxonomic significance. In the Cuspariae, most of the *C*-glycosylflavones identified are apigenin derivatives (9, 10).

Details of the isolation and identifications are available from the senior author.

LITERATURE CITED

1. I. Fouraste, J. Gleye, and E. Stanislas, *Plantes Méd. Phytothér.*, **7**, 225 (1973).
2. C. Moulis, J. Gleye, I. Fouraste, and E. Stanislas, *Planta Med.*, **42**, 400 (1981).
3. J. Bhattacharyya and L.M. Serur, *Heterocycles*, **16**, 371 (1981).
4. J. Bhattacharyya, L.M. Serur, and V.O. Cheryan, *J. Nat. Prod.*, **47**, 379 (1984).
5. M.L. Bouillant, J. Favre-Bonvin, and J. Chopin, *Phytochemistry*, **14**, 2267 (1975).
6. M.L. Bouillant, A. Sesset, J. Favre-Bonvin, and J. Chopin, *Phytochemistry*, **17**, 527 (1978).
7. J.J. Mabry, K.R. Markham, and M.B. Thomas, *Systematic Identification of Flavonoids*, New York, Springer Verlag, 1978, pp. 41-61.
8. J.B. Harborne and T.J. Mabry, *The Flavonoids: Advances in Research*, London, Chapman and Hall, 1982, p. 462.
9. J.B. Harborne, T.J. Mabry, and H. Mabry, *The Flavonoids*, London, Chapman and Hall, 1975, pp. 480-493.
10. K. Wirasutisna, J. Gleye, I. Fouraste, T. Ha, and E. Stanislas, *C.R. J. Int. Etudes Groupe Polyphénols (Toulouse 1982)*, *Bull. Liaison Groupe Polyphénols*, **11**, 460 (1982).

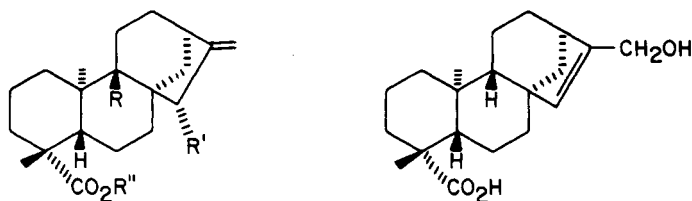
Received 7 February 1985

DITERPENES FROM VIGUIERA PORTERI

WERNER HERZ and PALANIAPPAN KULANTHAIVEL

Department of Chemistry, The Florida State University, Tallahassee, Florida 32306

Approximately 25 species of the large genus *Viguiera* (Compositae, tribe Heliantheae, subtribe Helianthinae) have been studied chemically (1-19). Characteristic constituents are heliangolides incorporating a furanone ring and diterpene acids of the *ent*-kaurane and *ent*-trachelobane series, although not all species elaborate both types of compounds. The sole representative of the genus in the southeastern U.S. is *Viguiera porteri* (A. Gray) Blake, which has a limited distribution in the Piedmont plateau of Georgia and southeastern Alabama. In keeping with the chemistry of other representatives of *Viguiera* and the closely related genus *Helianthus*, our examination of *V. porteri* has furnished the diterpene acids **1a-1d** and **2**. Acids **1c** and **1d** were isolated in the form of the methyl esters **1e** and **1f**. Other compounds present were β -sitosterol; stigmasterol; and linoleic, linolenic, and stearic acids. Sesquiterpene lactones were not detected.



- 1a** R, R', R''=H
1b R, R''=H, R'=OH
1c R=OH, R'=OAng, R''=H
1d R, R'=H, R'=OEpoxyang
1e R=OH, R'=OAng, R''=Me
1f R=H, R'=OEpoxyang, R''=Me

2