We have previously reported[1,2] on the main alkaloids of *Romneya coulteri* var. *trichocalyx* (Eastwood) Jepson and now wish to report that this plant also contains sanguinarine (isolated as the 14-methoxydihydrosanguinarine derivative) and dihydrosanguinarine. Experimental details of isolation and identification are given below.

EXPERIMENTAL

Dried, powdered root (200 g) of *Romneya coulteri* var. *trichocalyx* (Eastwood) Jepson[1] was macerated with 100 ml of 10% Na_2CO_3 solution, and 300 ml of 1:1 *n*-BuOH–benzene was added, and the mixture allowed to stand overnight. It was filtered and the filtrate was extracted 3 × with 100 ml of 1M H_2SO_4. The acidic layers were combined, made basic to pH 9, and extracted with 3 vol. $CHCl_3$. The $CHCl_3$ solutions were combined, dried (Na_2SO_4) and evaporated to yield 1·3 g of crude gummy alkaloids. This residue was dissolved in $CHCl_3$ and chromatographed through a column of Florisil (55 g, 60–100 mesh, Fisher Scientific Co.) prepared in $CHCl_3$. Elution with $CHCl_3$ yielded first, after evaporation, 120 mg of crude syrup which contained mainly two alkaloids by TLC (R_f = 0·52 and 0·65 silica gel with EtOAc). Visualization was with Dragendorff's reagent and UV light. The previously isolated alkaloids (coulteropine, romneine, protopine, and reticuline) were eluted in later fractions.

The 120 mg of crude alkaloids was separated by preparative TLC into two bands which were removed from the silica gel with MeOH and $CHCl_3$. The R_f = 0·65 band material (35 mg) was recrystallized from benzene–EtOH to yield dihydrosanguinarine, m.p. 188–190°, identical with a sample prepared by reduction of authentic sanguinarine. The R_f = 0·52 band (62 mg) was recrystallized from $CHCl_3$–MeOH to yield light tan crystals, m.p. 216–219°, assigned the 14-methoxydihydrosangurinarine structure by comparison with an authentic sample prepared as follows. Commercial 'sanguinarine nitrate' (Aldrich Chemical Co.; a mixture of sanguinarine, chelerythrine, protopine, and other alkaloids) was purified by a chromatographic scheme like that described above for the isolation work to yield pure sanguinarine nitrate. This was dissolved in basic solution, extracted with $CHCl_3$, and the residue crystallized from $CHCl_3$–MeOH to yield light tan crystals of m.p. 216–219°, identical with the isolated compound. *Anal.*: Calc. for $C_{21}H_{18}NO_5$: C, 69·22; H, 4·97; N, 3·84. Found: C, 69·29; H, 4·65; N, 3·54. MS: *m/e* 364 (M+); 332 (base peak = $M^+ - OCH_3$).

Acknowledgement—This work was supported in part by grant GM15424 from the National Institute of General Medical Sciences, U.S. Public Health Service and in part by Vipont Chemical Company.

---

[1] F. R. STERMITZ, L. CHEN and J. I. WHITE, *Tetrahedron* **22**, 1095 (1966).

[2] F. R. STERMITZ and L. C. TENG, *Tetrahedron Letters* 1601 (1967).

Phytochemistry, 1972, Vol. 11, pp. 2645 to 2646. Pergamon Press. Printed in England.

PIPERACEAE

CONSTITUENTS FROM *PIPER BANKSII*

J. W. LODER and R. H. NEARN

Division of Applied Chemistry, CSIRO, Box 4331, Melbourne, Victoria 3001, Australia

(*Received* 14 *March* 1972)

Key Word Index—*Piper banksii*; Piperaceae; elemicin; dillapiole; *N*-isobutyl-*trans*-2, *trans* 4-octadienamide.

Plant. Piper banksii Miq.—Piperaceae. *Source.* Clump Point, near Tully, N. Queensland. Herbarium No. SN 8276. *Previous work.* Related species, *P. novae-hollandiae*.[1]

Leaf and stem. Constituents extracted and separated as before.[1] Steam volatile oil contained elemicin and dillapiole. The only amide detected was *N*-isobutyl-*trans*-2,*trans*-4-octadienamide, but the small plant sample precluded examination of minor components.

---

[1] J. W. LODER, A. MOORHOUSE and G. B. RUSSELL, *Austral. J. Chem.* **22**, 1531 (1969).

EXPERIMENTAL

Elemicin identified from PMR, IR, UV and MS; oxidized ($KMnO_4$) to 3,4,5-trimethoxybenzoic acid (m.p., m.m.p., PMR). *Dillapiole* identified by comparison with authentic sample (PMR, MS and co-GLC (two stationary phases)). N-*isobutyl*-trans-2,trans-4-*octadienamide*, m.p. 88–90° (Recorded[2] m.p. 94°) was identified by comparison with an authentic sample (MS, co-GLC on two stationary phases: SE-30 and OV-17).

[2] M. JACOBSON, *J. Am. Chem. Soc.* **78**, 5084 (1965).

Phytochemistry, 1972, Vol. 11, p. 2646. Pergamon Press. Printed in England.

CONSTITUENTS OF *PIPER NEPALENSE*

O. P. GUPTA and C. K. ATAL
Regional Research Laboratory, Jammb-Tawi, India
and
K. N. GAIND
Department of Pharmaceutical Sciences, Panjab University, Chandigarh-14, India

(*Received* 29 *March* 1972)

Key Word Index—*Piper nepalense*; Piperaceae; caryophyllene oxide; triacontanol; sitosterol; *N*-isobutyl-deca-*trans*-2-*trans*-4-dienamide; piperine; piperlonguminine.

Plant. Piper nepalense Miq. *Source.* Himalayas. *Uses.* In Ayurvedic medicine. *Previous work.* None in the literature. *Date.* Collected in August 1971.

Stems. Powdered stems (0·5 kg) extracted with light petroleum (60–80°). The individual constituents were isolated by chromatography (neutral alumina, Brockmann) and by preparative TLC. The compounds were identified by m.p., m.m.p., TLC, UV, IR, NMR and MS.

Constituents. Caryophyllene oxide, m.p. 59–60°, $C_{15}H_{24}O$; triacontanol, m.p. 87–88°, $C_{30}H_{62}O$, sitosterol, m.p. 136–137°, $C_{29}H_{50}O$, *N*-isobutyl-deca-*trans*-2-*trans*-4-dienamide,[1] m.p. 82–83°, $C_{14}H_{25}NO$; piperine, m.p. 129–130°, $C_{17}H_{19}NO_3$; and piperlonguminine,[2] m.p. 166–168°, $C_{16}H_{19}NO_3$.

[1] K. L. DHAR and C. K. ATAL, *Indian J. Chem.* **5**, 588 (1967).
[2] A. CHATTERJEE and C. P. DUTTA, *Tetrahedron Letters* **16**, 1797 (1966).